

ESTUARY NEWS

NEWSLETTER OF THE DELAWARE
ESTUARY PROGRAM



Volume 14 / Issue 2 Winter 2004

THE DELAWARE RIVER'S AIRSHED

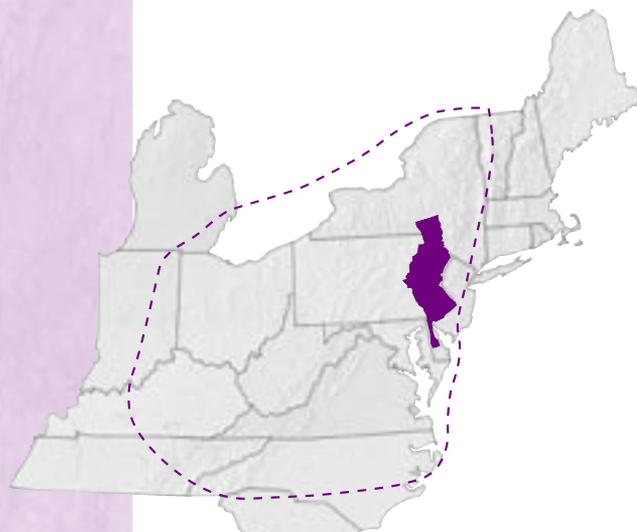
BY ANN FAULDS AND SHARI CURREY, PENNSYLVANIA
SEA GRANT

Just when you were beginning to get comfortable using the term “watershed”...

What do the activities of a power plant in Ohio, a dairy farm in Pennsylvania, and an automobile in Washington D.C. all have in common? These seemingly unrelated places and actions could have an impact on the Delaware River's *airshed*. Since the movement of airborne materials is strongly influenced by weather patterns, the Delaware River airshed can be defined as the geographic area that contributes most of the air-transported material (air pollution) that is deposited in the River. Like watersheds, airsheds transcend political boundaries, but unlike watersheds, airshed shapes and sizes depend on the strength and direction of the prevailing winds. As a result, airsheds have no sharp boundaries and are usually many times larger than their watersheds. So, air pollution originating from Ohio, western Pennsylvania or Washington D.C. can easily travel to the Delaware River's watershed in a day or two. Who would have guessed that the environmental integrity of the Delaware Estuary is influenced by regional activities outside the watershed's boundaries and all the Estuary's elements—the air, the land and the water—are intimately connected?

Scientists refer to the process by which airborne materials are transported and dispersed as *atmospheric deposition*. Atmospheric deposition may be wet, in the form of rain or snow, or dry, as when gases or particles directly contact a water body. Most of the atmospheric transport in the Delaware Watershed is wet, occurring along with precipitation. Since the prevailing winds and storms in the Delaware Valley typically come from the southwest, most of the airborne pollutants deposited in the Delaware Estuary come from this direction as well.

Polluting atmospheric depositions may be categorized as acidic, nutrient or toxic. Most of the acid deposition in the mid-Atlantic region starts as sulfur dioxide gas from the burning of fossil fuels, but quickly changes to sulfuric acid when mixed with water, creating acid rain. Nutrient deposition includes nitrogen compounds, such as oxides of nitrogen and



--- Airshed of the
Chesapeake Bay
Watershed of the
Delaware Bay

The dotted line is an approximate boundary of the Chesapeake Bay airshed, which includes the source of most of the material that is transported by the atmosphere to the Chesapeake Bay. So what is the boundary of the Delaware River airshed? Nobody knows for sure; the formal Delaware Bay airshed boundary has not yet been determined, but it probably overlaps substantially with the Chesapeake airshed.

ammonia, which can significantly influence water quality. Toxic deposition is often divided into heavy metals, such as mercury, and organic materials, such as PCBs (Polychlorinated biphenyls).

In a recent Penn State University study of 85 Pennsylvania watersheds, atmospheric deposition accounted for about 48 percent of the nitrogen in Pennsylvania waterways. Atmospheric deposition arising from agriculture, industry, and urban areas contributes most of the nitrogen load in the Commonwealth's waters. Thirty-seven percent of the atmospheric deposition in Pennsylvania comes from agriculture, and 63 percent originates from industrial and urban areas. "Nitrogen in synthetic fertilizers and manure can rise as a gas, then come back down," says Barry Evans, senior research assistant at Penn State's Environmental Resources Research Institute. "Also, a lot of the nitrogen that rises from the combustion of fossil fuels, such as coal and oil, comes back down as wet or particulate matter." As it travels over farmland, ammonia adds to the nutrients. Additional nitrogen compounds that land in the Delaware River come from automobile exhaust. The Clean Air Act has had the positive effect of reducing acidic sulfur emissions and acid

(continued on page 2)

rain; however, nitrogen deposition has remained relatively constant during the same time period.

Few states produce higher utility emissions than Pennsylvania. Mercury gas is released when coal is burned for power, and eventually falls to the ground, and into our waterways, where it can end-up in the tissue of fish. This is why the Commonwealth recommends eating no more than an average of 12 ounces per week of recreationally caught fish in Pennsylvania. PCBs are also air transported into the Delaware Estuary. Some PCB compounds tend to accumulate in fish. Large tissue concentrations can increase the risk of human nerve damage and cancer. While traces of PCBs have been detected at local air monitoring stations, the Delaware River Basin Commission estimates that atmospheric deposition accounts for less than three percent of the total input to the Delaware Estuary. More study is needed to find out how much of this PCB input is terrestrial and how much arrives in the Delaware Estuary via air.

For more information about airsheds, visit the following websites:

Chesapeake Bay Airshed: <http://www.chesapeakebay.net/info/wqcriteria/v/modeling.cfm>

Air Resources Laboratory: <http://www.arl.noaa.gov/research/projects/radm1.html>

EPA: http://www.epa.gov/airmarkets/cmap/mapgallery/mg_wetnitrate.htm

MD DNR: <http://www.dnr.state.md.us/streams/atmosphere/nox.gif>

Penn State University <http://aginfo.psu.edu/PSA/s99/where.html>

DRBC: <http://www.nj.gov/drbc>

So, what can you do for the airshed? The remedies below not only reduce air and water pollution - they can save you money!

- Conserve electricity use. By reducing demand, power plants will generate less electricity and less air pollution will land in the Delaware Valley. You can do this by using energy efficient lighting and appliances, and turning computers and lights off when not in use.
- Carpool and take mass transit. Remember, your toxic car exhaust spreads throughout the airshed and tailpipe emissions are a major source of nitrogen pollution. Cutting down on auto use will have many clean air benefits, including less nitrogen in our waterways.
- Reduce your use of lawn fertilizers. This will reduce the amount of nitrogen in your lawn that releases gases into the air or runs off into nearby streams. (See how to get involved in the "Making Waves" section on page 5.)
- Support research efforts to develop airshed management models specific to the Delaware Valley.

UPDATES FROM DELEP

DIRECTOR'S NOTE

In January 2004, the Estuary Program took another leap forward. Joining our team is, Kellie Westervelt, a seasoned professional who will assume the role of Habitat Director.



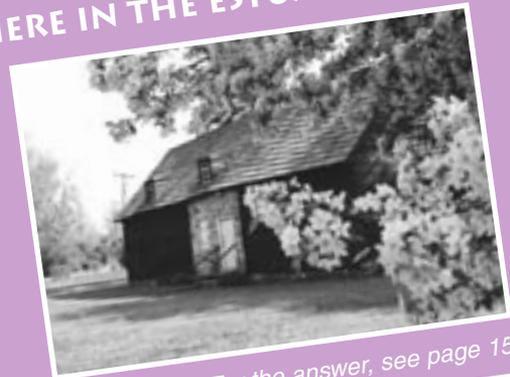
Kellie Westervelt

Kellie brings many years of experience into our leadership circle, and she joins us at a very auspicious time.

In addition to her biology credentials, Kellie has an impressive enthusiasm for the public process that leads to community support and on-the-ground action. She grew up in this area and, for the past 10 years, has been directing a habitat restoration project near Miami, Florida. That project engaged leaders from the civic, environmental, business and academic communities in a program with scientists and government officials to restore habitat on a coastal barrier island that was devastated by Hurricane Andrew in 1992.

Kellie will contribute biological expertise into our strategy for implementing restoration projects, and our development of an invasive species management plan through the revitalization of a habitat team. Based on the inventory of living resources

WHERE IN THE ESTUARY ARE YOU?



For the answer, see page 15

developed in 1995 and the habitat assessment completed last year, there is great interest in habitat restoration within our watershed right now. We have a habitat preference map for wetland and terrestrial sites based upon the combined preferences of 83 species that we consider to be essential to the ecological function of the Estuary. Kellie will be leading the organization of a science team that will help refine and build interstate support for a set of habitat projects that will focus both our fundraising and our future grant programs toward our most efficient habitat investments.

DRBC ADOPTS NEW PCB MONITORING REQUIREMENT

At its December 2003 meeting, the Delaware River Basin Commission (DRBC) directed that additional information concerning the sources of PCBs in the Delaware Estuary be collected. This direction reflects a general agreement among the regulatory and technical experts participating on the Toxics Advisory Committee that an adequate understanding of PCB sources and potential control measures will require additional monitoring data and modeling assessment.

The expert panel of the Toxics Advisory Committee met in November 2003 to discuss model calibration and other topics. While the expert panel seems to be satisfied that the data and model are adequate to support the Stage 1 TMDL (see "Estuary Basics" article below), its members acknowledged that data to support the model is limited and the water quality trends for PCBs are debatable. The industrial representatives participating in the review questioned whether the scientific understanding is sufficient to proceed with the regulatory decisions, focusing on the relation between loadings and the

PCB concentrations measured in the sediment and water column. They believe the fish tissue and water column data show a stable level while the model indicates an observable reduction over the years. They appear convinced that this inconsistency is so great that crucial physical and chemical functions cannot be clearly understood. They point out that the two largest load categories (contaminated sites and non-point sources) are subject to the greatest uncertainty and conclude that this weakens confidence in the calibration of the model and its use to the TMDL.

Based on these discussions, the DRBC adopted a resolution in December 2003 requiring a substantial increase in the collection of data concerning both regulated discharges and non-point sources.

The DRBC was established by state and federal law in 1961 and is composed of one representative of the states of Delaware, New Jersey, Pennsylvania and New York and one representative of the federal agencies. The Commission's responsibilities include water quality protection, water supply allocation, water conservation, watershed planning, drought planning, flood protection, and recreation.

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 ext. 16
kklein@delawareestuary.org

Monitoring Advisory Committee

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

Estuary Implementation Committee

Peter Evans, DELEP
(609) 883-9500 ext. 217
pevans@drbc.state.nj.us

Habitat and Living Resources Implementation Team

Kellie Westervelt
(800) 445-4935 ext. 15
kwestervelt@delawareestuary.org

Information Management Advisory Committee

Karl Heinicke, RIMS Coordinator
(609) 883-9500 ext. 241
heinicke@drbc.state.nj.us

Fish Consumption Advisory Team

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

Toxics Advisory Committee

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

ESTUARY BASICS

PCB TMDL! –“WHAT’S THAT,” YOU SAY?

BY PETER EVANS, DIRECTOR, DELAWARE ESTUARY PROGRAM

U.S. Environmental Protection Agency Regions II and III (EPA) signed the “Final Stage 1 PCB TMDL” for the Delaware Estuary on December 15, 2003. *Estuary News* includes such regulatory mumbo-jumbo reluctantly, but we feel compelled to draw your attention to the control of toxics in our Estuary.

“PCBs” are a group of 209 chemical compounds called “polychlorinated biphenyls” that were produced initially for use in electronic equipment starting in the late 1940s. PCBs

were considered a marvelous innovation at the time. In the 1970s, we learned of their toxicity, and since that time, their production and use has been severely regulated. Their persistence in our environment, however, is still a serious problem. PCBs are of special concern because studies indicate they cause cancer and birth defects and weaken the immune system in humans. One of the primary reasons we are warned about eating the fish from the Estuary is because many of the fish have PCB concentrations that are hundreds-to-thousands of times over our current health standards.

Today, principal sources of PCBs in our Estuary include contaminated sites (historic industrial and landfill sites), stormwater and wastewater from our cities and industries, and atmospheric pollution. To complicate the situation, large



ESTUARY BASICS CONTINUED

amounts of PCBs have been found in the sands and mud in the bottom of streams and rivers throughout the watersheds that drain into the Estuary.

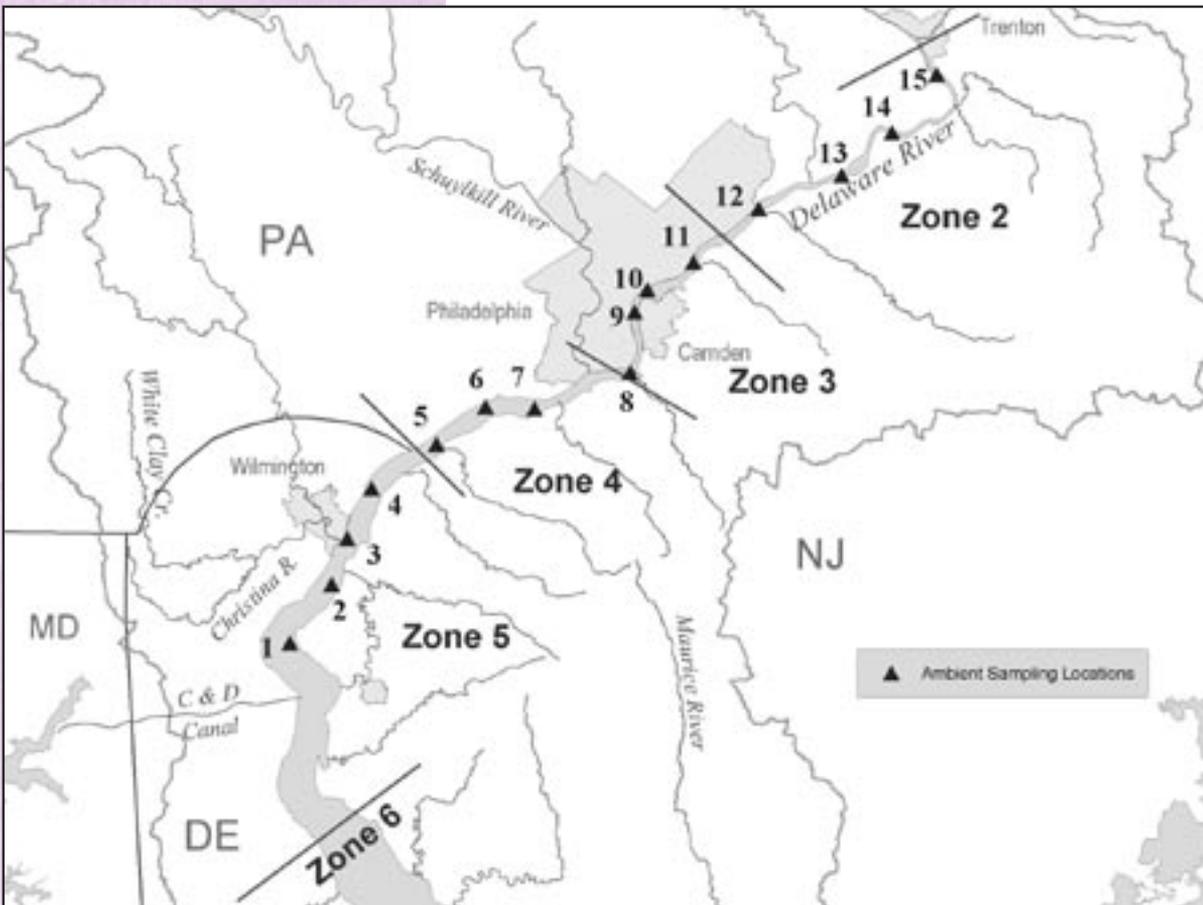
It will be very difficult and expensive to remove these toxins from the ecosystem and it will most likely take many years. As a result, establishing clear limits based upon the best science we have right now is a crucial first step. That's where the "TMDL" comes in. The TMDL, or Total Maximum Daily Load, is essentially a budget plan that defines how much of these toxins our system can handle and sets allowable limits on the sources we can identify.

Congress included the TMDL in the 1972 revision of the federal Clean Water Act. When we find that continuing pollution impairs the use of our streams, lakes and rivers, the law requires that we clearly establish allowable limits that will be applied to the sources we can identify. The TMDL for PCBs in the Delaware Estuary is based on water quality standards set by the states and the Delaware River Basin Commission to protect human health from carcinogenic effects. The criteria are more stringent in the lower Estuary based upon an evaluation of fish consumption in that area.

Establishing the allowable limits of PCBs in the Delaware Estuary presents a big challenge due to the size of the tributary watersheds, the number of sources, and the cost of gathering and analyzing the information needed to understand the physical, chemical and biological processes involved. As a result of the complexity and expense, the overall process of setting the required limitations for PCBs in the Delaware Estuary was designed in two stages.

Staff at the Delaware River Basin Commission performed most of the analyses with assistance from an expert consultant, policymakers at EPA, state agencies, and a Toxics Advisory Committee in an open and public process. This first stage was completed in December 2003. The second stage is already in progress while an "Implementation Advisory Committee," composed of government, business and environmental leaders, is planning measures to eliminate the known sources. In the next three years, more data will be collected and the computer model of our Delaware River and Estuary will be tested, while the remaining limitations are developed.

The Stage 1 TMDL, an executive summary, and associated reports are available on EPA Region III website via the following link: <http://www.epa.gov/reg3wapd/tmdl/index.htm>



The triangles represent locations within the Estuary where scientists from September 2001 through March 2003 sampled the water for PCB concentrations. The highest concentrations have been found in Zone 4.

MAKING WAVES

CITY FOLK TAKE TO THE FIELDS

The Somerton Tank Farm is an experiment in urban farming in Philadelphia's Far Northeast. What began as a barren, grassy ½ acre lawn, last March, is now a fully operating organic vegetable farm located on an 8-acre site owned by the Philadelphia Water Department. (Please see map on page 15 for location of the farm.)

Less than a year old, the farm is flourishing. A farmer and three farm trainees built all of the farm structures including a storage shed, post harvesting shed, and a packing station.

Early on, the founders of this urban agricultural oasis (Philadelphia Water Department and the Oley Institute) set two goals for themselves: to achieve \$25,000 in sales for the first year; and to train new urban farmers. Inherent in these goals were to control costs and to produce as much food as possible while maintaining healthy soil. "We wanted to prove that a city person who didn't have a lot of resources could practice urban agriculture and be successful at it," said Roxanne Christensen, project manager for the operation.

In its first year, the farm was successful in generating \$26,000 in revenue. How was this done? By producing fabulous vegetables, of course!

But seriously, the crew spent a year amending the soil prior to any planting, to make sure that the soil contained the proper nutrients for a successful farming operation. In addition, the founders took a cue from a farmer in Saskatoon, Saskatchewan. The rotational planting technique that he recommended was a labor-intensive scheme that relied upon a quick rotation of crops with a short growing season. Spinach, pea shoots, radishes, scallions, broccoli raab, arugula, scarlet and Japanese turnips, chard, baby beets, basil, eggplant, kale, bok choy, new potatoes, baby carrots, tomatoes, Chinese cabbage, filet beans cilantro, dill, fennel, Asian cooking greens, and nine types of salad greens all thrived at the Somerton Tank Farms. Once a crop had been

harvested the soil was tilled and other seeds were sown in its place within a couple of days.

Produce from the Somerton Tank Farm made regular appearances this past year at the farmer's markets at 37th and Powelton Streets in West Philadelphia, at 2nd and South Streets in Society Hill, and at the Reading Terminal Market. After some coaching from Pennsylvania Preferred and The Fair Food Project, Somerton Tank Farm veggies were also enjoyed at area restaurants. The farm has also shared its bounty with those in need. Deliveries were made to Emlen Arms in Mount Airy, Center in the Park in Germantown, and Somerton Food Bank in Northeast Philadelphia.

New urban farmers, Lori Albright and Nicole Shelly, have completed the farm's Philadelphia Farming Fellows program. They have been promoted to farmer status and have assumed responsibility for all operations of the farm under

the supervision of the Oley Institute. The Oley Institute was founded in 1997 to help develop human environments, which foster personal independence, spirituality, community and respect for the Earth. The staff at the Institute has been providing guidance throughout this first year and offering their expertise on organic farming practices. Both Lori and Nicole will become lead farmers in 2004 and will help to train and inspire new



Somerton Tank Farm is in the shadow of two, 10,000 gallon, red-and-white checked water tanks.

farmers, fine tune the business plan, and locate and raise capital to start their own farms in 2006.

Scattered efforts in urban farming are already underway in Philadelphia, but Somerton Tank Farm is a model that can be replicated by anyone with farming dreams, some land, and as little as \$20,000 seed money. The farm is expected to increase its gross revenue by 20 percent in 2004.

For more information about the Somerton Tank Farms, please call (215) 732-3048. Portions of this article were reprinted with the permission of the Philadelphia Inquirer. Also visit the Philadelphia Water Department's exhibit at the 2004 Philadelphia Flower Show running from March 7-14, 2004.

CLEAN AND GREEN: THE 20 BEST LAWN CARE PRACTICES

It's not too early in the year to be thinking about lawn care. The Alliance for a Sustainable Future has assembled a packet of information to educate organizations, schools, municipalities, and others about how to conduct a localized campaign to reduce lawn chemical use in your respective watershed.

The free packet contains a guide explaining how to allocate staff time, identify local allies and apply for grants; a CD-Rom with sample articles that can be easily customized for publication in your area; sample brochures; and a bibliography of books, videos, and websites. Also included is information on stormwater sampling, surveys and focus groups.

To obtain your free packet, please contact Susan Curry at (215) 591-1551 or suscurry@erols.com.

SPECIES SPECIFIC

DINOSAURS OF THE DELAWARE: IS IT TOO LATE TO SAVE THE DELAWARE RIVER ATLANTIC STURGEON?

BY J. JED BROWN, DELAWARE RIVER COORDINATOR, U.S. FISH AND WILDLIFE SERVICE DELAWARE BAY ESTUARY PROJECT OFFICE



Many people are aware of the basic facts about the aquatic species of the Delaware Estuary, mainly that it supports the largest population of spawning horseshoe crabs in the world, and that it once supported the largest American shad fishery in North America. Fewer people are aware, however, that the Delaware also supported the largest population of Atlantic sturgeon in North America.

Sturgeons are members of a primitive family of anadromous and freshwater fishes called the Acipenseridae. Anadromous fishes live the majority of their lives in salt water, but return to fresh water rivers to spawn (e.g. Pacific salmon and striped bass). The Delaware Estuary is home to two species of sturgeon, the Atlantic and the shortnose. The shortnose is a smaller, largely freshwater fish. The Atlantic sturgeon, the subject of this article, is a much larger, truly anadromous species. The fossil records show sturgeons existed over 200 million years ago. Sturgeon have survived in their modern form for over 70 million years, and at one time co-inhabited the planet with the dinosaurs. Why then, is a fish that outlived the dinosaurs in trouble now?

Native Americans probably fished for sturgeon, but the Native American's population density was not high enough (nor their take large enough) to deplete the sturgeon population. The early European settlers also caught sturgeon, but they did not target them. Sturgeon were generally considered a nuisance, tangling and tearing the nets set for the more desired American shad. Fishermen from the early 1800s claimed that "...very few people ate sturgeon, and that the roe (eggs) was considered worthless except as a bait to catch eel and perch or to feed to the hogs. ...A whole fish could be had for 25 to 30 cents."

This attitude toward sturgeon began to change in the late-1800s when several European ethnic groups immigrated to the United States and showed the local residents how to prepare the sturgeon's roe for caviar production. The development of the caviar fishery was not good for the Atlantic sturgeon. As the fishery intensified, the sturgeon populations began to decline. This decline has been linked to traits found in the life history of sturgeon. Atlantic sturgeon are primarily thought of as long-lived fish, which grow to large sizes and take a long time to reach maturity. A female Atlantic sturgeon will take approximately

14 years to reach maturity and will weigh about 150 pounds at that time. When the sturgeon fishery was peaking in the Delaware Estuary, in the late 1800s, it was estimated that the average size of a female caught was around 250 pounds. (The largest reliable size recorded for an Atlantic sturgeon is a 14-foot, 811-pound specimen, which was caught off New Brunswick, Canada.) Even when the females reach maturity, they do not return to the river every year to spawn—in fact, they probably only spawn once every four years or so. In addition to their size and late maturity, Atlantic sturgeon are capable of producing over two million eggs per spawning event. In fact, the weight of the eggs produced by a female sometimes exceeds 25 percent of their total weight.

The greatest harvest of Atlantic sturgeon occurred in 1888, when over 7 million pounds of sturgeon were landed along the East Coast of North America. Delaware Bay accounted for about 6 million pounds of the total 7 million pounds landed. At the height of the fishery, in the late 1880s, over 1,000 people were directly employed in the sturgeon fishery, either as fishermen, processors or transporters. Entire towns were developed around the fishery mimicking what had been seen during the California gold rush. The town of Bayside, New Jersey, the center of the New Jersey sturgeon fishery, was formerly called Caviar. (Please see map on page 15 for location.) As the fishery intensified, the landings began to decrease. In 1890, fishermen caught an average of 60 sturgeon per net. Less than a decade later, these catches dropped to eight fish per net. The heavy fishing pressure combined with the species slow growth rate led to a collapse of the sturgeon fishery at the end of the 19th Century. Substantial catches of Delaware River Atlantic sturgeon ended after 1900. To this day, over a century later, we have not seen a recovery of this species, although the sturgeon appears to have persisted at low levels in the Estuary.



Landing a sturgeon on the wharf at Bayside, NJ

Factors other than overfishing have certainly played a role in the decline of the Atlantic sturgeon population. It is now known that juvenile sturgeon are very sensitive to low levels of dissolved oxygen in the water. The poor water quality, through the 1980s, that characterized the lower Delaware River (a likely spawning area for young sturgeon) did not aid the plight of the sturgeon.

In 1998, the Atlantic coastal states agreed to a coastwide moratorium on the harvest of the Atlantic sturgeon. However, even though the directed sturgeon fishery was closed, sturgeon are still caught in nets set to catch other species of fish. The bycatch of sturgeon in other fisheries may pose a problem for their recovery. The bycatch issue is particularly problematic if a large portion of the remaining population of sturgeon are killed.

In a recent technical paper, Drs. David Secor and John Waldman estimated that it would take over 100 years for the Delaware River's sturgeon population to reach the levels of the 1800's, even if a directed fishery is never re-opened. This estimate assumes that there will be a constant low level of sturgeon bycatch mortality.

The recovery of the Delaware River Atlantic sturgeon is a top priority for the Delaware Bay Estuary Project Office of the U.S. Fish and Wildlife Service (USFWS). In conjunction with researchers at Delaware State University, they will be conducting gillnetting for adult Atlantic sturgeon on the Delaware River this spring. If adult Atlantic sturgeon are caught, they will tag the fish with transmitters. These transmitters allow researchers to track individual sturgeon on a continuous basis, which provides insights into the behavior of this unique member of our fish community. Ideally, a tagged sturgeon will enable researchers to gain valuable information on the likely location of their spawning areas. Identification of the Atlantic sturgeon's spawning areas is key to improving the chances of recovery for this species. It is important to protect such areas from disturbances during the spawning season and to prevent their destruction and degradation in the long run.



A trio of sturgeon taken at Cavier, on the Delaware River in New Jersey

Other recovery techniques include fertilizing sturgeon eggs and incubating them in a fish culture facility where fish could be raised to the juvenile stage. The USFWS has developed techniques to raise fingerling (juvenile) sturgeon in captivity with a high degree of success. By raising fish in captivity, a much higher percentage of fish survive to the juvenile stage than if the eggs were left in the River. Once the fish reach a suitable size, they will be released back into the River. If, however, several years of gillnetting efforts result in no fish, and no eggs or very young sturgeon are found, it may indicate that this population of Atlantic sturgeon has gone extinct. An alternate source of fish would need to be identified to re-establish the population in the Delaware River.

The concept of using restoration stocking to enhance depleted wild populations is not new. In the 1899 Report of the Fish Commissioners of Pennsylvania, the biologists warned that "unless something is done promptly the extermination of this valuable food fish is a matter of a very few years. At the present rate this extermination must occur within the next ten to fifteen years at the most, unless extensive artificial propagation is resorted to within the next three years."

Fortunately, the predicted extermination did not occur as rapidly as predicted in 1899, but clearly time is running out for our own Dinosaur of the Delaware. The time to act is now.

For more information, please contact Jed Brown at jed_brown@fws.gov.

ESTUARY EXCURSIONS

A YEAR IN THE LIFE OF A BIRDER

BY BOB DIETERICH, ENVIRONMENTAL SCIENTIST, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION II



It's wintertime – and most people probably think that nature is at rest. Furry creatures and reptiles are hibernating in their dens, the trees are bare, and farm fields and pastures are a sere brown. But to a birder (no actual participant in the pastime uses the term "birdwatcher"), it's just the start of a new and exciting cycle of avian exploration.

Wintertime, in fact, is the time of greatest waterfowl abundance in the mid-Atlantic region, from the immaculate

and stately tundra swan to the diminutive, perky ruddy duck. Good places to see a large variety of wintering waterfowl are the John Heinz National Wildlife Refuge at Tinicum Marsh and the several national wildlife refuges along the Delaware Bayshore. Dabbling ducks, like mallards and black ducks, concentrate in freshwater impoundments and lakes, whereas diving ducks and mergansers favor the open bay waters and the riverine estuary. Snow geese mass on coastal plain farm fields like snow drifts, and near the mouth of the Bay diving ducks like eiders and scoters revel in the harsh winter conditions. Gulls are another group that reaches its peak of variety in winter. Scan the Bristol, Pennsylvania landfill site from the vantage of Florence, New Jersey to see as many as ten different species of gulls from all over the continent. For landbirds, the best bets are feeding stations at local nature centers, and parks and gardens with an abundance of

ESTUARY EXCURSIONS CONTINUED

evergreen cover. The exposed outer beaches at the mouth of the Bay offer their own seasonal specialties of winter finches and sparrows in scattered flocks, not to mention the occasional ghostly snowy owl, perhaps at Cape Henlopen, peering imperiously from the dunes.

The season turns in March, when the waterfowl gather to stage their migration inland and northward to their breeding ranges. Landbirds pick up the momentum shortly after, and by late April the spring migration is in full swing. Try Fairmount or Pennypack Park in Philadelphia on a clear mid-May morning, when the migration reaches its peak. From



Princeton Woods in the north to Delaware's Cypress Swamp, one is likely to enjoy a kaleidoscope of color as birds in their finest plumages hurry along to their breeding territories. Rancocas Nature Center in New Jersey and Brandywine Creek State Park in Delaware are great

spring destinations. Of course, the spring shorebird migration along the Delaware Bayshore, which peaks from mid-May to early June, is one of the year's great wildlife spectacles anywhere along the East Coast.

Summer brings somewhat of a lull in activity. Birds are certainly visible from the shores to the interior woods, but many develop secretive habits as they concentrate on raising their broods. Patient stalking in places like Parvin State Park

in New Jersey is what it takes to tally the largest variety of birds during this lush, productive season.

The autumn season arrives with the first movement of shorebirds southward along the beaches in early August. Songbirds follow later in the month and the stage is set for the great two-pronged hawk migration. Cape May, New Jersey is a geographical funnel that concentrates birds migrating southward along the coast. The hawk watch at Cape May Point State Park records well over a dozen species of raptors annually, counting individual birds in the tens of thousands. Special attractions are bald eagles, peregrine falcons, and Cooper's hawks. Meanwhile, in the interior edge of the Delaware Estuary Watershed, at Hawk Mountain, Pennsylvania, on the Kittatinny Ridge, another wave of hawks and eagles takes advantage of favorable air currents bouncing off the ridge to ease their southward flight. Avid birders arrive by the hundreds on flight days to witness the passage of thousands of birds, from the uncommon golden eagle and goshawk to sharp-shinned hawks, red-tailed hawks, and red-shouldered hawks.

The fall migration winds down by early November, coinciding with the dropping of leaves from the trees and a return to winter quietude. Meanwhile, Arctic and sub-Arctic birds make their own migration southward to spend the winter in our area and delight birders with a new avian fauna. The cornucopia of ducks, geese, and swans returns and spends the winter wherever water remains unfrozen. At this time, birders pause, catch their breath, close the book on an eventful year, and prepare for a new round of adventure in the natural world. Come on in – the birding's fine!

Please see the map on page 15 for locations of the sites mentioned in this article. For information about the locations mentioned in this article please visit the following websites:

Hawk Mountain, www.hawkmountain.org

Fairmount Park/Pennypack Park, www.phila.gov/fairpark

Rancocas Nature Center, www.njaudubon.org/centers/rancocas

John Heinz National Wildlife Refuge at Tinicum, <http://heinz.fws.gov>

Cape Henlopen State Park, www.destateparks.com/chsp/chsp.htm

Brandywine Creek State Park, www.destateparks.com/bcsp/bcsp.asp

Parvin State Park, www.state.nj.us/dep/parksandforests/parks/parvin.html

Cape May Point State Park, www.state.nj.us/dep/parksandforests/parks/capemay.html

Wildlife refuges along the Delaware Bayshore and Delaware's Cypress Swamp, www.delawarevalleybirding.com



FUNDING OPPORTUNITIES

5-STAR RESTORATION CHALLENGE GRANTS

The Five-Star Restoration Grant Program, of the National Fish and Wildlife Foundation, provides financial assistance

to support community-based wetland, riparian and coastal habitat restoration projects that build diverse partnerships and foster local natural resource stewardship through education, outreach and training activities. Projects must involve diverse

partnerships of ideally five organizations that contribute funding, land, technical assistance, workforce support or other in-kind services.

Awards will range between \$5,000 and \$20,000; the average grant is \$10,000. In 2003, 56 projects received grants out of approximately 240 applications received. In order to be eligible for this funding, projects must include a strong on-the-ground wetland, riparian or coastal habitat restoration component, and should also include training, education, outreach, monitoring and community stewardship components. Applicants will need to demonstrate that measurable ecological, educational, social and/or economic benefits are expected to result from the completion of the project. Applications must be postmarked by March 1, 2004.

For more information, visit <http://nfwf.org/programs/5star-rfp.htm> or www.epa.gov/owow/wetlands/restore/5star.

GRANTS AVAILABLE FOR WATER RESOURCES EDUCATION PROJECTS

The League of Women Voters of Pennsylvania Citizen Education Fund announces funding for educational projects that raise awareness about protecting the community's drinking water source waters and/or preventing nonpoint source pollution in the watershed. Projects should encourage behavior change, and include partnerships with local or regional organizations such as watershed associations, civic groups, community water systems, governmental entities (including municipal authorities), and other public interest organizations. Grant awards up to \$5,000 per project. Proposals must be postmarked by 4:00 p.m. on April 2, 2004.

For more information, please visit www.pa.lwv.org/wren or www.drinkingwaterwise.org

ESTUARY SPOTLIGHT

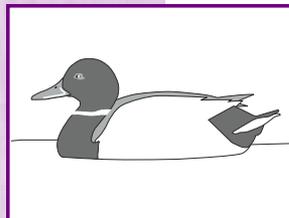
A BIRDS' EYE VIEW: DUCKS UNLIMITED...FROM THE CONTINENT TO THE REGION

BY KELLI ALFANO, PUBLIC AFFAIRS COORDINATOR, DUCKS UNLIMITED

Beginning in 1937, Ducks Unlimited (DU) was formed by forward-thinking conservation-minded hunters in response to the low duck number of the dust bowl days.

Ducks Unlimited's first project near Winnipeg, Manitoba - Big Grass Marsh - began the legacy of DU's singleness of purpose: *to protect, restore, and enhance the habitat's of North American waterfowl*. In the early years, efforts were mostly focused on the prairies of Canada and the wetlands of Mexico. Given the magnitude of problems faced by waterfowl throughout North America, DU determined the most effective means of providing a secure future for waterfowl would be to positively influence land use practices on a landscape scale. At this time, conservation was expanded to work on private lands. In 1984, Ducks Unlimited began work for the first time on American soil, with the opening of the Great Plains Regional Office in Bismarck, North Dakota. The following year, DU expanded into all 50 states with the development of the MARSH program (Matching Aid to Restore States Habitats).

In 1998, The Great Lakes/Atlantic Regional Office in Ann Arbor, Michigan was opened to address the needs of breeding, wintering and staging birds in the remainder of the country. The Great Lakes/Atlantic region provides important habitat for many waterfowl species: from breeding mallards in the Great Lakes states and breeding black ducks in the northeastern states; to critical staging and wintering habitat along the big rivers of Illinois, Indiana and Ohio, as well as the salt marshes of the Atlantic Coast and the estuarine habitats of the Chesapeake and Delaware Bays. In addition to addressing the needs of waterfowl, regional conservation



programs help to improve water quality, wildlife habitat, and quality of life.

DU's work is a proven boom to the quality of life in communities both near restoration sites and downstream. Healthy riparian buffers and wetlands lead to

healthier drinking water through nutrient uptake, sediment retention, and groundwater recharge. Additional benefits to communities include erosion control – protecting property from both soil loss and down-stream soil deposition. High quality recreational opportunities such as fishing, hunting, and birding, are also improved when habitat is restored and water quality is improved.

Locally, DU program plays a vital role in addressing Pennsylvania's objective of reducing nonpoint source pollution by enhancing riparian forest buffers on agricultural lands. They also support Pennsylvania's "No Net Loss" initiative by restoring significant and vital wetlands across the Commonwealth.

Funding provided by the U.S. Fish and Wildlife Foundation's Delaware Estuary Grants Program will be used to continue DU's *Clean Water PA* initiative, designed to improve water quality in impaired watersheds throughout Pennsylvania.

The Clean Water PA, initiated in 2000, has proven to be very successful in putting conservation projects on the ground. Ducks Unlimited and its partners completed over 88 projects, restoring 386 acres of wetlands, 144 acres of associated upland, and 34 miles of forested riparian buffers within the Delaware Bay drainage area.

Since the inception of the Habitat Stewardship Program in Pennsylvania, DU has based its restoration activities on providing strong incentives for landowners to: **1)** create wooded or grass buffers along their streams, **2)** create wider

ESTUARY SPOTLIGHT CONTINUED

than typical buffers, and **3)** fence cattle out of wetlands. DU will pay the full cost of the fencing and plantings for these projects (about 80 percent of the overall total on most projects). The landowner is responsible for costs to stabilize crossings and/or watering access points (usually about 20 percent of the total project cost). Landowners may pay this 20 percent or earn cost-share credits to cover their share by creating buffers wider than 15 feet and/or fencing cattle out of additional wetlands.

DU'S HABITAT STEWARDSHIP PROGRAM WORKS FOR DELAWARE'S PRIVATE LANDOWNERS

Since the start of the Delaware Bay Initiative in January 2001, private-land wetland restoration has been the number one goal of DU's Habitat Stewardship Program. The program provides technical and financial assistance, long-term management, and project monitoring for landowners throughout the State of Delaware. Through restoration, the program works to increase the number of emergent and forested wetlands, riparian buffers, and warm season grass buffers within the watershed. The program will also reduce the amount of sediment, nitrogen, and phosphorus entering the Delaware Bay, thereby, helping to improve water quality.

The Habitat Stewardship Program is a joint effort between DU and the Delaware Division of Fish and Wildlife. Private landowners participating in the Stewardship Program receive a 100 percent cost share rate for restoration work up to \$2,000 per acre, a Restoration Management Plan developed by DU biologists, and an annual monitoring of projects and revisions of management plans. All participating landowners

must sign a DU Wetland Restoration Agreement protecting the restored wetland areas and adjacent upland buffer areas for a minimum of 15 years.

To date in Delaware, the Habitat Stewardship Program has restored 258 acres of wetlands and nine acres of associated upland buffer. Sixteen different projects have been completed touching each of the state's three counties – New Castle, Kent and Sussex.

TURNING SCIENCE INTO HABITAT

Ducks Unlimited is dedicated to delivering science-based conservation. Across the company, research and planning are an integrated component of habitat delivery. Using the most up-to-date science, targeting tools are developed to focus conservation work to the areas that are most beneficial to waterfowl. For example, in the Chesapeake Bay, targeting tools consider the water quality benefits of restoration work when ranking important areas for habitat programs. In the Great Lakes, a major landscape level study of nesting mallards was just concluded and will provide the necessary data to develop state of the art modeling systems to address the declining breeding population in that area.

From our humble beginnings, Ducks Unlimited has grown tremendously and made great strides toward meeting the needs of continental waterfowl. With exciting programming now taking place in the Delaware Estuary region, we are poised to see continued improvements in habitat for species of all kinds.

For more information about Ducks Unlimited, please contact Kelli Alfano at (734) 623-2000 ext. 117.

ESTUARY HERITAGE

THE "OYSTER CAPITAL OF THE WORLD"

BY KRISTOFFER WHITNEY, EDUCATION OFFICE,
BAYSHORE DISCOVERY PROJECT

Standing on one of the old piers in the aptly named town of Bivalve, in South Jersey, one tries to imagine what life must have looked like during the first half of the 20th Century. The fact that the Maurice River Cove area, where Bivalve is located, was once called the "Oyster Capital of the World", was no exaggeration. (Please see map on page 15 for location.)

The riverfront in Bivalve was lined with sheds and wharfs to accommodate the booming Delaware Bay oyster industry. In 1904, the Central Railroad Company built Bivalve's two-story shipping sheds, transforming these riverfront structures that

were originally built in the 1880s. The industry continued to grow through the 1920s. The scene, the sights, the sounds, and the smells of commerce must have been staggering. These wharves accommodated docking for hundreds of schooners and a ferry. Oysters were loaded into freight cars to be transported to markets in Philadelphia, Baltimore, New York, and beyond. A passenger terminal for the railroad and trolley lines brought large numbers of workers from across Southern New Jersey. The regional employment, the schooners and ferries, and the industry, which were so vital then, are all but lost in the minds of so many people today – yet the numbers and their impact are worth remembering.

The oyster industry reached its peak during the 1920s, when approximately 67 boxcar-loads of oysters (as many as 80 when the harvest was abundant) left the area every day during harvesting season, equating to 7,000 carloads of

oysters per year. This means, if we estimated approximately 75,000 oysters per carload (one hundred sacks made a carload and each sack contained 700 or 800 oysters in shell), that 525 million oysters left the Maurice River ports each year. By 1929, New Jersey produced one third of the total output of oysters in the United States, most coming from the Maurice River Cove.



Historic photo of Bivalve shipping sheds.

This still doesn't tell the whole story, though. We know that in pre-Columbian times American Indian nations in New Jersey utilized the oyster as a food source, as did early European settlers in the 17th Century. By the 18th Century, oysters were being cultivated in the Bay, regulated by government, and were a popular street food in major Northeast cities like Philadelphia. Even as Bivalve and the greater Maurice River Cove area lived through their booming moments of the early 20th Century, the movement of oysters from hundreds of Delaware Bay oyster schooners through the wharves and shipping sheds to thousands of boxcars is only one piece of the story. Equally important were the thousands of supported families in the area; the related and auxiliary industries of shipbuilding, housing, and consumer goods; and a burgeoning African American population migrating from the South to work on the schooners; and in the new shucking houses, as oysters began to be shipped in cans rather than in shell.

Even today the story continues. Bivalve and the rest of the New Jersey Bayshore is no longer the center of the oyster industry due to a disease that devastated the oyster population in 1957. The region, however, still exudes a distinctive culture built on former times as it struggles for a present sense of itself.

Back on the pier in Bivalve, with an eye on the present, one sees extensive salt marsh, a smattering of marinas, and the remaining shipping sheds, wharves, and boats still used to harvest the oysters and fish that have sustained the Bayshore for hundreds of years.

With so many past and present voices clamoring to be heard, the Bayshore Discovery Project (BDP), who, in 2001, acquired seven units (out of an

existing 22 and an original 30) of the 1904 shipping sheds and wharves, seeks to continue its work as a collector and interpreter of local history and culture. Having restored the 1928 oyster schooner *AJ Meerwald*, bringing New Jersey history and culture alive for thousands of passengers since 1996, BDP will now bring its mission to bear on the shipping sheds in Bivalve. The restoration of the shipping sheds, a \$1.2 million project, is slated to begin in August of 2004, one hundred years after their original construction. The shipping sheds and wharves will constitute the Bivalve Center, a regional center for the discovery and celebration of the New Jersey Bayshore. Bivalve's past, present, environment, and people are the interwoven threads of a story that has resonance and meaning far beyond the Maurice River Cove, and it deserves to be told.

The mission of the Bayshore Discovery Project is to motivate people to take care of the environment, the history, and the culture of New Jersey's Bayshore region through education, preservation, and example. The historical content of this article is taken from "Preservation Plan for the Bivalve Oyster Wharves and Shipping Sheds," prepared by Watson & Henry Associates, Bridgeton, NJ, 2003.

For more information about the Bayshore Discovery Project, please call Kris Whitney at (856) 785-2060.

TEACHERS PAGE

REGISTER NOW FOR THE DELAWARE ESTUARY WATERSHED WORKSHOP

For the first time, the Partnership will be collaborating with The Academy of Natural Sciences and the Stroud Water Research Center to host the 2004 *Delaware Estuary Watershed Workshop* - a week-long program that will be held from July 12-16. Our combined efforts will offer educators with the field and laboratory skills needed to survey, assess,

and research specific aspects of the Estuary. The Workshop is open to K-12 educators. The participating teachers will be introduced to the following concepts: the Delaware Estuary and the Delaware Estuary Program; the Delaware River watershed and its sub-watersheds; the natural water cycle and drinking water cycle; non-point source pollution prevention; the economics of the Delaware Estuary; the cultural and maritime history of the Estuary; advocacy; wetlands; habitat and living resources; and agriculture.

TEACHERS PAGE CONTINUED

Last year, participants seined the Delaware Bay, with the assistance of graduate students from the University of Delaware's College of Marine Studies, to get a closer look at all of the estuarine critters found in the water. They toured the *Del River* oil spill response boat, to find out how oil spills are controlled and cleaned up. They also paddled the Schuylkill River, visited the Philadelphia Water Department's Southwest Water Pollution Control Plant, and participated in a fish shocking demonstration in the Wissahickon Creek.

There is no cost to the workshop, which includes an overnight stay in Lewes, Delaware and all meals. Participating teachers will be eligible for Pennsylvania Act 48 credit, New Jersey Professional Development Credit, or Delaware In-service Credit. For more information about the Workshop, please contact Lisa Wool at the Partnership at 1-800-445-4935 ext. 19 or e-mail lwool@delawareestuary.org.

HEY KIDS! SHOW US HOW "CLEAN WATER BEGINS AND ENDS WITH YOU!"

The Partnership for the Delaware Estuary has teamed up again with the Philadelphia Water Department to sponsor the 2004 "Clean Water Begins and Ends with You" Drawing Contest. The contest is open to all Philadelphia public, private, and parochial school students grades K-12. We are looking for illustrations that convey how the residents of the Delaware Estuary can help to reduce stormwater runoff pollution. The contest provides a great opportunity for students to be a part of protecting the Delaware Estuary. All winning drawings will be made into a 16-month calendar to be distributed throughout the tri-state region. The entries must be received by February 20, 2004.

To receive the necessary drawing contest background information, please contact Dee Ross at the Partnership at 1-800-445-4935 x 18 or email dross@delawareestuary.org.



Artwork created in 2003 by Brenna Coyle, Our Mother of Consolation School, grade 8.



PECO VISUAL LEARNING WORKSHOP

PECO Energy and Green Valleys Association are teaming up again to offer an exciting workshop for teachers. This two-day, 12-hour workshop integrates environmental education with photographic imagery and art to enhance learning and understanding of environmental issues. The program will be held Wednesday, July 28 and 29, 2004, from 9 a.m. to 3 p.m. It includes an introduction to the power of visual imagery and photography, instruction on the use of a Polaroid camera and then a multiple of activity assignments relating to environmental issues. Each participant will be given a Polaroid camera (to keep), a packet of film plus related art supplies and curriculum resources. Act #48 continuing education credits available. There is a program cost of \$35.

For additional information and a registration form contact Margot Taylor at (610) 469-8646 or visit GVA's website at www.greenvalleys.org.

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 DROSS@DELAWARE ESTUARY.ORG



USE THESE TOP TEN ESTUARY FACTS TO QUIZ YOUR STUDENTS

- Fact 10: An Estuary is a body of water surrounded by land where fresh water from rivers and streams run into and mix with salt water from the ocean. Estuary is another name for bay, sound, inlet, harbor, lagoon – what's important is the mixing of fresh and salt water.
- Fact 9: Estuaries are among the most productive natural systems on Earth due to the mixing of nutrients from land and sea, producing more food per acre than the richest Midwestern farmland.
- Fact 8: There are 102 estuaries in the U.S. according to the Environmental Protection Agency. Of these, 28 have been designated by their states and the federal government to be of national significance. The Delaware Estuary is one of those 28.
- Fact 7: Our coastal regions today are home for 110 million people – a number that is expected to increase to 127 million by the year 2010.
- Fact 6: People love estuaries for their beauty and for fishing, swimming, boating, diving, wildlife viewing, hunting, learning and working. In 1993, over 180 million Americans visited estuaries – about 70 percent of the entire U.S. population.
- Fact 5: Estuaries have many different types of habitats, vital to many important species of plants, fish, and other wildlife. Habitat includes shellfish beds, sea grass meadows, salt and fresh marshes, forested wetlands, beaches, river deltas, and rocky shores.
- Fact 4: Estuaries and coastal waters provide essential habitat for over 75 percent of the commercial fish catch and 80 to 90 percent of the recreational catch of fish.
- Fact 3: Fishing, tourism and recreational boating, which depend on healthy and productive estuaries, provide more than 28 million jobs for our nation. Commercial and sport fishing alone contribute \$111 billion yearly to the nation's economy.
- Fact 2: There's a lot we don't know yet about estuaries, like exactly how many acres of estuary habitats have been and continue to be destroyed. We do know that the level of habitat loss in some of our nation's most important estuaries is approaching 80 to 95 percent.
- Fact 1: We can save estuaries and their habitats! Join all of us working to help turn the tide by restoring one million acres of estuary habitat by 2010 and bringing one of our nation's great national treasures -- its estuaries -- back to health.

Top ten facts taken from Restore America's Estuaries at www.estuaries.org/toptenfacts.php.

ESTUARY EVENTS

Skiing in the Barrens

Whenever it Snows!

**Woodford Cedar Run Wildlife Refuge
Medford, New Jersey**

Be ready when the snow falls to cross country ski in the Pine Barrens. Woodford Cedar Run Wildlife Refuge will put you on their ski list, and if it snows, they'll call and schedule a time to join them on the trails. For more information, please call (856) 983-0326.



The Oddities of Species Reproduction

Friday, February 13, 2004, 7 to 9 p.m.

**The Nature Conservancy's Delaware Bayshores Center
Dennis Township, Cape May County, New Jersey**

How do they do it? Let The Nature Conservancy staff show you how during this (adults only) Valentine's Day program

that takes a humorous look at the interesting and unusual reproductive behavior and strategies of South Jersey's flora and fauna. Bring your valentine and blush with us. For more information, or to register, please call (609) 861-0600.

Land Ethics Symposium: Creative Approaches for Ecological Landscaping

Thursday, February 19, 2004

**Aldie Mansion
Doylestown, Pennsylvania**

This stimulating and informative symposium will focus on ways to create low-maintenance, economical, and ecologically balanced landscapes using native plants and restoration techniques. The symposium is sponsored by Bowman's Hill Wildflower Preserve, in New Hope, Pennsylvania. For more information, please call (215) 862-2924.

ESTUARY EVENTS CONTINUED

Winter Birds

Sunday, February 22, 2004, 9 a.m.

John Heinz National Wildlife Refuge at Tinicum
Philadelphia, Pennsylvania

Bring your camera and join Gregg Gorton for a leisurely stroll through the refuge to identify birds in their winter habitat. For more information, please call (215) 365-3118.

Audubon Cooperative Sanctuary Program for Golf Courses

Wednesday, March 3, 2004, 9 a.m. - 3:30 p.m.

ACE Conference Center
Lafayette, Pennsylvania

This workshop will assist managers of golf courses in the Schuylkill River Watershed in improving their environmental management practices, enhancing wildlife and habitat, reducing chemical use, conserving water, and protecting water quality. The workshop is free. For more information, please call (215) 685-6038.

Owl Prowl

Friday, March 5, 2004, 6:30 to 8 p.m.

Welkinweir Estate House
Pottstown, Pennsylvania

Join Rich Wood of Central Perkiomen Valley Park to investigate owls and their lifestyles while prowling in the woods at Welkinweir (property of the Green Valleys Association). Past prowls have witnessed great horned and screech owls. Program is open to the public with payment at the door, \$3 for members and \$5 for non-members. For more information, or to register, please call (610) 469-4900.



2004 Schuylkill Watershed Congress

March 6 & 7, 2004

Penn State Great Valley
Malvern, Pennsylvania

The Schuylkill Watershed Congress, organized annually since 1998, raises awareness of the watershed concept, offers training opportunities for river advocates, and fosters important partnerships for watershed protection and restoration. For more information, contact Chari Towne at (610) 469-6005, or chari@delawareriverkeeper.org.

Tree Seedling Sale

March 7 - April 2, 2004

Green Valleys Association
Pottstown, Pennsylvania

Plant a tree and make a difference in your community in recognition of National Arbor Day. Since 1967 GVA has distributed over 346,000 tree seedlings. Sale begins March 7 with orders due by April 2. For more information, please call GVA at (610) 469-4900.

Wilderness First Aid

March 12 - 14, 2004

Pocono Environmental Education Center
Dingmans Ferry, Pennsylvania

Head up to the headwaters for a 16-hour American Red Cross certification course in wilderness first aid. For more information, please call (570) 828-2319.

Estuary Excursion

Saturday, March 13, 2004, 10 a.m. to 2 p.m.

The Nature Conservancy's Delaware Bayshores Center
Commercial Township, Cumberland County, New Jersey

Come on out for an intriguing walk around PSEG's Commercial Township Estuary Enhancement Site. This is a perfect opportunity to satisfy your curiosities about the Estuary, to learn the famous history of the site, and to explore the trails, observation platforms, and the extensive dike system. All by foot! For more information or to register, please call (609) 861-0600.

Voices for the Marsh Photography Show

Hamilton, New Jersey

The Friends of the Hamilton-Trenton-Bordentown Marsh are sponsoring a juried photography show to showcase the environmental, historical, and recreational significance of the Marsh. Entries will be received at the Hamilton Library from March 18 through March 20. The show will run at various locations in the Crosswicks Watershed until early June 2004. For more information, please call (609) 587-4985.

Delaware's Blue Rocks

Saturday, March 20, 2004, 9 a.m. to 3 p.m.

Delaware Nature Society
Hockessin, Delaware

Widely renowned as a building stone and more recently as a baseball team, blue rocks played an important role in the early history of Northern Delaware. Explore several sites where the rock is exposed, visit old buildings made from blue rocks, and discuss how the characteristics of bedrock have influenced the area's development. There is a fee for this program. For more information or to register, please call (302) 239-2334.

Build a Bird House

Sunday, March 21, 2004, 2 to 4:30 p.m.

Delaware Nature Society
Hockessin, Delaware

House wrens and chickadees are interesting and beneficial birds to attract to your backyard. Craft your own birdhouse (one per family) using simple hand tools. Then you can hang your creation in a tree and wait for the nesting birds to arrive with spring weather! The program will finish with a "bird" snack. Children must be accompanied by an adult. Cost includes materials. For more information or to register, please call (302) 239-2334.

Beach Grass Planting

Saturday, March 27, 2004, 9 a.m. to 12 noon

Delaware's Ocean and Bay Beaches

Since 1990, many dedicated volunteers have stabilized Delaware's sand dunes by planting more than 4,640,000 stems of Cape American beachgrass on Delaware's ocean and bay beaches. Volunteer and help to increase that number. For more information, please call (302) 739-4411.

Fishing the Catfish Stream

Wednesday, March 31, 2004

Schuylkill Center for Environmental Education Philadelphia, Pennsylvania

Hear about the joys of fishing in the Wissahickon. What species of fish are found there? How are game fish stocked? What are the rules and regulations that apply to fishing? For more information, please call (215) 482-7300.

WHERE IN THE ESTUARY ARE YOU?

Answer from page 9

The 18th Century Swedish log home of John Morton a signator of the Declaration of Independence. The Morton Homestead is located between Route 420 and the Darby Creek in Prospect Park, Pennsylvania. For more information, please call (610) 583-7221. (Please see map for location.)



Photo by Joe Matassino

ESTUARY NEWS IS AVAILABLE ONLINE

AT WWW.DELEP.ORG.

IF YOU ARE A CURRENT SUBSCRIBER AND WOULD PREFER TO VIEW ESTUARY NEWS ONLINE, PLEASE LET US KNOW BY SENDING AN EMAIL TO THE PARTNERSHIP FOR THE DELAWARE ESTUARY AT lwool@delawareestuary.org

MAP KEY

- 1 Delaware Bay
- 2 Somerton Tank Farm
- 3 Bayside
- 4 Bivalve
- 5 John Heinz National Wildlife Refuge at Tinicum
- 6 Cape Henlopen State Park
- 7 Delaware's Cypress Swamp
- 8 Fairmount Park
- 9 Rancocas Nature Center
- 10 Brandywine Creek State Park
- 11 Parvin State Park
- 12 Cape May Point State Park
- 13 Hawk Mountain Sanctuary
- 14 Morton Homestead





US Postage
Non-Profit Org
PAID
Wilmington, DE
Permit #1885

Partnership for the Delaware Estuary, Inc.
400 West Ninth Street, Suite 100
Wilmington, DE 19801

Address Service Requested

DELAWARE ESTUARY PROGRAM

Partnership for the Delaware Estuary, Inc.
Kathy Klein, Executive Director
Tel: (800) 445-4935 ext. 16 / Fax: (302) 655-4991
E-mail: kklein@delawareestuary.org

Delaware Estuary Program
Peter H. Evans, Director
Tel: (609) 883-9500 ext. 217 / Fax: (609) 883-9522
pevans@drbc.state.nj.us

Environmental Protection Agency
Irene Purdy, EPA Region II
Tel: (212) 637-3845 / Fax: (212) 637-3889
E-mail: purdy.irene@epa.gov

Roberta Riccio, EPA Region III
Tel: (215) 814-3107 / Fax: (215) 814-2782
E-mail: riccio.roberta@epa.gov

Pennsylvania
James Grabusky
Department of Environmental Protection
Tel: (610) 832-6191 / Fax: (610) 832-6022
E-mail: jgrabusky@state.pa.us

Delaware
John Kennel
Department of Natural Resources
and Environmental Control
Tel: (302) 739-5726 ext.109 / Fax: (302) 739-3491
E-mail: john.kennel@state.de.us

New Jersey
Jay Springer
Department of Environmental Protection
Tel: (609) 341-3122 / Fax: (609) 633-1458
E-mail: jspringe@dep.state.nj.us

Delaware River Basin Commission
Bob Tudor
Tel: (609) 883-9500 ext. 208 / Fax: (609) 883-9522
E-mail: rtudor@drbc.state.nj.us

Philadelphia Water Department
Howard Neukrug
Tel: (215) 685-6319 / Fax: (215) 685-6207
E-mail: howard.neukrug@phila.gov

Editor
Joe Matassino, Partnership for the Delaware Estuary

Layout & Design
Greg Gambino



The Estuary News encourages reprinting of its articles in other publications. Estuary News is published quarterly by the Partnership for the Delaware Estuary, Inc., under an assistance agreement (CE-993985-06-0) with the U.S. Environmental Protection Agency (EPA). The purpose of this newsletter is to provide an open, informative dialogue on issues related to the Delaware Estuary Program. The viewpoints expressed here do not necessarily represent the views of the Partnership or EPA, nor does mention of names, commercial products or causes constitute endorsement or recommendation for use. For information about the Delaware Estuary Program, call 1-800-445-4935.

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. To learn more about DELEP activities, visit 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.

SEND A FREE GIFT SUBSCRIPTION

GIVE A FRIEND A SUBSCRIPTION TO ESTUARY NEWS

Name _____

Affiliation _____

Address _____

City, State, Zip _____

Telephone: _____ E-mail _____

- I no longer wish to receive Estuary News
- Send me Estuary News via E-mail

