The Philadelphia Water Department (PWD), working with its partners at the Sulzberger Middle School, the University of Pennsylvania, and the Mill Creek Coalition in West Philadelphia, received Pennsylvania Growing Green grants in fall 2000 (Phase I) and in fall 2002 (Phase II) to implement innovative stormwater management demonstration projects in the Mill Creek/Schuylkill River Watershed. (For the location of the Mill Creek Watershed, see the map on page 15)

During the late 19th century, Mill Creek was captured and diverted into a brick sewer at Philadelphia’s county line at City Avenue. It was buried up to 40 feet in depth in some locations to accommodate neighborhood development, and to address public health issues of raw sewage in the Creek. The outfall of this combined sewer is located below the Fairmount Dam, on the Schuylkill River.

Mill Creek Phase I included the construction of the Sulzberger Middle School outdoor classroom. The outdoor classroom was constructed during the summer of 2001. It is a unique stormwater management demonstration project that converted vacant land into a community asset and improved the quality of life for those living in the surrounding neighborhood. This project has also enhanced the science and environmental education curriculum at the Sulzberger Middle School by creating an environmental study area for their students.

The once vacant lot is now a park like setting. In the center of the lot, stormwater drains to a vegetated swale, or a dry stream bed. The swale, designed to mimic the once meandering Mill Creek, slows and cleans the stormwater runoff prior to it entering the sewer. The site is also home to native vegetation, which provides a riparian buffer. A rain barrel connected to the downspout of a neighboring property, which provides a source of water for the plants. The City’s Mural Arts Program has painted a mural at the site based on natural and urban watershed drawings created by the middle school’s students.

Mill Creek Phase II will go a long way toward restoring components of the original land features and hydrologic function of the Mill Creek Watershed, while providing an opportunity for low-income neighborhoods to access the benefits of a natural watershed setting. In Phase II, we have selected project sites that will afford us the opportunity to work with the community in a way that is meaningful to them—working to transform vacant lots and facilities in need of renovation into land use prototypes that can be replicated throughout the neighborhood and the larger urban community.

The projects planned for Phase II of the Mill Creek Watershed Redevelopment Project include:

- **Resurfacing two basketball courts at the Mill Creek Recreation Center.** One of the basketball courts will be resurfaced with standard asphalt covering and the other with a porous paving cover. This will afford the City the opportunity to monitor the sustainability and maintenance requirements for both courts over a period of time, and to determine whether a more pervious surface allows the court the flexibility to undulate with the earth below it with little visible or practical settlement. The pervious court will be installed with an underground drainage system with an ultimate connection to the sewer.

- **Creating a tree nursery.** A large open space covering approximately eleven City lots on Brown Street, between 49th and 50th Streets, is a prime location for an urban tree nursery and a prototype for an environmentally friendly vacant lot transformation. In Mill Creek, as in many urban

(continued on page 2)
communities, community gardeners have reclaimed vacant lots for community use. The tree nursery will be incorporated into the Sulzberger Middle School’s environmental services learning curriculum and will provide students with the opportunity to learn about plant cycles, environmental stewardship, operation and maintenance costs, business ethics, and community involvement.

- **Resurfacing of the Sulzberger Middle School parking lot.** The large, asphalt-covered parking lot is in poor condition. The existing asphalt will be removed and replaced, and a bio-detention basin will be installed.

- **Creating the Historic Mill Creek Greenway.** The Greenway will extend from the Creek’s upper reaches down to its mouth. It will help residents realize that what they do in their own communities can affect the larger environment. We will join the upper section of the watershed with plans and projects in design or implementation with our partners in the lower reaches. These partners are equally excited about the greenway’s potential to join disparate neighborhoods in a very physical way. The Greenway will provide an above ground trail that mimics the course of the buried Mill Creek.

All of the stormwater management projects in Phases I and II, highlight the fact that stormwater management at the property level is a major concern of residents living in older, densely built neighborhoods, particularly those located in the floodplains of sewered creeks and streams. In Phase I, we designed a program to address the community’s concerns about subsidence relating to the Mill Creek. As a result of this work, we recognized an opportunity to complement the goals of the City’s Neighborhood Transformation Initiative to stabilize distressed neighborhoods. As a group, we are excited to be contributing to the implementation of this initiative and to be illustrating the necessity of residents in managing stormwater runoff at their own properties.

*For more information about the Mill Creek Watershed Redevelopment Project, please call Joanne Dahme at (215) 685-4944.*

## UPDATES FROM DELEP

### PUBLIC PARTICIPATION IMPLEMENTATION TEAM (PPIT)

The PPIT recently met to review 33 minigrant proposals that were submitted for funding through the 2003 DELEP minigrant program. The requested funding was a record-breaking $124,192. Organization’s whose projects were selected for funding will be announced in late January 2003.

In 2003, the PPIT, in collaboration with the Fish Consumption Advisory Team, will be developing a strategy to educate the public about health issues related to consuming contaminated fish caught in the Delaware Estuary. Our first step will be to create and conduct a survey of consumption habits of subsistence anglers in Southeastern Pennsylvania’s Coastal Zone. Last October, the Delaware Estuary Fish Management Cooperative completed a survey aimed at identifying popular fishing locations, types of fish caught, catch and release practices, and other parameters to help access angler pressure on fishing resources. While the survey did not specifically address consumption issues, we feel that it will be a useful planning tool for our 2003 survey.

The Partnership for the Delaware Estuary and the Penn State University Pennsylvania Sea Grant program recently received funding from the Pennsylvania Coastal Zone Management Program to address this issue. While it is generally believed that multi-ethnic subsistence anglers are at high risk of exposure to chemical contaminants from eating wild fish, the scope of the problem is unknown in the greater Philadelphia area. Once the survey is completed, an education/outreach initiative will be designed to target many different constituency groups, including subsistence fishermen, health care providers, community leaders, and students.

### TOXICS ADVISORY COMMITTEE (TAC)

The TAC continues to work toward a December 2003 deadline for developing a Total Maximum Daily Load (TMDL) for PCBs for the Delaware River. (See the summer 2000 issue for a description of TMDLS and the fall 2000 issue for a description of PCBs).

PCB Pilot Trackdown Studies are being initiated by the cities of Camden, Philadelphia and Wilmington through a cooperative workgroup including these municipalities, their states, the Delaware River Basin Commission (DRBC), and the United States Environmental Protection Agency Regions II and III (U.S.EPA). Experts are being consulted. The City of Philadelphia completed its first sampling at the end of October. Camden and Wilmington both anticipate that their first samplings will be accomplished in spring 2003.

The TAC plans to update the DRBC, PCB criteria in February 2003 so that it is consistent with the U. S.’s guidance. The new guidance will be more stringent. New Jersey and Pennsylvania criteria already defer to DRBC criteria, so the update will be automatic in those two states. Delaware has committed to updating their criteria with a clause similar to that of the other states, so that all will be consistent.
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
Martha Maxwell-Doyle  
(609) 883-9500 ext. 215  
mmaxwell@drbc.state.nj.us

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

Monitoring Advisory Committee
Edward Santoro, Monitoring Coordinator  
(609) 883-9500 ext. 268  
esantoro@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

TIDINGS: NEWS FROM AROUND THE REGION

IDENTIFYING AND ASSESSING THREATS TO THE REGION’S WATER SUPPLIES
BY CHRISTOPHER S. CROCKETT, P.E., MANAGER, SOURCE WATER PROTECTION PROGRAM, PHILADELPHIA WATER DEPARTMENT - OFFICE OF WATERSHEDS

In 1996, Congress passed the Federal Safe Drinking Water Act Reauthorization. This legislation directed the United States Environmental Protection Agency (U.S. EPA) to assess the vulnerability and susceptibility of the nation’s surface and groundwater supplies, and to report that information to the public using a program called the Source Water Assessment Program (SWA). This program was viewed as the first of many steps in a long-term effort to ultimately develop and merge local water supply protection-based initiatives with other water resource protection initiatives nationwide.

In Pennsylvania, there are thousands of places where water is withdrawn for water supplies. The locations that withdraw surface water from rivers, streams, and reservoirs are called intakes. In Southeastern Pennsylvania, the Pennsylvania Department of Environmental Protection contracted with the Philadelphia Water Department to assess the surface water supply for over 50 water intakes in the Schuylkill River Watershed (see the map on page 15).

Assessing these watersheds was not an easy task. The Schuylkill River Watershed is almost 2,000 square miles. It is 130-miles long and encompasses 2,522 miles of streams. The area has more than 3,000 “point sources” such as dischargers, businesses, manufacturers, storage tanks, and contaminated sites. In addition, the land activities are quite diverse and concentrated in different areas of the watershed. The headwaters of the Schuylkill River are mostly forested, but affected by acid mine drainage. (See the "Estuary Basics" article on page 6 for an explanation of Acid Mine Drainage.) The middle of the Schuylkill River Watershed is in Berks County, where agricultural activities are dominant and development is becoming a concern. In the lower portion of the free flowing Schuylkill River, which includes Chester, Montgomery, and Philadelphia counties, urban and suburban activities have significant influences on local water resources.

So what does the SWA Program entail? The major components of the SWA Program include the following activities:

- Delineating the drainage areas and calculating the time it takes for water to move from point A to point B.
- Compiling an inventory of the potential dischargers within the delineated areas.
- Analyzing water quality and land use trends, and stream impairment data.
- Estimating the potential vulnerability and susceptibility of the water supply from potential sources of runoff.
- Prioritizing and screening potentially significant sources for protection efforts.
- Recommending future protection efforts.

All of the efforts described above were conducted for the following ten contaminant groups and then combined for an overall prioritization and ranking. The ten contaminants included cryptosporidium, fecal coliform, metals, nutrients (conservative – nitrates), nutrients (non-conservative - phosphorus), volatile organics, petroleum hydrocarbons, chlorides, total suspended solids/turbidity, and disinfection byproducts.

We estimated the runoff impacts from different areas of the watershed, by identifying land uses for the watershed using the 2000 census records. The watershed was then divided into 356 subwatersheds using United States Geological Survey delineations. The 356 subwatersheds contained up to 14 different land uses resulting in over 3000 modeling units for
runoff calculation. Mapping enabled us to visually examine areas of the watershed that had the highest estimated loads for the ten different contaminants listed above.

Addressing the many technical issues of providing a reproducible and scientifically sound way to rank and prioritize these diverse issues for the ten different contaminant groups was a challenge. Ultimately, a number of individual parameters and qualifiers were used to rank the various point and non-point sources.

Throughout the process, stakeholders have been involved through two main avenues, public meetings and stakeholder advisory group meetings. Quarterly advisory group meetings have taken place to gain information, input, and consensus among many local stakeholders. The process also served as a means of educating stakeholders about source water protection issues and of developing local efforts that merge common goals for local water resource protection.

FINDINGS

The results of the SWA Program identified the following activities in the Schuylkill River Watershed to have the highest priority for water supply protection: urban and/or residential runoff, agricultural activities and runoff, and upstream treated and untreated sewage discharges (combined sewer overflows and sanitary sewer overflows). Other activities were considered priorities to be addressed, but did not rank as high as the previously listed activities: acid mine drainage, spills, and uniform policies and regulations.

For each individual intake, a prioritized list of the top 100 potentially significant sources was provided for each of the ten contaminant groups, and for a combined overall prioritization. The prioritization results allow the ability to overlay and compare the high priority sites and runoff areas for multiple water intakes. These activities are currently ongoing with the stakeholder advisory group participating as part of the source water protection planning process. In addition, stakeholders are beginning to identify implementation projects and partners for future protection efforts.

RECOMMENDATIONS

The recommendations that came out of the SWA Program for the watershed included, prioritizing the enforcement of untreated sewage discharges, using land use planning and zoning to protect water resources, and installing stream bank fencing and riparian buffers to reduce livestock impacts on streams in Berks County.

Through the SWA Program, many other goals for stormwater management from urban and suburban areas in the Schuylkill River Watershed were identified. Some of these included managing stormwater as an asset not a liability, installing detention pond retrofits for water quality benefits, using Smart Growth and redevelopment techniques, and encouraging the installation of rain barrels by homeowners.

MOVING FROM ASSESSMENT TO PROTECTION

Currently, the advisory group is identifying common partners and areas for potential protection projects. The ultimate goal of these projects is to address local water resource issues while protecting local water supplies. The projects identified to date include, developing an inventory of the projects currently underway to protect water resources in the watershed, prioritizing common issues, creating an implementation plan, identifying partners that can help and sources of funding, and implementing protection projects.

Even though this process is ongoing, a number of protection initiatives have begun and various stakeholders have accomplished individual projects. Some of these efforts have included trash cleanups, blocking access to illegal dumping sites, assisting partners with grant applications, raising awareness of regulators to address untreated sewage discharges, and the creation of riparian buffer, and implementation of stream bank cattle fencing projects.

If you have any questions about or would like to get involved in the Schuylkill River Source Water Assessment Partnership, please contact Chris Crockett at (215) 685-6234, or email him at chris.crockett@phila.gov. For more information, visit the Schuylkill River Source Water Assessment Partnership website at www.phillywater.org/schuylkill.
BIVALVE, THE ESTUARY, AND AN INSTITUTION WITH A DIVERSE MISSION

BY BOB WALKER, EDUCATOR, BAYSHORE DISCOVERY PROJECT

Bivalve, New Jersey was at one time a major oyster port on the Delaware Bay. Today, Bivalve contains the architectural remnants of a once flourishing oyster industry, which includes Rutgers University’s Haskin Shellfish Research Laboratory, devoted to developing a stock of virus-resistant oysters, and the Bayshore Discovery Project.

The Bayshore Discovery Project, formally known as the Delaware Bay Schooner project, is home to a restored oyster schooner and New Jersey’s official tall ship the A.J. Meerwald. The organization has a new name, and a renewed vision and mission. The Bayshore Discovery Project has been growing and evolving dramatically over the past several years. It has reached a point where the organization is far more multi-faceted than it was when only the A.J. Meerwald’s restoration defined our purpose.

The A.J. Meerwald serves as a vehicle for promoting the long-term stewardship of the Delaware Estuary by functioning as a sailing classroom, a flagship, and a symbol. Built in 1928, the A.J. Meerwald documents in oak, cedar, and canvas the once plentiful resources, the success of the oyster industry, and the “boothtown days” before the fall.

She is a highly visible advocate for the Delaware Estuary - personifying its spirit, educating its human inhabitants, and monitoring its health - as she carries adults and young people up, down, and around the Estuary and the coastline of New Jersey. In addition to serving as a sailing classroom, the A.J. Meerwald represents a significant symbolic victory for the Estuary. She mirrors the recent trends of the Estuary itself as the Estuary slowly undergoes a restoration of its own.

As soon as the A.J. Meerwald began sailing in 1996, the organization made a huge leap from being primarily about restoration to education. The last seven years have focused on delivering and refining the education programs that happen on the schooner, as well as the outreach and educational programs that take place shore-side.

Education stations onboard the schooner include watershed, plankton, oystering, petroleum, water quality, and trawl. If requested ahead of time, teachers may suggest their own program content or discussion of local issues. Students help raise the sails and participate in quiet observation time. Our education sails are well organized and executed, and serve as a model for similar programs offered by our peers.

Shore-based education programs include a Wetlands Discovery Tour. This tour provides the opportunity for schools and other groups to explore the beauty, plants, and wildlife of the bayside marshes; to catch marine life with seine and dip nets; and to discover what can be found in a minnow pond. We also have a Maritime Traditions program at the Delaware Bay Museum that interprets shipbuilding, oystering, commercial fishing, and recreational uses of the Delaware Bay. The museum, located in the heart of Port Norris, is open four days each week, from April to October.

Other aspects of our on-going education programs are our lecture series and story telling nights. We offer a monthly public lecture series, and twice each year, a story telling night that has been enjoyed by many participants throughout the region. Also, on the first Saturday in June, we host the annual Bay Day celebration that has enjoyed continued growth, maturity, and attendance each year.

The Delaware Estuary is a thriving ecosystem, a major transportation route, includes wetlands of international significance, an important hub of industrial activity, a major migratory stopover in the Atlantic Fly-way, and home to 130 fish species, hundreds of thousands of shorebirds, waterfowl and raptors, and eight million people. The value in protecting the Estuary’s delicate balance must be recognized. The restoration and subsequent use of the A.J. Meerwald for teacher training and for education of students and the general population helps to address these needs.

Our new name, Bayshore Discovery Project, reflects more accurately the depth and breadth of the organization’s mission: 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. Every board member, staff member, and volunteer, continues to be focused during this important time on the history of the Estuary, and on the delivery of the mission and vision of this valuable grassroots organization, created by many energetic founders. Our organization is providing new opportunities in a region that has amazing intangible resources yet limited tangible ones.

The A.J. Meerwald about to be towed to the Maurice River completion site. Photo taken by Bill Buchanan in Bivalve, New Jersey in September 1995.
At this point, we are on the brink of an organizational shift - new horizons include the restoration of the historic Bivalve shipping sheds; a deeper educational presence in Cumberland County Public Schools; a land-based initiative including a museum, library, gallery, and classroom; and the restoration of the ex-schooner Cashier. With these new developments, comes the need to examine the organization’s mission and goals.

Our plan is to create a major dynamic educational destination to study the surprising natural diversity, rich cultural fabric, and proud heritage of Delaware Bay. A place we are calling The Bivalve Center. The creation of The Bivalve Center has begun with the restoration of seven Bivalve shipping sheds and wharves originally constructed in 1904 by the Central Railroad Company. These sheds were the heart of the booming Delaware Bay oyster industry, which provided the lifeblood to the region’s growth and development.

We envision the Bivalve Center as a dynamic destination that not only provides a “portal for discovery,” but also serves as a leadership presence in advocating stewardship of the incredible, magical place that is the Delaware Estuary.

For more information about the Bayshore Discovery Project, call (856) 785-2060 or visit them on the web at www.ajmeerwald.org.

**ESTUARY BASICS**

**ACID MINE DRAINAGE**

BY JAMES GRABUSKY, WATERSHED MANAGER, SOUTHEAST REGION, PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The coal mining industry that once fueled the Industrial Revolution and supplied power during two world wars, left behind some serious environmental problems. One of the most overlooked, and potentially most harmful consequence of our nation’s reliance on coal is acid mine drainage (AMD).

AMD, the main pollutant of surface water in the mid-Atlantic Region, comes mainly from abandoned coal mines, which are plentiful in the upper portions of the Delaware Estuary Study Area, at the headwaters of the Schuylkill River, in Pennsylvania. Like other types of nonpoint source of pollution, such as stormwater mismanagement or agriculture runoff, AMD affects the quality of the water flowing into the Estuary. AMD is caused when pyrite, an iron sulfide, is exposed and reacts with air and water to form sulfuric acid and dissolved iron. Some or all of the iron can precipitate to form the red, orange, or yellow sediments in the bottoms of streams containing mine drainage.

According to current estimates, AMD degrades more than 4,500 stream miles in the mid-Atlantic Region. This results in a loss of aquatic life and restrictions on stream use for recreation, public drinking water, and industrial water supplies. In Pennsylvania alone, the 3,000 miles of streams degraded by AMD create an estimated loss of $67 million in annual revenue from sport fishing.

The source of the problem stems from mines that were built as early as the 1800’s. These mines were built to utilize gravity drainage in an effort to avoid excessive water accumulation underground. As a result, water polluted by acid, iron, sulfur, and aluminum drained away from the mines and into nearby streams.

Until the 1950’s, coal mining was conducted with little regard for its environmental impact. Recent developments in environmental regulations, coal mining methodology, and treatment of effluent from mining operations have greatly improved the impact from active mines. However, abandoned mines continue to discharge to our rivers and streams.

Correcting the problem won’t be easy or inexpensive. The estimates for correcting AMD-related problems with currently available technology are between $5 and $15 billion.

For the Pennsylvania Department of Environmental Protection, reclaiming abandoned mine areas has been the focus for solving the AMD problem. Reclamation efforts are funded by a 35-cent per ton federal fee on coal being mined today, and from state reclamation funds from fees and bonds that have been forfeited. Additionally, mining companies that re-mine abandoned mine areas are treating discharges.
The Commonwealth's earliest attempts to address these problems began in 1967 with the establishment of the Land and Water Reclamation Fund. This program provided $200 million to address abandoned mine problems, including AMD. Operation Scarlift, as the abandoned mine portion of the Fund was called, achieved limited success with respect to AMD abatement and treatment. Projects included the development of a large number of watershed studies (which are still in use today), surface mine reclamation, mine sealing, and the construction of several chemical treatment plants to treat AMD. While these chemical plants were largely successful, the cost to operate and maintain them was substantial. Several plants were subsequently shut down. It quickly became obvious that large-scale chemical treatment of AMD would be prohibitively expensive for the Commonwealth.

In the 1980's, as passive treatment technology began to emerge, the Commonwealth used some remaining Operation Scarlift funds to construct three passive treatment systems. These systems, which consisted of a combination of aerobic and anaerobic wetlands and ponds, were only partially successful in removing metals and did a poor job of neutralizing acidity. It was obvious that the technology had not yet reached the point where passive treatment could be successful.

In 1990, an amendment to the federal Surface Mine Control and Reclamation Act (SMCRA), allowed states to “set aside” ten percent of their Abandoned Mine Land Trust grant to address AMD. Prior to this time, these funds could only be used to address health and safety problems on abandoned mine lands throughout the country. Pennsylvania’s 10 Percent Set Aside Program, which receives approximately $2 million per year, was established in 1992. The first AMD treatment systems were constructed in 1997. Also in 1997, the federal Office of Surface Mining established a program called the Appalachian Clean Streams Initiative (ACSI). This program provided additional funds to states in the Appalachian region to address AMD problems.

Most recently, in 1999, the Pennsylvania General Assembly passed the Environmental Stewardship and Watershed Protection Act. Known as “Growing Greener,” it will invest nearly $650 million over five years to protect and restore watersheds and reclaim abandoned mines. The Pennsylvania Department of Environmental Protection’s Bureau of Abandoned Mine Reclamation (BAMR) administers the 10 Percent Set Aside and ACSI programs and also receives funding from Growing Greener. These funding sources, as well as monies from the bond forfeiture program, provide the AMD abatement funding used by BAMR. While these funding sources are substantial, they pale when compared to the estimated $5 billion cost to address all the AMD problems in Pennsylvania.

Under these programs, 19 separate treatment facilities have been constructed. Many of the projects have been or are being constructed in partnership with a number of other agencies, including the Natural Resources Conservation Service and the U.S. Army Corps of Engineers.

The challenges faced by the AMD problem are significant but not insurmountable. With advances in technology for remediation and a commitment from mining companies to implement Best Management Practices, future generations can look forward to the day when AMD is a distant memory.

For more information about the AMD problem in Pennsylvania, please contact Jim Gragusky at (610) 832-6191.

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**SPECIES SPECIFIC**

**LIVING WITH THE CANADA GOOSE**

*Branta canadensis*

BY JAY SPRINGER, NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION DIVISION OF WATERSHED MANAGEMENT

The Canada goose is one of the most visible waterfowl species in the Atlantic Flyway. Traditionally, this has been a migratory species. During the spring and summer months, migratory populations of Canada goose nest in Northern Quebec and in the Maritime Provinces of Canada. They fly south to the Delaware Estuary and other nearby locations in late September. Habitat requirements for migratory geese have primarily focused on feeding and resting areas, and as such they are attracted to wetlands and adjacent agricultural areas for food and security.
In recent years, we have seen a sizable increase in the population of resident or year-round Canada goose flocks, posing problems for human populations and the birds themselves. In many areas, the population of geese has reached nuisance levels, resulting in the overgrazing of turfgrass and cropland, which impacts aesthetics, creates an erosion hazard, and results in crop losses. It has also resulted in the accumulation of fecal material on land, which creates a health risk and degrades our water quality by increasing the levels of nitrogen and phosphorous found in the water. Geese also pose a hazard to aircraft at airports and have been known to attack humans when they feel threatened.

The combined factors of low adult mortality and favorable habitat conditions for breeding and feeding, indicate that resident Canada goose populations may double every five years, exacerbating the problem. If geese populations are not moving on, then humans will have to find a way to manage the population or to peacefully coexist.

**GOOSE MANAGEMENT**

Solving conflicts between people and geese will continue to create a significant management challenge for wildlife biologists and policy makers. A delicate balance must be achieved between the biological and social issues that revolve around the impacts of resident geese.

Canada goose have two basic requirements: fresh water for drinking, resting, nesting and escape from predators, and food. Because geese are grazers, the plentiful, highly managed lawns of residential neighborhoods, corporate office campuses, golf courses, parks, and some airports provide preferred habitats for these birds. They typically nest within 100-feet of open water. They like large open areas with few obstructions that give a 360° view of potential predators. These birds have a high tolerance for humans and adapt quickly. Thus, the perfect feeding spot that meets all of their requirements - nice, green, managed lawn space near water - are also the conditions that many humans prefer.

There are several simple and inexpensive indirect management techniques that have proven to be successful in managing resident Canada goose populations. The most important is to encourage people to stop feeding the geese. There are also methods of hazing, scaring, or harassing them with the use of animals, such as Boarder Collies, and other herding dogs, and swans or falcons. Recorded distress calls, noisemakers, or visually frightening devices such as scarecrows, Mylar balloons, and R/C aircraft have all been helpful in controlling flocks. Lastly, altering habitat by eliminating managed turf areas close to lakes and ponds is a good idea.

The problems with geese have become so bad that the U.S. Fish and Wildlife Service has proposed new rules to deal with the resident Canada Goose. These new rules amend what was permitted under the Migratory Bird Treaty Act to empower states to employ direct population control management activities. Direct population impact measures are usually very controversial, but have been found to be highly successful when utilized in conjunction with the above indirect management techniques. Some options include netting and relocating geese to another location, harvesting via a managed hunt, removing nests and eggs, and managing eggs via adding (shaking), puncturing, oiling, and/or the placement of dummy eggs.

Wildlife biologists discovered that when nests and/or eggs are removed, geese will usually reconstruct their nests and lay more eggs. However, they have also found that geese typically will not lay more eggs if their clutch does not hatch, thereby controlling the population. Although it is very labor intensive, egg management at nests has been found to be the most successful and least controversial of these direct measures.

**CONCLUSION**

The challenge for biologists, local officials, and policy makers will lie in making the correct choices. The keys to developing an integrated management strategy include:

- local community support for the need to take action;
- available control options, given the biology of Canada Goose and the characteristics of the site;
- relative effectiveness of the techniques;
- cost, regulatory considerations, and social acceptability of the techniques; and
- knowing the time of year when the resident Canada goose population is greatest.

In most cases, it has been found that there is no single control method that will work every time and everywhere. There may have to be an integrated management strategy, or combination of short-term and long-term controls, in order to have a successful program. Additionally, it may be necessary to tailor methods to address an existing problem and to prevent a future one from occurring. Once completed, the integrated management strategy must be shared with the public and distributed to all stakeholders.

Information for this article was obtained from the U.S. Fish and Wildlife Service's website at www.fws.gov and the New Jersey Department of Environmental Protection Division of Watershed Management Draft “Management of Canada Geese in Suburban Areas - A Guide to Basics”, March 2001.
The Delaware Estuary is a densely populated area. If you travel down along the Bayshore in South Jersey, however, you'll come across wide-open spaces. In this part of the Estuary, there are vast expanses of bay marsh and farmland that are intersected by small creeks, the occasional road, and a town or two.

Commercial and Maurice River Townships, which flank either side of the lower Maurice River, are particularly rich in history. (See the map on page 15 for the location of this area.) The area was the heart of the Delaware Bay's oyster industry. The towns of Port Norris, Bivalve, and Mauricetown lived and died with the industry, and today offer an interesting perspective of what life was like “down Jersey.”

At the dead end of Routes 553 and 649 is Port Norris, population 1,507. In the early 1700’s, Port Norris (then named Dallas’ Ferry) consisted of a mill, a tavern, and a ferry. In the 1830’s construction of a railroad to the port of Bivalve provided an economic boom to the village. One hundred years later, Port Norris became known as the “Oyster Capital of the World,” producing, at the time, more millionaires per square mile than any other town in New Jersey.

Due to parasitic disease, the oyster industry in the Delaware Bay has hit hard times, and with it so have the towns of Port Norris and Bivalve. Working to restore the oyster’s population are scientists at Rutgers University’s Haskin Shellfish Research Laboratory, in Bivalve. Their well-equipped laboratories enable them to conduct investigations on microbiology, shell structure and physiology, analytical chemistry, cytogenetics, and biochemistry, in an effort to develop a disease-resistant oyster.

Working to preserve the area’s heritage is the Bayshore Discovery Project, also based in Bivalve. The project owns and operates New Jersey's official Tall Ship the restored 1928 oyster schooner A.J. Meerwald. The Project also maintains the Delaware Bay Museum in Port Norris filled with Delaware Bay maritime history exhibits. (See the “Making Waves” article on page 5 for more information about the Bayshore Discovery Project.)

Further up the Maurice River, the streets of historic Mauricetown are lined with the homes of seafaring captains. The stain-glassed window of this town’s landmark church depicts the area’s maritime history and lists the names of the local captains who were presumed drowned at sea. Antique shopping and strolling are the main activities for visitors.

Other nearby sites worth a visit include, the Commercial Township Wetland Restoration Site. Portions of this 4200-acre site were diked in the eighteenth century. By excluding tidal flow from the Delaware Bay, salt hay farming was made possible. Three thousand acres of the site were modified in 1997 by PSEG, by creating a network of channels and inlets to support restoration of normal tidal flow and the growth of desirable marsh vegetation. The site now provides important spawning, nursery, foraging, and refuge habitat for fish and other types of wildlife. The site offers visitors observation platforms, elevated boardwalks, and a two-mile nature trail. The Commercial Township Wetland Restoration Site is open from dawn to dusk.

On the opposite shore of the Maurice River stands the very photogenic East Point Lighthouse. Constructed in 1849, this “Cape Cod” style lighthouse provided Delaware Bay oyster schooners with a navigational marker to the ports of Port Norris, Millville, Mauricetown, and Port Elizabeth. It is the second oldest lighthouse still standing in New Jersey. The lighthouse is undergoing restoration, therefore the building interior is not open to the public except for special events. There is an annual “open house” on the first Saturday of August.

To get to the East Point Lighthouse, you’ll probably have to drive through the Heislerville Wildlife Management Area. This management area is filled with a variety of habitat from tidal mudflats to oak and pine uplands. A road winds around fresh water impoundments offering a convenient means of viewing snow geese, mute swans, and the occasional bald eagle. The area is open from dusk to dawn to dusk.

Looking to sample some of that local cuisine, try The Fish Hook Restaurant, formally the Shell Pile in Port Norris. Most accommodations are centered in and around the nearby Vineland/Millville area. Happy travels!

There is a wealth of information available for this area and for Cumberland County, New Jersey in general. Here are some websites to get you started: www.co.cumberland.nj.us; www.nps.gov/neje/cumberland.htm; and www.amerelwood.org. Also, try giving the Cumberland County Tourism Advisory Council a call at 1-866-866-MORE.
Throughout 2002, the Partnership for the Delaware Estuary worked on five sites in Southeastern Pennsylvania to help enhance and create wildlife habitats and to improve water quality – one small piece of ground at a time.

Of the five sites, three were schools in Northeast Philadelphia, that all installed a native plant garden in place of mown lawn. At Archbishop Ryan High School, the students took a formal courtyard and planted both sides of a pathway with native wildflower and grass plugs. The students at Baldi Middle School transformed a barren patch of grass next to their school’s entranceway into a beautiful garden of golds, purples, pinks, and oranges. Finally, a wood chip pathway through a maze of native wildflowers and grasses was established at Hackett Elementary School.

The Partnership also worked with the Hills of Bethel Civic Association in Boothwyn, Pennsylvania, to plant their detention basin located in a neighborhood’s common area. It was planted with native trees and shrubs that would provide habitat as well as extend the buffer to an adjacent forest. We also planted a small area along the top edge of the basin with native wildflower and grasses to serve as an example of how cool season grass areas can be replaced with warm season grasses and wildflowers. The plantings at the Hills of Bethel had to be protected with eight-foot deer fencing because of the large number of white tailed deer in the area.

Lastly, at the Silver Lake Nature Center in Bristol, Pennsylvania, we worked with the Bucks County Public Works Department to get the necessary permits to move dirt and to coordinate the manpower and machinery needed for the initial stages of their project. Invasive trees and shrubs were removed from a 100-foot section of shoreline along Silver Lake, and a steep bank was graded. The area was then contained with fencing to keep out geese as well as curious park visitors. Once the fencing was up, we were able to plant the herbaceous wetland plugs and the native shrubs and trees.

In 2003, the Partnership looks forward to working with schools on similar types of habitat enhancement projects in the estuary region. If interested, please give Jenn Porter a call at 1-800-445-4935 x 17.

The Clean Water Theater troupe’s performance of *All Washed Up!* is scheduled to debut in Philadelphia this spring. The 25-minute educational and interactive musical will introduce students to the concept of watersheds, drinking water, stormwater runoff pollution, and the Delaware Estuary.

Philadelphia schools interested in this assembly program will be required to send a representative to a one-day introductory workshop designed and coordinated by the staff of Philadelphia Earth Force. The workshop, which will be held in February, will include hands-on activities, using the “Protecting our Watershed Kits,” to introduce key watershed concepts and issues to educators participating in the Clean Water Theater assembly program. The kits include a teacher’s guide, activity notebook, “Making Water Quality Connections” assessment posters, tip cards that outline how to perform activities leading to successful civic change, and a tote bag to carry all of the items. The activities learned during the workshop, and the resources in the kit, should be used in the classroom to prepare students for the Clean Water Theater assembly. After experiencing Clean Water Theater, students will take the lead and become actively involved in developing and implementing community service projects.

Thanks to a generous grant from the Pennsylvania Coastal Zone Management Program and funding from the Philadelphia Water Department, the performances are free. A number of shows can also be performed during local events, at senior centers, or during nonprofit functions in the City of Philadelphia.

*Call the Partnership at 1-800-445-4935 for more information, or to schedule your performance for this March, April, or May.*
FUTURE HOMEOWNERS OF AMERICA, IT’S TIME TO GET HANDY!

H2ouse or www.H2ouse.org is a handy place for homeowners (present and future) to learn about water saving opportunities in each area of the home. The site encourages visitors to take action to conserve water resources. For example, when touring the site’s virtual home, click on the laundry room’s clothes washer to learn that a traditional washing machine uses approximately 41 gallons of water while a high efficiency machine uses only 23 gallons of water. Visitors can then link to the Consortium of Energy Efficiency where a product list identifies which brand name washing machines are the most energy efficient and where they can be purchased.

REGISTER NOW FOR THE 7TH ANNUAL DELAWARE ESTUARY TEACHERS’ INSTITUTE

The Partnership for the Delaware Estuary’s Teachers’ Institute is a week-long, residential program providing K-12 educators with the opportunity to explore and experience the geographic, scientific, economic, cultural, and historic resources of the Delaware Estuary. The 2003 Institute will take place in July.

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.

In the past, participants have seined the Delaware Bay, with the assistance of graduate students from the University of Delaware 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 cruised the Delaware River with Philadelphia City Sail, visited the Philadelphia Water Department’s Southwest Water Pollution Control Plant, toured the Clement Pappas Company in Seabrook, New Jersey, and explored the Cape May Bird Observatory.

For more information about the 7th Annual Institute, please contact Lisa Wool at 1-800-445-4935 x 19 or e-mail lwool@delaawarestuary.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 "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 15-month calendar to be distributed throughout the tri-state region. The entries must be received by February 15, 2003.

To receive the necessary background information, please contact Lisa Wool at 1-800-445-4935 x 19 or e-mail lwool@delaawarestuary.org.

Artwork created in 2002 by Ronald Williams, Daroff Elementary School, grade 6.
ESTUARY EVENTS

UPCOMING DELAWARE ESTUARY EVENTS AND HAPPENINGS

Coastal Hazards: Living with a Restless Sea
January 21 & 28, and February 4 & 11, 2003
Cape Henlopen State Park
Lewes, Delaware
Join Wendy Carey, University of Delaware Sea Grant Coastal Processes Specialist, for this month-long course designed for coastal residents. Four informative sessions will cover subjects such as coastal processes, coastal geology, sea level rise, coastal erosion, management and planning tools relating to coastal hazards issues, coastal storms, and how residents and property owners can become better prepared for living with a restless sea. The course is limited to 25 and pre-registration is required. For more information, please call (302) 645-6852.

Artistic License at the Bayshores
Friday, January 24, 2003, 6:30 p.m.
Delaware Bayshores Center
Delmont, New Jersey
Join Delaware Bayshores Program members, volunteers, and staff in examining the art of Southern New Jersey. Also take the time to learn some basic wildlife illustration techniques. Children are welcome! For more information, please call (609) 861-0600.

Screeching, Hooting, and Howling
Saturday, January 25, 2003, 6 p.m.
Killens Pond State Park
Felton, Delaware
Join a park naturalist on a guided hike in search of owls. Afterwards, warm up around a campfire with toasted marshmallows and a hot chocolate. For more information or to register, please call (302) 284-4299.

Tundra Swan Tour
Sunday, February 2, 2003
Whitesbog Village
Browns Mills, New Jersey
Join a naturalist on a walk out to the pond at Whitesbog Village and learn about the habits and migration patterns of the Tundra Swans that winter in the area. There is a fee of $5 per person or $10 per family. For more information, please call (609) 893-4646.

Ice Storm Trail Hike
Saturday, February 8, 2003, 1 p.m.
Killens Pond State Park
Felton, Delaware
Take a guided hike to learn how this forest rebounded after a devastating ice storm that took place in 1994. For more information or to register, please call (302) 284-4299.

Winter Botany in Cumberland County
Saturday, February 8, 2003, 10 a.m. – 2 p.m.
Manumuskin River Preserve
Maurice River Township, New Jersey
Join naturalist Karl Anderson in the identification of the diverse winter plant forms found throughout the Manumuskin River Preserve. The trip will inspect varieties of trees, mosses, and lichens found at the Conservancy’s largest preserve in New Jersey. Bring along appropriate hiking attire, beverage, and snack item. There is a fee of $8.00, or $5.00 for Conservancy members. For more information, please call (609) 861-0600.

Birding
Saturday, February 8, 2003, 9 a.m.
John Heinz National Wildlife Refuge at Tinicum
Philadelphia, Pennsylvania
Bring your camera and join Brian Byrnes for a leisurely stroll through the refuge to identify birds in their winter habitat. For more information please call (215) 365-3118.

A Canter through the Horse Barns
Wednesday, February 12, 2003
Bellevue State Park
Wilmington, Delaware
Ever wondered what all of the green barns at Bellevue were used for? Mr. duPont owned thoroughbreds, steeplechase horses, Percheron draft horses, and carriage horses. Latch on to this rare opportunity to explore these buildings on this tour of the horse facilities. There is a fee of $3 per person. For more information, please call (302) 793-3046.

Photography Workshop
Saturday, February 22, 2003, 10 a.m. – 3 p.m.
John Heinz National Wildlife Refuge at Tinicum
Philadelphia, Pennsylvania
Learn the fundamentals of outdoor imaging and see the very latest in photo equipment. Frank Miles, Mark Bohn, and Bill Buchanan will be on hand to share their photographic expertise regarding equipment, technique, and tricks of the trade. For more information and to preregister, please call (215) 365-3118.
Kids Can Expo  
Sunday, February 23, 2003, 10 a.m. – 4 p.m.  
Cape May Convention Hall  
Cape May, New Jersey  
The New Jersey Audubon Society’s Nature Center of Cape May is hosting this popular mid-winter event, which provides games, exhibits, crafts, hands-on experience and plenty of good treats to eat. For more information, please call (609) 898-8848.

Jacob Jones: The Man, The Ships, and The Tragedies  
Sunday, February 23, 2003, 1 p.m.  
Cape Henlopen State Park  
Lewes, Delaware  
Jacob Jones, Delaware native and American naval hero, was the namesake of two ill-fated destroyers that met their ends at the hands of German U-boats during World War’s I and II. The second ship lies on the ocean floor just 50 miles off the coast of Delaware. Join park staff at the Seaside Nature Center to learn about this intriguing Delawarean and the ships that bore his name. For more information, please call (302) 645-6852.

Beach Grass Planting  
Saturday, March 22, 2003  
Delaware’s Ocean and Bay Beaches  
Since 1990, volunteers have stabilized Delaware’s sand dunes by planting more than 3,540,000 stems of Cape American beach grass. Volunteer and help to increase that number. For more information, please call (302) 739-4411.

Nature Photography  
Friday, March 28, 2003, 6:30 p.m.  
Delaware Bayshores Center  
Delmont, New Jersey  
Join professional wildlife photographer Michael Hogan during a presentation on photography techniques, developing hints, and camera diversity. Examples of pinelands, and Bayshores photography will be exhibited. Bring along your own equipment or photographs for discussion! For more information, please call (609) 861-0600.

ESTUARY HERITAGE

IT’S ALL IN A NAME

To know the stories behind the names of the rivers, towns, and places of the Delaware Estuary is to be aware of the complex and fascinating history of the area. The Delaware Estuary, more than most estuaries, has been a cultural crossroads, which is reflected in the vibrant mix of names that one sees on a map. Place names of English origin are prevalent (as one would expect) followed closely by Native American (Algonkian language), and Dutch and Swedish names reflecting the early settlement history of the Estuary.

Without too much digging, however, one can find names of Irish, German, French, Italian, Finnish, Spanish, and even Russian origin. The Irish, Italians, and Germans settled in the cities or inland from the Estuary so their names are relatively scarce. In addition, many place names were anglicized making it difficult to identify their origin. A favorite is the Shiver de Freeze creek in New Jersey, which comes from the French Cher-aux-de-frise referring to iron spikes and bars placed to deter ships.

As interesting as the cultural origins are the reasons or intentions behind the names. The Native Americans and Dutch used names of physical description, for example the Schuylkill means “hidden river,” Crum Creek stems from Crumkill or “crooked river,” Neshaminy means “two streams,” and Menantic comes from Menantakh or “covered swamp.”

All cultures adopted names to honor important people. The Cohansey River is named after Chief Cohansik, the Maurice River after Prince Maurice of Orange, the Christina River after King Gustav Adolphus’ daughter, Pittsgrove after the English statesman William Pitt, and many places after William Penn, including his birthplace, Lewes.

Even the not so famous, those who lived or were among the first to settle in the area, come to have places named after them. Bricksboro was named after Joshua Brick, a local developer; Harmersville after Ebenezer Harmer, a storeowner; Carney’s Point after an Irish immigrant; Bowen after John Bowen, a local landowner; and Leesburg after Lee Brothers Shipping.

Many names migrated to the New World with the Europeans as a way of maintaining their identity. The list is long and includes Greenwich, Dorchester, Florence, New Italy, Bristol, Berlin, Blenheim, Carlisle Run, Gloucester, and Burlington. Even migrants from New England brought place names to the Delaware Estuary such as Deerfield, from Massachusetts and Fairfield, from Connecticut.

Literary or aesthetic origins are scarce, but some exist. When John Fenwick, an officer in Cromwell’s army, came to this country with 200 men, he was so impressed with the tranquility of a place that he gave it the name Salem, from the Hebrew “shalom,” meaning peace. Biblical names are found in Genesis and Jericho. Auburn is most likely named after Oliver Goldsmith’s Deserted Village.

Some names defy categorization except that as a group they are contrived. Odessa used to be Cantwells Bridge, named after a toll bridge that spanned the Appoquinimink Creek.
When the railroad came to neighboring Middletown, the inhabitants feared loss of trade. Thus, they changed the name in 1851 to honor a port in the Ukraine that was known for exporting wheat. The change in name, they hoped, would draw attention to the town as a port and prevent the loss of trade.

There are also fun names that are unusual and expressive. Among these are Mad Horse Creek, Butler’s Gut, Clampit, Cocked Hat, Bivalve, Cat & Kitten Gut, and Deadman’s Point. Each has a story associated with it.

The names of the Estuary are among its hidden treasures. To know them is to better appreciate the Estuary and it’s colorful history.

This article was originally run in the 1994 winter issue of Estuary News. Its author is John Hines who was then an environmental planner for the Bureau of Land, Water, and Conservation in the Pennsylvania Department of Environmental Resources. Mr. Hines is now with Pennsylvania’s Office of Interbasin Cooperation.

**Leslie Millar: More than a Lighthouse Keeper**

**By Bob Trapani, Jr., President, Delaware River and Bay Lighthouse Foundation**

Most every lighthouse has a history of a few men and women whose contributions and commitment to keeping a good light outshone their fellow keepers. Their accomplishments ranged from enduring unwavering watches through the fiercest of gales to risking life and limb in tumultuous cold waters for the sake of the mariner trapped in the icy grip of an unforgiving sea. These selfless and heroic acts of humanity performed by many keepers have been well documented and will continue to rightfully live on in our maritime history.

However, as important as it is to recognize the countless acts of heroism carried out by the lighthouse keeper, it is just as important to recognize the keepers who were proficient at maintaining a wide array of equipment related to the world of aids to navigation. Their passion and expertise in mastering the variety of optics, sound signals and operational equipment in lighthouses made them invaluable as technicians to the U.S. Lighthouse Service and later the U.S. Coast Guard. From their ability to thoroughly understand the mechanics of each piece of equipment to their expert troubleshooting and subsequent solution capabilities, these special keepers enabled the lighthouse to continue as a reliable and sought-after light, serving the mariners who plied our nation’s waterways.

One such man was Leslie Van Stavern Millar, former lighthouse keeper of Marcus Hook Range Rear Light in Bellefonte, north of Wilmington, Delaware. During Keeper Millar’s long and illustrious career with the Lighthouse Service and the Coast Guard, he served as a light keeper and machinist, and eventually was in charge of all the aids to navigation from the Philadelphia Naval Yard south to the mouth of the Delaware Bay.

According to Keeper Millar’s daughter, Helena Millar Cleveland, in addition to his assignment as keeper of Marcus Hook Range Rear Light, her father also performed mechanical repair work and maintenance on a variety of lighthouses. Ms. Cleveland recalls, “My father would be sent from one lighthouse to another doing work on them. He would be gone weeks at a time. I remember we had an old floor model, battery operated radio and my father would talk to us over the radio almost every night when he was gone.” Ms. Cleveland remembers Harbor of Refuge Lighthouse and Cape May Lighthouse as ones her father would speak about visiting.

Mr. Millar assumed his tour of duty as keeper of Marcus Hook Range Rear Light in the 1930s, says Ms. Cleveland, “when my father was transferred from Philadelphia to Edgemoor, Delaware. At that time, a deal was struck between the U.S. Lighthouse Service and the Coast Guard enabling my father and his family to move into the residence next to Marcus Hook Range Rear Light, under the requirement that the light be manned at all times.”

Helena Millar Cleveland recalls Keeper Millar’s favorite lighthouse to be Harbor of Refuge (for the location of the Harbor of Refuge, see map on page 15). She stated that he would take her brothers, and in later years her husband, to the lighthouse to fish. It was from Harbor of Refuge Light that Mr. Millar penned a letter dated September 21, 1948 to his daughter Helena, which she has shared for this feature below:

**Harbor of Refuge**

0615 — Sept. 21, 1948

Dear Daughter Helena,

Well of all things, can you imagine your dad writing a letter to you at the ungodly hour of a quarter after six in the morning? And without any breakfast at that. It’s pretty quiet here just now, only for the pounding of the sea. No fog signal sounding. Hear a ship now and then blow a passing signal. We are overhauling some diesel fog signal engines and checking up on the equipment that rotates the light.

The weather looks as though we were going to have fog but I can still see Cape May’s beacon flashing its warning light some twelve miles to the northeast of us. Daylight is just beginning to break and the keeper here is beginning to get breakfast ready. I’ll have to quit writing for a while as it interferes with his getting breakfast and we...
couldn't let that happen as I like something to eat almost as well as you do.

A Navy cruiser, the Worchester, is lying at anchor about one and one-half miles to the north of us and he is sending a message by blinker light. Just a minute — till I see if I can read it. Yep — he just sent a message to the pilot boat to come alongside and take his pilot off. Guess he is getting ready to go to sea. A fleet of eleven trawlers or fishing boats are leaving the harbor now and heading out to sea. Suppose they will come back in a day or two loaded to the gills. They are fishing way off Massachusetts so it takes them a whole day to even get to the fishing grounds.

Well sweetheart, I'll have to quit this for a while or the cook will be heaving me overboard. I don't know when I'll be able to mail this. The pilot boat comes alongside here once in a while and if they do, I'll put it aboard her. If not, I'll add some more to it and mail it when we get ashore. Bye-bye until I get a chance to add some more to this.

And following are some memories from Ms. Cleveland's brother, Robert Earl Millar. On bad weather encountered at Marcus Hook Range Rear Light: "Can't say I have many memories worth passing on but one thing that sticks with me is changing the bulb when it would go out. And here is the thing most vivid… it would seemingly always happen late at night and usually in a thunderstorm. The problem was there was a ventilator in the lantern room and as luck would have it, it was located right over the light bulb area. Water would collect in the ventilator and 'bing,' off would come a drop — hit the bulb, and out would go the light. Then 'ringgggg' would go the alarm in the house at the top of the stairs. Most, if not every time this would happen, I was the only "man" at home, as Don, Len and Richard were off fighting the war and Dad was on a trip to the lighthouses in the Delaware Bay. I would then go climbing the 100 feet to the lantern room, with no flashlight or lantern and put in a new bulb. Of course, thunder and lightning were crashing all around me and some I'm sure hitting the arrestor, which sat on top of the lantern room next to the ventilator! I recall looking at the copper rod where it entered the ground at the bottom of the light and seeing scorch marks from hits gone by."

For more information, visit the Delaware River and Bay Lighthouse Foundation's site at www.delawarelights.org. This article appeared in its entirety in the August 2001 edition of Lighthouse Digest. It was reprinted with their permission.

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.
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-993985-05-0) 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.

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