

# Historic Bristol Borough's Freshwater Tidal Marsh: Conservation Plan



*Bristol Marsh*

December 2008



1958 • 2008

85 Old Dublin Pike  
Doylestown, PA 18901

(215) 345-7020

(215) 345-4328

[www.heritageconservancy.org](http://www.heritageconservancy.org)



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View from North Corner of Marsh

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# I. Background and Purpose

## Orientation

Bristol Marsh (“the Marsh”) is a rare and important 17-acre +/- freshwater tidal marsh located along the Delaware River, just southwest of the Bristol Historic District in Historic Bristol Borough in Bucks County, Pennsylvania. It is one of the few remaining freshwater tidal marshes along the Delaware, receiving water from the Delaware River and the Atlantic Ocean and it is home to six rare plant species native to the Delaware River Basin. Otter Creek also drains into the Marsh. Historically Bristol Marsh was next to the Delaware Canal Basin. At the Canal Basin boats mainly carrying coal from Easton ended their journey along the Delaware Canal. (See Aerial Map)

Today the former Canal Basin is a parking lot northeast of the Canal. The Delaware and Lehigh Trail runs between the Marsh and the Parking Lot ending at Bristol Borough Riverfront Park along the Delaware. North of the Canal is a public works yard managed by the Borough of Bristol and Otter Creek. The 11-acre property southwest of the Marsh is owned by Rohm and Haas. Rohm and Haas, a specialty chemical company, is in the process of being bought by DOW Chemical Company. The southeast side of the canal is bordered by the Delaware River.

*Bristol Marsh (“the Marsh”) is a rare and important 16-acre +/- freshwater tidal marsh...*



*Stormwater Channel*

## General Community Characteristics

According to the Bristol Borough Comprehensive Plan of 2006, Bristol did much of its development prior to World War II, making it denser than other, more suburban communities that developed in Bucks County after World War II. Most of the buildings and houses are historic in nature. (Bristol Borough Comprehensive Plan, 24)

Between 1970 and 2000, Bristol experienced a steady population decline, dropping from 12,085 residents in 1970 to 9,923 in 2000. It is expected that the Borough population will increase steadily over the next 20 years by a total of 6%. (Bristol Borough Comprehensive Plan, 25-26)

While the Median Household Income has largely remained the same in Bristol since 1970, home values have increased. This has led to low levels of homeownership and an increased percentage of renter occupied units. The comprehensive plan says this had led to problems with property maintenance. (Bristol Borough Comprehensive Plan, 28)

## History of Marsh Conservation

In 1986 The Nature Conservancy (“TNC”) established the “Bristol Marsh Nature Preserve,” through a cooperative management agreement with Bristol Borough. Through this agreement TNC promised to develop a management plan for the Marsh. Following this agreement TNC preserved the following areas of the nature preserve:

- 1986 – TNC acquired an 11.26 acre conservation easement on Rohm and Haas property on the south side of Otter Creek. This area is forested and is buffered by additional forested lands still owned (without easement) by Rohm and Haas.
- 1989 – TNC bought the 2.567 acre Kasloff property. It sits between the Borough’s maintenance facility and the marsh. This portion of the marsh includes the old canal bed.
- 1996 – Three conservation easements (A, B, and C) held by TNC were established on 14.19 acres of Borough-owned woodland and mown park area on the north and northeast sides of the Marsh.



*Historic Map of Bristol Borough*

## **Purpose of Conservation Plan**

As described above the Marsh property (owned by Bristol Borough) and the woodland southwest of the Marsh (owned by Rohm and Haas) is protected via a conservation easement and management agreement with TNC. There are also an additional 2 acres owned by TNC on the former Kasloff Property. (See Ownership Map) Due to a change in TNC's mission and focus areas, the area has lacked consistent stewardship and, as such, its ecosystem is suffering. In light of the fact that TNC staff is in Harrisburg and cannot commit to the Bristol area any longer, TNC has asked that Heritage Conservancy (as a local land conservation organization with the appropriate capabilities) consider assuming the conservation easement and associated responsibilities.

In order to do so, Heritage Conservancy must assess the conditions of the Marsh and the subject property. Heritage Conservancy completed an initial Rapid Assessment Report in July 2008 and has engaged in a Conservation Planning Project to provide a more comprehensive site assessment, needs analysis and stewardship/management plan with the input of community stakeholders. The Conservation Plan is the result of this project and seeks to develop guidelines to meet the following goals:

- Protect the fragile ecosystem, particularly the six rare plant species found in the Marsh
- Improve, repair, and replace existing interpretive, educational facilities and provide for increased educational opportunities in relation to the Marsh
- Use the Marsh as a tool to assist in revitalizing Historic Bristol Borough



*Pickerelweed*



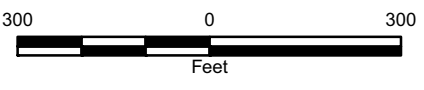
# BRISTOL MARSH

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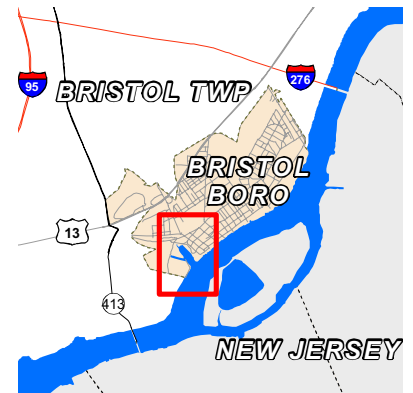
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## 2005 Aerial Photograph

### Legend

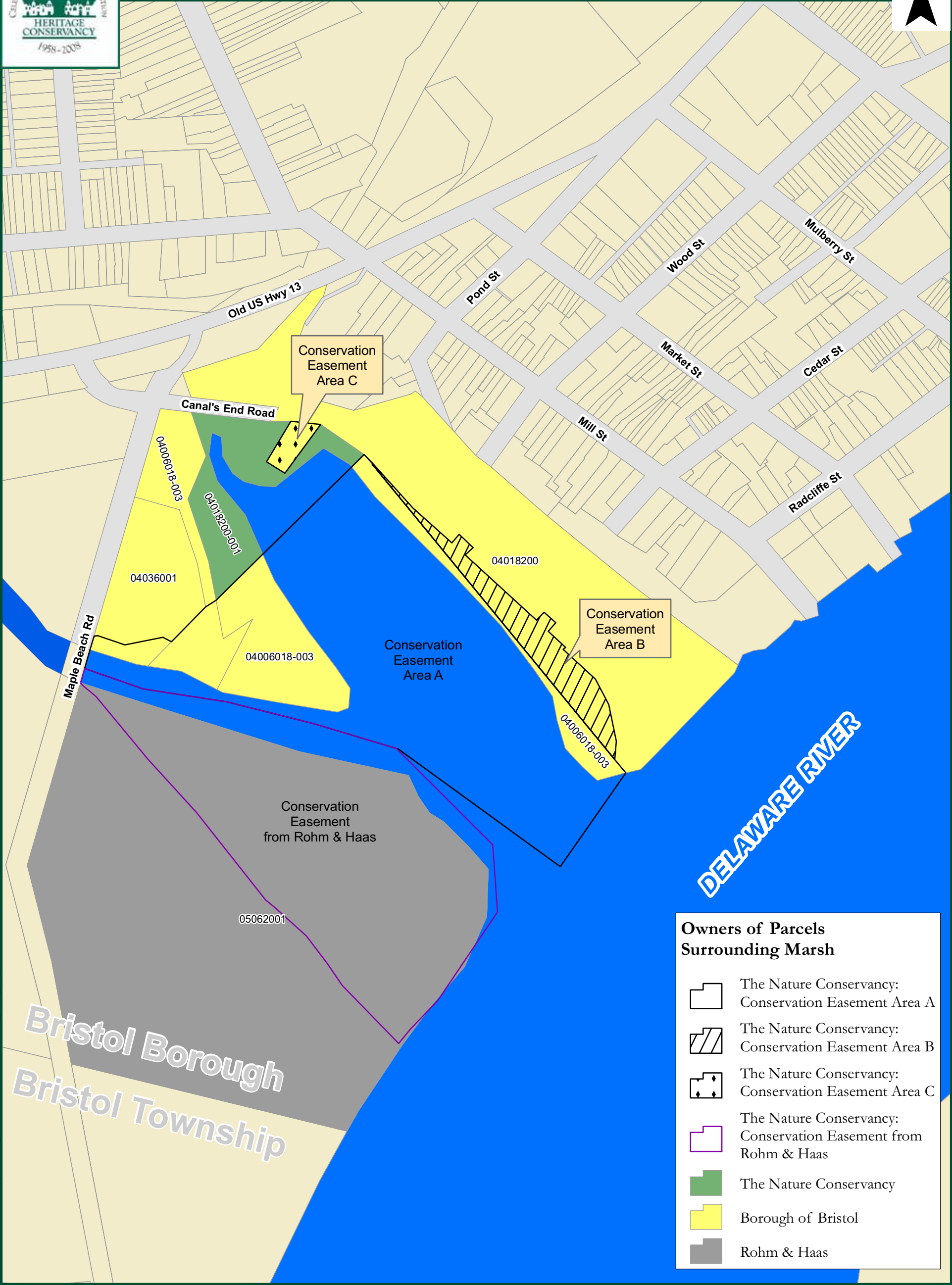
-  Parcel Boundaries










Data Sources: Parcels - Next Level Mapping, Inc.;  
Orthos - DVRPC (2005), Municipal Boundary - PA DOT;  
Roads - TIGER



# BRISTOL MARSH



**Owners of Parcels Surrounding Marsh**

-  The Nature Conservancy: Conservation Easement Area A
-  The Nature Conservancy: Conservation Easement Area B
-  The Nature Conservancy: Conservation Easement Area C
-  The Nature Conservancy: Conservation Easement from Rohm & Haas
-  The Nature Conservancy
-  Borough of Bristol
-  Rohm & Haas

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Bristol Borough  
Bristol Township

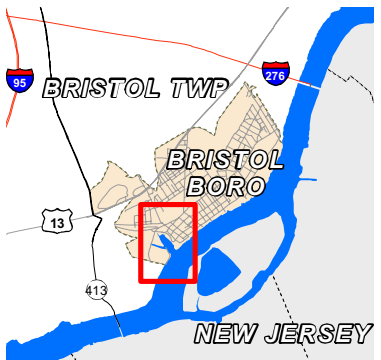
## Ownership Map

Data Sources: Parcels - Next Level Mapping, Inc.;  
Municipal Boundary - PA DOT; Roads - TIGER;  
Owner Information - The Nature Conservancy &  
MacNeel-Eisan Assoc.; Easement A, B, & C - Bristol Marsh  
Nature Preserve Plan by Gilmore & Assoc. Inc.; Rohm &  
Haas Easement - Plan of Rohm & Haas Property by  
William G. Major Associates



**Legend**

-  Parcel Boundaries



**For Illustrative Purposes ONLY. Parcel lines and easement lines are approximate.**



## II. Ecological Significance and Characteristics

### A Tidal Marsh

Freshwater tidal marshes, such as Bristol Marsh, are fragile and highly productive ecosystems. They provide unique and essential habitat for specialized flora and fauna and function as a water purifier and filter of surrounding waters and as a nursery for fish and other aquatic organisms.

According to Living Resources of the Delaware Estuary published in 1995 seven freshwater tidal marsh community alliances exist along the Delaware River. Bristol Marsh is made up of the Pickerelweed-Arrow-Arum Herbaceous Alliances (marshes or mid-tidal shores and flats). The vegetation existing in these alliances occurs on mid-tidal shores and flats or protected freshwater and slightly brackish tidal creeks and pools. The vegetation can also live in depressions with ponds on the high marsh that are flooded only during extreme high tide. Associated plants include:

- Pickerelweed (*Pontederia cordata*)
- Wild Rice (*Zizania aquatica*)
- Common Arrowhead (*Sagittaria latifolia*)
- Dotted Smartweed (*Polygonum punctatum*)
- Bur Marigold (*Bidens laevis*)



*Common Arrowhead - Sagittaria latifolia*

Living Resources of the Delaware Estuary lists marshes as having the following values:

- Important feeding grounds for migratory birds, waterfowl, and wading birds
- Spawning and nursery areas for anadromous fishes
- Water quality improvements (removing phosphorous, ammonia, and nitrates while adding oxygen)
- Recreational Activities (bird watching, nature study, hunting, fishing)

Marshes have been heavily impacted by human activity, mainly diking. Most were diked and converted to agricultural land by the early nineteenth century. When some dikes failed, the land reverted to tidal marsh, but converted often to Phragmite marshes.



*Ducks at Bristol Marsh*

## Natural Features

The Bucks County Natural Areas Inventory places Bristol Marsh as a Priority 2 Natural Area. The Marsh is described as containing a “high quality fresh water tidal marsh, a rare natural community type, and five plant species of special concern in Pennsylvania” (38). The document lists that the site includes a narrow strip of riparian floodplain forest and a degraded section of the Marsh which is undergoing restoration. Two observation platforms provide an opportunity to view the area.

The Bucks County Natural Areas Inventory also includes information about Maple Beach Dredge Spoil, a Natural Area southwest of the Marsh on the property owned by Rohm and Haas and partially under easement by TNC. This is a Priority 4 Natural Area that is an old field on dredge spoil and disturbed riparian forest. Invasive species such as Common reed (*Phragmites australis*) are a problem and a small population of Willow oak is present.

The Pennsylvania Natural Areas Index (“PNDI”) by the Pennsylvania Department of Conservation and Natural Resources (“DCNR”) lists six rare plant species in Bristol Marsh and Maple Beach. They are listed in the table below.

Table 1 - Rare Plant Species			
Scientific Name	Common Name	Global Rank	State Rank
<i>Amaranthus cannabinus</i>	Waterhemp Ragweed	Secure	Vulnerable
<i>Bidens bidentoides</i>	Swamp Beggar-Ticks	Vulnerable	Critically Imperiled
<i>Echinochloa walteri</i>	Walter's Barnyard-Grass	Secure	Critically Imperiled
<i>Sagittaria calycina</i>	Long-Lobed Arrow-Head	Secure (Subspecies Apparently Secure)	Critically Imperiled
<i>Sagittaria subulata</i>	Subulata Arrow-Head	Apparently Secure	Vulnerable
<i>Zizania aquatica</i>	Indian Wild Rice	Secure	Vulnerable

Source: DCNR



Mix of plants at Bristol Marsh

The Marsh and Maple Beach are both within a floodplain area based on data from the Pennsylvania Department of Environmental Protection (“PA DEP”) and the Geology is Trenton Gravel according to the Pennsylvania Geologic Survey by DCNR. (See Natural Resources Map)

Data from the United States Department of Agriculture shows two types of soil around the Marsh. The property owned by the Borough is Urban Land,

while the property owned by Rohm and Haas is made up of Udorthents, reflecting that much of the area is most likely made up of fill. (See Soils Map)

The United State Geological Survey Topographic Map reflects that Bristol Marsh is largely in an urban area, near areas of sewage disposal. No dramatic changes in the topography occur in the Marsh area and the Marsh appears to exist between 15 and 20 feet above sea level. (See Topographic Map)

## Existing Conditions

Between March and August 2008, Heritage Conservancy completed a number of site visits to the Marsh to review the general conditions of the Marsh, check for invasive species and document the continued existence of the rare plant species documented by DCNR.

The early visits to the Marsh focused mainly on the areas along the edge of the actual Marsh. A wall of vegetation blocks most of the view of the Northeast side of the Marsh from the Mill Street Parking Lot. This vegetation is mostly made up of invasive species and poison ivy. The invasive plants include:

- Norway Maple
- Patalonia
- Black Locust
- Purple Loose Strife
- Thistles
- Stilt Grass
- Catalpa

Some native plants were identified in this area as well. These included an Alder, an Ash and Jewelweed.

The paths along this side lead through the dense vegetation to wooden outlooks and educational signage. On one site visit a group of students were seen on the outlooks with their teacher observing the Marsh. The outlooks are covered in graffiti and have some spots that need repair. Two of the signs have been ripped out of the ground, and lie on their sides. Most of the signs are covered in graffiti. The paths are lined with trash, including broken bottles and plastic wrappers.



*Jewelweed growing on Northeast side of the Marsh*



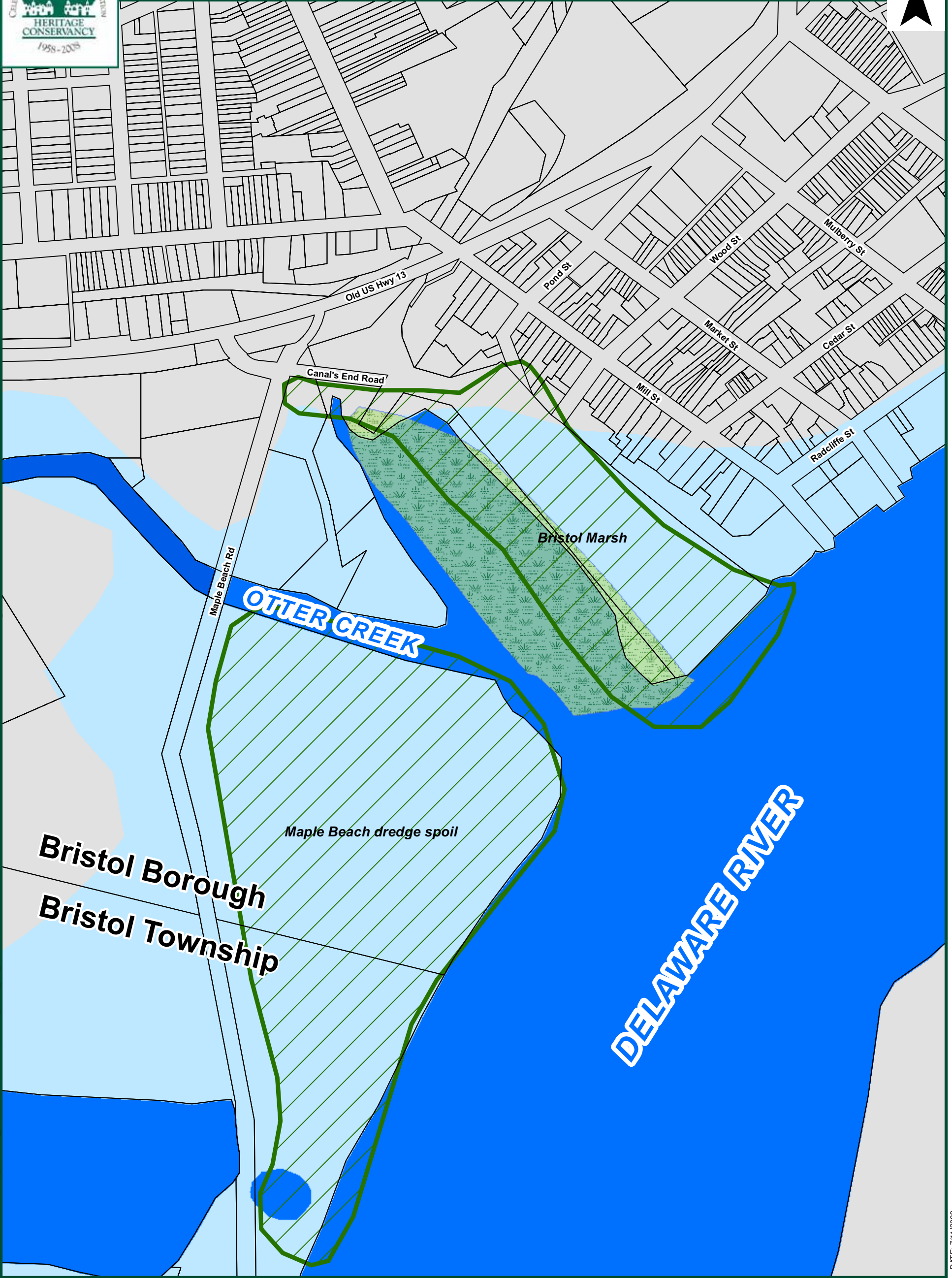
*Trash near Marsh trails*



*Vandalized educational signage at Marsh*



# BRISTOL MARSH



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




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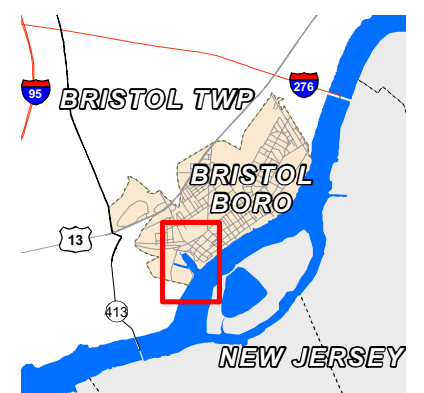


## Natural Features Map

Data Sources: Parcels - Next Level Mapping, Inc.  
Municipal Boundary - PA DOT; Floodplains-PADEP  
Wetlands-USFWS; Natural Areas- BCPC

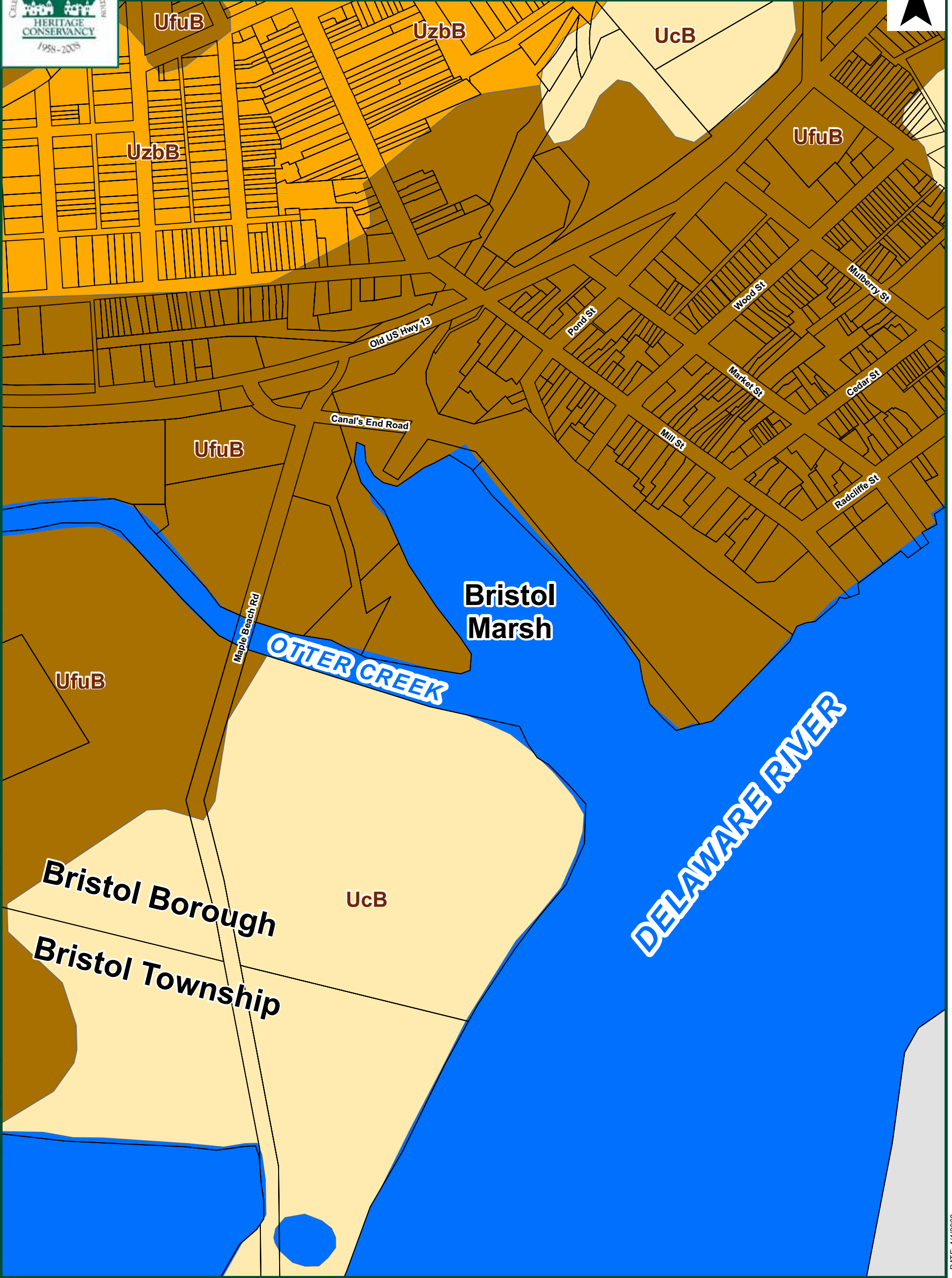
### Legend

-  Parcel Boundaries
-  100 Year Floodplain
-  Surface Water
-  Bucks County Natural Areas Inventory
-  NWI Wetlands



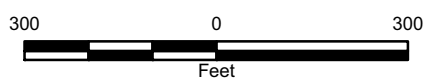


# BRISTOL MARSH



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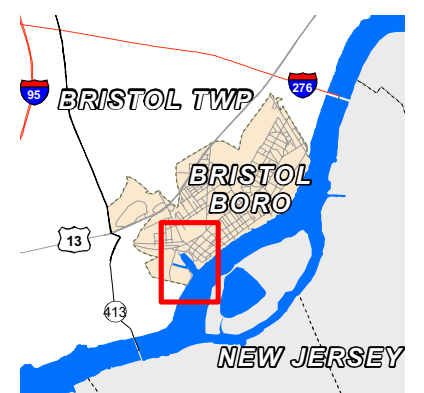


## Soils Map

### Legend

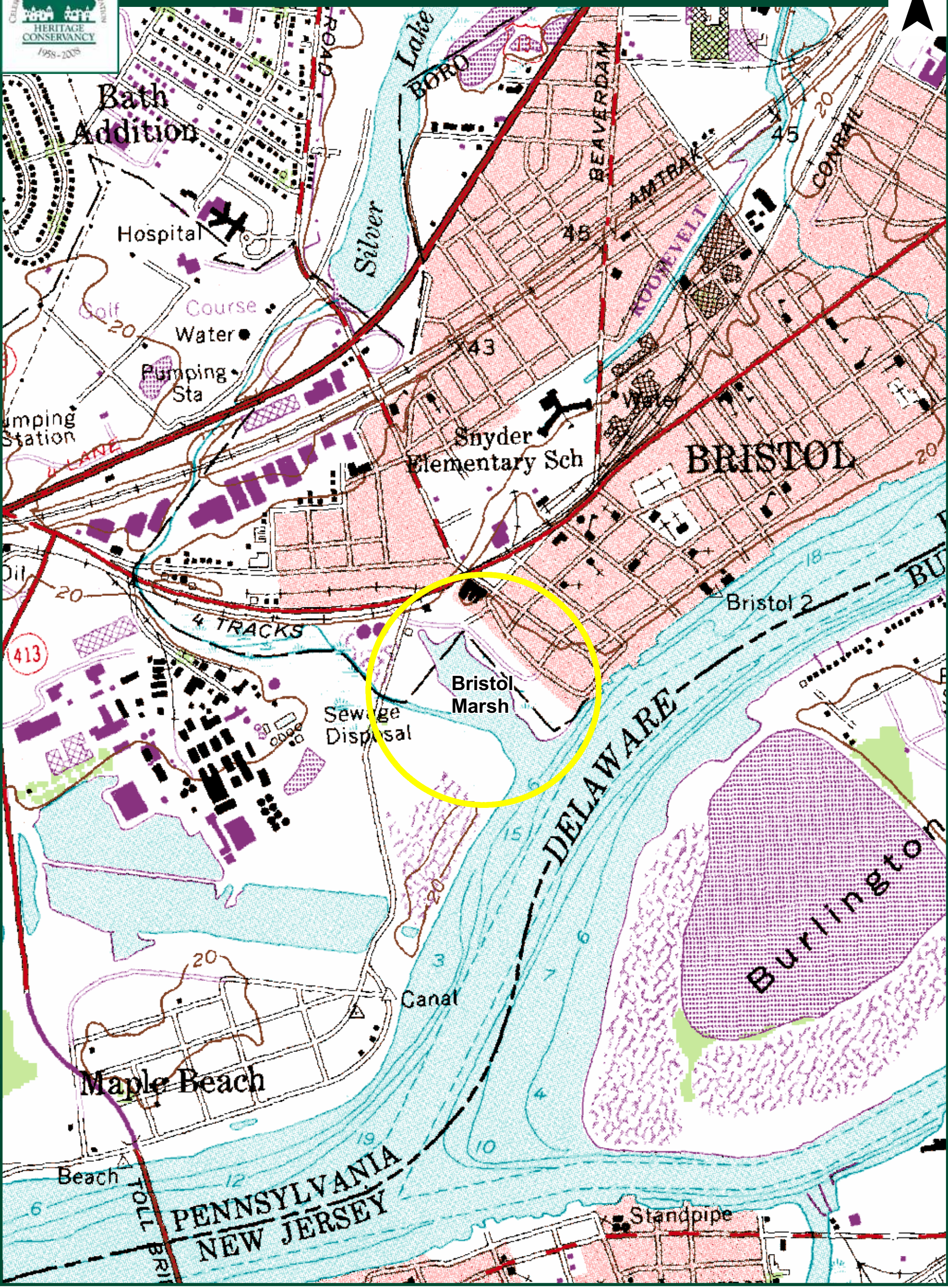
- UcB - Udorthents, sandy
- UzbB - Urban Land-Udorthents
- UfuB - Urban Land
- Parcel Boundaries
- Surface Water

Data Sources: Parcels - Next Level Mapping, Inc.  
 Municipal Boundary - PA DOT;  
 Soils - USDA/Natural Resources Conservation Service 2004



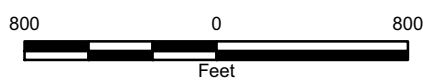


# BRISTOL MARSH



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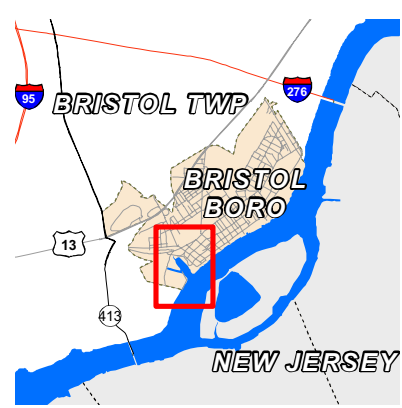
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## Topographic Map

- Legend
-  Area of Interest

Data Sources:  
Topo - USGS Bristol Quad 1955, Photorevised 1981





Just north of the parking lot, is an abandoned brick building on Borough property. It was recommended in *The Bristol-Delaware River Strategy: Actions for Riverfront Revitalization* for conversion into an office that could be used by a representative from TNC monitoring the Marsh. This building remains abandoned and therefore available for such a use. Although the roof, interior walls, windows and doors need to be replaced, the brick, outer walls remain intact.



*Abandoned water department shed near Marsh*

A small portion of the land along Maple Beach Road is under Conservation Easement Area A. Along Maple Beach Road on the Northwest side additional invasive plants were identified. These included:

- Mulberry
- Japanese Knotweed
- Pokeweed
- Japanese Hops
- Queen Anne's Lace
- Catalpa
- Stilt Grass



*Japanese Knotweed along Maple Beach Road*

The Bristol Borough Public Works Maintenance Facility is along this road. This property is owned by the Borough and not under easement. The property seems to be largely used as storage area for Borough waste. Piles of dirt, pipes, wood, metal grates, and other debris exist along the dirt road leading through the facility. There are also a few small storage sheds on the property and a trailer and construction equipment.



*Bristol Borough Maintenance Facility*



*Gate behind Borough Maintenance Facility leading to Marsh buffer*

A gate at the back of the facility leads back out to the easement area. This area serves as a buffer between the Marsh and the maintenance facility. This area was also planned for restoration by TNC; however it is unknown whether restoration occurred. The area is highly overgrown with vegetation suggesting that plantings are not new.

Past the maintenance facility Maple Beach Road crosses over Otter Creek. From the bridge it is possible to see trash within the Creek. It is unclear whether this has floated in from somewhere else or been dumped directly from the bridge, however trash along the road suggests the possibility of illegal dumping.



*Otter Creek, looking towards Marsh*

Past the bridge a dirt path leads to the fourth conservation easement on land owned by Rohm and Haas. The path appears to represent the Southwest edge of the easement, with Otter Creek and Bristol Marsh on the Northeast edge.



*Maple Beach Bridge over Otter Creek*

The Rohm and Haas property does not have the dense, invasive vegetation covering the Northeast side of the Marsh. The ground is sandy and native plants, including Oak trees, Sensitive Fern and Sassafras, were identified here. In addition the state rare Wild Rice was identified here. While Phragmites were not identified in the easement area they could be seen on other portions of Rohm and Haas Property.



A lot of activity appears to go on in this area. The remains of a camp fire and paint balls were found. In addition a couple was picnicking in this area during the site visit.

On August 21, 2008 Heritage Conservancy staff along with Doctor Anne F. Rhoads, PhD, senior botanist for the Pennsylvania Flora Project at the Morris Arboretum at the University of Pennsylvania, walked through the Marsh itself during low tide. This was done in order to observe and confirm the existence of the rare plant species at the Marsh.

Of the six species identified in the PNDI, four were identified during this site visit. These included:

- Long-lobed arrowhead
- Subulate arrowhead
- Water-hemp ragweed
- Wild rice

Of these four species all four of them were found in significant amounts throughout the Marsh. Walter's barnyard grass was not identified. A plant that appeared to be the globally rare swamp beggar's ticks was identified, however only a few of these plants were found on the northeast edge of the Marsh. It was not possible to confirm that this plant was the globally rare species since it had not yet bloomed.

Other native species of significance were identified in the Marsh by Dr. Rhoads. These included:

- Multi-flowered mud-plantain (*Heteranthera multi-flora*)
- Horehound (*Lycopus rubellus*)
- Pickerelweed (*Pontederia cordata*)
- Common arrowhead (*Sagittaria latifolia*)
- Spatterdock (*Nuphar lutea*)
- Arrow Arum (*Peltandra virginica*)

Limited amounts of disturbance appear in the Marsh itself. One large tire was seen in the Marsh and a small area was covered in the invasive purple loosestrife.



*Path along edge of Rohm and Haas easement*



*Paint balls found on Rohm and Haas easement*



*Large tire in Marsh*

Vegetation found on Rohm and Haas property



*Phragmites growing on Rohm and Haas property outside of easement area*



*Sensitive fern on Rohm and Haas easement*



*Oak on Rohm and Haas easement*



*Woodland on Rohm and Haas easement*

Rare Species found in Bristol Marsh



*Long-lobed Arrowhead (Sagittaria calycina)*



*Waterhemp ragweed (Amaranthus)*



*Subulata Arrowhead (Sagittaria subulata)*



*Indian Wild Rice (Zizania aquatica)*

Other native species of significance found in Bristol Marsh



*Multi-flowered mud-plantain –  
(Heteranthera multi-flora)*



*Pickerelweed  
(Pontederia cordata)*



*Horehound (Lycopus rubellus)*



*Common arrowhead  
(Sagittaria latifolia)*



*Spatterdock (Nuphar lutea)*



*Arrow Arum (Peltandra virginica)*



*Marsh high ground with purple loosestrife*

## TNC Plans, Studies and Projects

The Nature Conservancy first presented a proposal for developing a nature preserve at Bristol Marsh in February 1985 with its document *Bristol Marsh: A Nature Preserve on the Delaware River – A Proposal from the Nature Conservancy*.

Within this proposal TNC offered to develop a management plan that will meet the following management needs:

- Education
- Signage
- Clean Up
- Mowing

The education element included engaging local schools, clubs and the Silver Lake Nature Center; forming a local volunteer committee; developing an informational brochure on the marsh; and improving site access via a nature path or boardwalk. Signs that would be needed include “Nature Sanctuary” signs around the perimeter, a large wooden entrance sign, and signs discouraging littering and dumping of trash. As part of clean up, TNC recommends regular clean ups with local community groups because of trash washed up by the Delaware River and developing a recycling program at Silver Lake Nature Center. TNC also recommends reducing the area mowed by the Borough and developing a mowing schedule with the Borough.

Shortly following this proposal, in December 1985, the National Park Service, in its report entitled *The Bristol-Delaware River Strategy: Actions for Riverfront Revitalization*, also made recommendations for restoring Bristol Marsh (which it refers to as the “Otter Creek Marsh Preserve”). It recommended the following actions to be taken:

- Create a gateway entrance at the intersection of Maple Beach Road and Old Route 13 with appropriate signage and plantings
- Consider renovating the Water Department Shed, a well-preserved brick building with a tile roof located a short distance from the gateway, for several purposes including a headquarters for the Otter Creek Marsh Preserve, a visitor’s center and an historical museum
- Provide planned facilities for the Otter Creek Marsh Preserve, including nature trails surrounding the marsh, a boardwalk leading out over the marsh to an observation platform, signs, and outdoor displays
- Develop a program of clean-up and maintenance involving local volunteers, as well as a series of public walks and other events
- Link the Marsh to the waterfront park and business district through a system of walkways

According to this document funds for the project are being raised from public and private sources, including the federal Land and Water Conservation Fund and several private foundations and corporations.

On June 7, 1993 the Bristol Marsh Site Management Plan was completed by TNC. This document was meant to set forth an overall approach to future management of the Bristol Marsh property. Included within this document is a summary of projects completed to date. The listed projects include:

- 1986 – TNS provides 50% match to Bristol Borough’s grant application to PA DCNR for construction of overlooks
- 1989 – TNC proposes restoration project to address dumping issue on Parcels 4-18-200-1 and 4-36-1
- 1992 – In the fall 10 stalks of purple loosestrife were removed

The Management Plan Recommendations include:

- Complete restoration project on TNC and Borough Municipal facility land (grading, planting, install permanent fence between restoration area and Borough facility, install interpretive signs and boardwalk by 1994)
- Establish intensive monitoring and maintenance program for restoration areas
- Establish monitoring program for *Bidens bidentoides* (last monitoring conducted in September of 1982)

- Establish education program in coordination with Silver Lake Nature Center
- Implement invasive plant removal strategy and have regular clean-up days
- Find and support volunteer monitor to assist TNC in watching for threats or encroachment
- Review site design with regard to the latest property ownership info
- Pay property taxes (or pursue tax-exempt status)
- Strengthen cooperative management agreement with regard to property involved, renewal periods, responsibilities vs. expectations, if opportunity arises

In February 1993 a Subsurface Evaluation by GZA GeoEnvironmental, Inc dug eight test pits on TNC land to determine the soil quality. This study revealed that fill material consisted of municipal and residual waste and tests detected low levels of VOCs and TPH. The TPH levels exceeded PA DEP Groundwater Protection A levels in all locations, and Protection B levels in one location. By exceeding Protection A restrictive conditions are required by PA DEP. Exceeding Protection B is not permitted. The report recommended further studies.

Based on this recommendation TNC retained DelVal Soil and Environmental Consultants to complete further analyses in August 1993. DelVal's Evaluation of Fill Material determined the following:

- Fill material was previously placed at the site, probably to cover over the underlying wetlands.
- The fill is made primarily of municipal trash and river dredgings (a dark brown to black material) with a secondary amount of orange to grey ash material that is probably the remains of trash incineration. No liquid sludge or indications of unique toxic wastes were observed and no volatile organic odors were encountered in the fill.
- Water seeped from the lower level of most of the excavations and probably represented a shallow water table that was slightly higher than the marsh water level. No unique odors or materials were observed in the water.
- The results of the soil analyses revealed elevated levels of cadmium, lead and mercury. Lead was a primary concern since it was believed to be a health risk if ingested.
- The Toxicity Characteristic Leaching Procedure ("TCLP") results showed no leaching of any metals except lead, and the lead leaching levels were below the limits for hazardous materials current at the time.
- The petroleum hydrocarbon levels exceeded PA DEP requirements for clean soil.

- All of the water samples met the drinking water standards that were current at the time and no volatile organics were found.
- No obvious obstructions to root growth were observed. All but one of the soil nutrient tests revealed an excessively high soil pH and level of calcium.

Before acquiring any property it is The Nature Conservancy's policy to complete an environmental assessment of the property. An environmental assessment of Bristol Marsh was completed in October 1994. The following was discovered upon completion of the assessment:

- The historical use of the property was as “canal, parking lot, borough maintenance facility, park, and vacant industrial land”
- Areas of the Marsh have distressed vegetation and/or are bare for no apparent reason
- The Marsh contained unusual odors and stains
- There was evidence of dumping, trash or other debris
- Disposed waste on site was made up of “appliances, construction debris, household trash, incinerator ash, tires, car wash brushes, and leaf compost”
- PA DEP had sent a letter to Borough asking it to clean-up the site
- Soil contamination “does not pose an unacceptable health risk to humans at the site”

Based on this assessment TNC believed that restoration of the uplands would decrease the liability of TNC and the Borough and stop short dumping in the long-term.

The information from these documents leads to a number of questions. It is unclear whether any of these plans or studies impacted the Marsh. Most significantly no information has been provided as to whether the proposed restoration project has been completed. This restoration project should be referred to for guiding future Marsh projects.

## Cultural and Recreational Resources

Cultural and Recreational Resources also are closely linked to the Marsh area. The Marsh is immediately adjacent to Bristol Borough Riverfront Park, the riverfront park used for community events and outdoor activities. It is also at the end of the Delaware and Lehigh National Heritage Corridor trail which follows the watered and filled portions of the Delaware Canal. This serves as a reminder of the Marsh's connection to the Delaware Canal, which ended in a now filled basin next to the Marsh. Today Bristol Borough is looking at opening portions of the Delaware Canal.





*Bristol Borough Riverfront Park near Marsh*

Further northeast of the Marsh is the Bristol Historic District and the Spurline Trail that links green space in Bristol. North is the Silver Lake Nature Center. The Silver Lake Nature Center is an important environmental education resource in Bristol. Silver Lake currently offers programs for school students at the Marsh, focusing particularly on how tides work. These programs have been utilized less by the school districts in recent years according to Robert Mercer, Director of Silver Lake Nature Center. The Bristol Borough Open Space Plan recommends connecting Silver Lake Park to the Marsh via a trail following Otter Creek.

A Heritage Trail was also proposed in the Open Space Plan to wrap around the Marsh and follow the Delaware River to Bensalem. Bristol Marsh clearly plays an important role in Bristol's open space network and will likely play a more significant role in the future. (See Location Map)

## Trends/Threats

Bristol Marsh has consistently faced change throughout history. It is highly likely that some of it was filled in by European settlers and since then it has been impacted by the growth of a dense urban town and development along the Delaware River, the building and closing of the Delaware Canal and Canal basin, and the development of a parking lot, a trail and a riverfront park. The Marsh is likely to be subject to future impacts as revitalization is planned for the Delaware Riverfront.

Ecologically speaking, based on site analysis and comments by Dr. Rhoads, it appears that the Marsh itself is in very good condition. Most, if not all, of the rare plant species continue to thrive in the Marsh. In addition a number of species important to the Pickerelweed-Arrow-Arum Herbaceous Alliances seem to be doing well.



*Blue markers near Marsh showing former path of the Delaware Canal*



*Invasive species, Japanese hops along Maple Beach Road*

Despite this the Marsh is facing a number of threats. These include:

- Invasive species
- Hazardous waste
- Littering/Dumping
- Debris from Delaware River

Invasive species not native to Pennsylvania spread very quickly and are likely to use up natural resources and harm native and rare plants. Although most invasive species were found outside the Marsh, purple loosestrife has already spread into the Marsh itself, threatening the rare plants of the Marsh. Native plants provide natural habitats for the animal species native to the Marsh, and invasives are likely to uproot this by attracting unwanted pests and animals.



*Debris collecting at edge of Marsh*

Little information is available about what happened after the completion of a number of TNC's studies and proposals. According to TNC community volunteer Cheryl Hamm, some debris was removed as part of the restoration plan and new plantings were completed along Otter Creek, but she is not convinced any of these changes made a significant difference or that any of the new plantings survived.

It is unknown whether anything was done to improve the soil quality on the property or to restore the Marsh. If nothing has been done it is likely that the Marsh continues to be threatened by hazardous waste which also is likely to impact the quality of drinking water. In addition the piles of garbage and debris at the Borough Maintenance Facility also present a potential hazardous threat to the Marsh.



*Trash pile within Bristol Borough maintenance facility*

Littering and dumping is probably the most visible threat to the Marsh. Despite garbage cans in the parking lot and signs threatening fines for illegal dumping, garbage litters the park area, Maple Beach Road, and the Rohm and Haas property. In addition destruction of the overlooks and signs is seen throughout the site. While these issues present potential contaminants to the natural environment, they also harm the overall appearance of the Marsh, discouraging visitors and presenting a negative image of the Marsh not only to the Bristol community, but all who visit the Marsh.

It seems likely that much of the debris found in Otter Creek and in the Marsh itself has washed in from the Delaware. This again detracts from the overall visual appearance of the Marsh. Unfortunately this element is much more difficult to control

# BRISTOL MARSH



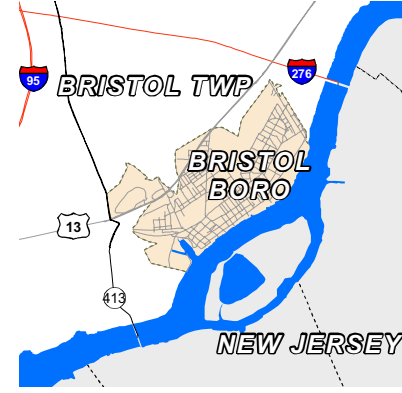
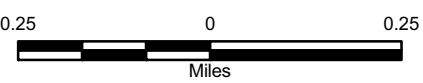
## Location Map

FILE: \\Gisserver2\GIS\Projects\2729 BRISTOL\_MARSH\Map\Bristol\_Marsh Jan 2008.mxd

DATE: 9/4/2008

### Legend

- |  |                           |  |                              |  |                         |
|--|---------------------------|--|------------------------------|--|-------------------------|
|  | Private Open Space        |  | Existing and Proposed Trails |  | Surface Water           |
|  | Public Open Space         |  | Library                      |  | Delaware Canal (Filled) |
|  | School Open Space         |  | Municipal Building           |  | Municipal Boundaries    |
|  | Bristol Historic District |  | School                       |  | Roads                   |



Data Sources: Parcels - Next Level Mapping, Inc.; Muncipal Boundary - PA DOT; Roads - TIGER; Trails and Open Space - Bristol Boro Open Space Plan



### III. Relationship to Other Plans

The Comprehensive Plan for Bristol Borough completed in July 2006 serves as a source of background information and future recommendations for Borough decision makers. It was also written to satisfy the legislative mandate that a comprehensive plan be prepared at least once every 10 years.

This plan lists Bristol Marsh as part of the “Conservation District,” which is protected under the zoning ordinance. According to the plan, some of the land surrounding Bristol Marsh, though, is not zoned. This included a parcel used for municipal facilities, which the plan recommended zoning as industrial or Conservation District. Another parcel, owned by Rohm and Haas, further from the Marsh, is partially in the Borough, but mostly in Bristol Township. The comprehensive plan recommended zoning the piece in the Borough as Conservation District. The plan also recommended adding the entire Maple Beach Area (on another parcel owned by Rohm and Haas) into the Conservation District. Sally A. Bellaspica, zoning officer for Bristol Borough, has confirmed that since this recommendation these parcels have been zoned as part of the Conservation District.

The plan describes Bristol Marsh as the best remaining example of a freshwater tidal marsh in Pennsylvania. It is considered a rare, natural community, functioning as a nursery, pollution filter and water purifier for the Delaware River.

The plan makes the following recommendations in relationship to Bristol Marsh:

- The Borough acquire the Maple Beach Property
- Extend a recreation trail all the way around the Marsh to Maple Beach, which could then extend all the way to Bensalem (based on *The Bucks County Waterfront Revitalization Plan*)
- All construction in the Otter Creek watershed should be based on recommendations of *The Otter Creek Stormwater Management and Flood Control Study* (BCPC 1999)
- Maintain signage to encourage more park usage
- Additional benches, bike racks, trash cans, lighting and landscaping along trails
- Establish coordinated trails wayfinding system

### Bristol Borough Parks, Recreation, & Open Space Plan

*The Bristol Borough Parks, Recreation, and Open Space Plan* was completed in 1996 and contains similar information to the Bristol Open Space Plan, completed in 1998.

The most interesting recommendation with regards to Bristol Marsh is to convert Borough Yard (Public Works Facility by the Marsh) to an educational and interpretive center for the Marsh Preserve. This project was given a long-range priority to be completed in 3-5 years. The plan recommends reviewing the feasibility of this project.

Another recommendation is to restore the Bristol Summer Youth Program. This project was given a high priority to be completed in 1-2 years. This was a day camp that offered games, arts and crafts, athletics, picnics and field trips. A program like this provides a possible forum for educating students about the Marsh and its value.

The report includes a description of Silver Lake Park and the Bristol Marsh Preserve. The Location Map shows that Bristol Marsh is part of a proposed recreation corridor of trails and parkland through the Borough. A separate Preliminary Master Plan Delaware Canal Map shows proposed improvements related to this historic transportation corridor.



*View of trail along east side of Marsh*

## **Bristol Borough Open Space Plan**

This plan completed in 1998 provides a general description of Bristol Borough's significant open space areas and includes a great deal of material from the *1996 Park, Recreation and Open Space Plan*. It makes recommendations for land acquisitions and future plans for trails linking open space within the Borough.

Bristol Marsh is listed as a Conservancy Area, occupying 25 acres of open space. It is described as home to various unique and endangered vegetative species and a habitat for a wide array of wildlife.

The plan adds a new goal to preserve and protect significant environmental areas in the borough and a new related objective to implement long range planning efforts to preserve and protect open space lands along the Otter Creek and Adam's Hollow Creek.

Bristol Marsh is mainly referenced in terms of projects already completed at that time by TNC. Otter Creek, however, is referenced several times. Currently Otter Creek is followed by an intermittent trail that is interrupted by industrial uses. The plan recommends using it as a potential link between Silver Lake and the Marsh, establishing easements along the Creek to protect the remaining open space and establishing a complete trail leading from Silver Lake to the Marsh.

## Bucks County Plans

Both *The Bucks County Comprehensive Plan* (December 1993) and *The Bucks County Natural Resources Plan* (March 1999) emphasize the importance of protecting the integrity of existing wetlands and floodplains in Bucks County through acquisition and easements and other protection strategies. In addition, the natural resources plan recommends developing interpretive programs for significant natural features.

The Bucks County Park and Recreation Plan (December 1986) recommends that the county acquire significant natural feature sites that can be used for parkland and list Bristol Marsh as an existing natural feature park.

## A Management Plan for the Delaware Estuary

This plan, completed in September 1996, is a “blueprint” for the 2020 “Vision” of the Delaware Estuary. It was put together to address necessary environmental and economic improvements, water supply and water quality, and public involvement and access to the river and its resources.

This plan views wetlands as a valuable resource, recognizing that those living along the Delaware estuary pay for the loss of wetlands through water treatment costs, erosion, and the cost of flood protection and control. Between 1954 and 1971 it is estimated that between 21 and 24 percent of the originally existing wetlands of the Delaware Estuary have been lost, reducing fish populations and water supply through a lack of groundwater retention and increased salinity. One of the major negative impacts on Marshes according to this plan has been caused by the spread of Phragmites, which impacts wildlife habitats by decreasing available food, reducing diversity and decreasing the open water space.

The plan lays out several management actions with regards to habitat protection related to Marshes. These include:

- Support the Implementation of Urban Best Management Practices
- Coordinate and Enhance Wetlands Management within the Estuary
- Reduce the Cumulative Loss of Wetlands
- Target Habitat Enhancement Opportunities for Present and Future Action
- Develop and Implement an Estuary-Wide Policy to Evaluate Proposed Intentional Introductions of Exotic Species and Prevent Unintentional Ones
- Protect Rare Species through a Landscape Approach
- Develop Educational Initiatives in Support of the Habitat and Living Resources Action Plan
- Promote Ecotourism in the Estuarine Region
- Encourage Use of Citizen Monitoring Activities and Best Available Technology for Monitoring
- Promote “Hands-On” Educational Activities and Volunteer Stewardship Opportunities



*View of Delaware River near Marsh*

## Lower Delaware River Management Plan

The *Lower Delaware River Management Plan* (August 1997) was written to achieve protection of the valuable natural, historic and cultural resources. It is also a component of a study to determine eligibility of the Lower Delaware River in the National Wild Scenic River Program.



The goals from this plan include (Page 3):

- Maintain existing water quality in the Delaware River and its tributaries from measurably degrading and improve it where practical
- Preserve and protect the river's outstanding natural resources, including rare and endangered plant and animal species, river islands, steep slopes and buffer areas in the river corridor and along tributaries
- Encourage recreational use of the river corridor that has a low environmental and social impact and is compatible with public safety, the protection of private property and with the preservation of natural and cultural qualities of river corridor
- Identify principles for minimizing the adverse impact of development within the river corridor
- Preserve open space as a means of maximizing the health of the ecosystem, preserving scenic values, and minimizing the impact of new development in the river corridor

This plan recognizes Bristol Marsh as a wetland and a significant natural resource and therefore a vital link in our ecological system, providing critical habitats to rare and endangered species of wildlife and plants. It lists Bristol Marsh as one of the three remaining freshwater tidal areas on the Delaware River. The plan also points out that wetlands are natural filters regulating hydrologic functions such as maintaining streams, stabilizing groundwater tables, groundwater recharge and stormwater flood capacity.

The plan also lists Maple Beach as a "critical habitat" (Page 32).

For significant natural areas such as wetlands the plan calls for the following actions:

- Promote stream corridor preservation and protection of steep slopes, floodplains, and wetlands
- Encourage protection of significant natural resources, including rare and endangered plant and animal species and significant wildlife habitats
- Native plant materials should be used in landscaping
- Corridor municipalities should provide stream corridor protection through preserving buffers, steep slopes, wetlands, floodplains, and woodlands that are a vital part of the ecosystem of the river corridor

With regards to recreation the plan recommends the following actions (Pages 43-44):

- Establish publicly owned land which provides appropriate river access and support facilities for people pursuing recreational opportunities
- Establish strict rules on excessively noisy, intrusive, reckless and environmentally harmful activities or vehicles in the river corridor, and promote enforcement of those rules by both states
- Promote appropriate public access points with maps, guidebooks, signs, etc. to reduce recreational trespassers on private property
- Lands with significant recreational value within the corridor should be publicly owned or protected by land trusts in order to facilitate public recreational use
- State, county, municipal, and private entities should provide additional access sites to the river, particularly low-impact recreational activities that are environmentally suited to protecting the river habitats
- A comprehensive interpretation plan for the entire Lower Delaware River corridor should be developed that is compatible with the plan prepared for the Delaware and Lehigh Navigation Canal National Heritage Corridor

This plan recognizes that its success is dependent on well-informed citizens and landowners and emphasizes the importance on educating children who will provide future stewardship of the river. The plan therefore encourages outreach to increase awareness of the river and its tributaries.

## Lower Delaware River Conservation Plan

The *Lower Delaware River Conservation Plan* (September 1999) was written to address how best to handle the increasing population and development to ensure the environmental stability and beauty of the Delaware River and its tributaries.

The plan sets forth several Goals, as listed below (Pages 47-51):

- Maintain existing water quality in the Delaware River and its tributaries from measurably degrading and improve it where practical
- Preserve and protect the river's outstanding natural resources, including rare and endangered plant and animal species, river islands, steep slopes and buffer areas in the river corridor and along the tributaries
- Preserve and protect the character of historic structures, districts and sites, including landscapes, in the river corridor
- Encourage recreational use of the river corridor that has a low environmental and social impact and is compatible with public safety, the protection of private property and with the preservation of natural and cultural qualities of the river corridor

- Identify principles for minimizing the adverse impact of development within the river corridor
- Preserve open space as a means of maximizing the health of the ecosystem, preserving scenic values, and minimizing the impact of new development in the river corridor

The following specific projects within this plan relate to areas surrounding Bristol Marsh:

- Restore and stabilize banks along Otter Creek near Bristol Marsh
- Develop public access through pedestrian/biking trails, fishing, boating etc at Delaware River
- Construct “Comfort Stations” in Bristol Borough Riverfront Park
- Extend Bristol Spurline Park
- Develop a Canal Landing/Tourist Center in Downtown Bristol (Page 60).
- Implement BMPs on the borough public works yard in conjunction with restoration efforts along Otter Creek
- Acquire privately-owned marshlands located along the historic Delaware Canal and towpath for purposes of conservation, pedestrian trails and interpretation

Based on the issues addressed in this plan Bristol Marsh will be in the middle of a few different future projects, including plans for a trail linking to Silver Lake and plans for waterfront development and the park along the Delaware. This makes Bristol Marsh a very key element in Bristol’s future plans.

The plan provides a brief description of the Silver Lake Nature Center, a potential partner in future environmental education activities at the Marsh.

## Delaware River Heritage Trail: State of the Trail Report

This report was written in October 2003 and provides information of plans for a Delaware River Heritage Trail. The National Park Service has been working with local stakeholders for a number of years to develop and implement a trail to link the communities along both sides of the tidal Delaware River for recreational, cultural and economic purposes. The walking and bicycling trail consists of a loop primarily located along the riverfront, with Morrisville and Trenton at the northern end and Philadelphia and Palmyra at the southern end. Portions of the proposed trail will correspond with the East Coast Greenway, a continuous trail corridor from Maine to Florida.

The report indicates that the Delaware River Heritage Trail will extend two miles through Bristol Borough in close proximity to Bristol Marsh.



*Otter Creek*

## Delaware River Heritage Trail Proposed Route Southern New Jersey and Pennsylvania



*Proposed route for the Delaware River Heritage Trail*

### Water Resources Plan for the Delaware River Basin

This plan was finished in September 2004 and addresses the water resources issues and problems in the Delaware River Basin, seeking an integrated approach towards its management.

This plan does not refer to specific locations in terms of what is important and where projects should be done. It instead lays out overall objectives to apply to the Delaware River Basin as a whole.

Many of these objectives relate to Bristol Marsh. The plan emphasizes that water quality and supply, stormwater management and flood prevention all benefit from healthy aquatic and riparian ecosystems and therefore we must work to restore, protect and enhance them. The plan also calls for invasive species management and the use of natural vegetation to encourage soil health, preventing erosion and sedimentation.

One final element the plan emphasizes is education and community engagement. This includes raising awareness and encouraging citizens to be involved in water resource stewardship. The plan also suggests professional training in the private and public sectors about opportunities to apply water resource protection tools, operations management for pollution prevention, maintenance methods, etc. Such an education program may be appropriate for the Bristol Borough public works department.

## IV. Stakeholder Input

In order to establish a vision for the Marsh, Heritage Conservancy began by speaking with Stakeholders at a meeting on March 18, 2008. During this meeting concerns about the Marsh and its history were shared (See Appendix 1 for meeting details). Stakeholders expressed their short and long-term goals for the Marsh. In addition, Heritage Conservancy has held a number of key person interviews to gain increased feedback about the Marsh project. Key person interviews were completed with:

- Loretta Vasso, Community Mobilizer, Bristol Borough Community Partnership
- Bobbie Enke, Board Member, Bristol Borough Community Partnership
- Science Teachers, Bristol Junior High School
- Megan Ivey, Bristol Borough Revitalization Task Force
- Scott Patterson, Community Member
- Mayor Joe Saxton, Bristol Borough
- Police Chief Arnold Porter, Bristol Borough
- Manager James Dillon, Bristol Borough
- George Waldron, Bristol Borough Public Works
- Dr. Ann F. Rhoades, PhD, Morris Arboretum
- Nathaniel Burns, Landscape Architect, Langan Engineering
- Robert Moore, Director, Historic Delaware Canal Improvement Corporation
- James Revie, President, Historic Delaware Canal Improvement Corporation
- Susan Taylor, Friends of the Delaware Canal
- Robert Mercer, Director, Silver Lake Nature Center
- Donna Boone, Main Streets Manager, Delaware and Lehigh National Heritage Corridor
- Todd Sampsell, The Nature Conservancy
- Amanda Reed, The Nature Conservancy

In addition, through outreach projects, including clean ups and educational programs, Heritage Conservancy has connected to community members to better understand the role of the Marsh within the Borough of Bristol.

During the public meeting on March 18, community members placed their actions into three categories: Immediate Concerns, Short-Term Goals and Long-Term Goals. Information from the additional interviews can also be placed into these categories, creating a timeline for the Marsh to be used for the overall vision.



*Heritage Conservancy representative speaking at Bristol Borough Community Cleanup*



*Students from Bristol Junior High School picking up trash at the Marsh*

## Immediate Concerns

Common concerns for community members and other stakeholders that they wish to see immediate action on include:

- Improved Security
- Trash and Graffiti Removal/Prevention
- Vegetation Management
- Increased Community Support



*Broken bottle on Marsh trail*

A number of community members believe that limiting access to the Marsh and surrounding property is necessary. A number of unwanted activities seem to regularly occur in these areas, such as paint ball, vandalism, etc. It was suggested during the stakeholders' meeting that the bridge over Otter Creek be blocked off and that access be limited on the Rohm and Haas property through a fence and security enforcement. At the March meeting a fence along the trails was recommended as well as a neighborhood watch program. Loretta Vasso of the Bristol Borough Community Partnership pointed out during her interview, though, that a neighborhood watch program would be impossible in an area where no one lives. Police Chief Arnold Porter suggested providing a police bicycle patrol on the paths surrounding the Marsh to increase security.

As mentioned previously, the areas surrounding the Marsh are littered with bottles, wrappers, debris and other trash items. A number of community clean up options have been discussed, including working with the boy scouts and girl scouts and working with other community service workers. Unfortunately, many are concerned about the safety of those cleaning at the Marsh and cleaning up the property is not permanent. The Nature Conservancy pointed out that this has been a problem with previous clean ups, particularly when working with kids.

Robert Mercer, Director of the Silver Lake Nature Center, believes that a carry-in/carry-out rule could minimize the amount of trash being left at the site. Carry-in/carry-out policies remove all trash cans and recycle bins from the premises and require that anything brought into a natural area be taken out by the person who brought it in. Robert Mercer has seen success with this program at Silver Lake and also in New Jersey parks. In addition to following these rules many park visitors will pick up other people's trash if it is left behind. Most community members, including Manager James Dillon of Bristol Borough, believe this will not work.

At the March meeting it was recommended to have an increased number of trash cans along the parking area and possibly plastic bags available at the trail entry to use as personal trash bags. In addition items that deter vandalism were also recommended, such as outlooks made out of "plumber," a wood that cannot be burned.

Graffiti removal also needs to be addressed on the educational signage and wooden outlooks. The police chief, Arnold Porter, currently works with an organization called “TAG” to remove graffiti in Bristol and he believes they may be able to help in the Marsh area. New signs are actually already made for the Marsh area, so it was also recommended to replace the existing signage. In addition, Bristol Mayor Joe Saxton recommended working with the Mayor’s youth council to promote an “anti-graffiti message” and stricter punishment for those using graffiti.

Community members have also expressed a concern about the large amount of overgrown vegetation dominating the Marsh area. Stakeholders have recommended removing some of the trees and vines that are blocking out the Marsh area along the perimeter and continual removal of invasive species. Manager James Dillon believes that an initial demonstration project with invasive removal and native planting in a small area would be a place to start.

Perhaps the biggest emphasis of the meeting in March was to gain community support for the project. Community members expressed the importance of community involvement, educational events and greater publicity by informing the media so that community members can have a stake in the conservation of the Marsh. Signs for the Marsh with local sponsorship were recommended at the March meeting as well.

## Short-Term Goals

Short-term goals focus on the following:

- Planning
- Monitoring/Maintenance/Restoration
- Community Involvement

A special emphasis was placed on creating a publicized plan for the Marsh that would actually be implemented during the March meeting. Based on comments from community stakeholders it seems that a number of planned projects for the Marsh have never been completed and they would like to see a plan that is actually implemented. In addition community members emphasized the importance of doing an historical and cultural resources study of the Marsh area and Otter Creek to understand the Marsh in an overall context.

Community members also want to see ongoing monitoring, maintenance, and restoration at the Marsh. One recommendation was to hire someone to serve as a Marsh manager. This person could be hired through the Borough or another organization. Many also believe that it important to involve the scientific and academic community, possibly having regular projects completed by students, to encourage ongoing maintenance of the Marsh. It was also recommended that we determine the natural hydraulics of the

Marsh to restore it to its natural condition, since it has no doubt been impacted by fill, river traffic, and dredging.

Community involvement must be an ongoing concern throughout. Heritage Conservancy, schools, the Borough, the Silver Lake Nature Center and other community programs all provide important outlets to educate and increase awareness about the Marsh. These organizations can be used to outreach to more community members and businesses that use the Marsh.



*Community members at the Bristol Borough Community Clean Up*

## Long-Term Goals

Long-term goals focused on the following:

- Vegetation Management
- Stormwater Management
- Improved Signage
- Education
- Community Involvement
- Community Development/Revitalization

With regards to vegetation one of the main concerns is the control and removal of invasive species and replacement with native species. A number of community members at the Marsh meeting recommended new plantings in the Marsh area, specifically reforesting the surrounding woodland area with native species. One stakeholder recommended partnering with a group such as TreeVitalize to restore the forest.

Robert Mercer recommended the use of chemicals for most of the invasive removal, but Ann Rhoades of the Morris Arboretum did say that the purple



loosestrife within the Marsh itself could probably be pulled up by hand. The key to prevent the invasive species from returning would be to replant with natives immediately.

Another element to consider is stormwater management. At the March meeting, one community member mentioned that the Borough parking lot alongside the Marsh presents opportunities for innovative stormwater management techniques that allow for natural infiltration of water into the soil, preventing flooding and improving water quality.

Currently the signage at the Marsh is covered in graffiti and dated. Most recommend the replacement of the existing signs with the second set the Borough is currently storing. The question of the need for increased signage has come up at several meetings. Manager James Dillon believes that limited signage should be permitted so as to prevent interference with the natural beauty of the Marsh. Susan Taylor of the Friends of the Delaware Canal believes that part of the problem with the Marsh is the inability to see it from the parking lot. An entry sign may help, although it may be necessary to open up the vegetated buffer in spots to provide vistas into the Marsh area. New signs would also be required if a Carry in/Carry Out policy was established at the Marsh.

Increased, consistent educational programs are also strongly supported. A classroom where students could learn to identify plants which are invasive and learn about the Marsh's unique species was suggested. Currently the Silver Lake Nature Center hosts programs for school students that bring them to the Marsh and educate them about the tides and the plant communities living in the Marsh. Unfortunately these programs are losing popularity. New ideas are needed to promote and encourage increased educational opportunities at the Marsh. Science teachers at the Bristol Junior High School have expressed an interest in promoting environmental educational programs at the Marsh, including clean ups and invasive species removal programs.

Community involvement continues to be a critical, ongoing element. In the long-term there is a need for regular community events that promote the Marsh. Mayor Joe Saxton recommends promoting the Marsh throughout the year at each of the many community events. This could include tours of the Marsh and handing out educational materials related to the Marsh, such as an educational pamphlet.

One of the main results of community involvement should be to increase community ownership of the Marsh. Nathaniel Burns of Langan engineering emphasized the importance of having a local community group take responsibility for the Marsh. The Bristol Community Partnership recommends having a community group "adopt the Marsh." This group could then be responsible for the maintenance of the Marsh and hosting regular clean ups. The mayor supports the idea of a community art project



*Borough parking lot beside Marsh*



*Vandalized educational sign at eastern overlook*

along the Marsh to deter vandalism. One idea is painted stones along the path or the parking lot done by school students.

Many have also emphasized the importance of connecting the Marsh to development projects surrounding the Marsh area. The Marsh is closely tied to locations like the waterfront and Burlington Island. One stakeholder at the March meeting believed that promoting “eco-visits” to the Marsh and Burlington Island together could be a good method of promoting the Marsh.

Robert Mercer believes it is important to consider what the Marsh is there for. It is not necessarily meant to be an individual site for recreation, but meant to exist as part of a whole. Therefore it should be closely connected to other open space areas through trails and greenways and serve as one piece of the overall riverfront development. One goal would be to promote eco-tourism in Bristol as a whole with the Marsh as one element. There is a need for more robust shopping, museums, and other tourist attractions, which Donna Boone, Main Streets Manager for the Delaware and Lehigh National Heritage Corridor is hoping to promote along Mill Street and in Bristol’s historic district near the Marsh.

Another element to consider is the opening of the Delaware Canal in Bristol. Robert Moore and James Revie of the Historic Delaware Canal Improvement Corporation have chosen Bristol as a focus area and support any project to enhance the Marsh area since it is closely tied to the Delaware Canal. The hope is that the Canal will bring in increased tourism and the Marsh will be tied to that.

## V. Vision for the Marsh

Based on key person interviews, a stakeholders' meeting, conversations with community members at outreach events, site analysis and document review Heritage Conservancy has developed the following vision for the Marsh:

**Visual Appearance** – Enhance the overall visual appearance of Bristol Marsh surroundings through invasive plant removal and native plant replacement, regular clean ups, sign replacement, outlook repair/replacement, trail maintenance, and improved trash management

**Community Engagement** – Increase community understanding and appreciation of the Marsh through regular community clean ups, tours of the Marsh at community events, improved signage, and improved passive recreation opportunities at the edge of the Marsh area

**Education** – Provide educational programs about the function and significance of the Marsh in partnership with the school district and Silver Lake Nature Center and consider the possibility of opening a nature center for the Bristol Marsh and Maple Beach areas

**Community Development** – Recognize and enhance Bristol Marsh's role in development projects planned for Bristol Borough including trails, greenways, main street development, canal opening and waterfront development

**Natural Resource Protection** – Ensure the preservation of the Marsh and its native plant species through monitoring and invasive plant removal and protection from human interference

**Restoration** – Address surrounding land uses that may be incompatible with the Marsh preservation and consider methods to increase naturalized areas, using The Nature Conservancy's previous plans for restoration as a reference



*Marsh in the Winter*

## VI. Conservation Plan Recommendations

The goals listed in the vision were used by the study committee and Heritage Conservancy to develop concrete recommendations on how to implement the vision (See Appendix 2 for details on Study Committee Meeting). The following sections outline these recommendations. While Heritage Conservancy may be designated as a leader for many of these recommendations, since the future easement holder is still being determined the responsibility may go to another organization.

### Visual Appearance

#### Develop View Sheds to the Marsh in Appropriate Locations

The thick vegetation surrounding the Marsh prevents many from recognizing its value or presence. Remaining hidden also allows increased opportunities for unwanted activities. This plan recommends opening up a view shed around the first outlook, closest to the Delaware River. This will help connect visitors to the Bristol Borough Riverfront Park to the Marsh and provide a scenic view of the Marsh. The following actions should be taken to clear this view shed:

- Remove large, invasive trees and vines
- Clear poison ivy from area
- Replace with native plantings



*First Marsh overlook, closest to the Delaware River*

Prior to planting with natives an analysis of the area must be completed to determine the natives that will thrive most appropriately along the Marsh.

In the long-term there should be an additional view shed along Maple Beach road.

### Implement a Modified Carry In/Carry Out Policy

Although there is a great deal of skepticism as to whether a carry in/carry out policy will work, based on our meetings it may be a viable option for the Bristol Marsh. This plan recommends a modified version with carry in/carry out established specifically within the Marsh park area and the Riverfront Park. Signage will be necessary to promote carry in/carry out at each path entrance.

Limited, sturdy trashcans and recycling bins with closed lids are recommended for along the parking lot area. Limiting the number prevents opportunities for vandalism and prevents the health hazards caused by overflowing trashcans.

### Improve and Repair Outlooks and Signs

The outlooks at the Marsh are damaged and in need of repair and the signs at each outlook are covered in graffiti and often moved from their correct locations. The Borough does have replacement signs, but these may not be appropriate for continued use at the Marsh.



Logo for carry in/carry out policy



Possible trashcan option for parking lot area



Fallen Sign at the Marsh

This plan recommends to begin by replacing and repairing the existing outlooks and signs. The Borough and Heritage Conservancy should reconsider what types of outlooks and signs are used at the Marsh in the long-term. Improved educational signage and re-designed outlooks that are difficult to damage would be more appropriate. One idea for new signage is to provide identification plaques for native tree species. In addition entry signs into the Marsh area should be more significant and emphasize the importance of keeping the Marsh area clean. Heritage Conservancy should work with the community and the Borough to develop new ideas as to how public access and education along the Marsh should appear.

### **Improve Appearance of Paths**

The invasive plants and poison ivy along the paths that spread out over them and block them from view need to be removed and replaced with more appropriate edge plantings. Research should be done into what plants would be appropriate along a path edge.

### **Plan for Emergency Clean Ups**

During times of heavy rain and flooding a great deal of debris washes in from the Delaware River. During this time if the debris is picked up right away it will not become buried in the mud. Therefore this plan recommends establishing plans for immediate clean ups after such events. Ideally this could be done by the public works department.



*Debris collected at edge of Marsh*

## Provide Regular Park Maintenance

The Borough public works department working with a community organization or group could complete regular clean ups of the paths and surrounding Marsh area to control littering and spread of invasive species along the Marsh. These clean ups should ideally occur once a month to provide constant maintenance of the park. This element can start with work done by the public works department, but efforts should be made to engage an appropriate community group as well.



*Junior High Students on a clean up project*

## Community Engagement

### Engage a local community group to serve as “Friends of the Marsh”

As mentioned before, the Marsh has been subject to a number of unwanted activities and keeping up with the trash control and invasive plants is difficult. In order to see the Marsh more effectively preserved a local group would be best to take responsibility for overseeing management of the Marsh on regular basis. This group would have the following responsibilities:

- Monthly clean up along the paths and park areas of the Marsh
- Regular monitoring of area surrounding Marsh (reporting illegal activities to the police and contacting public works where major clean up is needed)
- Recruiting skilled labor for more major projects, such as removal of unwanted trees
- Invasive removal and native planting projects

This group could be recruited from a number of places. Cheryl Hamm who has already been a significant community leader at the Marsh could potentially lead this group. Silver Lake Nature Center has also offered to recruit from their volunteers. In addition the Bristol Community Partnership is linked to a number of community groups and organizations that may have local volunteers interested in the Marsh project. The school districts should also be contacted, so that middle school and high school students can serve as volunteers as well. The junior high school science department has already brought students over to the Marsh for clean ups. Heritage Conservancy will work with these groups to organize a “Friends of the Marsh” group that could take responsibility for Marsh stewardship.

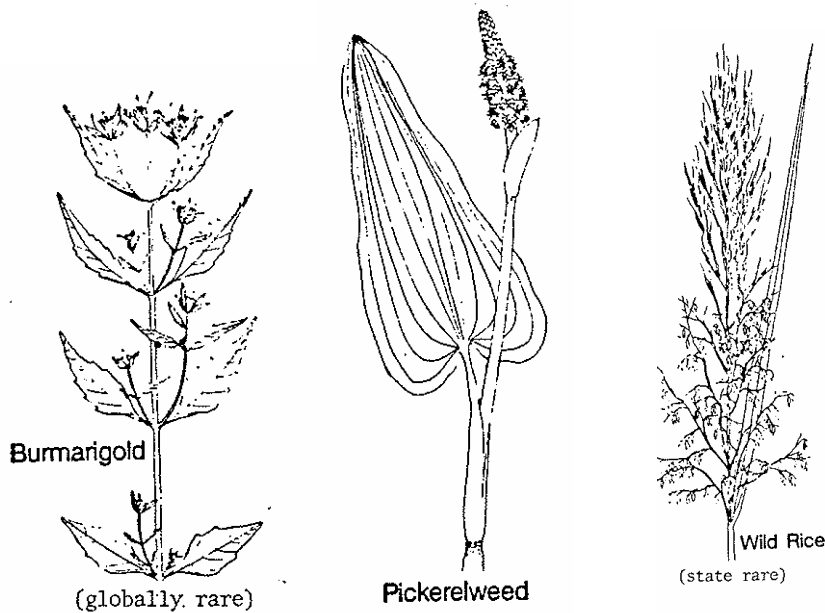
### Publicize the Importance of the Marsh in the Community

There are a number of opportunities to publicize the importance of the Marsh in the community. Many community members call it a “swamp” and do not understand its full significance. By publishing articles about major clean ups and events and projects at the Marsh in the local newspapers and the Bristol Borough newsletter community members will develop a greater appreciation for it. The newsletter also presents an opportunity to recruit volunteers for major projects.



The Borough website should also include a link to a page about the Marsh as one of Bristol's significant resources. This can provide scientific facts about the Marsh as well as post regular updates and articles from the Friends of the Marsh, once such a group is established. In addition it might include challenges and games for school students learning more about the Marsh.

Finally a pamphlet about the Marsh could be developed and made available at Borough Hall and other locations promoting its significance. This pamphlet should be highly graphic with scenic images of the Marsh inviting residents and visitors to walk the trails around the Marsh, and have picnics at the nearby Riverfront Park. This pamphlet should showcase the rare species at the Marsh and encourage visitors to stand at the outlooks and identify some of the significant plants.



*Possible images of Characteristic plants of Bristol Marsh (collected by TNC) to use in a pamphlet or other educational materials*

### Showcase the Marsh at Local Events

Throughout the year a number of local events occur in Bristol that present opportunities for promotion. These events include a number of ethnic festivals, movies in the park, and a Historic Bristol Day. This plan recommends that the once the Friends of the Marsh is established they have a table at these events where they can hand out educational brochures and recruit new volunteers for the group. In addition the group could provide tours of the Marsh during these events, helping other community members understand its importance.

## Education

### Promote existing Silver Lake Nature Programs at the Marsh

Already Silver Lake Nature Center hosts an educational program for local school students at the Marsh, focusing on the plant community and the motion of the tides. However, this has lost popularity over the years and Silver Lake has had trouble organizing educational events around the tides at the Marsh since the program must be done during low tide. Silver Lake Nature Center is committed to reinvigorating this program and promoting it at the schools.

Heritage Conservancy, Bristol Borough, the School District, and Silver Lake Nature Center should work together to promote the existing program. Emphasis should be placed on teaching children how to preserve the environment and the importance of hands-on education in coordination with the schools science program. Silver Lake could get feedback from the schools about why the program has been used less and together they could work towards gaining grants to lower the costs to the schools.



*School students walking along the path at the Marsh*

### Utilize the Marsh as an Outdoor Classroom

The Marsh presents a number of opportunities for outdoor educational programs in addition to the educational program already hosted by Silver Lake Nature Center. Students could potentially collect and test water samples at the Marsh or identify native and invasive plant species, along with a number of other activities. Heritage Conservancy and the Silver Lake Nature Center could work with the schools' science departments to integrate

Marsh projects into the school curriculum where appropriate so that every student learns about the Marsh at some point during his or her education.

## Research Feasibility of Developing a Stewardship Facility at the Marsh

A number of plans recommend having a building at the Marsh for either a property steward or an educational facility. A stewardship facility could serve both purposes, employing stewards to regularly monitor and maintain the Marsh and including educational components to encourage more people to learn about the Marsh outside of the school system. This could even be a branch of Silver Lake Nature Center and a location for Friends of the Marsh, providing a presence on the Marsh to watch for unwanted activities and encouraging the Marsh's significance. Either the old water department shed or the site of the public works facility could be used for this purpose. At this time it is unclear whether this would be a feasible project at the Marsh. More research must be done to determine if this is possible and which, if either, site would be most appropriate.

## Community Development

### Promote Marsh as One of Bristol's many Destinations

The Marsh is closely connected to a number of sites in Bristol Borough and the surrounding region. Rather than promoting the Marsh alone it should be promoted along with all the significant sites in Bristol. These could include Bristol Borough's Riverfront Park, the historic district and Silver Lake Nature Center. Particularly the Marsh should be tied into plans for opening the Delaware Canal. If the Canal is completely reopened in Bristol it will



*Bristol Borough's Riverfront Park*

extend down to the Marsh and become a significant site for tourists and community members. Visitors to the Canal should be encouraged to spend some time walking around the Marsh and visiting the riverfront park.

One method to do this is to develop a visitors' map for Bristol that highlights the location of the Marsh along with Delaware Canal and other sites. Information about activities to do at each site and their significance should be included. For example the Marsh might be highlighted as a place to hike



*Abandoned Water Department Shed near Marsh*

trails and see one of the best remaining examples of a freshwater tidal Marsh along the Delaware River.

## Implement Trail Plans

The *Bristol Borough Comprehensive Plan* and the *Bristol Borough Open Space Plan* both recommend a number of trail projects in Bristol. One is a recreation trail that would extend around the Marsh into the Maple Beach area and follow the Delaware River to Bensalem. This trail would encourage more people to walk along Maple Beach Road and through the Rohm and Haas property, providing more activity and protection from unwanted activities. In addition it would encourage those interested in longer hikes to visit the site.



*Delaware Canal Tow Path, looking from Washington Street in Bristol*

Another very important trail recommendation is one that would follow Otter Creek and connect to Silver Lake. This would attract those interested in more extensive hiking that may like to spend time at both Silver Lake and the Marsh. This would also be important if an educational facility was established at the Marsh because the trail would link it to Silver Lake's Nature Center.

Finally, the Canal Tow Path which exists in pieces along the former Canal route should be restored, so that residents in Bristol can easily walk down to the Marsh and those visiting the Canal site will be directly linked to the Marsh.

Heritage Conservancy should coordinate with Bristol Borough to determine what is necessary to implement these plans.

## Natural Resource Protection

### Develop Invasive Plant Management Strategy

While invasive plants are a constant threat, removing them all may not be possible. However there are opportunities to control them. Invasive plants moving into the Marsh area should be removed immediately during regular clean ups to protect the Marsh's rare species. Currently a small batch of purple loosestrife was the only invasive found in the Marsh itself and can be easily pulled out by volunteers or the public works department. Those monitoring the Marsh should be educated on what to look for and should inform the Borough or volunteers of what should be removed.



*Grasses growing in Marsh*

The surrounding area needs a more extensive plan as to how to remove invasive plants. This should include poison ivy. While it is not technically an invasive plant it is dangerous to those visiting the Marsh. Heritage Conservancy should engage professionals familiar with invasive plant removal to determine how best to remove these plants.

## Re-Plant with Appropriate Native Plants

In order to prevent the return of invasive plants and to allow for proper infiltration and filtration of groundwater the areas surrounding the Marsh must be replanted with appropriate native plants after invasive plants have been removed. Heritage Conservancy should determine appropriate native plants for the area through studies and consulting appropriate professionals. Volunteers and professionals should be utilized to replant the area.

## Educate Community on Appropriate Uses

Currently a number of inappropriate uses appear to be occurring on the Rohm and Haas property, including paint ball and ATV use. Efforts should be made to discourage these uses through signage and educating school students. Efforts need to be made to determine who is doing these illegal activities and action should be taken by Rohm and Haas and the police department.

## Monitor Soil and Water Quality

Tests should be done to determine the current soil and water quality at the Marsh and Otter Creek. If there is evidence of excessive pollution efforts should be made to determine what is causing the problems and how to decrease them.

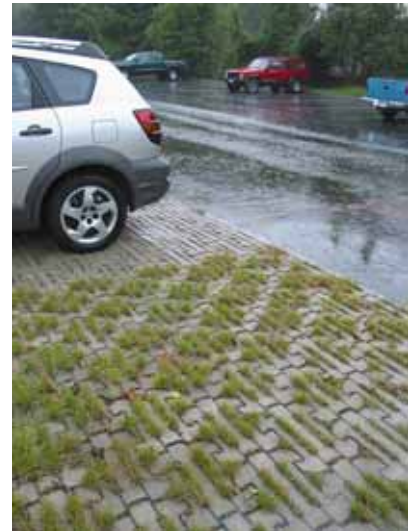
## Obtain Easement on Rohm and Haas Woodlands

Beyond the easement area on the Rohm and Haas property is woodland that is part of Maple Beach and is not currently protected. It has been identified as a significant natural area and also provides an additional buffer area between the Marsh and Rohm and Haas facilities. Heritage Conservancy should look into the possibility of expanding the current easement with Rohm and Haas to the remainder of the wooded area. Rohm and Haas was recently bought by the Dow Chemical Company, so it is likely an easement will need to be negotiated with Dow, rather than Rohm and Haas.

## Restoration

### Provide Improved Stormwater Management along Bristol Borough Parking Lot

The parking lot alongside the Marsh presents an opportunity to initiate innovative stormwater management techniques. The use of Best Management Practices, such as pervious pavers, bio-swales where the parking lot meets the Marsh, and vegetated islands within the parking lot, will improve run off, decrease flooding, and protect water quality. It will also provide a more natural look within the parking lot to better relate it to the riverfront park and the Marsh.



*Example of pervious pavers used to improve water runoff*



*Example of vegetated swale in parking lot*



*Bristol Borough Maintenance Facility*

## **Consider Alternative Use of Public Works Facility**

Currently the public works facility is filled with a number of trash piles. These present a clear hazard to the Marsh and must be addressed. Heritage Conservancy could work with Bristol Borough to determine the future of the public works facility and, if it should be determined necessary, help the Borough find a more appropriate location for the facility. Whatever the decision, the location should not be used for the storage of trash and debris.

## **Establish Riparian Buffer along Otter Creek**

A great deal of pollution in the Marsh comes from the businesses along Otter Creek. Efforts should be made to provide a minimum 50-foot wide buffer along all of Otter Creek to protect the creek and the Marsh from the surrounding uses. Once this buffer is in place a stewardship plan should be developed to ensure its proper maintenance.

## **Phasing/Funding Options**

It is not possible to implement all of these ideas right away. Priority must be given based on feasibility and long-term impact. Special focus should be given to removal of invasive plants and replanting with natives, since invasive species present an immediate threat to the rare species living in the Marsh. In addition, immediate efforts should be made to develop a “Friends of the Marsh” group since this group will be needed in order to implement a number of goals.

In order to ensure success funding will be needed for many of these projects. DCNR, DEP and the Delaware and Lehigh Heritage Corridor have all presented opportunities to gain funding for a number of these projects.

The following pages outline phasing for each of these projects and provide recommendations for possible funding sources where known and establish responsibilities for success. Some of the phases will be determined after planning and research has been completed, so next phases will be listed as “To Be Determined” (“TBD”). This section also includes cost estimates. These estimates are only approximate and only meant to provide a general idea of potential costs.

Table 2 - Phased Implementation Plan for the Bristol Marsh Conservation Plan					
Vision	Recommendation	Phasing of Project Completion			Potential Partners
		1-2 Years	2-5 years	5-10 years	
Visual Appearance	Develop view sheds to the Marsh in Appropriate Locations	Demonstration Project Near Delaware River \$10,000	Along Maple Beach Road \$10,000	Maintenance (Cost TBD)	Heritage Conservancy, Bristol Borough
	Implement a modified Carry In/Carry Out Policy	Signs/Trashcans \$5,000	Maintenance (Cost TBD)	Maintenance (Cost TBD)	Heritage Conservancy, Bristol Borough, DEP for funding
	Improve and repair outlooks and signs	Repair and Replacement \$10,000	Evaluate Effectiveness \$5,000	Implement Improvements (Cost TBD)	Heritage Conservancy, Bristol Borough, DEP and D&L Heritage Corridor for funding
	Improve Appearance of Paths	Clean up \$10,000	Maintenance (Cost TBD)	Maintenance (Cost TBD)	Heritage Conservancy, Bristol Borough
	Plan for Emergency Clean Ups	Clean up \$5,000	Clean up \$5,000	Clean up \$5,000	Bristol Borough
	Provide Regular Park Maintenance	Maintenance (Cost TBD)	Maintenance (Cost TBD)	Maintenance (Cost TBD)	Bristol Borough, Community Volunteers
	<b>Subtotal</b>	<b>\$40,000+</b>	<b>\$15,000+</b>	<b>\$5,000+</b>	<b>\$60,000+</b>
Community Engagement	Engage a local community group to serve as “Friends of the Marsh”	Establish group \$2,000	Ongoing Projects \$1,000	Ongoing Projects \$1,000	Silver Lake Nature Center, Community Volunteers, Heritage Conservancy
	Publicize the importance of the Marsh in the community	PR, brochure, etc \$3000	Website \$5,000	Ongoing \$3,000	Heritage Conservancy, Bristol Borough
	Showcase the Marsh at local events	Ongoing \$0	Ongoing \$0	Ongoing \$0	Bristol Borough, Community Volunteers
	<b>Subtotal</b>	<b>\$5,000</b>	<b>\$6,000</b>	<b>\$4,000</b>	<b>\$15,000</b>

\*All cost estimates are approximate

Table 2 - Phased Implementation Plan for the Bristol Marsh Conservation Plan					
Vision	Recommendation	Phasing of Project Completion			Potential Partners
		1-2 Years	2-5 years	5-10 years	
Education	Promote existing Silver Lake Nature Programs at the Marsh	Renewed promotion of programs at Marsh \$3,000	Ongoing Promotion \$3,000	Ongoing Promotion \$3,000	Silver Lake Nature Center, Bristol Borough, Bristol Borough School District, Heritage Conservancy
	Utilize the Marsh as an Outdoor Classroom	Work with schools on integrating Marsh into curriculum \$3,000	Continued use of Marsh in curriculum \$3,000	Continued use of Marsh in curriculum \$3,000	Bristol Borough School District, Heritage Conservancy
	Research feasibility of developing a stewardship facility at the Marsh	Research \$10,000	TBD	TBD	Bristol Borough, Heritage Conservancy, Silver Lake Nature Center
	<b>Subtotal</b>	<b>\$16,000</b>	<b>\$6,000+</b>	<b>\$6,000+</b>	<b>\$28,000+</b>
Community Development	Promote Marsh as one of Bristol's many Destinations	Develop visitor maps, guides, pamphlets, etc \$5,000	Update visitor's materials \$3,000	Update visitor's materials \$3,000	Bristol Borough, Heritage Conservancy
	Implement Trails Plans	Planning \$25,000	Planning \$25,000	Build Trails (Cost TBD)	Bristol Borough
	<b>Subtotal</b>	<b>\$30,000</b>	<b>\$28,000</b>	<b>\$3,000+</b>	<b>\$61,000+</b>

\*All cost estimates are approximate



Phased Implementation Plan for the Bristol Marsh Conservation Plan					
Vision	Recommendation	Phasing of Project Completion			Potential Partners
		1-2 Years	2-5 years	5-10 years	
Natural Resource Protection	Develop Invasive Plant Management Strategy	Begin invasive Removal \$10,000	Develop Invasive Management Plan \$10,000	Implement Plan \$50,000	Heritage Conservancy, Bristol Borough
	Replant with appropriate Native Plants	Demonstration Project \$10,000	Research and Planning \$10,000	Expanded Native Planting \$50,000	Heritage Conservancy, Bristol Borough
	Educate Community on appropriate uses	Develop signage and educational materials \$5,000	Maintenance \$5,000	Maintenance \$5,000	Bristol Borough, Heritage Conservancy, Bristol Borough School District
	Monitor Soil and Water Quality	Monitoring \$2,000	TBD	TBD	Heritage Conservancy, Community Volunteers
	Obtain Easement on Rohm and Haas Woodlands	Negotiate expanded easement with Rohm and Haas (or Dow) \$2,000	Obtain easement and develop management plan for property \$10,000	Monitoring and Maintenance (Cost TBD)	Heritage Conservancy, TNC, Bristol Borough
	<b>Subtotal</b>	<b>\$29,000</b>	<b>\$35,000</b>	<b>\$105,000+</b>	<b>\$169,000+</b>

\*All cost estimates are approximate

Phased Implementation Plan for the Bristol Marsh Conservation Plan					
Vision	Recommendation	Phasing of Project Completion			Potential Partners
		1-5 Years	6-10 years	11-20 years	
Restoration	Provide improved stormwater management along Bristol Borough Parking Lot	Research and Planning \$5,000	TBD	TBD	Bristol Borough, Heritage Conservancy
	Consider alternative use of public works facility	Research and Planning \$5,000	TBD	TBD	Bristol Borough, Heritage Conservancy
	Establish Riparian Buffer along Otter Creek	Research and Planning \$10,000	Implementation \$40,000	Develop Stewardship Plan \$5,000	Bristol Borough, Heritage Conservancy, Silver Lake Nature Center, Community Volunteers, TreeVitalize
	<b>Subtotal</b>	<b>\$20,000</b>	<b>\$40,000+</b>	<b>\$5,000+</b>	<b>\$65,000+</b>

\*All cost estimates are approximate

## VII. Public Meeting Comments

On November 25, 2008, Heritage Conservancy hosted a public meeting to review the draft plan for the Marsh. The meeting was advertised through a legal notice in the local paper, a press release, posters throughout the Borough, and an e-mail to the stakeholders. In advance of the meeting, copies of the draft plan were made available at the public library, Borough Hall, the Borough tax office, and on Heritage Conservancy's website.

The meeting was attended by a diverse group of community members, representatives from supporting organizations and municipal representatives. Heritage Conservancy initiated the meeting with a PowerPoint presentation that provided an overview of the proposed conservation planning process and the resulting draft goals and recommendations. The second half of the meeting focused on seeking input from the attendees.

Overall, the attendees agreed that the plan's goals and recommendations were good. An outline of comments is included in the appendices. Participants felt that it was very important to make the existing trails more visible, as well as a "window" into the marsh. One participant suggested that improved signage, including an entry sign would help with overall understanding of the Marsh as a park. It was also recommended that improved signage include photographs of the Marsh at high tide and low tide since one time visitors will not see both views. Some participants liked the idea of the carry in/carry out policy, while another expressed concern about its effectiveness.

There was a very positive response to the enhanced education component and Silver Lake Nature Center's involvement since they have substantial experience with programs in the marsh. In addition, participants agreed that greater publicity is needed including marketing trips to the Marsh and sponsoring community events. Bristol Borough Manager, James Dillon, discussed one upcoming event planned—Martin Luther King, Jr. Day Marsh Clean up. Heritage Conservancy, The Nature Conservancy and Bristol Borough are organizing the event. Participants agreed this would be a good opportunity to publicize the Marsh, provide educational opportunities and improve the overall appearance.

Connecting the Marsh to other Bristol sites, such as the riverfront and the Delaware Canal were also supported. In addition to trail connections, one participant suggested a reinterpretation of the Canal markers showing how the Canal entered the Marsh. It was also emphasized that coordinating with Langan Engineering's plans for the waterfront redevelopment is important. Presently Langan is coordinating with Heritage Conservancy to develop a waterfront development plan that is compatible with the Marsh.

Participants were eager to help out and be involved in future projects and hopeful that the marsh will soon be enhanced with respect to protecting its natural resources, as well as an educational resource for the community and visitors.

(See Appendix 3 for news articles, poster, sign-in sheet, meeting minutes and the presentation)

## VIII. Conclusion

Bristol Marsh is an important resource to Bristol Borough and the surrounding region. Naturally it serves as a nursery to animal species, home to a number of native plants, and acts as a natural water filter. It also has the potential to be a great community and educational resource. Conservation of the Marsh depends on protecting its natural communities, but also on promoting its value to residents of Bristol. This plan envisions a future of the Marsh where students come for class, community members work to keep it clean, and visitors can come and enjoy the Marsh as a beautiful, natural park.



*Oblique View of Marsh (Photograph from PA DEP, 2008)*



## IX. References

### Documents provided by The Nature Conservancy:

- The Bristol-Delaware River Strategy, Actions for Riverfront Revitalization prepared by the National Park Service – December 1985
- Bristol Marsh Nature Preserve, Phase I Restoration, Planting Plan and Schedule, prepared by The Nature Conservancy (No Date)
- Bristol Marsh Restoration Project, Phase I Restoration Specifications prepared by The Nature Conservancy with assistance from Andropogon Associates, Ltd. – February 1995
- Erosion and Sedimentation Control Plan for Bristol Marsh Nature Preserve prepared by The Nature Conservancy (No Date)
- Evaluation of Fill Material at the Bristol Marsh Nature Preserve prepared by DeVal Soil and Environmental Consultants for The Nature Conservancy – August 1993
- Joint Permit Application I-95 and PA 413 prepared by Lippincott Engineering Associates, Inc. for PennDOT District 6-0 – 1994
- Master Plan of Improvements, Bristol Marsh Nature Preserve prepared by Urban Research and Development Corporation – July 1988
- Northeast Edge Elevations of Bristol Marsh Nature Preserve prepared by The Nature Conservancy (No Date)
- Subsurface Evaluation, Bristol Marsh Property prepared by GZA GeoEnvironmental, Inc. for The Nature Conservancy – February 1993

### Other Referenced Documents:

- Bristol Borough Comprehensive Plan prepared by Remington, Vernick & Beach Engineers, Inc. – July 2006
- Bristol Borough Municipal Open Space Plan prepared by DePallo Design and Planning – 1998
- Bristol Borough Municipal Parks, Recreation, & Open Space Plan prepared by DePallo Design & Planning – 1996
- Bucks County Comprehensive Plan prepared by Bucks County Planning Commission – December 1993
- Bucks County Natural Areas Inventory prepared by Bucks County Planning Commission – June 1999
- Bucks County Natural Resources Plan prepared by Bucks County Planning Commission – March 1999
- Bucks County Park and Recreation Plan prepared by Bucks County Planning Commission – December 1986

Code of Ordinances of Bristol Borough published by Authority of the  
Borough – June 2004

Delaware River Heritage Trail State of the Trail Report prepared by  
Delaware River Greenway Partnership – October 2003

Living Resource of the Delaware Estuary prepared by the Delaware Estuary  
Program – July 1995

Lower Delaware River Conservation Plan prepared by Heritage Conservancy  
– September 1999

Lower Delaware River Management Plan prepared by Lower Delaware River  
Wild and Scenic River Study Task Force with assistance from the  
National Park Service, Northeast Field Area – August 1997

A Management Plan for the Delaware Estuary prepared by the Delaware  
Estuary Program – September 1996



## Appendix 1. Stakeholders' Meeting, March 18, 2008

1. Meeting Minutes
2. Sign in Sheet
3. Presentation



### **Bristol Marsh Conservation Plan Meeting**

**Date:** March 18, 2008

**Location:** Borough Hall, Historic Bristol

**In Attendance:**

- Liz Fisher – Bristol Borough Historical Society
- Cheryl Hamm – Nature Conservancy Volunteer
- Danielle Beerhalter – Rohm and Haas
- Jeff Dewey – PA DEP
- Richard Albert – Delaware Riverkeeper Network
- Robert Mercer – Silver Lake Nature Center
- Don West – Bristol Borough Environmental Advisory Committee
- Francis DiRenzo – Bristol Borough Environmental Advisory Committee
- Kevin Hess – PA DEP: CZM
- Carolyn Wallis – DCNR
- Donna Boone – Landmark Towns
- Elissa Thorne – Delaware and Lehigh National Heritage Corridor
- Manager Jim Dillon – Bristol Borough
- George Waldron – Bristol Borough Public Works Director
- Kevin Everett – Bristol Borough Public Works Foreman
- Amanda Reed – The Nature Conservancy
- Marian Sumner – Heritage Conservancy
- Mary Zagar – Heritage Conservancy
- Mike Frank – Heritage Conservancy

**Overview:**

Marian Sumner, Heritage Conservancy, introduced the project, to create a master plan to guide long-term conservation efforts for Bristol Marsh (the Marsh). Amanda Reed, The Nature Conservancy, gave the history of the Marsh and explained The Nature Conservancy's past involvement there. She also explained that since The Nature Conservancy is not as close to the Marsh as Heritage Conservancy they are hoping to transfer management of the land over to Heritage Conservancy. Mary Zagar, Heritage Conservancy, then presented a Powerpoint presentation highlighting Heritage Conservancy's goals and immediate concerns relating to the Marsh.

Once the presentation portion was completed, Heritage Conservancy handed out post-its so the meeting attendees could write down individual goals for the marsh. These were then placed on a timeline of immediate concerns, short-term goals, and long-term goals. Using markers, meeting attendees marked their top three goals from amongst all the choices. The meeting concluded with a discussion of how to implement these goals, led by Mike Frank of Heritage Conservancy. During this discussion Manager James Dillon expressed concern that







## Appendix 2. Study Committee Meeting, October 21, 2008

1. Agenda
2. Sign in Sheet
3. Meeting Minutes





### Appendix 3. Public Meeting, November 25, 2008

1. Press Release
2. Legal Notice for Bristol Pilot
3. Bucks County Courier Time Meeting Announcement
4. Bucks County Herald Meeting Announcement
5. Poster
6. Meeting Minutes
7. Sign in Sheet
8. Presentation
9. Bucks County Courier Times Article



**HERITAGE CONSERVANCY**

**Preserving Our Natural and Historic Heritage**

FOR IMMEDIATE RELEASE  
November 6, 2008

CONTACT: Sandra Yerger  
215-345-7020 x 103  
[syerger@heritageconservancy.org](mailto:syerger@heritageconservancy.org)

**November 25<sup>th</sup> Public Meeting on Conservation Plan for Historic Bristol  
Borough's Freshwater Tidal Marsh**

Doylestown -- Heritage Conservancy is hosting a public meeting to seek community input on the Conservation Plan for Historic Bristol Borough's Freshwater Tidal Marsh. Located just southwest of the Bristol Historic District in Historic Bristol Borough, Bristol Marsh is one of the few remaining freshwater tidal marshes along the Delaware River. It is home to six rare plant species native to the Delaware River Basin.

The Marsh property is owned by Bristol Borough and Rohm and Haas and protected via conservation easements by The Nature Conservancy (TNC). Due to a change in TNC's mission and focus areas, TNC has requested that Heritage Conservancy (a local land conservation organization) consider assuming the conservation easements and associated responsibilities. In response Heritage Conservancy has worked, through grants from PA DCNR and DEP, with local stakeholders to develop a draft Conservation Plan for the Marsh to determine the best options for the Marsh's future. Copies of the draft Plan are available for review at Bristol Borough Hall, the tax office, and the Margaret R. Grundy Memorial Library. To view a copy of the conservation plan online visit [www.heritageconservancy.org](http://www.heritageconservancy.org). Comments are invited at the public meeting, as well as via email to [mzagar@heritageconservancy.org](mailto:mzagar@heritageconservancy.org) by November 25<sup>th</sup>.

EVENT: Public Meeting - Conservation Plan for Bristol Borough's Freshwater Tidal Marsh WHEN: Tuesday, November 25, 2008, 7:00 p.m. WHERE: Bristol Borough Hall, Community Room, 250 Pond St., Bristol, PA
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Heritage Conservancy, founded in 1958, promotes open space preservation, natural resource protection, property stewardship, historic preservation, adaptive reuse of existing structures, wildlife habitat restoration, and biodiversity. These goals are achieved through professional land use planning and design, public outreach and education, innovative land conservation and historic preservation strategies, and the application of "best management practices" for property stewardship. Heritage Conservancy is a non-profit membership organization. For additional information about the Conservancy visit [www.heritagconservancy.org](http://www.heritagconservancy.org).

###

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- Deaths
- Lost & Found

**EMPLOYMENT**

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- Staffing Wanted

**REAL ESTATE**

- House for Sale
- Commercial Real Estate
- Leases

**LET'S GET TOGETHER**

Conversation Plan for Bristol Borough & Pottsville Borough, Schuylkill County, PA. Includes: Bucks County & Pottsville, Bucks County & Doylestown, Bucks County & Philadelphia.

**LET'S GET TOGETHER**

Conversation Plan for Bristol Borough & Pottsville Borough, Schuylkill County, PA. Includes: Bucks County & Pottsville, Bucks County & Doylestown, Bucks County & Philadelphia.

**LET'S GET TOGETHER**

Conversation Plan for Bristol Borough & Pottsville Borough, Schuylkill County, PA. Includes: Bucks County & Pottsville, Bucks County & Doylestown, Bucks County & Philadelphia.

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80.36		.00		.00	

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*Public Notice  
Bristol Marsh Plan  
Required by grant*

*Maricau*

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# BUCKS COUNTY Courier Times



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## BUCKS BRIEFS for Nov. 25

### Fort Washington connection to open

#### FORT WASHINGTON

Construction of the Pennsylvania Avenue extension has been completed and will open the connection between Oreland and Fort Washington today at noon.

Crews will remove construction barriers from the half-mile section of new roadway, which was built to enable motorists to use Pennsylvania Avenue to travel between Fort Washington and Oreland and access all ramps at the Route 309-Pennsylvania Turnpike interchange, said PennDOT assistant press secretary Gene Blaum.

The Pennsylvania Avenue opening coincides with PennDOT's imminent completion of the \$82.6 million contract to rebuild and improve Route 309's interchange with the turnpike at Fort Washington. Construction began at the interchange in January 2005 and the final cleanup will be completed by the end of next month. This contract is part of PennDOT's \$350 million project to rebuild the 10-mile-long Route 309 Expressway.

### Meeting day changed next month

#### NORTHAMPTON

Northampton's board of supervisors will hold its two public meetings next month at 8 p.m. Dec. 10 and Dec. 17.

The board usually meets on the second and fourth Wednesdays of the month, but changed the second meeting because the usual date falls on Christmas Eve.

Both meetings will be held at the town hall, 55 Township Road in Richboro.

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## Heritage Conservancy sets meeting for marsh project

The Heritage Conservancy is hosting a public meeting 7 p.m. Nov. 25, at Bristol Borough Hall, Community Room, 250 Pond St., Bristol, to seek community input on the plan for Historic Bristol Borough's Freshwater Tidal Marsh.

Located just southwest of the Bristol Historic District in Bristol Borough, Marsh is one of the few remaining freshwater tidal marshes along the Delaware River. It is home to six rare plant species native to the Delaware River Basin.

The Marsh property is owned by the borough and Rohm and Haas and protected via conservation easements by The Nature Conservancy (TNC). Because of a change in

TNC's mission and focus areas, TNC has requested that Heritage Conservancy consider assuming the conservation easements and associated responsibilities. In response, Heritage Conservancy has worked, through grants from the DCNR and DEP, with local stakeholders to develop a draft conservation plan for the marsh to determine the best options for the its future.

Copies of the plan are available for review at the borough hall, the tax office, and the Margaret R. Grundy Memorial Library.

To view a copy of the conservation plan online visit [heritageconservancy.org/projects/pdf/bristol-marsh.pdf](http://heritageconservancy.org/projects/pdf/bristol-marsh.pdf).

# November 25th - Public Meeting for Bristol Borough Residents



## Historic Bristol Borough's Freshwater Marsh: Conservation Plan

Bristol Borough Hall at 7:00 pm

250 Pond Street • Bristol, PA 19007

On Tuesday, November 25th you will have an opportunity to review and share your feedback on the *Conservation Plan*. Copies of the DRAFT plan are currently available for review at the following locations:

- Bristol Borough Hall, Tax Office
- Grundy Memorial Library
- Also, you can access the plan on Heritage Conservancy's website:  
[www.heritageconservancy.org](http://www.heritageconservancy.org)



This meeting is hosted by Heritage Conservancy. Inquiries, please contact Mary Zagar—215-345-7020 x132  
[mzagar@heritageconservancy.org](mailto:mzagar@heritageconservancy.org)

## Bristol Marsh Conservation Plan Public Meeting

**Date:** November 25, 2008

**Location:** Borough Hall, Historic Bristol

### In Attendance:

- Manager Jim Dillon – Bristol Borough
- Kevin Everett – Bristol Borough Public Works
- Donna Boone – Landmark Towns
- Nate Burns – Langan Engineering
- Megan Ivey – Revitalization Task Force
- Susan Taylor – Friends of the Delaware Canal
- Linda Rowan – Borough Resident
- Jerry Taylor
- David Long
- Marian Sumner – Heritage Conservancy
- Mary Zagar – Heritage Conservancy

### Overview:

Marian Sumner, Heritage Conservancy, began the meeting, and introduced Mary Zagar who provided an overview of the project. This included summarizing the completed steps, the proposed vision, and the action steps through a powerpoint presentation. Marian Sumner then invited community members to share their comments on the plan. The meeting closed with Manager Dillon commenting on the upcoming Martin Luther King, Jr Day Clean Up to be at Bristol Marsh and encouraging community members to come out for it.

### Comments:

1. Comments on Plan elements
  - a. Visual Appearance
    - i. Important to make existing trails more visible
    - ii. Carry in/Carry out is good, but will it be effective?
    - iii. Improved signage could include high tide and low tide photos on signs for those who see Marsh in only one condition
  - b. Education
    - i. Requiring as part of curriculum good (in school and on site)
    - ii. Important to work with Silver Lake since has experience
  - c. Community Engagement
    - i. Martin Luther King, Jr Day Clean Up good opportunity to begin this
  - d. Community Development
    - i. Marketing trips to the Marsh important
2. Other Comments
  - a. Should be integrated with waterfront plan for Bristol Borough
  - b. Consider reinterpretation of Canal Markers, possibly showing how Canal entered Marsh
  - c. How will proximity of future docking facilities affect Marsh?
  - d. Place emphasis on birds at Marsh → Opportunity to bring in bird enthusiasts
  - e. Connect with East Coast Greenway



**Bristol Marsh Public Meeting, November 25, 2008**

**Please Sign In!**

Name	Organization	E-mail	Phone
Donna Boone	LAWSONVILLE TOWNS	donna@delawareanddelight.org	215-781-2605
Kevin Everett	Bristol Boro Public Works		267-246-5444
Megan Ivey	Revitalization Task Force	meganiv@whotmail.com	215-785-5711
Susan Taylor	Friends of the Delaware Canal	friends@fdcc.org	215-862-2021
Jerry Taylor	"		

**Bristol Marsh Public Meeting, November 25, 2008**

**Please Sign In!**

Name	Organization	E-mail	Phone
David Long		dbloug@princeton.edu	
Jim Dillon		jdillon@bristolboro.com	
NOTE BUZZS	LANCAN ENGINEERING	nbuzz@lancan.com	

**Bristol Marsh Public Meeting, November 25, 2008**

**Please Sign In!**

Name	Organization	E-mail	Phone
Linda Rowan	Boro Resident	lrowan@localnet.com	215-785-3632

