

# BURLINGTON ISLAND: DESIGNING FOR NATIVE SPECIES RECOVERY, SUSTAINABLE USE & CLIMATE RESILIENCY



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LARC 8355 CAPSTONE SEMINAR - FALL 2022

<http://buckscountyadventures.org/voyage-to-forbidden-island/>



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## INTRODUCTION

- BURLINGTON ISLAND IS A FOUR HUNDRED ACRE ISLAND LOCATED IN THE DELAWARE RIVER BETWEEN BRISTOL, PA AND BURLINGTON, NJ. IT IS OFFICIALLY PART OF THE CITY OF BURLINGTON, IN BURLINGTON COUNTY, NEW JERSEY. CURRENTLY UNINHABITED, IT IS A SCENIC LANDMARK IN THE DELAWARE RIVER ACCESSIBLE ONLY BY BOAT.
- ONCE CALLED MATENNECUNK, OR ISLE OF PINES BY THE LENNI LENAPE, THE ISLAND WAS A HUB OF TRADE AND AGRICULTURE ALONG THE DELAWARE.
- IT IS THE SITE OF ONE OF THE FIRST EUROPEAN SETTLEMENTS IN NEW JERSEY; AND OVER THE LAST 375 YEARS HAS BEEN A TRADING POST, GARRISON, FISHERY, FARM, AMUSEMENT PARK, QUARRY AND SPOILS DUMP.



LENNI LENAPE OF MANHATTA ISLAND c1600



BURLINGTON ISLAND AMUSEMENT PARK c1920  
THE GREYHOUND ROLLERCOASTER



BURLINGTON ISLAND AMUSEMENT PARK c1920



OPEN PIT GRAVEL MINING



DREDGE MACHINERY



2019 BURLINGTON ISLAND CLEAN UP  
UNITED BY BLUE

- CLEARCUT FOR TIMBER AND AGRICULTURE, MINED FOR GRAVEL AND SAND, DREDGED AND USED AS A DREDGE SPOILS DUMP, THE ISLAND HAS BEEN PLUNDERED THROUGH THE 20TH CENTURY. NOW, AS PART OF A SYSTEM OF CONNECTED GREEN SPACES IN NEW JERSEY, IT IS IN THE PROCESS OF BEING PRESERVED AS AN HISTORIC, EDUCATIONAL AND RECREATIONAL RESOURCE.

## GOALS

- DEVELOP A PLAN FOCUSED ON RESTORATION, PRESERVATION AND THE TRANSFORMATION OF BURLINGTON ISLAND INTO AN ECOLOGICALLY AND ESTHETICALLY RICH AND RESILIENT RIVER LANDMARK RECONNECTING THE COMMUNITY TO THE LANDSCAPE AND ECOLOGY OF THE RIVER.
- INCORPORATE THE FRIENDS AND ISLAND MANAGER'S MISSION OF EDUCATION, CONSERVATION, CULTURE AND RECREATION.

## RESTORATION & PRESERVATION OBJECTIVES

- CREATE A LIVING SHORELINE ALONG THE ISLAND'S SOUTHWESTERN EDGE, ARRESTING EROSION AND REVITALIZING THE ISLAND'S SHORELINE ECOLOGY.
- RECREATE AND MAINTAIN THE CONDITIONS NECESSARY FOR FRESHWATER MUSSEL CULTIVATION IN THE ISLAND'S NORTHEASTERN TIDAL SWAMP AREA, RESTORING AN HISTORICAL CONNECTION TO THE ISLAND'S CULTURAL AND ECOLOGICAL HERITAGE.
- MODEL RESPONSIBILITY AND STEWARDSHIP OF THE ISLAND'S ECOLOGICAL RESOURCES AS PART OF A LARGER RESTORATION AND EDUCATION PROGRAM WITHIN THE PARTNERSHIP FOR THE DELAWARE ESTUARY AND DELAWARE RIVERKEEPER NETWORK.



## CONTEXT

'OUR INDUSTRIAL LANDSCAPES REMIND US OF THOSE WHO TOILED IN THE FACTORIES, PIERS AND POWER PLANTS WHEN THE WATERFRONTS OF THE DELAWARE WERE THE PROUD GATEWAY TO A REGION ONCE KNOWN AS THE "WORKSHOP OF THE WORLD."' - STEVEN UJIFUSA



## HISTORICAL CONTEXT: 17TH - 19TH CENTURIES

- PRIOR TO 1624, THE LENNI LENAPE FARMED AND TRADED FROM THE ISLAND.
- 1624, THE DUTCH ESTABLISHED A HOUSE AND TRADING POST ON THE "ISLAND OF MATINNEKONCK."
- 1656, SWEDISH TRADERS SAILED UP THE DELAWARE AND "LANDED GOODS UPON MATINNEKONCK ISLAND WITH INTENTIONS TO TRADE."
- 1668, A FRENCHMAN, PETER JEGOU, "OBTAYNED A PERMIT AND GRANT TO TAKE UP YE LAND AND SETTLE HIMSELFE, TO BUILD AND KEEP A HOUSE OF ENTERTAYNMENT FOR YE ACCOMMODATION OF TRAVELERS."
- 1677, ENGLISH QUAKERS ARRIVED TO SETTLE THE NEW BRITISH COLONY OF BURLINGTON.
- 1682, THE WEST JERSEY ASSEMBLY DECREED THAT "THE POSSESSION OF THE ISLAND IN THE TOWN OF BURLINGTON, WITH THE RENTS, ISSUES AND PROFITS THEREIN ARE TO BE EMPLOYED FOR THE MAINTAINING OF A SCHOOL FOR THE EDUCATION OF YOUTH WITHIN SAID TOWN." GOVERNED BY THE NEW BOARD OF ISLAND MANAGERS EXISTING TO THIS DAY.
- 1711, THE ISLAND WAS SURVEYED, "AND BEING CALLED MATINECONK ISLE, IT WAS SAID TO CONTAIN 300 ACRES."
- 1682-1900, AGRICULTURAL RENTS FROM BURLINGTON ISLAND FUND THE PUBLIC SCHOOL SYSTEM OF THE CITY OF BURLINGTON.



A NEW MAP OF EAST & WEST NEW JERSEY 1706

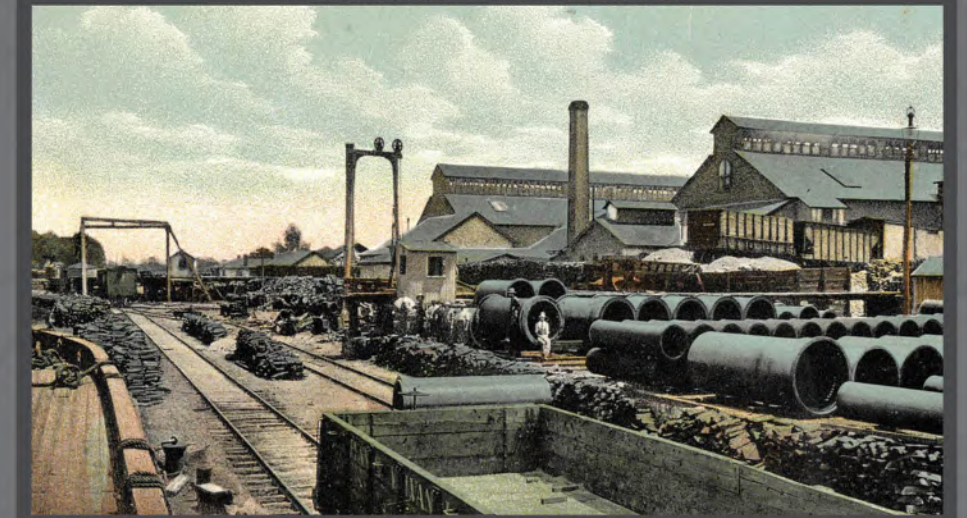
● BURLINGTON ISLAND

## HISTORICAL CONTEXT: 20TH - 21ST CENTURIES, BURLINGTON & BRISTOL

- 1880 - 1945, BURLINGTON & BRISTOL ARE MAJOR MANUFACTURING CENTERS PRODUCING AND EXPORTING SHIPS, IRON AND STEEL, WOOL, LEATHER, SILK, CLOTHING AND WALLPAPER, AMONG MANY OTHER THINGS.
- Post 1945, IN THE WAKE OF INDUSTRY LOSS TO OVERSEAS MANUFACTURING THE ECONOMIC PROSPERITY OF BURLINGTON AND BRISTOL BEGIN TO DECLINE.
- 1952, LEVITTOWN OPENS IN BRISTOL TOWNSHIP BRINGING SUBURBAN EXPANSION LEADING TO FURTHER URBAN DECLINE.
- 1970-2000, BURLINGTON AND BRISTOL URBAN POPULATIONS AND ECONOMIES CONTINUE TO DECLINE.
- 1999, THE PA REDEVELOPMENT AUTHORITY CONDUCTS AN ENVIRONMENTAL ASSESSMENT OF THE BRISTOL BOROUGH WATERFRONT.
- 2006, BRISTOL BOROUGH'S RIVERFRONT NORTH, A MIXED USE DEVELOPMENT OPENS WITH SEVERAL OTHER INDUSTRIAL BROWNFIELD SITES UNDER REDEVELOPMENT.
- 2008-2016, THE HISTORIC BRISTOL MARSH EASEMENT IS CONSOLIDATED; BRISTOL MARSH PRESERVE AND BRISTOL WATERFRONT PARK REDEVELOPMENT BEGIN.
- 2019, BURLINGTON CITY'S DOWNTOWN WATERFRONT OPPORTUNITY ZONE IS CREATED.
- 2020, BURLINGTON'S WATERFRONT PARK PHASE I (OLIN STUDIO), IS IMPLEMENTED TO PROTECT THE CITY BY REDUCING FLOOD EVENTS, INCREASING RESILIENCY AND PROMOTING ECONOMIC DEVELOPMENT.



BURLINGTON BRISTOL BRIDGE



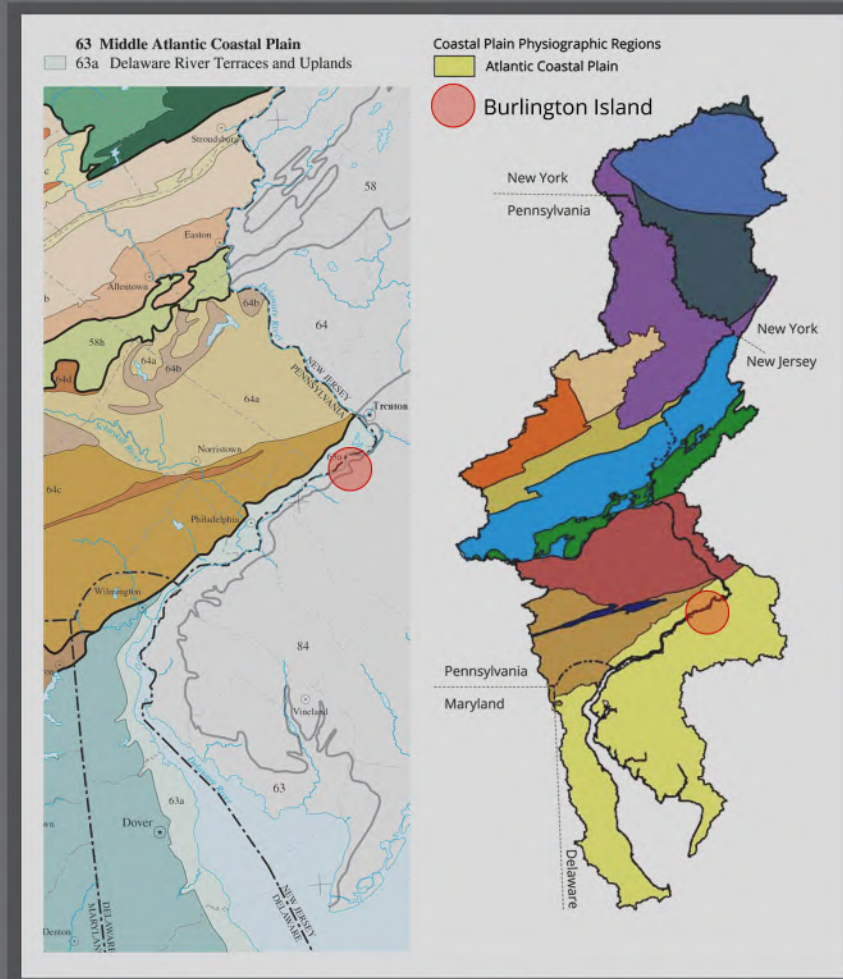
U.S. CAST IRON PIPE & FOUNDRY COMPANY, BURLINGTON, N. J.



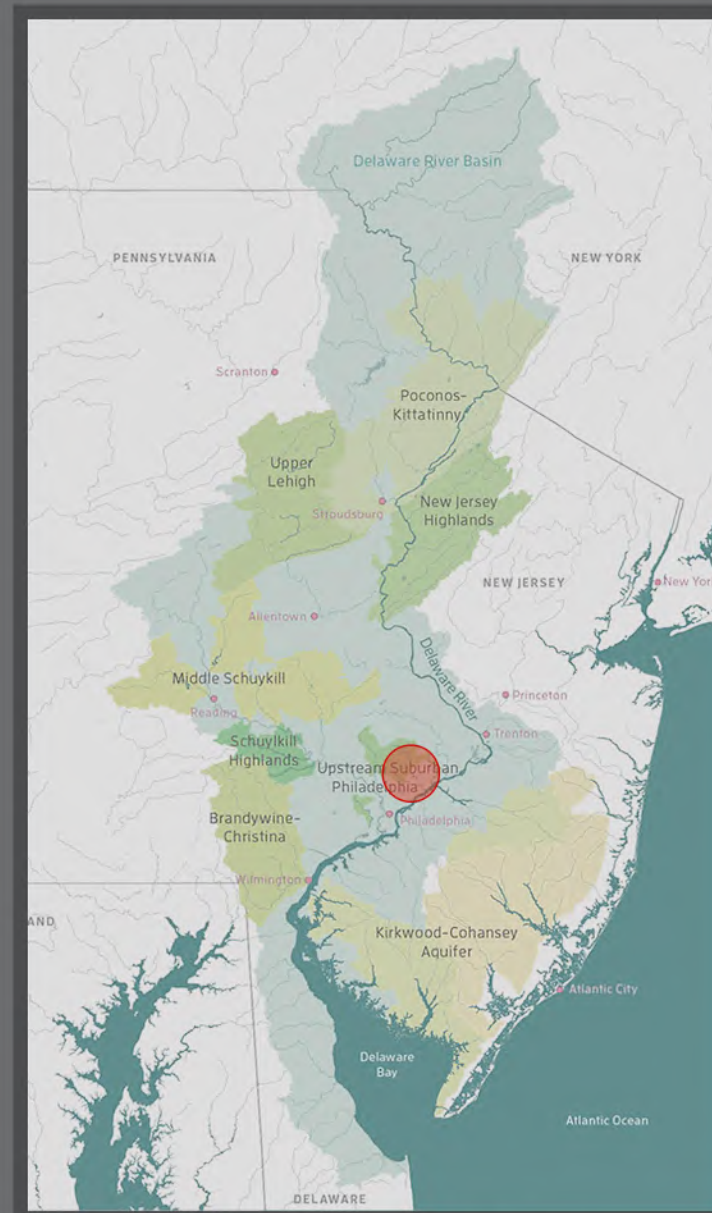
GRUNDY WOOL MILL, BRISTOL BOROUGH, PA

# PHYSIOGRAPHIC CONTEXT: THE DELAWARE RIVER WATERSHED

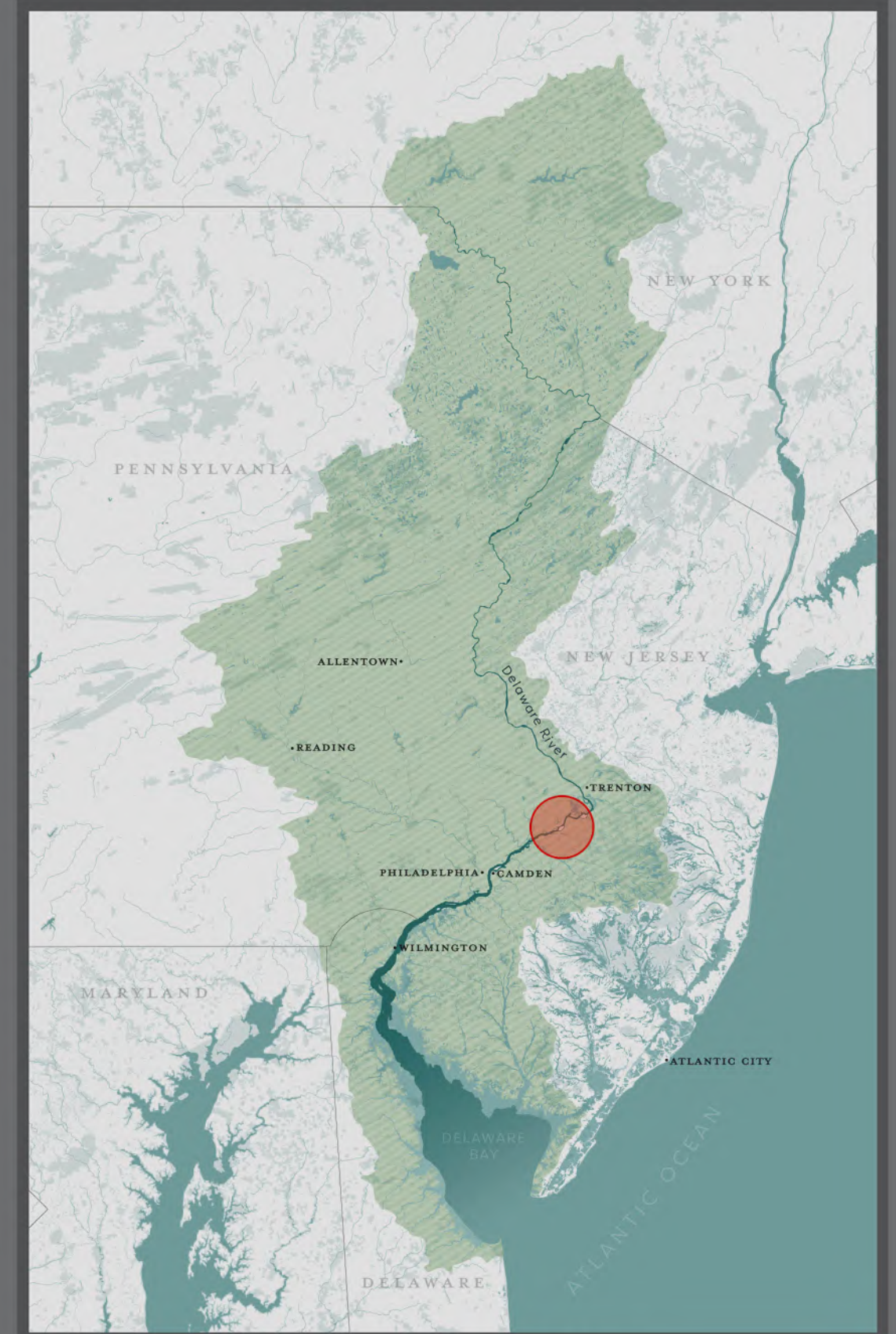
- THE DELAWARE RIVER IS THE LONGEST UN-DAMMED RIVER EAST OF THE MISSISSIPPI
- IT FLOWS THROUGH FIVE STATES INCLUDING: NY, NJ, PA, MD AND DE
- 400 MILES OF NATIONAL WILD AND SCENIC RIVERS ARE WITHIN ITS BOUNDARIES
- IT IS 330 MILES LONG AND PROVIDES DRINKING WATER TO 13 MILLION PEOPLE
- IT COVERS 13,500 SQUARE MILES
- 6000 SQUARE MILES IS FORESTED
- 1100 SQUARE MILES ARE WETLANDS



ECO & PHYSIOGRAPHIC REGIONS



REGIONAL WATERSHEDS

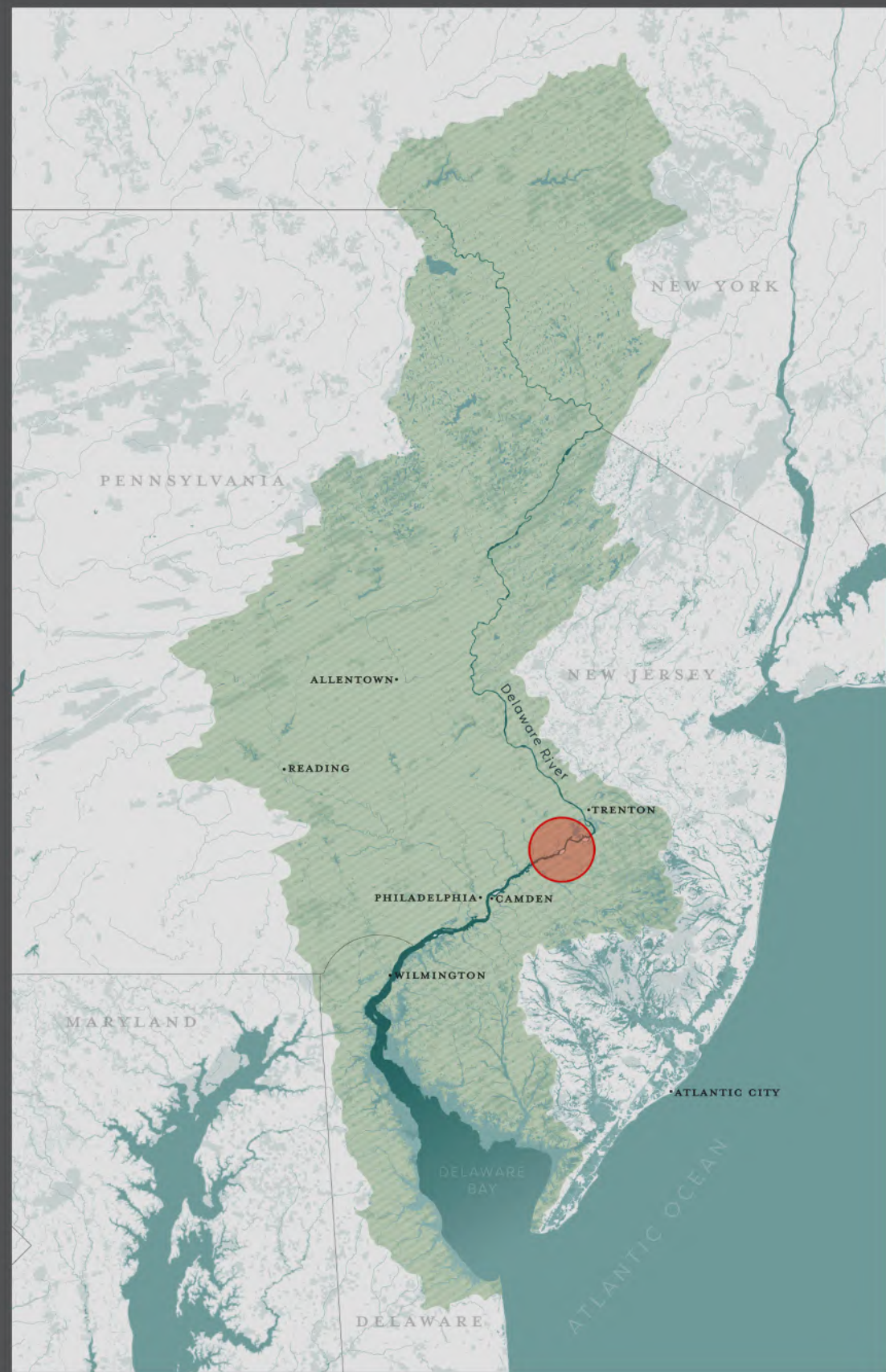


DELAWARE RIVER BASIN

## PHYSIOGRAPHIC CONTEXT: SHORELINE AQUATIC ECOLOGY

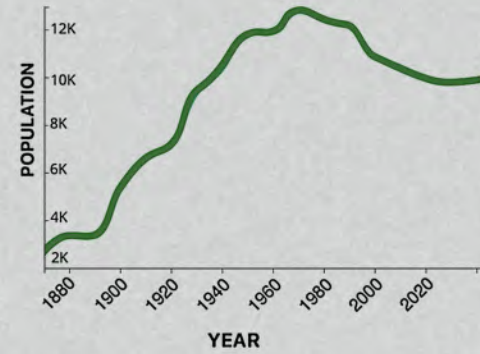
- INDICATOR SPECIES REPRESENT THE OVERALL HEALTH OF AN ECOLOGICAL SYSTEM THROUGH THEIR POPULATION AND HABITATS. HEALTHY RIVERS ARE HABITAT FOR HEALTHY WILDLIFE.
- THE DELAWARE RIVE HAS ONE OF THE LARGEST NATIVE EEL POPULATIONS IN THE NATION. BORN IN THE SARGASSO SEA, THE AMERICAN EEL TRAVELS THE ATLANTIC OCEAN TO THE DELAWARE BAY AND UP THE UN-DAMMED RIVER.
- THE ELLIPTIO COMPLANATA MUSSEL RELIES ON THE EEL FOR REPRODUCTION AND BECAUSE OF THE PRESENCE OF THE AMERICAN EEL, IT THRIVES IN THE UPPER DELAWARE.
- MUSSELS FILTER SIX TIMES THE DELAWARE'S AVERAGE DAILY SUMMER FLOW.
- THANKS TO CLEAN WATER, RIVER OTTER POPULATIONS ARE INCREASING IN THE DELAWARE.
- DOCUMENTED RARE WILDLIFE SPECIES ON BURLINGTON ISLAND: *SHORTNOSE STURGEON*, *TIDEWATER MUCKET*,

*EASTERN PONDMUSSEL*,  
*YELLOW LAMPMUSSEL*,  
*GREAT BLUE HERON*,  
*PEREGRINE FALCON*,  
*BALD EAGLE*,  
*OSPREY*.

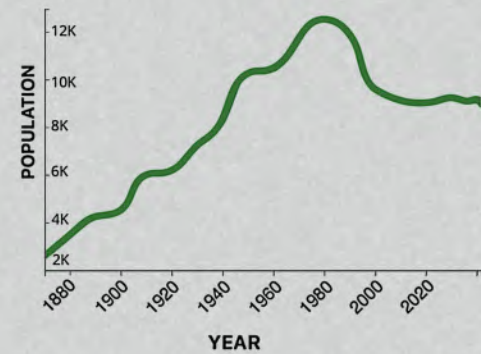


# LOCAL CONTEXT: PEOPLE OF BURLINGTON AND BRISTOL COMPARATIVE DEMOGRAPHICS

**Bristol, PA**  
Population 2022: 9889

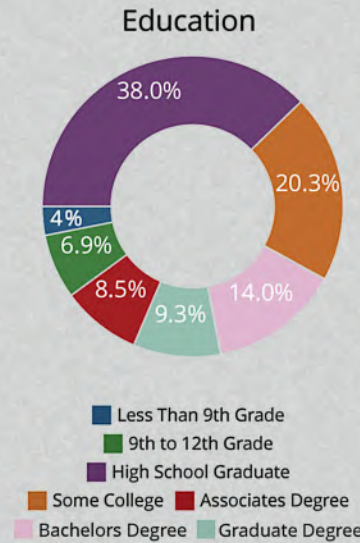


**Burlington, NJ**  
Population 2022: 9707



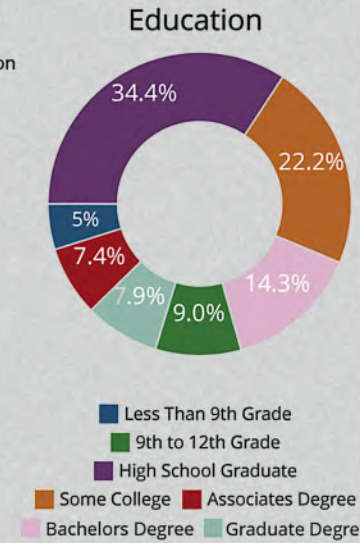
**Bristol, PA**

80.43%  
Born in Bristol  
97.11%  
Native Born

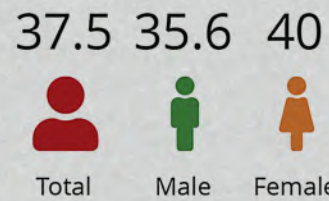


**Burlington, NJ**

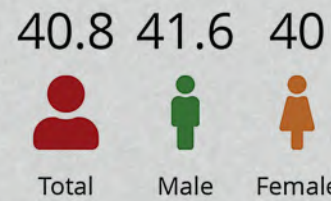
60.71%  
Born in Burlington  
92.22%  
Native Born



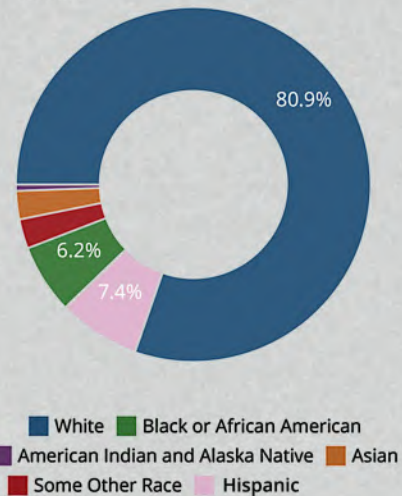
**Bristol Median Age**



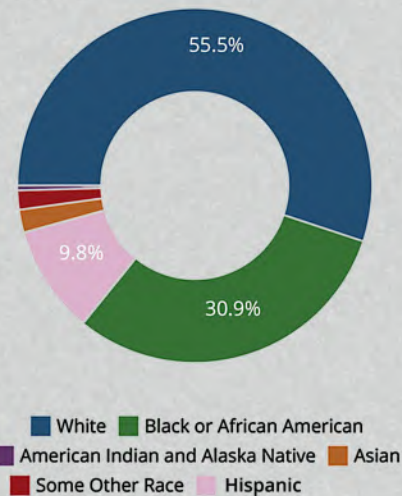
**Burlington Median Age**



**Race**



**Race**



56.1%  
Rate of Home Ownership

\$60,028  
Median Income  
\$182,000  
Median Home Value

12.4%  
Poverty  
3.03  
Average Family Size  
2.42  
Average Household Size

**Bucks County Comparison**  
Median income \$100,144  
Med Home value \$384,400  
Poverty 6.5%

65.9%  
Rate of Home Ownership

\$65,688  
Median Income  
\$167,500  
Median Home Value

15.5%  
Poverty  
3.39  
Average Family Size  
2.64  
Average Household Size

**Burlington County Comparison**  
Median income \$94,397  
Median Home value \$291,600  
Poverty 7.9%

## COMPARATIVE ANALYSIS

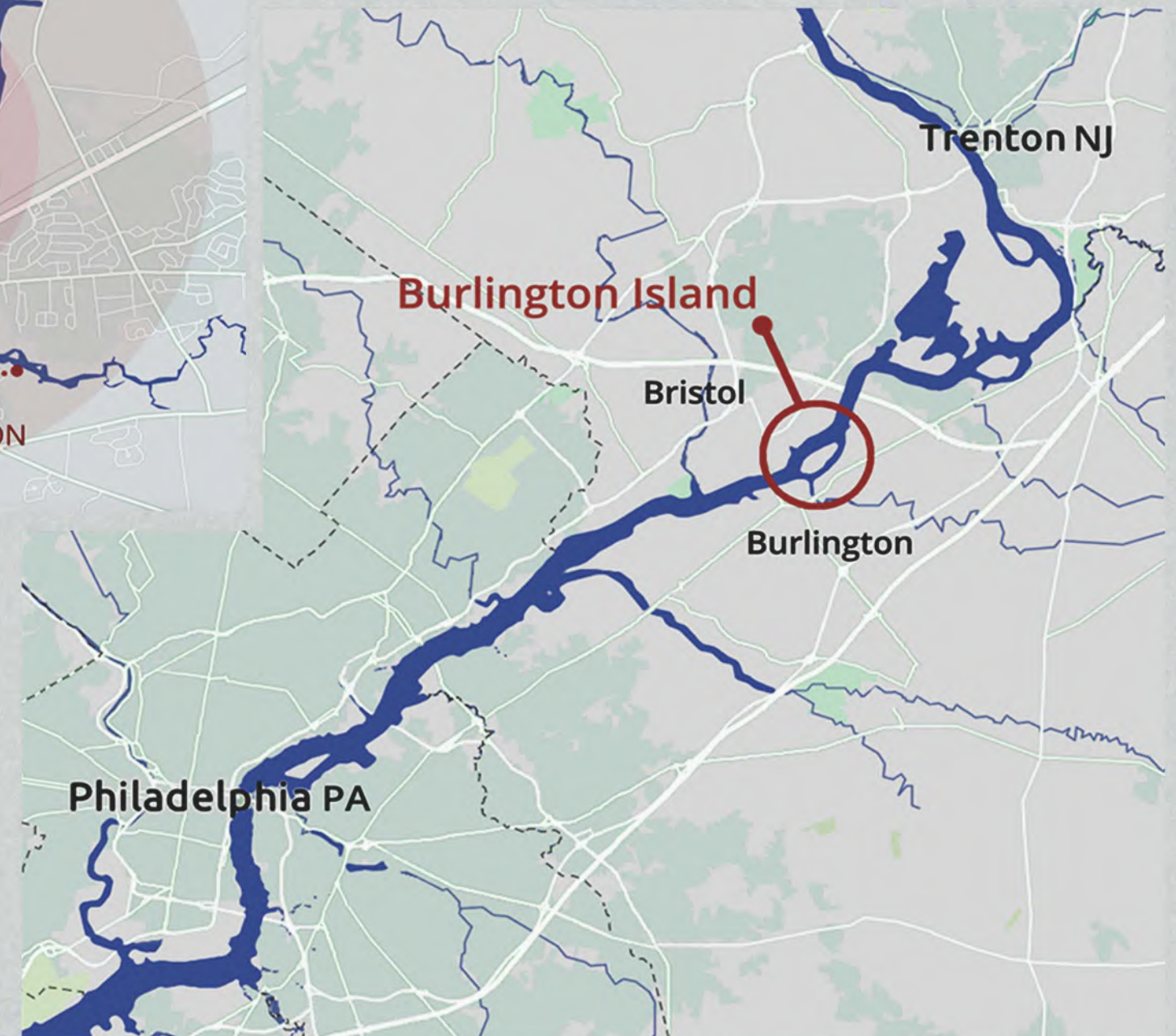
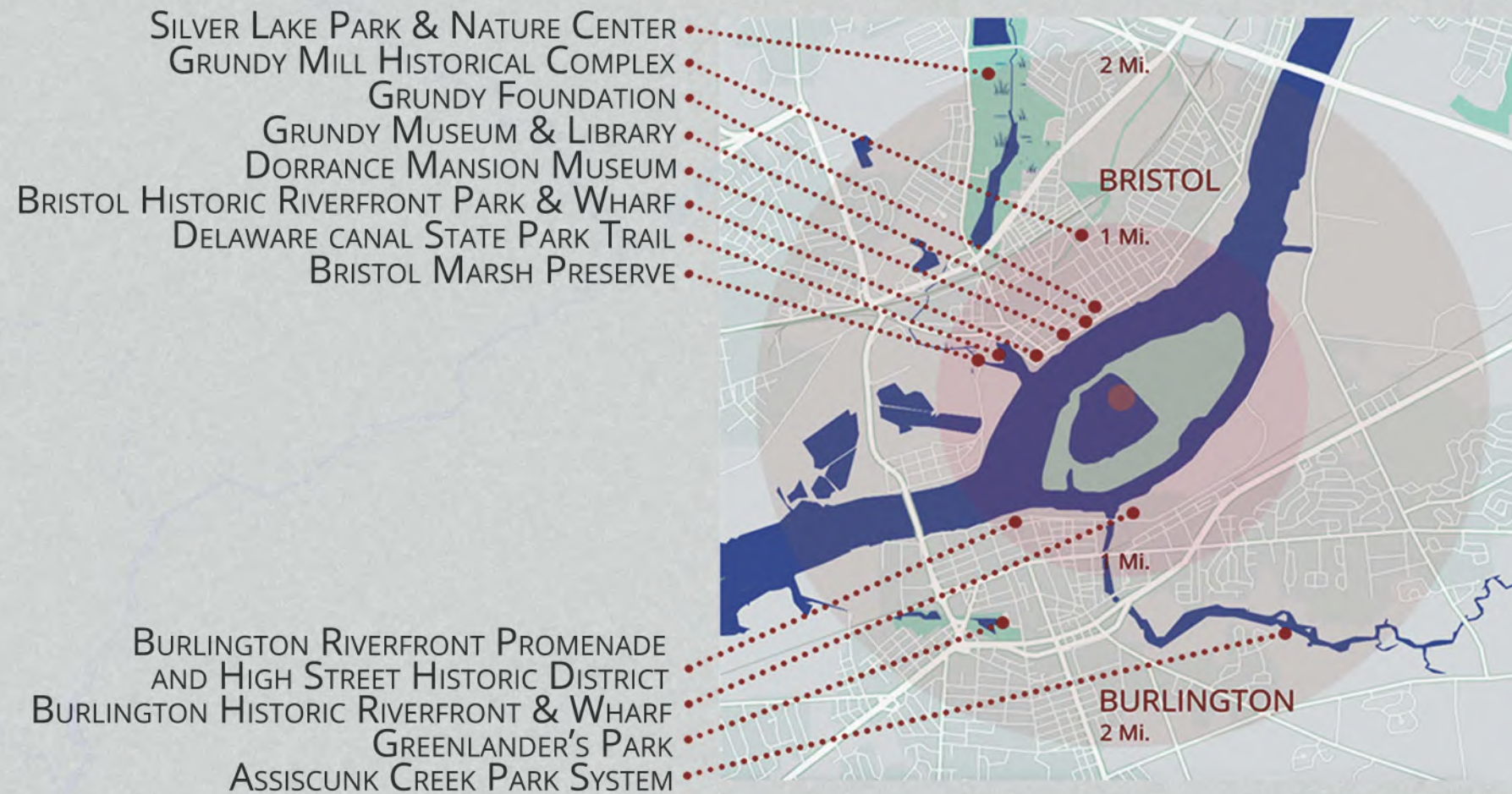
- BOTH BURLINGTON AND BRISTOL ARE POST-INDUSTRIAL CITIES WITH A LONG HISTORY OF ECONOMIC AND POPULATION DECLINE THROUGH THE SECOND HALF OF THE 20TH CENTURY.

- BOTH ARE SIMILAR SIZED POPULATIONS; SIMILAR IN MEDIAN AGE AND EDUCATIONAL DEMOGRAPHIC RANGE, BUT DIVERGING IN RACIAL STATISTICS. BURLINGTON BEING A MORE MULTICULTURAL COMMUNITY.

- BOTH COMMUNITIES EXPERIENCE SIGNIFICANTLY LOWER MEDIAN INCOMES AND HOME VALUES WHEN COMPARED WITH THEIR SURROUNDING COUNTIES, AND DOUBLE THE RATE OF POVERTY.

- REAL ESTATE VALUES AND POVERTY ARE PARALLELED BY SIMILAR PATTERNS OF POST-INDUSTRIAL BROWNFIELD LIABILITIES, AS WELL AS SIMILAR PATTERNS OF ECONOMIC REDEVELOPMENT AND POPULATION STABILIZATION IN THE 21ST CENTURY.

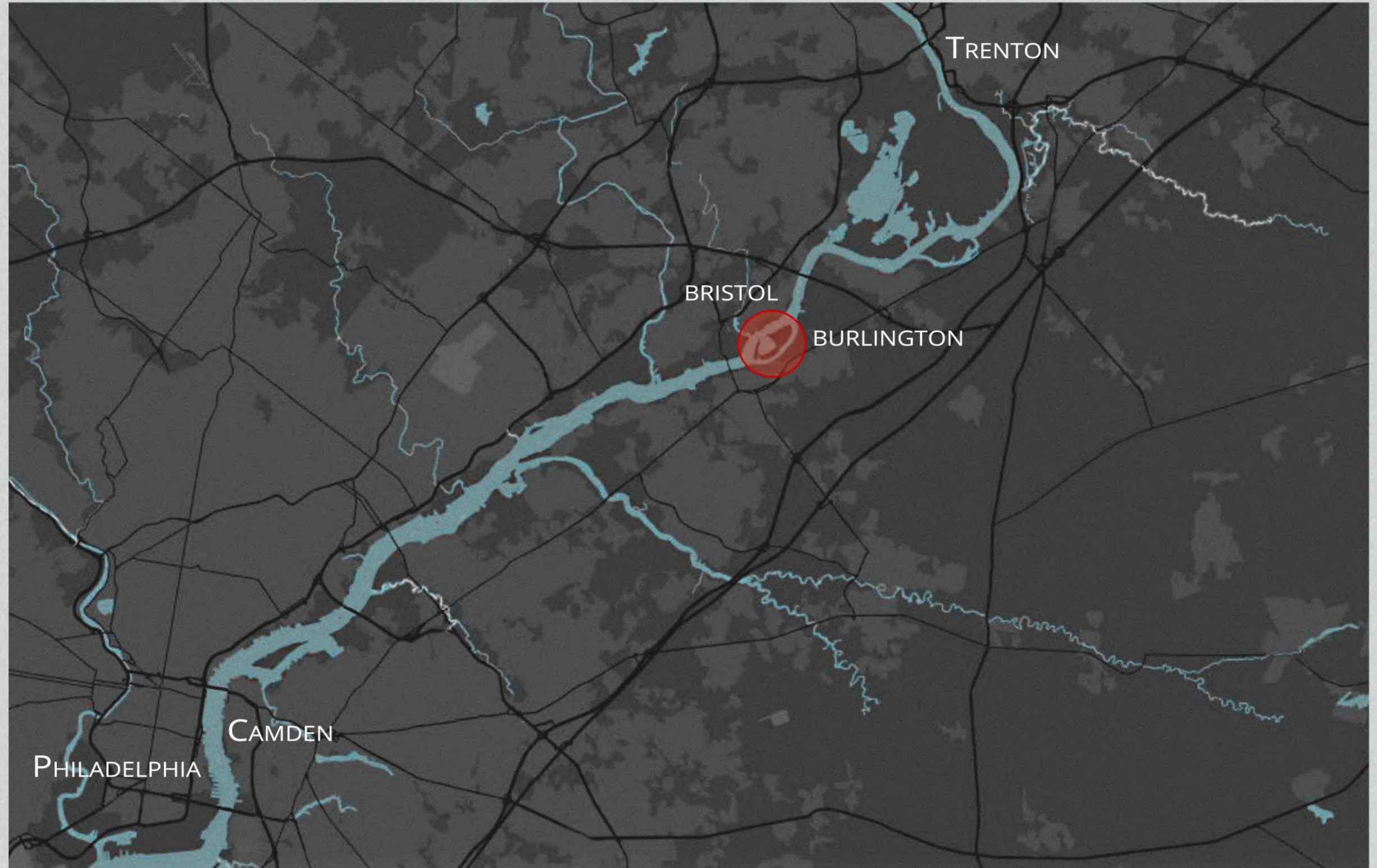
# REGIONAL AND LOCAL CONTEXT: ENVIRONMENTAL, CULTURAL AND HISTORICAL ASSETS



**LOCATION:** 30 MILES NORTH/NORTHEAST OF PHILADELPHIA AND CAMDEN ALONG THE DELAWARE RIVER. BRISTOL AND BUCKS COUNTY, PA ARE IMMEDIATELY TO THE EAST. BURLINGTON AND BURLINGTON COUNTY, NJ ARE IMMEDIATELY TO THE WEST. THE ISLAND IS ACCESSIBLE BY BOAT FROM BOTH THE BRISTOL WHARF AT THE WATERFRONT PARK, AND FROM CURTIN'S WHARF AT THE BURLINGTON WATERFRONT.

## REGIONAL CONTEXT: TRANSPORTATION AND ACCESS

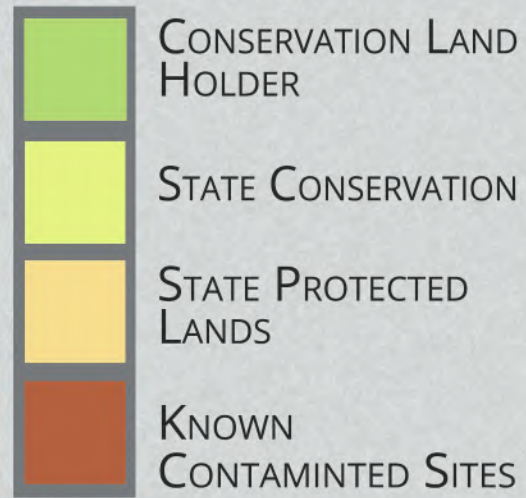
- I-95, I-295 AND I-276 CONNECT IN BRISTOL.
- U.S. ROUTE 13 & PA ROUTE 413 CROSS THE BURLINGTON-BRISTOL BRIDGE TO I-95, I-295.
- SEPTA SUBURBAN BUS SERVICE 127, 128, AND 129 STOP IN BRISTOL.
- SEPTA REGIONAL RAIL TRENTON LINE STOPS IN BRISTOL.
- NJ TRANSIT BUS ROUTES 409 AND 418 PROVIDE TRANSPORTATION BETWEEN BURLINGTON AND CAMDEN.
- THE NJ RIVER LINE LIGHT RAIL SYSTEM PROVIDES TRANSPORTATION BETWEEN TRENTON AND CAMDEN, STOPPING AT BURLINGTON SOUTH AND TOWNE CENTRE.



# LAND USE / LAND COVER REGIONAL CONTEXT: CAPTURING THE URBAN CONDITIONS OF THE SHORELINE

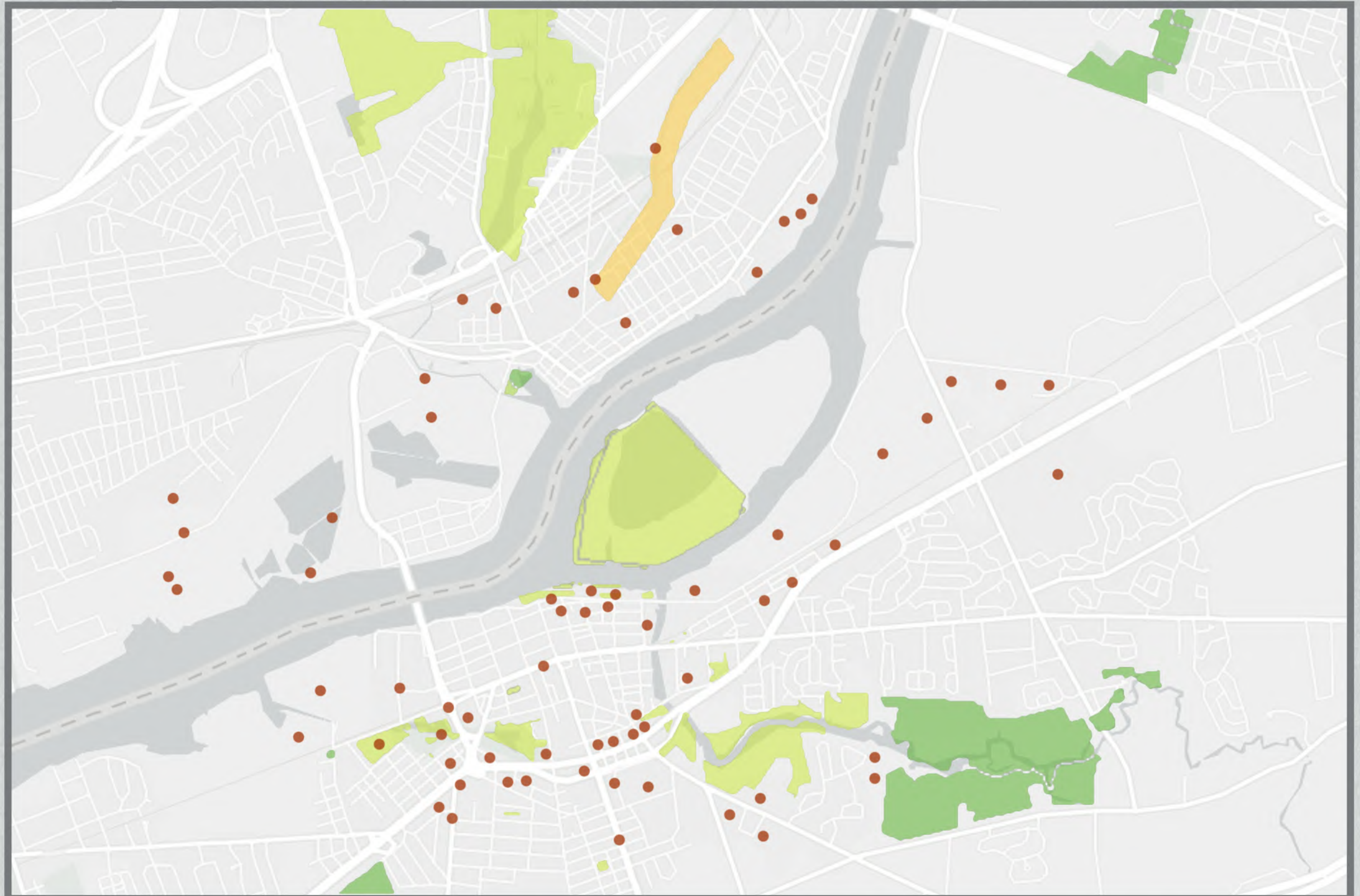


# OPEN LAND REGIONAL CONTEXT, INDUSTRIAL LEGACIES: URBAN GREEN SPACE & CONTAMINATED SITES



NATIONALLY, THERE ARE THOUSANDS OF CONTAMINATED SITES OF VARYING SIZE AND SIGNIFICANCE IN SETTINGS RANGING FROM ABANDONED BUILDINGS TO LARGE AREAS CONTAMINATED WITH TOXIC MATERIALS FROM PAST INDUSTRIAL ACTIVITIES.

KNOWN CONTAMINATED SITES ARE THOSE SITES AND PROPERTIES WHERE CONTAMINATION OF SOIL OR GROUND WATER HAS BEEN CONFIRMED AT LEVELS EQUAL TO OR GREATER THAN APPLICABLE STANDARDS.



## SITE CHARACTER

"KNOWN IN ISLAND HISTORY AS THE 'BEST AND LARGEST ISLAND IN THE DELAWARE RIVER,' VISITING THE ISLAND IS LIKE WALKING BACK IN TIME."

- KATHLEEN BUTLER



# HISTORICAL CHARACTER: 20<sup>TH</sup> CENTURY, BURLINGTON ISLAND AMUSEMENT PARK

- IN 1900 THE LOWER SECTION OF THE ISLAND WAS DEVELOPED AS A FAMILY PICNIC RESORT, WITH 4,000 PEOPLE VISITING IN A SINGLE DAY IN 1902.



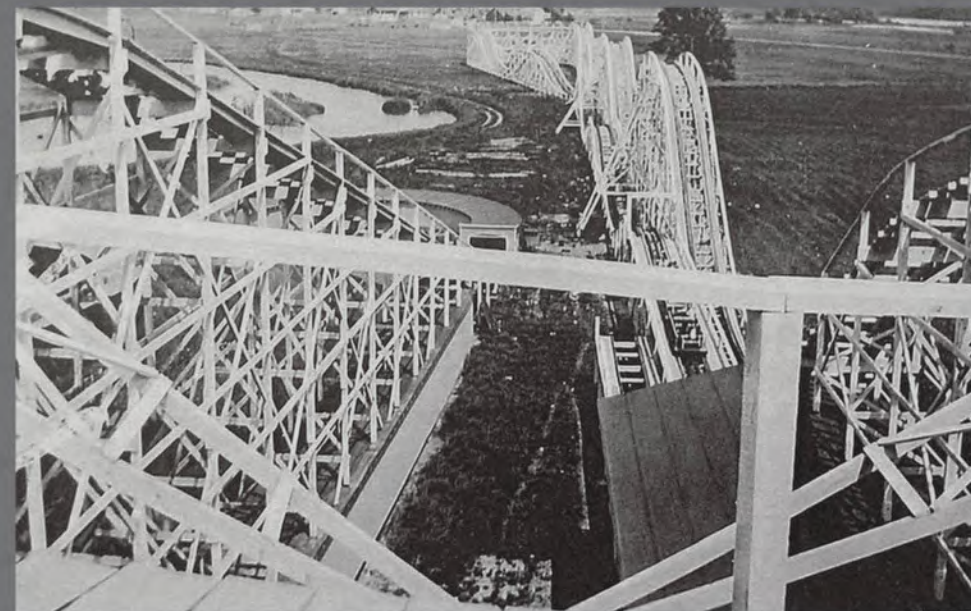
- IN 1917 AN IMPROVED ISLAND BEACH PARK OPENED, AN AMUSEMENT PARK COMPLETE WITH ROLLERCOASTER, MINIATURE RAILROAD AND CAROUSEL IN ADDITION TO THE BEACH AND PICNIC GROUNDS.



- IN 1928 A FIRE DESTROYED MOST OF THE PARK AND AFTER A SECOND FIRE IN 1934 THE PARK WAS CLOSED. 1934 WAS THE LAST TIME THE ISLAND WAS ACCESSIBLE TO THE PUBLIC AS A CULTURAL ASSET.



- FERRYBOATS AND STEAMSHIPS BROUGHT VISITORS FROM CAMDEN, PHILADELPHIA AND TRENTON.



- THE GREYHOUND WAS ONE OF THE LARGEST ROLLERCOASTERS ON THE EASTERN SEABOARD.

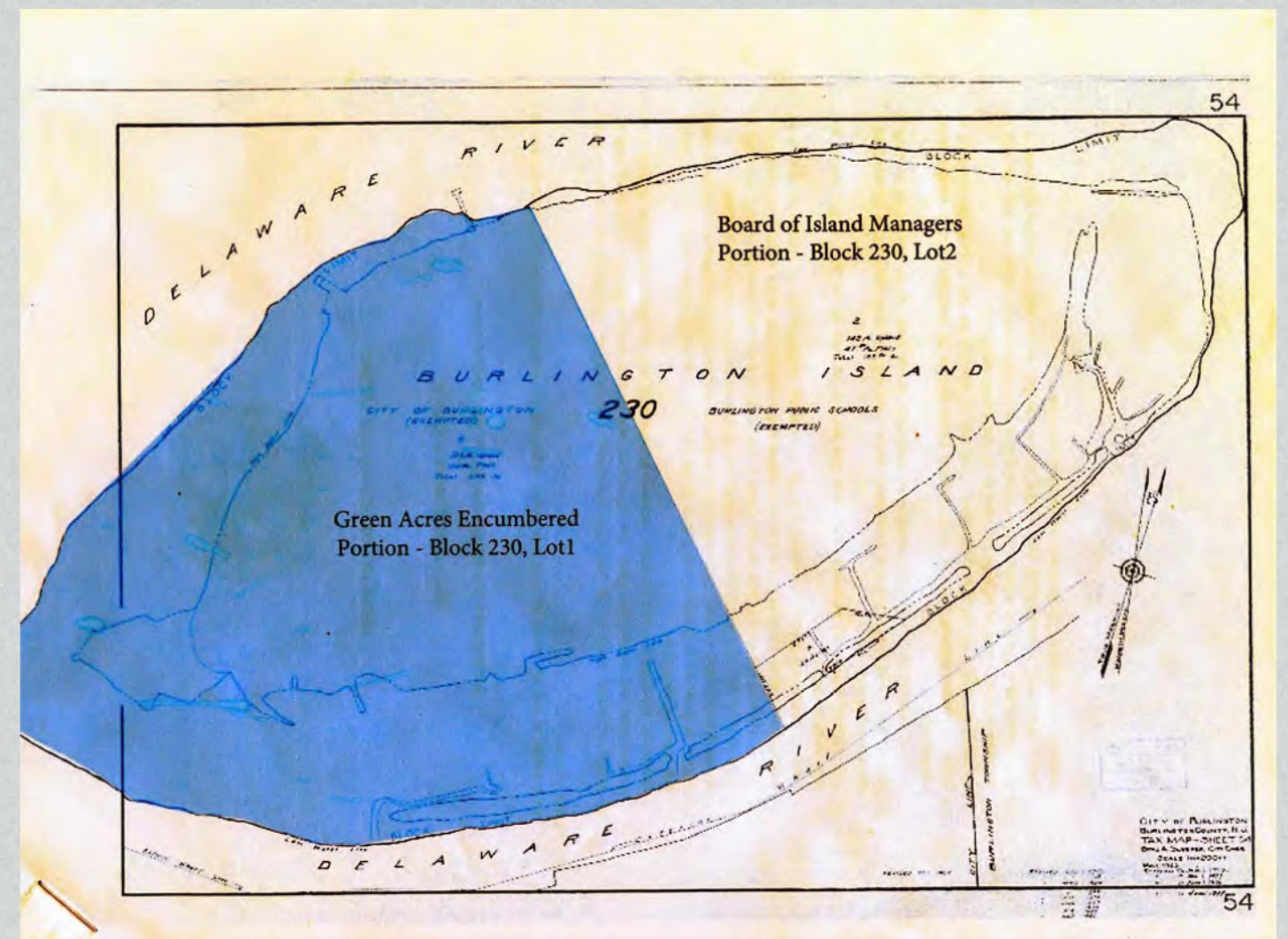
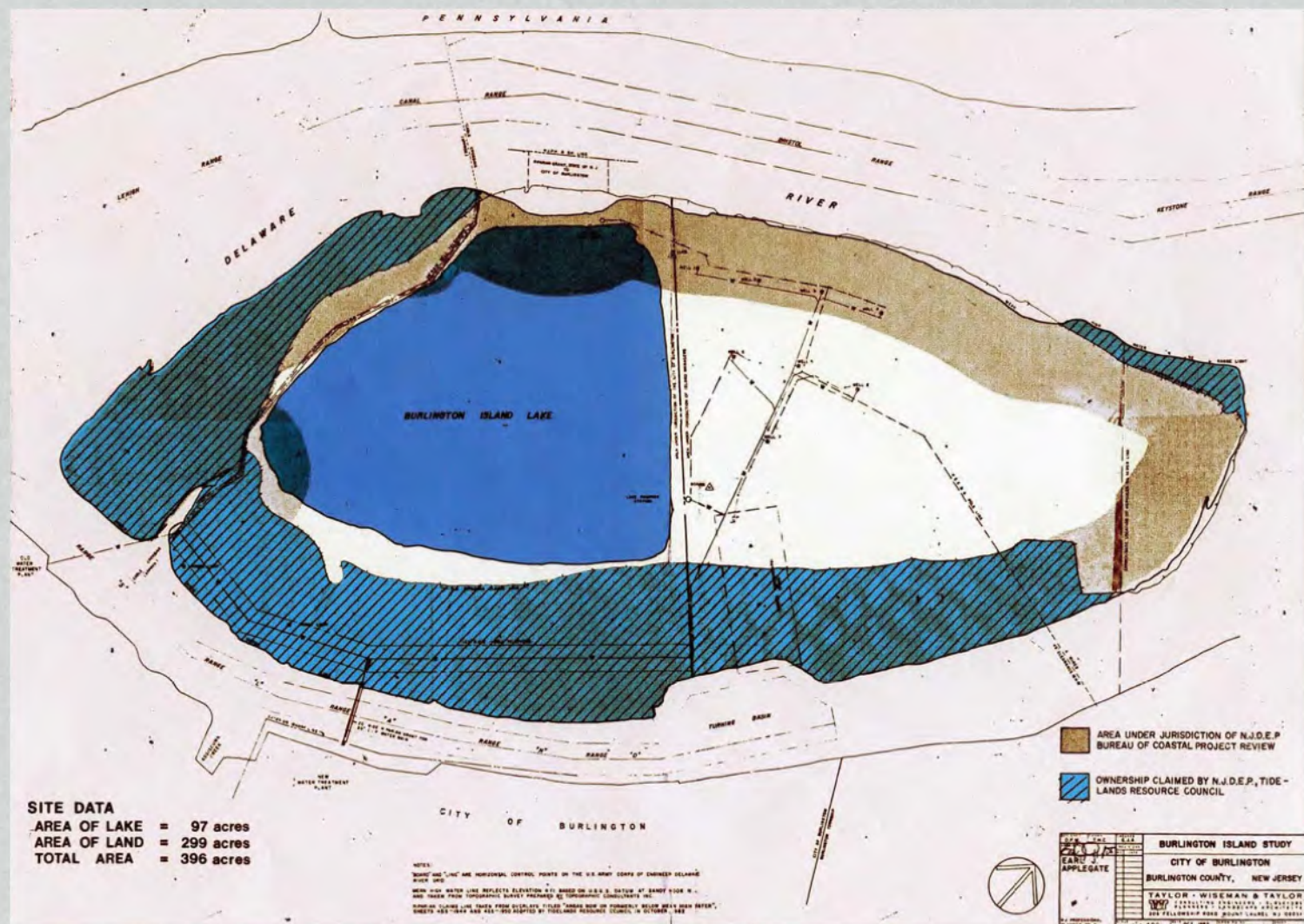


- THE CAROUSEL IS NOW IN SEASIDE HEIGHTS, NJ

# SITE CHARACTER: A COMPLICATED HISTORY OF OWNERSHIP AND LAND USE

- 1853 THE BOARD OF ISLAND MANAGERS SELLS THE LOWER HALF OF THE ISLAND TO A PRIVATELY HELD COMPANY TO FUND THE CITY OF BURLINGTON PUBLIC SCHOOLS.
- 1970 THE LOWER HALF OF THE ISLAND IS SOLD BACK TO THE CITY OF BURLINGTON, NOT THE BOARD OF ISLAND MANAGERS.
- 1970 NJ DEP BEGINS DUMPING DREDGE ON THE ISLAND
- 2016 LAWSUIT TO STOP DREDGE SPOIL DUMPING, A TEMPORARY HOLD PUT IN PLACE.
- 2019-20 GREEN ACRES CONSERVATION PROGRAM ACQUIRES THE LOWER HALF OF THE ISLAND FROM THE CITY.

THE BOARD OF ISLAND MANAGERS ACT ACCORDING TO SEPARATE CHARTER OF 1852 FOR BURLINGTON ISLAND AND THE SCHOOL FUND.  
 FRIENDS OF BURLINGTON ISLAND SUPPORTS GREEN ACRES IN THEIR MISSION OF PARTNERSHIP PRESERVATION.  
 THE BURLINGTON ISLAND LAWSUIT TO STOP THE ARMY CORPS OF ENGINEERS FROM DUMPING DREDGE SPOILS IS IN LEGAL LIMBO.



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL TIDE LANDS PROTECTION, NJDEP BUREAU OF COSTAL REVIEW

NJDEP GREEN ACRES WITH FRIENDS OF BURLINGTON ISLAND & BOARD OF ISLAND MANAGERS

# PHYSIOGRAPHIC CHARACTER: DREDGING HISTORY

## 20TH CENTURY HISTORICAL CONDITIONS



1925 POST AMUSEMENT PARK FIRE



1960 EARLY QUARRY LAKE



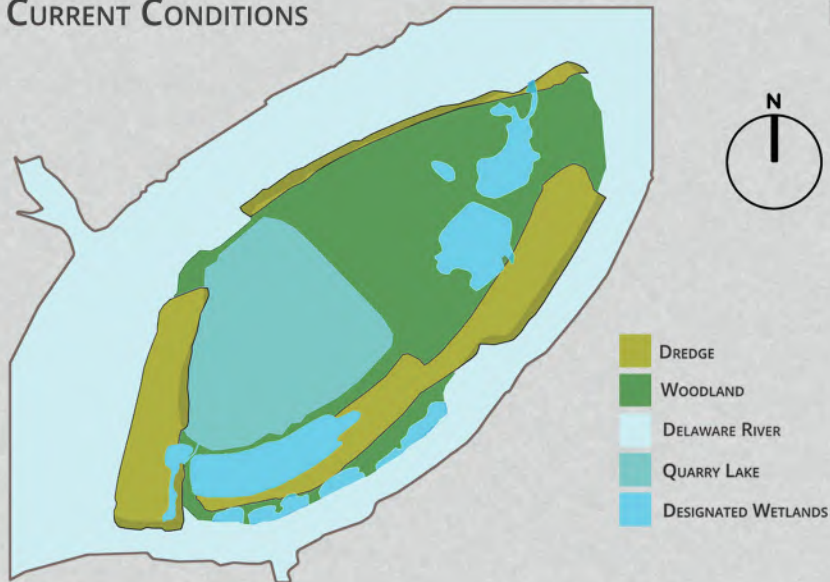
1970 QUARRY LAKE EXPANDED TO TIDAL CLAIM. VISIBLE DREDGE

## 21ST CENTURY CONDITIONS

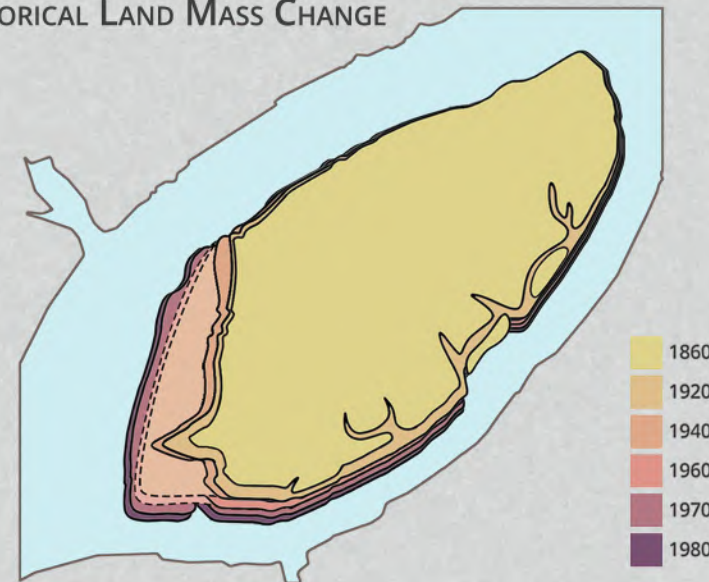
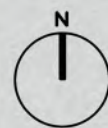


2022 BERM & WOODS RE-ESTABLISHED. DUMPING IN LEGAL LIMBO

## CURRENT CONDITIONS



## HISTORICAL LAND MASS CHANGE



## DREDGING:

THE UNDERWATER EXCAVATION AND REMOVAL OF MATERIALS FROM FRESH, ESTUARINE, OR OCEAN WATERS TO DEEPEN AND, OR WIDEN WATERWAYS FOR THE CREATION AND MAINTENANCE OF HARBORS AND CHANNELS.

## IMPACTS OF DREDGING AND DREDGE DUMPING:

- WATER TURBIDITY AND RESUSPENSION OF CONTAMINANTS
- WATER TOXICITY FROM SEDIMENTATION AND RESUSPENSION
- HABITAT SMOTHERING FROM SEDIMENTATION AND DISPOSAL
- MARINE HABITAT DISTURBANCE AND LOSS
- SHORELINE HABITAT DISTURBANCE AND LOSS

BEFORE 1640: MATINNECUNK, ISLAND OF PINES, LENNI LENAPE

1624: DUTCH & SWEDISH COLONIES

1664: ENGLISH COLONY

1682: BOARD OF ISLAND MANAGERS EST.

1700

1776: U.S. OF AMERICA EST.

DREDGING BEGINS ON THE DELAWARE RIVER 1880

100 ACRES OF LOWER ISLAND SOLD 1853  
BURLINGTON ISLAND ASSOCIATION

1800

1900

DREDGING BEGINS FOR WWI SHIP BUILDING IN BRISTOL: 1917

BEACH ISLAND AMUSEMENT PARK: 1900-1925

QUARRYING, WARNER SAND COMPANY: 1940-70

BOIM SUMMER CABINS: 1950-1977

FRIENDS OF BURLINGTON ISLAND EST: 2019

UNITED BY BLUE ISLAND CLEAN UP: 2019  
2 WEEKS & 96,100 POUNDS OF TRASH REMOVED

2000

# PHYSIOGRAPHIC CHARACTER: PLANT COMMUNITY DESCRIPTIONS



Pennsylvania Natural Heritage Program

## Green Ash – Mixed Hardwood Floodplain Forest



**System:** Palustrine

**Subsystem:** Forest

**PA Ecological Group(s):** River Floodplain

**Global Rank:** GNR

**State Rank:** S4

### General Description

The Green Ash – Mixed Hardwood Floodplain Forest occurs behind levees and on low terraces which may frequently be temporarily flooded but with a shorter duration of flooding than the Silver Maple Floodplain Forest. However, soil characteristics suggest that the ground water level is high for much of the growing season (hydric soil indicators present, soils typically somewhat poorly drained to poorly drained). Soil texture varies from silt to clay loam. On more exposed sites with higher flood flow velocities and coarser substrates, this community may more closely resemble the Sycamore – Mixed Hardwood Floodplain Forest.

The canopy of this community is dominated by green ash (*Fraxinus pennsylvanica*) and may contain one or more other hardwood species as sub-dominants, including black walnut (*Juglans nigra*) and sycamore (*Platanus occidentalis*). Other less common canopy species include American elm (*Ulmus americana*), hackberry (*Celtis occidentalis*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), and pin oak (*Quercus palustris*). The subcanopy and shrub layers are often sparse (occasionally dense at some sites) and are characterized by regeneration of canopy tree species and some shrub species such as spicebush (*Lindera benzoin*). Where exotic species are not rampant, the herbaceous layer is characterized by jewelweed (*Impatiens* spp.), wood nettle (*Laportea canadensis*), wingstem (*Verbesina alternifolia*), Canadian waterleaf (*Hydrophyllum canadense*), poison ivy (*Toxicodendron radicans*), and Virginia creeper (*Parthenocissus quinquefolia*). A number of examples of this community have been heavily impacted by exotic herbaceous species, which may attain a total cover in excess of 90 percent.

## North Atlantic Coastal Plain Tidal Swamp



### Macrogroup: Coastal Plain Swamp



**State Distribution:** DC, DE, MA, MD, NJ, NY, PA, VA

**Total Habitat Acreage:** 196,233

**Percent Conserved:** 30.0%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
MD	43%	84,026	13,139	16,589	54,299
VA	29%	56,049	2,686	6,496	46,867
NJ	21%	41,724	13,129	2,827	25,768
DE	6%	11,564	807	2,514	8,243
NY	1%	1,507	384	104	1,020
PA	1%	1,278	221	8	1,050
DC	0%	83	0	3	79
MA	0%	2	0	0	2



### Description:

A tidally flooded hardwood forest and shrubland in lower river floodplains and estuaries of the North Atlantic Coastal Plain. Deciduous hardwood species predominate, especially ash (green or pumpkin), black gum, or water tupelo, along with red maple, American elm, and black willow. Alder and silky dogwood are common shrubs. Lianas and vines are common: poison ivy, greenbrier, and Virginia creeper. Species richness in the herbaceous layer is exceptionally high due to microtopographic features. Regularly flooded hollows primarily support flood-tolerant swamp species such as orange jewelweed, arrow arum, and various smartweeds. Water hemlock, and smallspike false nettle are typical of elevated hummocks.

### Ecological Setting and Natural Processes:

Occurs as small patches in the uppermost portions of tidal rivers that have sufficiently fresh water and short enough flooding to support trees. Stands form distinct pockets and fringes on poorly-drained, slightly acidic tidal muck with high silt and clay content. Most common in the Chesapeake Bay region, but reaching as far up as the lower Hudson River.

### Similar Habitat Types:

In Chesapeake and Delaware Bays, found usually at the upper limit of brackish or fresh and oligohaline tidal marshes. Southern Atlantic Coastal Plain Tidal Wooded Swamp is similar, with a different (but overlapping) suite of species due to biogeographic differences.

# PHYSIOGRAPHIC CHARACTER: SUCCESSIONAL PLANT COMMUNITIES

RED MAPLE / GREEN ASH / ERECT KNOTWEED SPECIES TIDAL WOODLAND  
FRESHWATER TIDAL FOREST



UPLAND WOODS

WET WOODS

SHRUB FOREST WETLAND

ISLAND WOODY  
PLANT COMMUNITIES  
SHRUB FOREST WETLAND



RED MAPLE

GREEN ASH



WINTERBERRY

WILLOW OAK

WET WOODS



AMERICAN SYCAMORE

SILVER MAPLE



SPICEBUSH

AMERICAN ELM

UPLAND WOODS



TULIP POPLAR

BITTERNUT HICKORY



ARBORVITAE

AMERICAN BEECH

## NATIVE WOODY PLANTS OBSERVED

- ACER RUBRUM*, RED MAPLE
- ACER SACCHARINUM*, SILVER MAPLE
- ACER SACCHARUM*, SUGAR MAPLE
- BETULA NIGRA*, RIVER BIRCH
- CARYA CORDIFORMIS*, BITTERNUT HICKORY
- CORNUS AMOMOM*, SILKY DOGWOOD
- FAGUS GRANDIFOLIA*, AMERICAN BEECH
- FRAXINUS AMERICANA*, WHITE ASH
- FRAXINUS PENNSYLVANICA*, GREEN ASH
- ILEX VERTICILLATA*, WINTERBERRY
- LIRIODENDRON TULIPIFERA*, TULIP TREE
- PINUS ECHINATA*, SHORT LEAF PINE
- PLATANUS OCCIDENTALIS*, AMERICAN SYCAMORE
- PRUNUS SEROTINA*, BLACK CHERRY
- QUERCUS PHELLOS*, WILLOW OAK
- SASSAFRAS ALBIDUM*, SASSAFRAS
- THUJA*, ARBORVITAE
- ULMUS AMERICANA*, AMERICAN ELM

## PLANT SPECIES OBSERVED 8/18/2022

### HERBACIOUS PLANTS OBSERVED

- AGERATINA ALTISSIMA*, WHITE SNAKEROOT
- DENNSTAEDIA PUNCTILOBULA*, HAYSCENTED FERN
- DICHANTHELIUM CLANDESTINUM*, DEERTONGUE
- ELYMUS VIRGINICUS*, VIRGINIA WILD RYE
- TOXICODENDRON RADICANS*, POISON IVY
- URTICA DIOICA*, COMMON NETTLE
- VERBESINA ALTERNIFOLIA*, WINGSTEM

### INVASIVE NATIVE PLANTS OBSERVED

- RUBUS OCCIDENTALIS*, BLACK RASPBERRY
- SMILAX ROTUNDIFOLIA*, ROUNDEAF GREENBRIER

## RARE PLANT SPECIES DOCUMENTED BY NJDEP

- ESTUARY BIDENS BIDENTOIDES*, BURR-MARIGOLD
- ISOETES RIPARIA* VAR.  *RIPARIA*, SHORE QUILLWORT
- SAGITTARIA CALYCINA* VAR.  *SPONGIOSA*, TIDAL ARROWHEAD
- SAGITTARIA SUBULATA*, AWL-LEAF ARROWHEAD
- SCHOENOPLECTUS SMITHII*, SMITH'S CLUB-RUSH

### NON-NATIVE & INVASIVE PLANTS OBSERVED

- BERBERIS THUNBERGII*, JAPANESE BARBERRY
- CLEMATIS ORIENTALIS*, CHINESE CLEMATIS
- MICROSTEGIUM VIMINEUM*, JAPANESE STILTGRASS
- MIMOSA PUDICA*, MIMOSA
- MARUS ALBA*, WHITE MULBERRY
- REYNOUTRIA JAPONICA*, JAPANESE KNOTWEED

# PHYSIOGRAPHIC CHARACTER: SEPTEMBER ISLAND VISIT, SHORELINE AND FOREST CONDITIONS



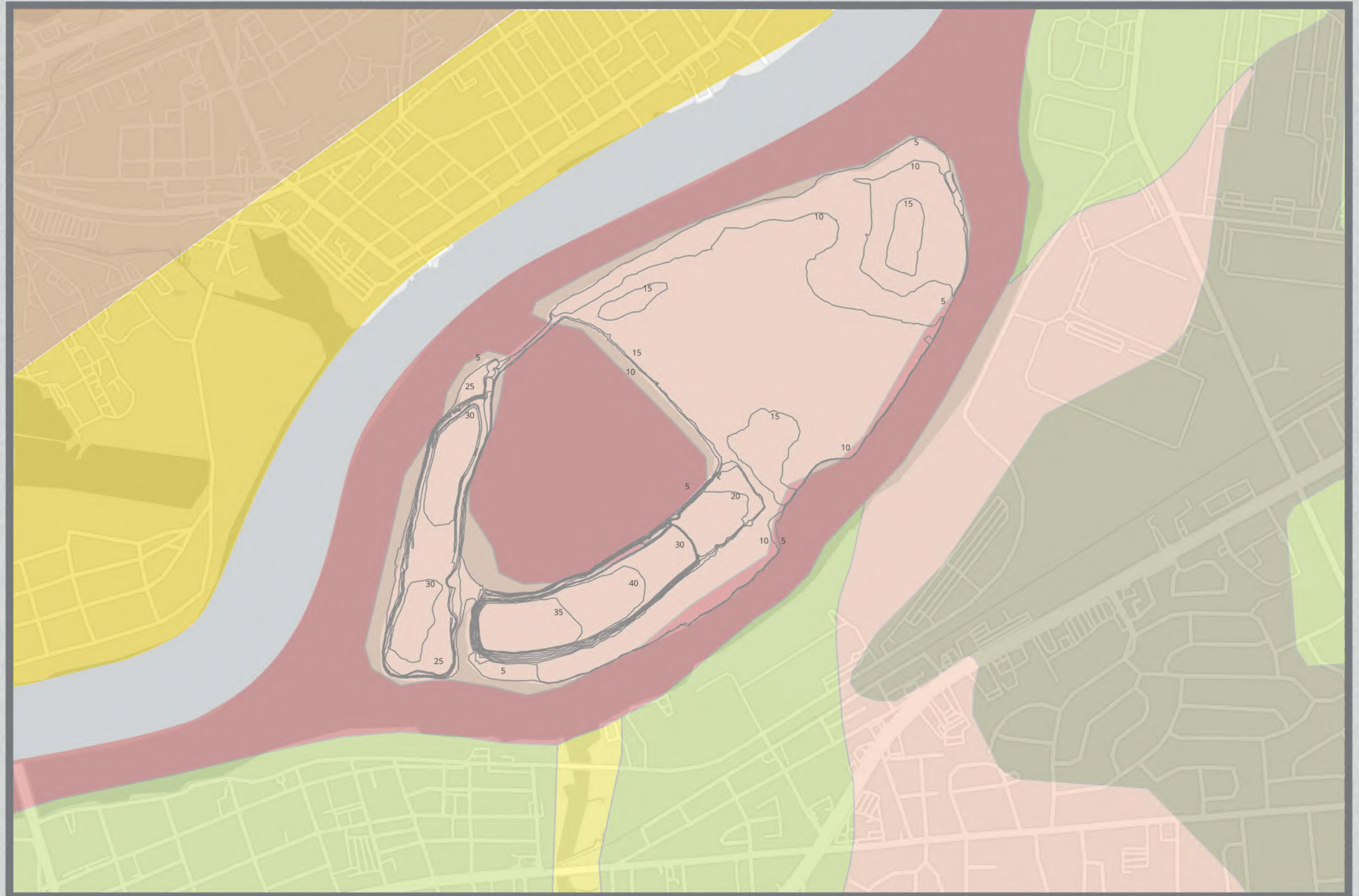
# SITE INVENTORY & ANALYSIS

GUIDING THE DEVELOPMENT OF GOALS AND OBJECTIVES  
FOR SITE DESIGN, PLANNING AND RESTORATION



# SITE INVENTORY & ANALYSIS: SURFICIAL GEOLOGY & 5' TOPOGRAPHY

- CAPE MAY FORMATIONS
- EOLIAN DEPOSITS
- SALT MARSH & ESTUARINE DEPOSITS
- SWAMP & MARSH DEPOSITS
- UPPER STREAM TERRACE DEPOSITS
- STRATIFIED SAND & GRAVEL
- IGNEOUS & METAMORPHIC



# SITE INVENTORY & ANALYSIS: SOIL TYPES

## BRISTOL WATERFRONT

DAa - DELAWARE FINE SANDY LOAM

UCB - UDORTHENTS, SANDY

UzB - URBAN LAND UDORTHENTS, SANDY COMPLEX

## BURLINGTON ISLAND

UDDcB - UDORTHENTS, DREDGED COARSE MATERIALS

UDDfB - UDORTHENTS, DREDGED FINE MATERIAL

GABb - GALESTOWN SAND

DocB - DOWNER LOAMY SAND NORTHERN COASTAL PLAIN

## BURLINGTON WATERFRONT

UDrB - UDORTHENTS, REFUSE SUBSTRATUM

UDDcB - UDORTHENTS, DREDGED COARSE MATERIALS

URSAAB - URBAN LAND, SANDY

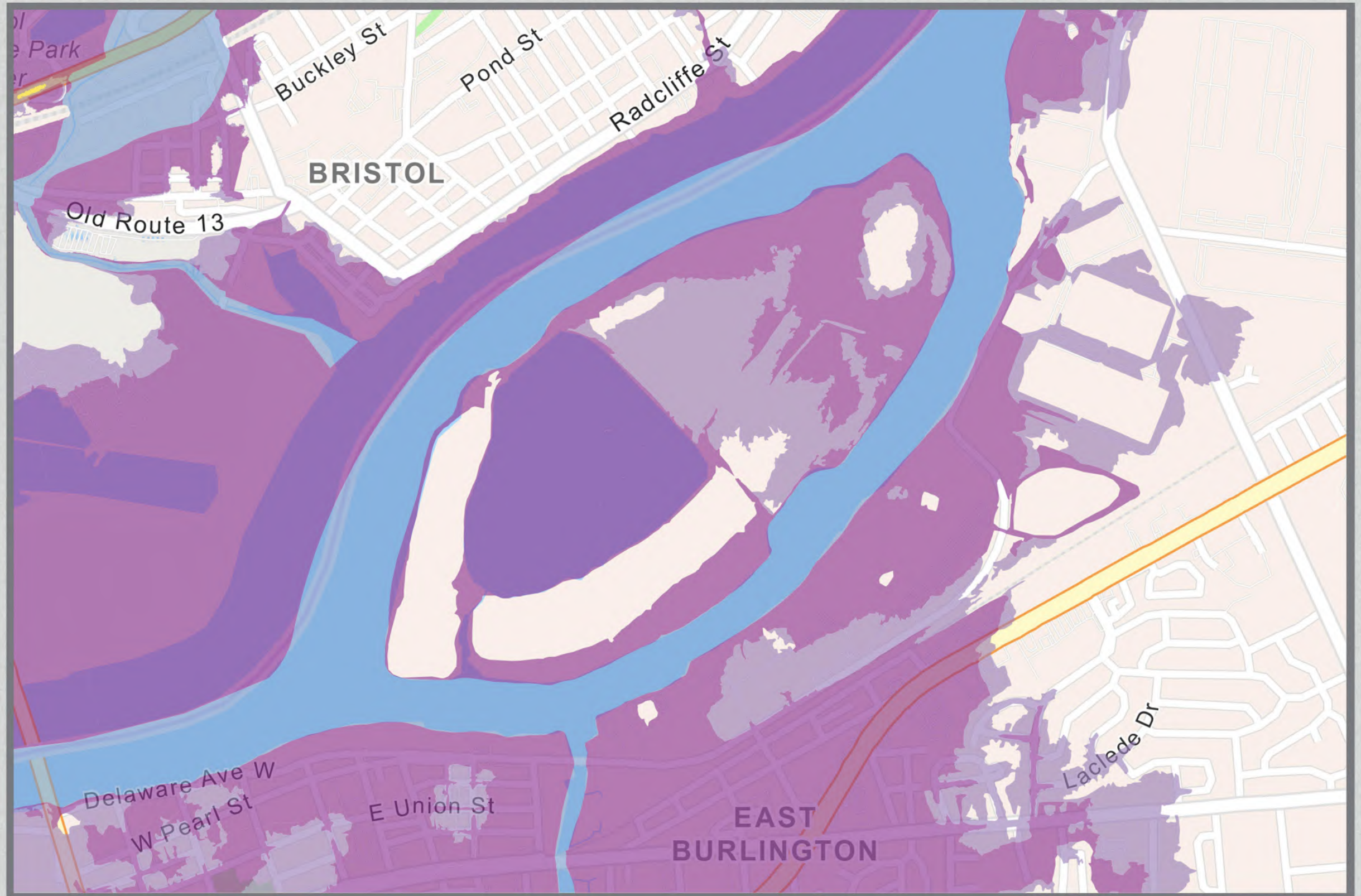
MAMNAv - MANNINGTON-NANTICOKE COMPLEX VERY FREQUENTLY FLOODED

PHG - PITS, SAND AND GRAVEL







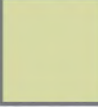



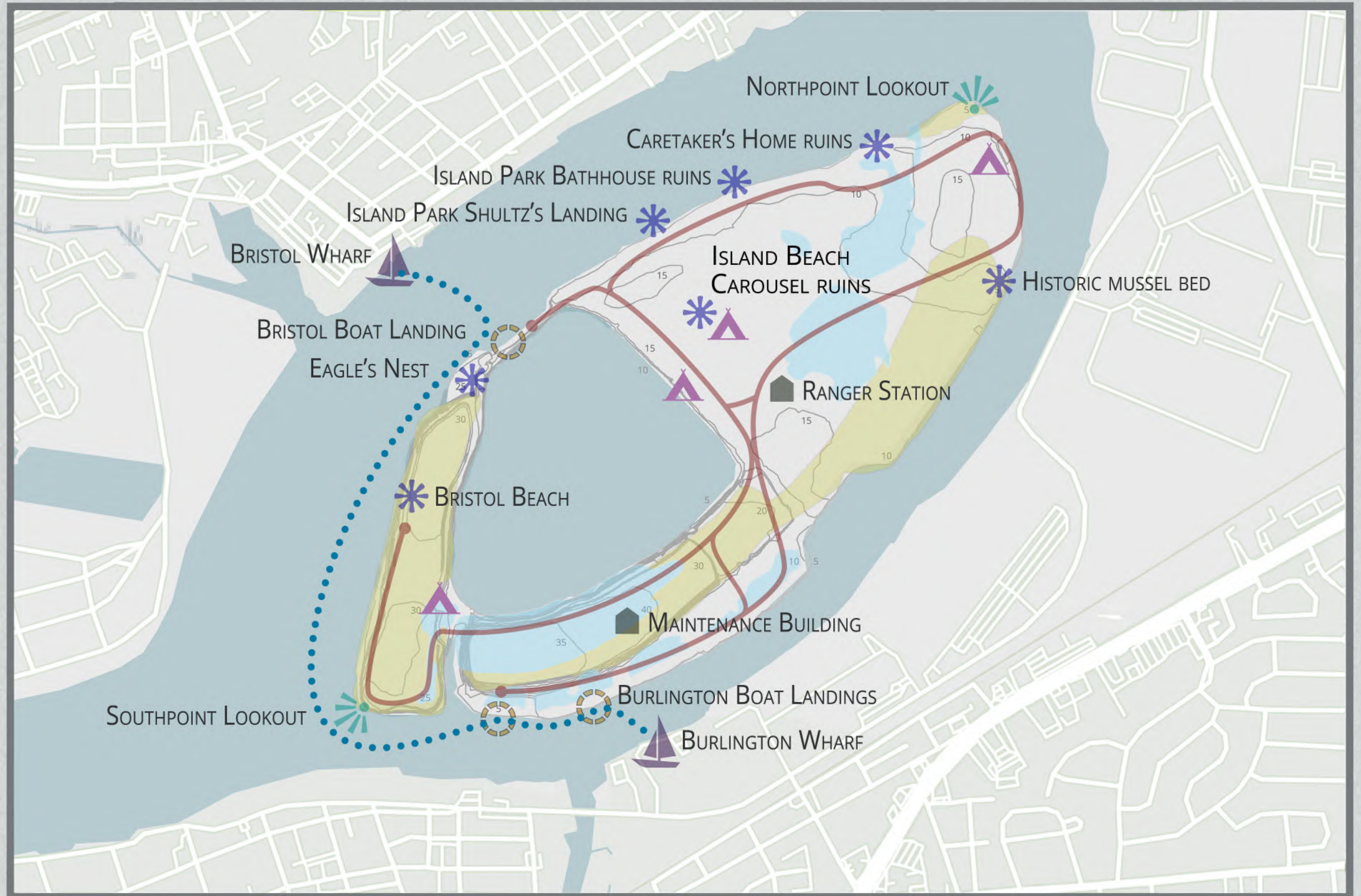
# SITE INVENTORY & ANALYSIS: FEMA FLOOD HAZARD AREAS

- 1% ANNUAL HAZARD
- 0.2% ANNUAL HAZARD
- REGULATORY FLOODWAY



# SITE INVENTORY & ANALYSIS: EXISTING CONDITIONS

- WATERWAY
- PATHWAY
-  WHARF
-  BUILDINGS
-  VIEWS
-  POINTS OF INTEREST
-  BOAT LANDINGS
-  CAMPING
-  DREDGE
-  WETLANDS



# THE SITE

MATINICUNK, ISLE OF PINES



## THE SITE: WHY BURLINGTON ISLAND?

- REDEVELOPING PARKS AND OPEN SPACE IS A CATALYST FOR REVITALIZING NEIGHBORHOODS & COMMUNITIES.
- BEYOND WHAT PARKS DO TO FULFILL INDIVIDUALS, THEY ADDRESS IMPORTANT COMMUNITY AND CIVIC NEEDS.
- PARKS SERVE AS A TOUCHSTONE FOR A SENSE OF COMMUNITY AND IDENTITY FOR THOSE WHO LIVE, WORK, AND PLAY THERE.

### THE GOALS:

COMMUNITY BUILDING

ENVIRONMENTAL JUSTICE

CONSERVATION, EDUCATION, RESTORATION, SUSTAINABILITY

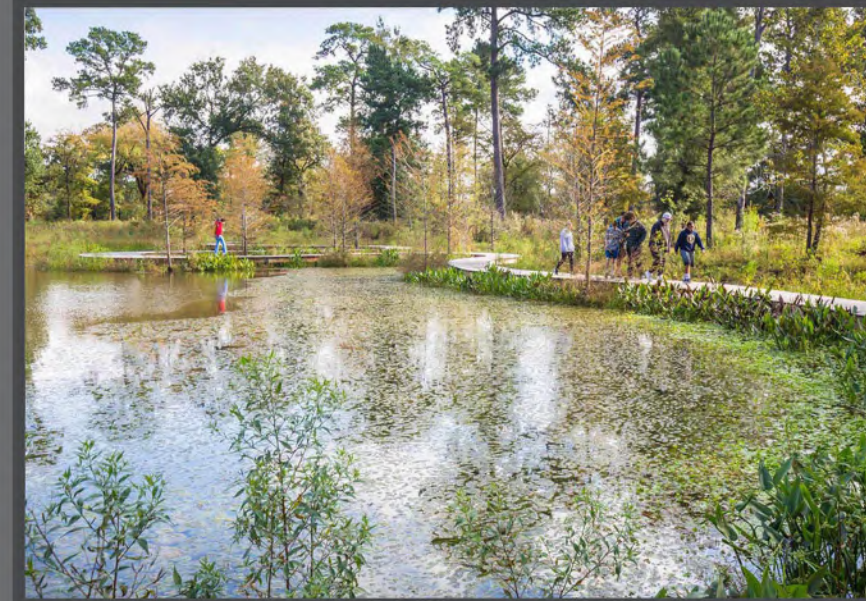
PLAY, REBIRTH, PHYSICAL & MENTAL WELL BEING



# SITE CASE STUDIES: IMAGINE & DESIGN FOR NATIVE SPECIES, SUSTAINABLE USE & RESILIENCY



RED RIBBON TANGHE RIVER PARK, QINHUANGDAO, CHINA. TURENSCAPE, 2007

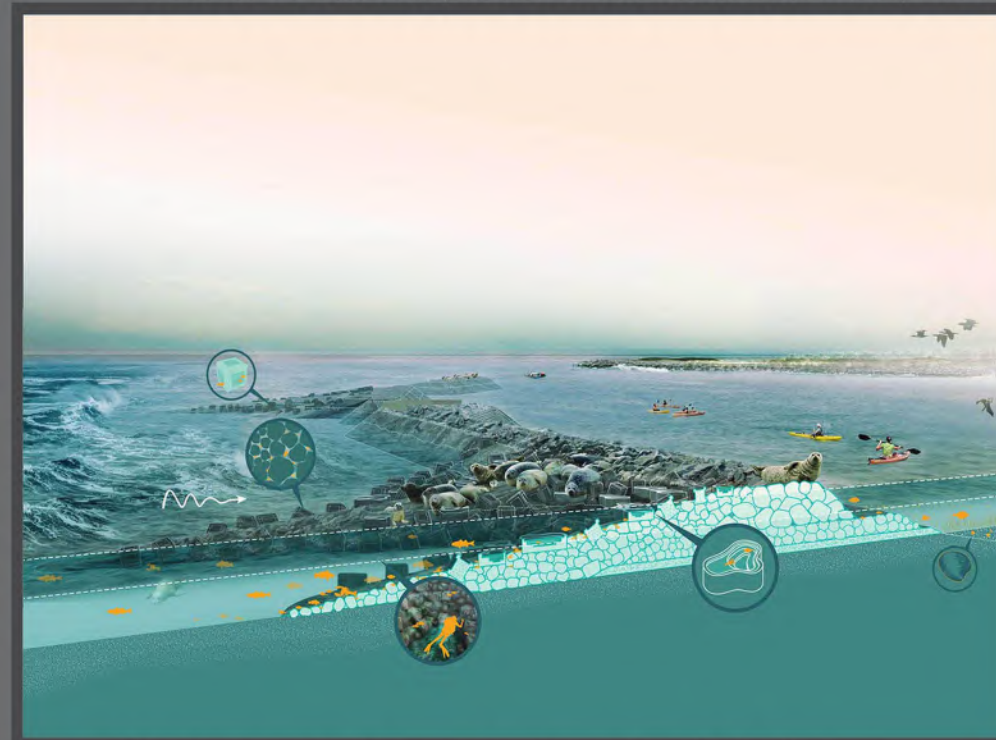


HOUSTON ARBORETUM & NATURE CENTER, HOUSTON, TX. DESIGN WORKSHOP, INC. & REED | HILDERBRAND, 2012

- PRESERVING NATURAL HABITATS ALONG THE RIVER, THE RED RIBBON BOARDWALK INTEGRATES LIGHTING AND SEATING WHILE PROVIDING CONNECTIVE WAY FINDING THROUGH THE PARK.
- THE HOUSTON ARBORETUM RE-DESIGN ENHANCES THE DISTINCT CHARACTER OF THE LANDSCAPE, WHILE PRESERVING SENSITIVE ECOLOGICAL AREAS. THROUGH RESILIENCY PLANNING.



RIVER RING MASTERPLAN, BROOKLYN, NY. JAMES CORNER FIELD OPERATIONS, 2021



LIVING BREAKWATERS, STATEN ISLAND, NY. SCAPE,

- THE RIVER RING ENHANCES CONNECTIVITY TO A PUBLIC WATERFRONT, RESTORING NATURAL HABITATS, ELEVATING THE STANDARD FOR URBAN WATERFRONT RESILIENCY AND TRANSFORMING THE WAY PEOPLE INTERACT WITH THE RIVER.
- WIDELY CONSIDERED A MODEL FOR CLIMATE-ADAPTIVE GREEN INFRASTRUCTURE, LIVING BREAKWATERS IS A LAYERED APPROACH TO RISK REDUCTION, ENHANCING PHYSICAL, ECOLOGICAL AND SOCIAL RESILIENCE ALONG THE SHORELINE.

## SITE RESEARCH: LIVING SHORELINE

CAN SHORELINE ECOLOGICAL RESTORATION AND STEWARDSHIP OF BURLINGTON ISLAND CREATE THE NECESSARY HABITAT FOR ENDANGERED SPECIES RECOVERY?

LIVING SHORELINES ARE ENGINEERED STRUCTURES INSTALLED TO CONTROL SHORELINE EROSION WHILE ALSO MEETING A VARIETY OF ECOLOGICAL GOALS. THROUGH THE THOUGHTFUL AND INNOVATIVE PLACEMENT OF MATERIALS, LIVING SHORELINES CAN MAINTAIN THE CONNECTIVITY BETWEEN LAND AND WATER HABITATS WHILE INTERCEPTING WAVE ENERGY, REDUCING SEDIMENT AND SALT MARSH LOSS, AND PROVIDING HABITAT FOR A VARIETY OF FISH, BIRDS, MAMMALS, AND SHELLFISH.



ACADEMY OF NATURAL SCIENCES, DREXEL UNIVERSITY. (2021). SITE EVALUATION FOR LIVING SHORELINE PROJECTS IN DELAWARE.

# SITE RESEARCH: LIVING SHORELINE, FRESHWATER MUSSEL RESTORATION

## CAN SHORELINE ECOLOGICAL RESTORATION AND STEWARDSHIP OF BURLINGTON ISLAND CREATE THE NECESSARY HABITAT FOR ENDANGERED SPECIES RECOVERY?

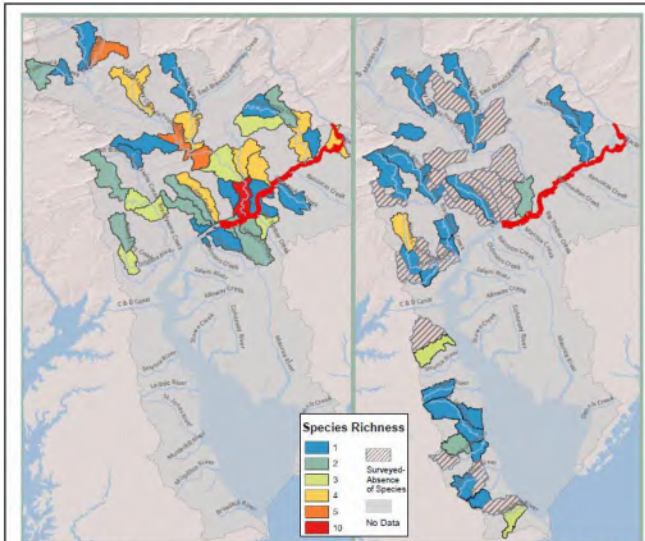
**Freshwater Mussel Recovery Strategy for the Delaware Estuary and River Basin**  
Partnership for the Delaware Estuary - 4/9/13



### I. Introduction

Freshwater mussels are the most imperiled animals in the United States, and locally within the Delaware River Basin. The 2012 State of the Estuary Report (PDE 2012a, 2012b) describes the declining species richness and population range for the dozen native species within the Delaware Estuary and river basin (Fig. 1). Over the past 20 years, the conservation and restoration of rare mussel species has become a national priority. In recent years, this effort has broadened to include species that are classified as more common but which are declining in range and abundance.

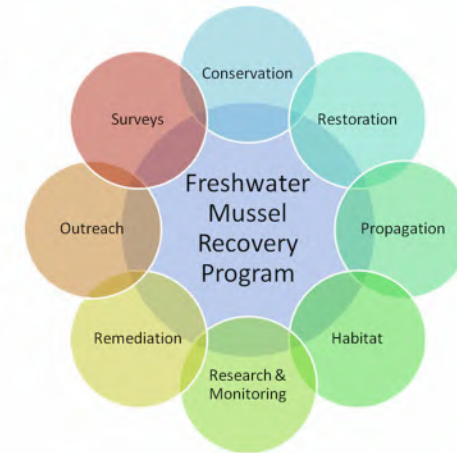
There are diverse reasons for this increasing interest in mussel conservation and restoration. State heritage programs and federal agencies (USFWS, USGS) have been primarily focused on biodiversity preservation and the protection of listed species. Recent interest at the federal (EPA), state (DEP) and local (townships, water companies) levels has centered mainly on the water and habitat benefits that are furnished by healthy mussel beds in streams, rivers and lakes. Like marine species which have long been considered as sentinel bioindicators of aquatic health, healthy communities of freshwater mussels signify healthy streams and rivers.



**Figure 1.** Freshwater mussel species richness per watershed unit based on survey data from 1919 (left) and since 1996 (right) (PDE, 2012b).

As a National Estuary Program, the Partnership for the Delaware Estuary (PDE) is expected to establish measurable goals for sustaining and improving water and habitat conditions, thereby working to implement our Comprehensive Conservation Management Plan (CCMP). We recently elevated healthy freshwater mussel populations as one of a limited subset of "driver" goals which facilitate ecosystem-based restoration in the Delaware River Basin. This goal is based on the observation that mussels are very long-lived (up to 100 years) and sensitive to a variety of suboptimal conditions, ranging from water quality, water quantity, riparian cover, and fish passage. Hence, to achieve multiple goals for water and habitat conditions in any given water body, a simplified focus on achieving a healthy assemblage of native freshwater mussel species living in abundance will drive positive decision-making in support of broader CCMP actions and needs. Furthermore, since each adult mussel filters gallons of water every day, the fact that many areas once held abundant mussels but no longer is thought to contribute to degraded water quality.

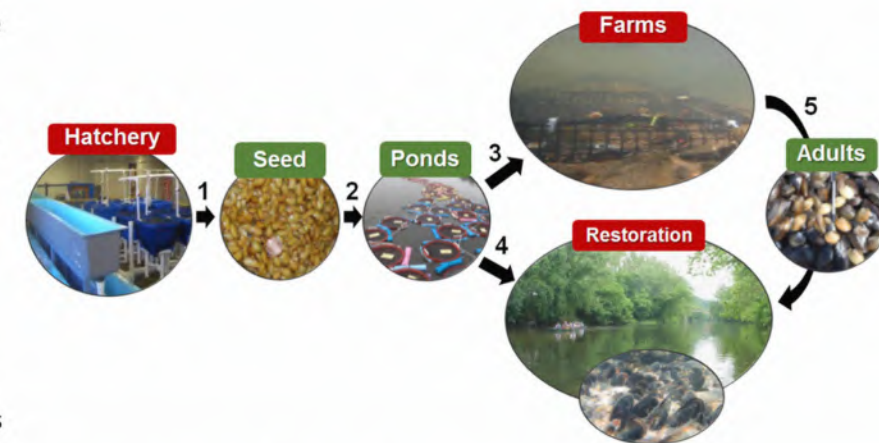
A healthy mussel bed can be comprised of thousands to millions of mussels, and each adult mussel can filter more than 10 gallons of water per day. In this process, a mussel bed can remove substantial amounts of microscopic particles, including many forms of pollutants. Increased water clarity provides more light for bottom plants. Some harmful pollutants are transformed into less harmful forms. A robust mussel bed can also help stabilize erosion and improve habitat conditions for many other plants and animals. The decline of natural mussel beds makes it that much harder to sustain water quality and maintain a healthy ecosystem.



PDE will work with partners to build a new hatchery and rearing facilities for large-scale mussel propagation. Once mussel seed are produced, they will be used to rebuild natural mussel assemblages. Up to a half million baby mussels will eventually be produced annually. These offspring will be reared to hardier sizes at satellite partner facilities and ponds throughout the region.

Once ready for relocation, some juvenile mussels will be relocated from nursery sites to restoration sites in streams, rivers and lakes. Others can be used to promote clean water in strategic enhancement projects, and some will be used for education and research purposes that support MuCWI goals. The types of mussels raised, project locations, and specific uses will largely depend on priorities set by PDE, MuCWI partners, and funders.

The central hatchery will be located at Bartram's Gardens in southwest Philadelphia, Pennsylvania. Numerous ponds that are suitable for raising baby mussels have been identified in northern Delaware and southeast Pennsylvania, and more partners with rearing ponds



# SITE RESEARCH: LIVING SHORELINE, GRAVEL MINING AND SHORELINE RESTORATION

CAN SHORELINE ECOLOGICAL RESTORATION AND STEWARDSHIP OF BURLINGTON ISLAND CREATE THE NECESSARY HABITAT FOR ENDANGERED SPECIES RECOVERY?

## River Island Natural Area Restoration

Nestled on the Clackamas River just upstream from Barton Park, River Island provides 240 acres of habitat for plants and wildlife, including endangered salmon and steelhead, native turtles and migratory birds. Metro worked with community members and experts to design plans to restore fish and wildlife habitat and improve water quality at this voter-protected natural area.



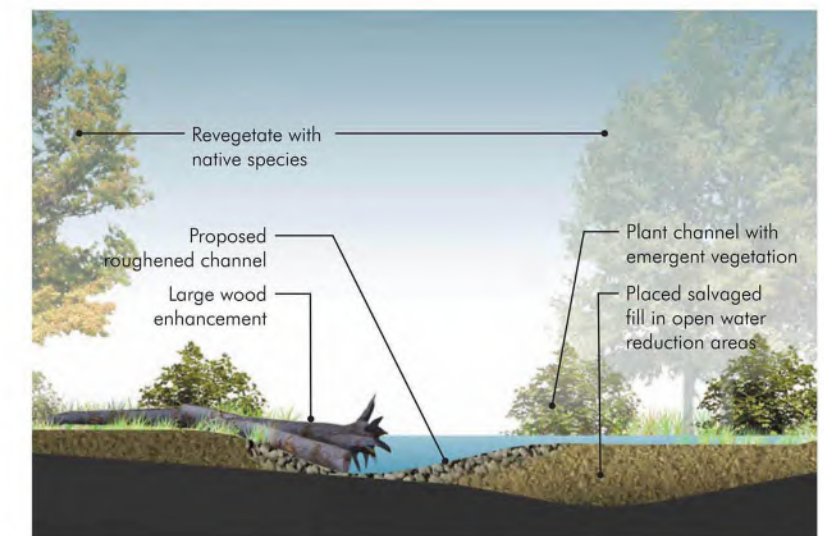
OREGON METRO COUNCIL. (2016). RIVER ISLAND SITE CONSERVATION PLAN. RIVER ISLAND SITE RESTORATION PLAN. RIVER ISLAND RESTORATION. OREGONMETRO.GOV. RETRIEVED SEPTEMBER 22, 2022

## SITE CONSERVATION PLAN

# River Island Natural Area

Barton, Oregon

Years of gravel mining and record flooding in 1996 altered River Island's landscape and changed the Clackamas River's path through the gravel mine – bad news for wildlife that depend on the river. By passing a parks and natural areas levy in 2013, the region's voters made it possible for Metro to restore River Island, returning it to a more natural state.



## SITE MASTER PLAN: SCOPE

THE SCOPE OF THE MASTER PLAN IS THE ENTIRE 400 ACRES OF BURLINGTON ISLAND, ITS LAKE, FORESTS, SHORELINES AND TIDAL SWAMPS. FOCUSING ON RESTORATION AND THE INTEGRATION OF PROGRAMMING AND AMENITIES OF AN HISTORICALLY DIVIDED LANDSCAPE, THE SCOPE OF THIS PROJECT AIMS TO UNITE AND CELEBRATE THE ISLAND'S ASSETS AS A WHOLE.



# SITE MASTER PLAN: OPPORTUNITIES AND CONSTRAINTS

WITH ITS MIXED LAND USE HISTORY, THE ISLAND LANDSCAPE PRESENTS A NUMBER OF CHALLENGES: PROTECTING AND PRESERVING ITS INTACT SHORELINES AND WETLAND ECOLOGY, RESTORING WHERE POSSIBLE, AND RECONSIDERING, OR REIMAGINING THE PLACES THAT HAVE BEEN THE MOST DISTURBED. RE-ESTABLISHED FORESTS, HISTORICAL RUINS AND INDUSTRIAL REMAINS ARE THE FOREGROUND FOR DESIGN OPPORTUNITIES.



## OPPORTUNITIES

- CLIMATE CHANGE RESILIENCY
- ENVIRONMENTAL STEWARDSHIP
- VARIED RESTORATION APPLICATIONS
- EDUCATIONAL PARTNERSHIPS WITH COMMUNITY STAKEHOLDERS
- RECREATIONAL PARTNERSHIPS WITH COMMUNITY STAKEHOLDERS
- RECREATIONAL PROGRAMMING BOTH DIRECTED & UNDIRECTED
- COMMUNITY ENGAGEMENT
- MEMBERSHIP AND VOLUNTEER PROGRAMMING

## CONSTRAINTS

- OWNERSHIP AND GOVERNANCE
- DREDGE SPOILS LEGAL STATUS
- REMAINING TOXIC REFUSE

# SITE DESIGN PROGRAM: QUARRY LAKE AND ENVIRONS

- INCORPORATE MEMORIES, HISTORY, DREAMS • CAPTURE THE IMAGINATION • ENGAGEMENT AS A PRIORITY • FOCUS ON ASSETS
- CREATIVE USE OF EXISTING RESOURCES



## PROGRAMMING

- BEACHES & SWIMMING
- BOATING AREAS
- SAFETY PAVILION
- EDUCATIONAL PAVILION
- EDUCATIONAL AREAS
- RECREATIONAL PAVILION
- RECREATIONAL AREAS
- COMMUNITY GARDEN
- LENAPE FOOD FOREST
- TENT CAMPING
- BURLINGTON & BRISTOL DOCK SHUTTLE

## SITE RESTORATION: COMMUNITY PARTNERS BEGIIIN THE WORK

"MY FIRST IMPRESSION WAS THE STARK CONTRAST, A BEAUTIFULLY WILD, REFORESTED ISLAND WITH A SPARKLING FRESHWATER LAKE LITTERED WITH MOUNDS AND MOUNDS OF CENTURY OLD TRASH." - MARIA McDONALD, UNITED BY BLUE PROGRAM COORDINATOR



UNITED BY BLUE BARGE ON THE DELAWARE RIVER, SPRING 2019

- IN FEBRUARY OF 2019, THE NEW JERSEY DEP CONTACTED UNITED BY BLUE TO HELP ORGANIZE AN ENVIRONMENTAL CLEANUP OF BURLINGTON ISLAND. BECAUSE OF THE SCOPE OF THE TASK, GREEN ACRES, FRIENDS OF THE ISLAND, THE CITY AND THE BOARD AGREED THEY LACKED THE RESOURCES AND EXPERTISE TO DO THE WORK. AT THIS POINT THE ISLAND WAS OFF LIMITS TO VISITORS.

- THE INITIAL SITE VISIT OF THE ISLAND REVEALED A LANDSCAPE OF TRASH OVERTAKEN BY NATURE, BOTH AMAZING AND DISHEARTENING. THE CREW INCLUDED MORE THAN THIRTY PUBLIC, PRIVATE AND NON-PROFIT VOLUNTEERS. WITH A BARGE, THE MUNICIPALITY'S WASTE REMOVAL SERVICE, AND LOCAL RECYCLER THE CLEAN UP BEGAN.

- 96,100 POUNDS OF TRASH WAS REMOVED FROM BURLINGTON ISLAND BY VOLUNTEERS METICULOUSLY WORKING TO DO AS LITTLE HARM AS POSSIBLE TO THE ENVIRONMENT. THE ISLAND OPENED TO VISITORS LATER IN 2019, WITH MUCH OF THE LARGER, TOXIC REFUSE REMOVED. BUT THERE IS STILL MORE COMPLICATED AND NECESSARY TRASH REMOVAL TO BE DONE.

# SITE RESTORATION PROGRAM



**LAKE:** BIO-FILTRATION AND SPRING WATER RESTORATION.

**FOREST:** INVASIVE PLANT CONTROL AND UNDERSTORY RESTORATION.

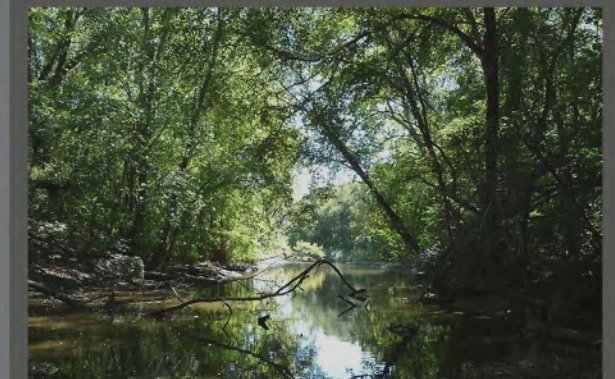
**WETLAND:** RESTORE ECOLOGY NECESSARY FOR SUCCESSFUL NATIVE MUSSEL POPULATIONS.

**SHORELINE:** PROTECT RARE NATIVE SPECIES. CREATE NEW HABITAT PROMOTING WILDLIFE RESTORATION.

- LAKE
- FOREST
- WETLAND
- WETLAND EDGE
- SHORELINE



BURLINGTON ISLAND LAKE



HISTORIC TIDAL MUSSEL BED



FOREST PATH



SHORELINE

## THE SITE: PRIMARY STAKEHOLDERS



### BOARD OF ISLAND MANAGERS

*America's Oldest Elected School Board - Est. 1682*

*"Change will not come if we wait for some other person or some other time. We are the ones we've been waiting for. We are the change that we seek"*  
-Barack Obama

#### 2022 VISION STATEMENT

***"Consistent with the 1852 Charter, as Managers and Treasurer of the School Fund of the education of the youth of Burlington City, our 2022***

***Vision is to provide cultural, educational, and recreational experiences on the Island, while protecting and preserving the Island's natural resources."***

#### HOW 96,100 POUNDS WAS REMOVED FROM BURLINGTON ISLAND

Home to historical infrastructure and debris that had broken down into piles of rusted trash, Burlington Island was presenting a serious threat to the health of the Delaware River. Century-old trash was sinking into the river after heavy rains and floods and also leaching chemicals into the soil and riverbeds. United by Blue partnered with the City of Burlington and the Board of Island Managers, as well as several private sector businesses like, Sea Tow Delaware, Allied Recycling, and River Services, to execute this complicated cleanup. First, it took weeks to transport the needed machinery to the island, including a barge to make trips back and forth, to bring trash back to the mainland to be disposed of and recycled. The successful cleanup can be watched because it is worthy of a documentary of its own! (<https://burlingtonisland.org/>)

## Burlington Island

The mission of the Friends of Burlington Island (FOBI) is to develop and maintain a unique island experience for the citizens of the Delaware Valley where they can hike, fish, and enjoy the tranquility of Mother Nature.

The FOBI aims to assist with a safe and responsible approach to opening Burlington Island for enjoyment by the public. We particularly support programming for school age children to enable recreational and educational opportunities.

*"The greatest threat to our planet is the belief that someone else will save it." ~Robert Swan*

The FOBI needs **YOU** to join the growing number of supporters working to preserve the Island in its natural state for the enjoyment of surrounding communities, naturalists, environmentalists, and recreational enthusiasts. **YOU** can help accomplish the FOBI's goals to raise funds, recruit volunteers, promote the Island's vitality, and provide assistance to responsibly reopen Burlington Island.

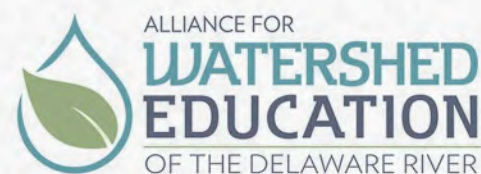
#### **SIGN THE PETITION**

Please help save Burlington Island, Burlington, NJ from having dredge spoils dumped on it.

Dredge spoils will destroy the natural environment that fosters the deer, fish and other animals that call the island home. Dredge spoils will also bury the ancient Native American village, burial and ceremonial grounds on the Island.

(<https://friendsofburlingtonisland.org/>)

## THE SITE: COMMUNITY & EDUCATIONAL STAKEHOLDERS



DOANE ACADEMY, BURLINGTON, NJ  
 ST PAUL'S PAROCHIAL SCHOOL, BURLINGTON, NJ  
 CAPTAIN JAMES LAWRENCE ELEMENTARY SCHOOL BURLINGTON, NJ  
 SAMUEL SMITH ELEMENTARY SCHOOL BURLINGTON, NJ  
 WILBUR WATTS INTERMEDIATE SCHOOL BURLINGTON, NJ  
 BURLINGTON CITY HIGH SCHOOL, BURLINGTON, NJ  
 ST MARK'S CATHOLIC SCHOOL, BRISTOL, PA  
 SNYDER-GIROTTI ELEMENTARY SCHOOL, BRISTOL, PA  
 BRISTOL MIDDLE SCHOOL, BRISTOL, PA  
 BRISTOL JR-SR HIGH SCHOOL, BRISTOL, PA  
 BEDIA SULTAN EDUCATION CENTER, BRISTOL, PA  
 CHILDREN OF GOD EDUCATIONAL SERVICES, BRISTOL, PA

BSA SCOUT TROOPS, BURLINGTON, NJ  
 GSA SCOUT TROOPS, BURLINGTON COUNTY, NJ  
 THE OPPORTUNITY LEAGUE, BURLINGTON, NJ  
 BOYS & GIRLS CLUB OF BRISTOL, PA  
 BSA SCOUT TROOPS, BRISTOL, PA  
 GSA SCOUT TROOPS, BUCKS COUNTY, PA  
 NEIGHBORHOOD FIRST PROGRAM INC, BRISTOL, PA  
 SEA SCOUT TROOPS, BUCKS COUNTY, PA

## SUMMARY

DESPITE A LONG HISTORY OF ENVIRONMENTAL EXPLOITATION AND NEGLECT, BURLINGTON ISLAND HAS COME FULL CIRCLE. SUCCESSIONAL FORESTS AND WETLANDS ARE RE-ESTABLISHING THEMSELVES, CLEANER WATER HAS ALLOWED FOR ONCE DEGRADED AQUATIC HABITATS TO BEGIN THE PROCESS OF REGENERATION, AND RARE AND ENDANGERED SPECIES ARE AGAIN INHABITING THE ISLAND'S ECOLOGY. PRESERVATION, RESTORATION AND STEWARDSHIP ARE THE BEST IMAGINABLE FUTURE FOR THIS UNIQUE ISLAND AND ITS CRUCIAL SURROUNDING ECOLOGICAL RESOURCE, THE DELAWARE RIVER.



## SUMMARY: GOALS

- DEVELOP A PLAN FOCUSED ON RESTORATION, PRESERVATION AND THE TRANSFORMATION OF BURLINGTON ISLAND INTO AN ECOLOGICALLY AND ESTHETICALLY RICH AND RESILIENT RIVER LANDMARK RECONNECTING THE COMMUNITY TO THE LANDSCAPE AND ECOLOGY OF THE RIVER.
- INCORPORATE THE FRIENDS AND ISLAND MANAGER'S MISSION OF EDUCATION, CULTURE, CONSERVATION AND RECREATION.

## RESTORATION & PRESERVATION OBJECTIVES

- CREATE A LIVING SHORELINE ALONG THE ISLAND'S SOUTHWESTERN EDGE, ARRESTING EROSION AND REVITALIZING THE ISLAND'S SHORELINE ECOLOGY.
- RECREATE AND MAINTAIN THE CONDITIONS NECESSARY FOR FRESHWATER MUSSEL CULTIVATION IN THE ISLAND'S NORTHEASTERN TIDAL SWAMP AREA, RESTORING AN HISTORICAL CONNECTION TO THE ISLAND'S CULTURAL AND ECOLOGICAL HERITAGE.
- MODEL RESPONSIBILITY AND STEWARDSHIP OF THE ISLAND'S ECOLOGICAL RESOURCES AS PART OF A LARGER RESTORATION AND EDUCATION PROGRAM WITHIN THE PARTNERSHIP FOR THE DELAWARE ESTUARY AND DELAWARE RIVERKEEPER NETWORK.

*PINUS ECHINATA*, SHORTLEAF PINE



## SUMMARY NEXT STEPS

- 1/23 - 4/23 CONTINUE CONVERSATIONS AND FRIENDS OF BURLINGTON ISLAND BOARD MEETINGS
- 1/23 - 4/23 CONTINUE FRESHWATER MUSSEL RESTORATION RESEARCH AND VOLUNTEER WORK
- 1/23 FINALIZE ADDITIONAL STAKEHOLDERS
- 1/23 - 2/23 DESIGN PROGRAMMING
- 2/23 - 3/23 MASTER PLANNING AND ADDITIONAL CASE STUDIES AS NEEDED
- 2/23 - 4/23 SITE VISITS
- 3/23 FOCUS AREA SITE DESIGN
- 4/23 PRESENTATION

*PINUS ECHINATA*, SHORTLEAF PINE



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