



# NHEC 2014

Asset and Performance Management

Extreme Events and Sea Level Rise

Water Quality and Evolving Regulations

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Program Manager for  
DeIDOT

# Transportation Asset Management

Executive Order 41  
Sept. 12, 2013

*Governor's Committee  
on Climate and Resiliency*





# Asset and Performance Management

- Preserve significant investment.
- Operate transportation system 24/7.
- Minimize lifecycle costs.
- Operate in a financially sustainable manner.
- Improve long-term decision-making.
- “Pay me now, or pay me later.”



# Asset and Performance Management

- Policy-driven
- Performance-based
- Analysis of Options and Tradeoffs
- Decisions Based on Quality Information
- Monitoring Provides Clear Accountability and Feedback

# Asset and Performance Management

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Delaware Department of Transportation

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- [http://www.deldot.gov/information/business/drc/winter\\_workshop/pdf/2013/2013\\_ww\\_03\\_performance\\_management.pdf](http://www.deldot.gov/information/business/drc/winter_workshop/pdf/2013/2013_ww_03_performance_management.pdf)

# Asset and Performance Management

**NPDES Group**

**National Pollutant Discharge Elimination  
System  
(NPDES)**

# Asset and Performance Management

## NPDES Group

- **Culverts and Storm Drains**
- **BMP'S and SWM Ponds**
- **Guard Rail**

# Asset and Performance Management

## Culverts and Storm Drains

- Annual inspections based on canopy cover

## Storm Drains

- Residential 20 Year Cycle

## BMP'S and SWM Ponds

- Removing 12,000 cy of Sediment from SWM Ponds Built in the Early 1990's
- New BMP Maintenance Manual



# Asset and Performance Management

**National Pollutant Discharge Elimination  
System(NPDES)**

LaTonya Gilliam

NPDES Program Manager

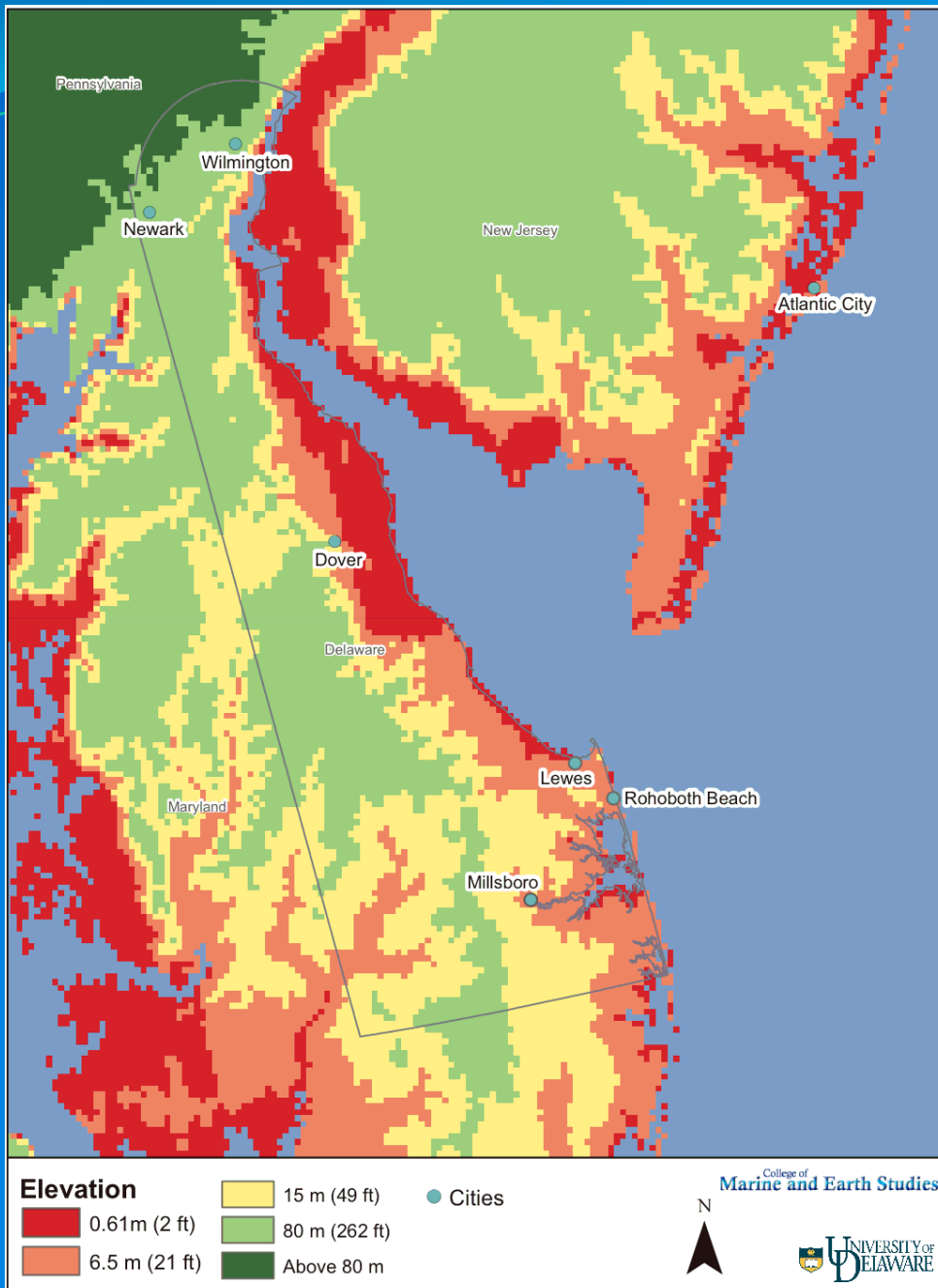
[Latonya.gilliam@state.de.us](mailto:Latonya.gilliam@state.de.us)

(302) 760-2553

# Extreme Events & Sea Level Rise

- Red areas roughly represent the inundation level with a two-foot sea level rise

- Coastal/Bay areas downstate should be considered as vulnerable.



# Extreme Events & Sea Level Rise

## Hurricanes & Tropical Storms

- Sandy (2012)
- Irene (2011)
- Henri (2003)
- Isabel (2003)
- Floyd (1999)



Indian River Inlet Bridge

2012

# Extreme Events & Sea Level Rise

## Localized Flooding and Precipitation

- Seaford Delaware 15" of rain (2006)
- Flash Flood in Dover (2012)
- Record Snow Fall (2010)
- Record Rainfall 2014.....?



Dover, De  
2012

# Extreme Events & Sea Level Rise

More Frequent, intense  
Precipitation =  
visibility/lighting issues;  
flooding; and standing water.

Increased Coastal Storm  
Intensity = More evacuations;  
flooding; wave action on  
infrastructure; and loss of  
wetland protection.

Sea Level Rise = permanent  
inundation of roads; reduced  
bridge clearances; and  
amplified storm surges.



**Culvert Collapse - Sussex**



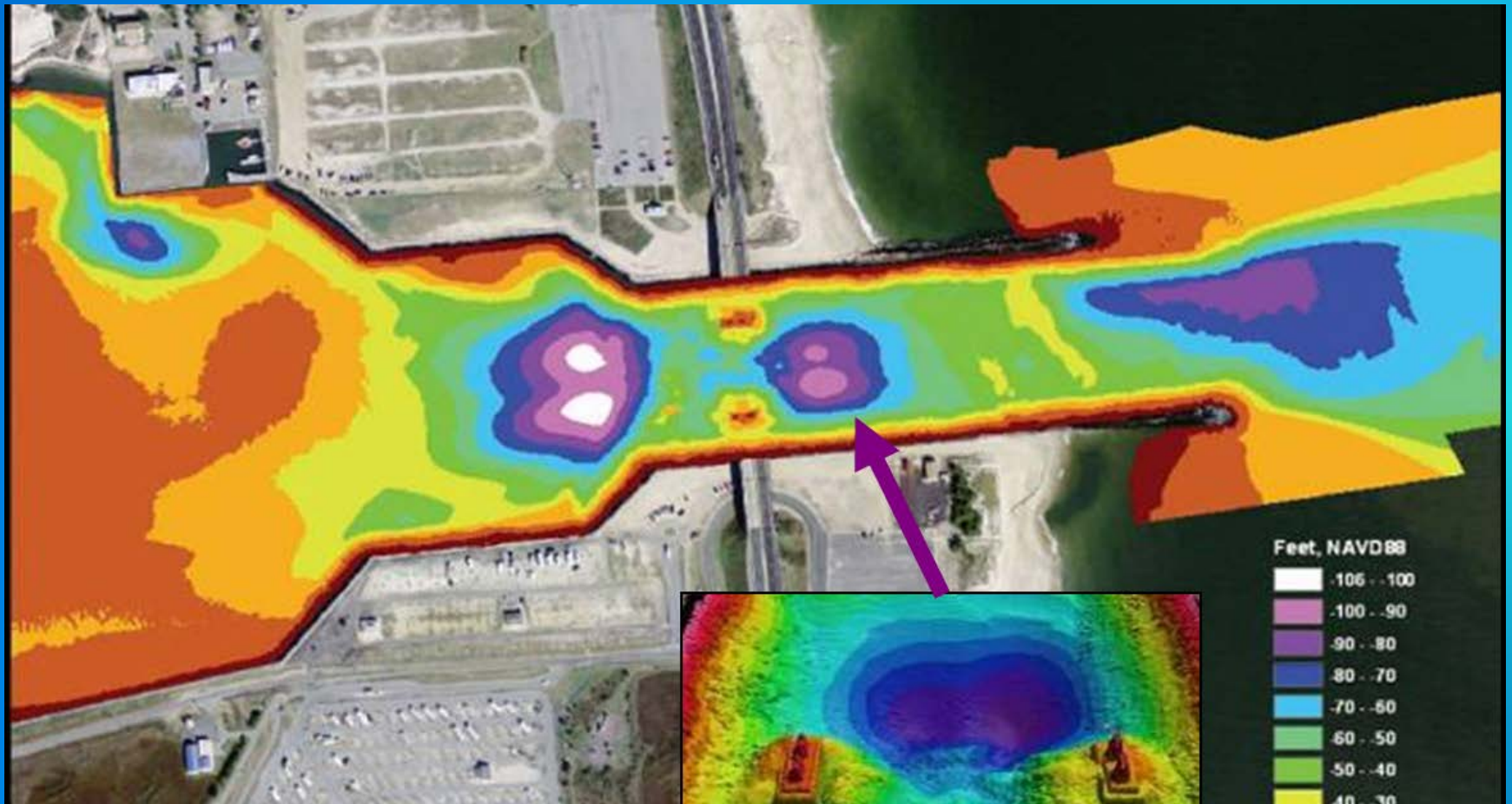
**Daily Tidal Flooding – DE 9**



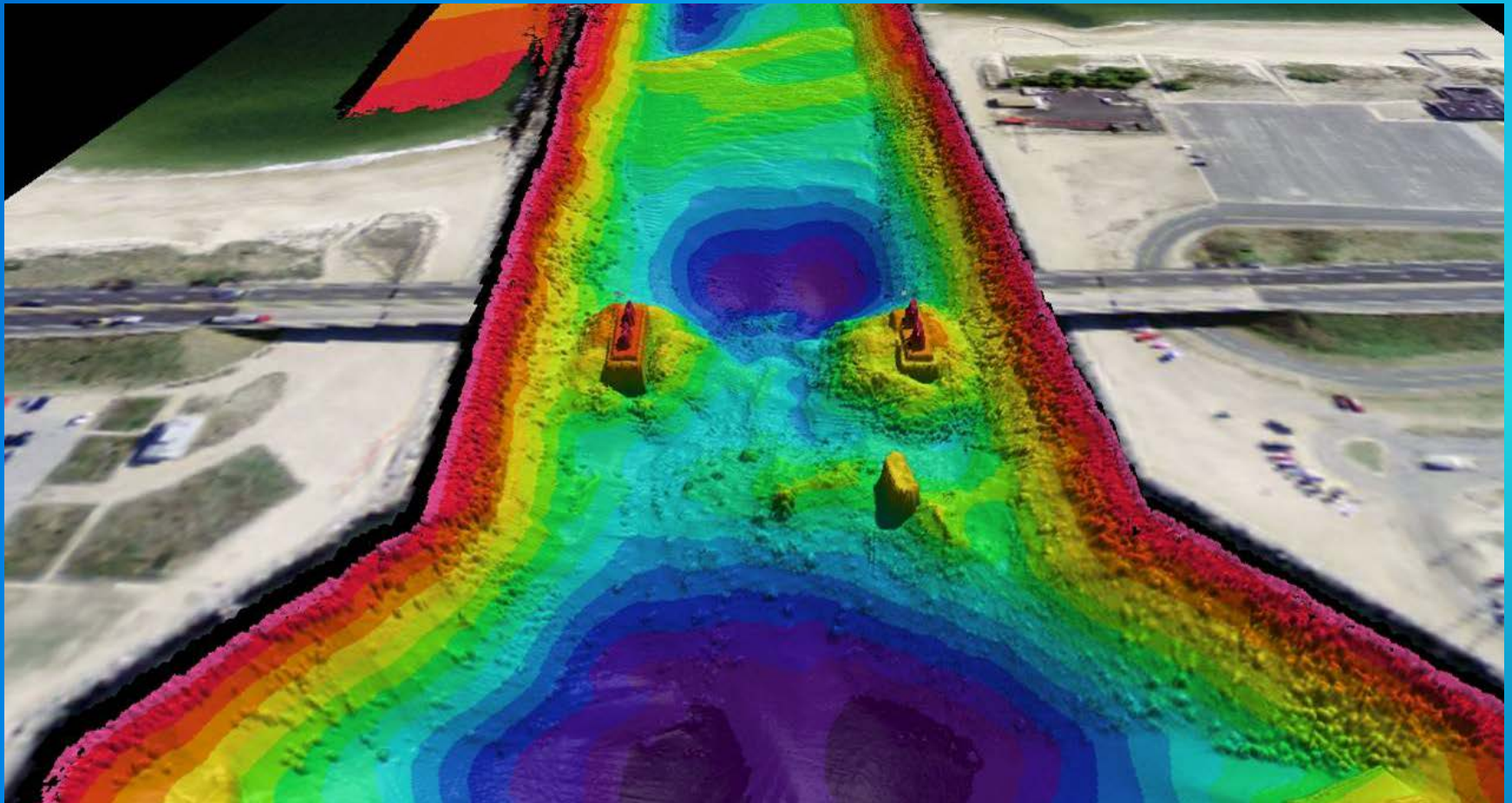
# Extreme Events & Sea Level Rise



# Extreme Events & Sea Level Rise



# Extreme Events & Sea Level Rise





# Extreme Events & Sea Level Rise



# Extreme Events & Sea Level Rise



# Extreme Events & Sea Level Rise





# Delaware Seashore State Park



Del Seashore @  
MHHW (current)



Del Seashore @ 0.5 M  
(green) and 1.0 M SLR  
(yellow)

# Extreme Events & Sea Level Rise

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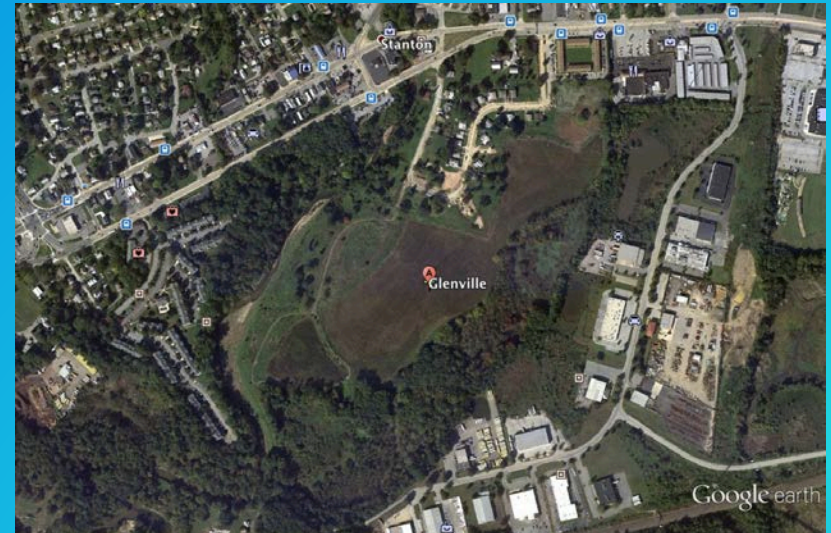
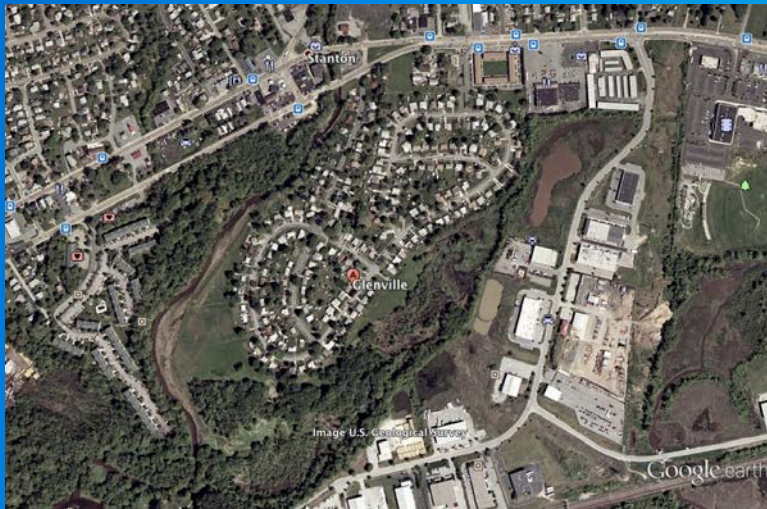


# Extreme Events & Sea Level Rise



[http://www.dnrec.delaware.gov/swc/Shoreline/Documents/Coastal%20Resiliency/inland\\_communities.pdf](http://www.dnrec.delaware.gov/swc/Shoreline/Documents/Coastal%20Resiliency/inland_communities.pdf)

# Extreme Events & Sea Level Rise



- 158 Homes Removed
- Wetlands Mitigation Bank (22 Acres)
- Flood Cell /Flood Storage
- Fox Point State Park

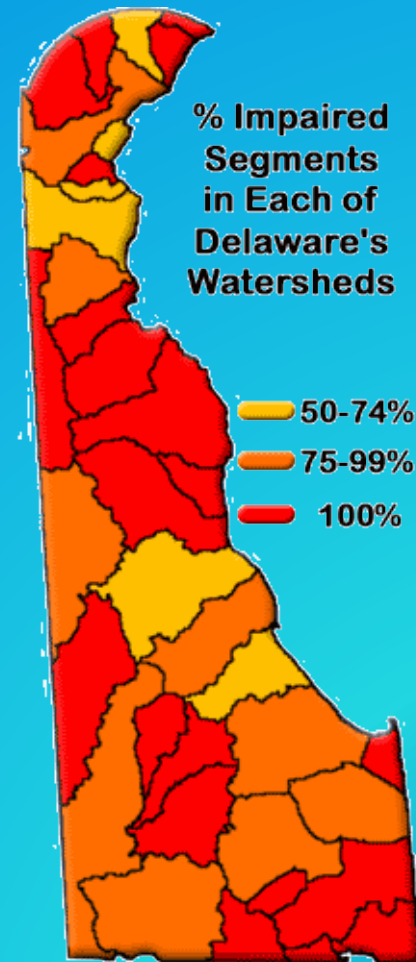
# **Water Quality Delaware's Uphill Battle**



# Delaware's Water Bodies

## Delaware 303(d) List Fact Sheet

- 377 Bodies of Water
- 90 percent are listed as impaired by EPA standards
- Primary Sources of Impairments are Phosphorus and Nitrogen



# Delaware's Water Bodies

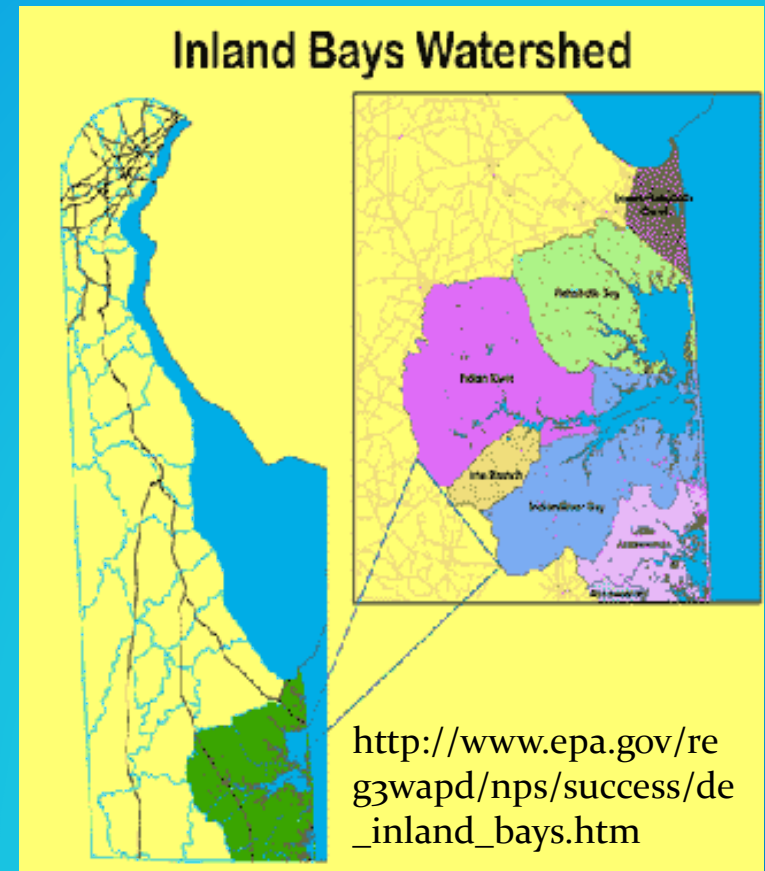
## Sources of Nutrients

- Varies by Watershed, Airshed & Land Use
- Agriculture
- Atmospheric Deposition
- Stormwater/Urban Land Use
- Wastewater

# Delaware's Water Bodies

## Real Problems for the Inland Bays

- Fish Kills
- Dead Zones
- Bacterial Infections
- Decreased Recreational and Property Values



# Delaware's Water Bodies

## Legislative Background

- June of 1990, Stormwater Management added to Chapter 40, Title 7, of the Delaware Code
- April 2005, Green Technology Revision
- July 1995, DelDOT named a Delegated Agency
- November 2008, Inland Bays PCS
- May 12, 2009 Chesapeake Bay Executive Order
- January 2014, Volumetric Approach and Full Implementation of TMDL's

# Water Quality

## Revised Regulations

- **3 Regulatory Storm Events**
  - **Resource Protection Event(RPv)**
    - 1-year
  - **Conveyance Event**
    - 10-year
  - **Flooding Event**
    - 100-year

# Water Quality

## Tool Box

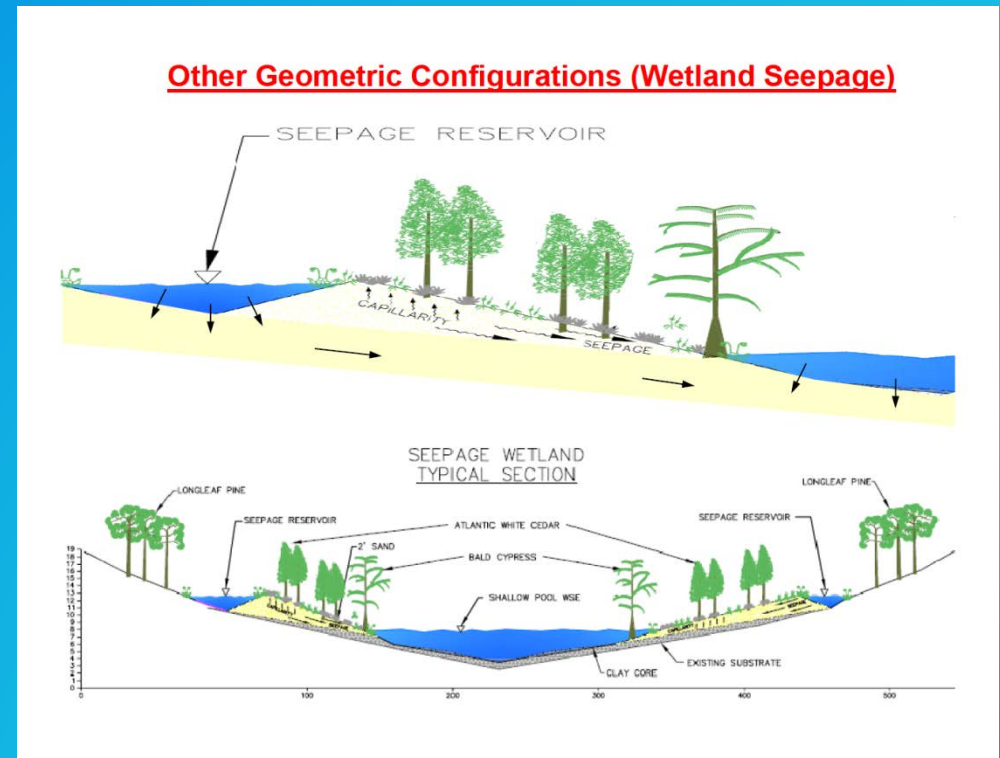
- Delaware Urban Runoff Management Model (DURMM 1 & 2)
- Promotes Reductions in Effective Impervious Area Through Good Disconnection Practices, Biofiltration & Bioretention BMP's

<http://www.swc.dnrec.delaware.gov/Pages/SedimentStormwater.aspx>

# Water Quality

## Tool Box

- Permeable Pavements
- Seepage Wetland
- Vegetated Swales





# Surf Your Watershed By

- Zip Code
- City
- 8 Digit HUC Code
- Stream Name, State
- USGS Code
- Watershed Groups
- More....

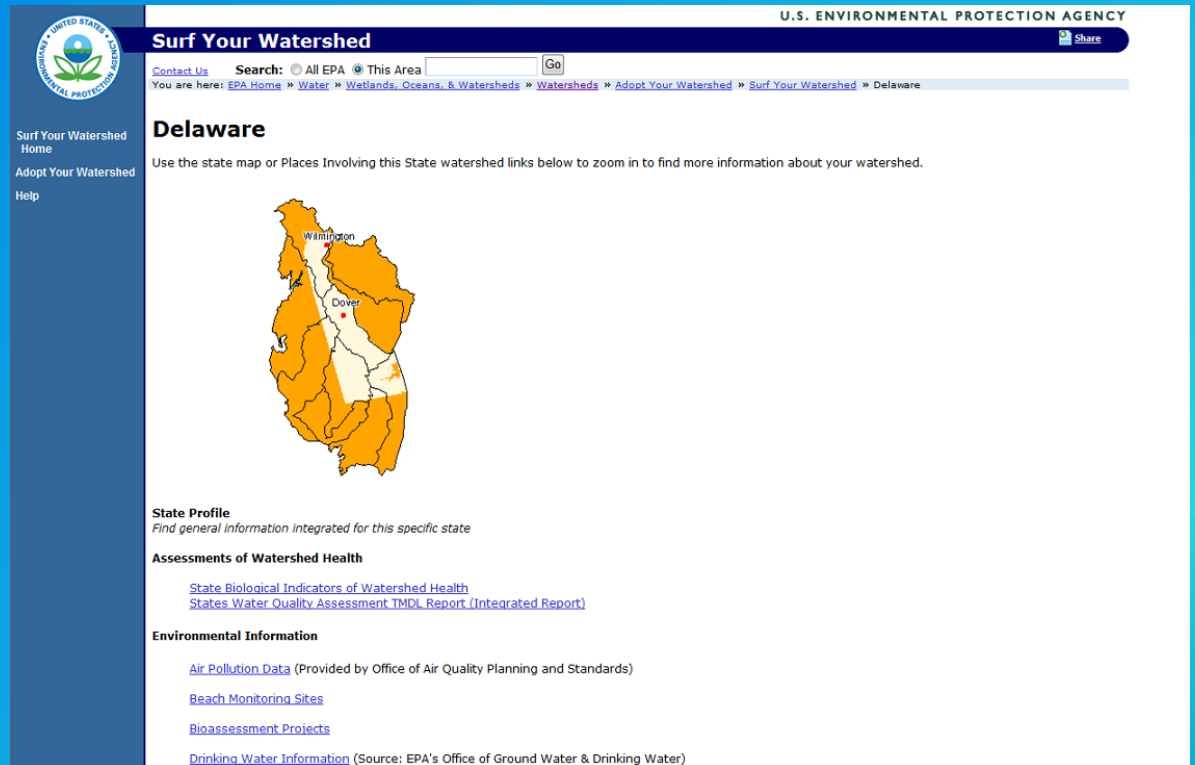
The screenshot shows the 'Surf Your Watershed' page on the U.S. Environmental Protection Agency website. The page features a navigation bar with the EPA logo and the text 'U.S. ENVIRONMENTAL PROTECTION AGENCY'. Below the navigation bar, there is a search bar and a 'GO' button. The main content area is titled 'Surf Your Watershed' and includes a brief description of the tool's purpose: to help users find their watershed and locate citizen-based groups working to protect water quality. A 'Find your watershed' section contains a form with several input fields: 'Zip Code (5 digit number)', 'City Name', 'Watershed Name (Name associated with 8 digit HUC code)', 'State (2-character state abbreviation)', and 'Stream (Stream name and state abbr., e.g., Fall Creek, NC)'. Below the form are 'Submit' and 'Reset' buttons. A 'Locate by state' section includes a dropdown menu for selecting a state or territory, currently set to 'Alabama', and a 'GO' button. A map of the United States is displayed below the dropdown menu, with the selected state highlighted. The page also includes a sidebar with links to 'Surf Your Watershed Home', 'Adopt Your Watershed', and 'Help', and a 'Share' button in the top right corner.

<http://cfpub.epa.gov/surf/locate/index.cfm>



# Surf Your Watershed

- Watershed Health
- Environmental Data
- USGS Data
- Geographical Info
- State and Federal Resource Agencies




The screenshot shows the EPA's "Surf Your Watershed" interface for Delaware. At the top right, it says "U.S. ENVIRONMENTAL PROTECTION AGENCY" and has a "Share" button. Below that is a search bar with "All EPA" selected and "This Area" selected. A breadcrumb trail reads: "You are here: EPA Home » Water » Wetlands, Oceans, & Watersheds » Watersheds » Adopt Your Watershed » Surf Your Watershed » Delaware". The main heading is "Delaware". Below the heading is a text prompt: "Use the state map or Places Involving this State watershed links below to zoom in to find more information about your watershed." A map of Delaware is shown with its watersheds outlined in orange. The cities of Wilmington and Dover are marked on the map. Below the map, there are sections for "State Profile" (with a sub-heading "Find general information integrated for this specific state"), "Assessments of Watershed Health" (with links to "State Biological Indicators of Watershed Health" and "States Water Quality Assessment TMDL Report (Integrated Report)"), and "Environmental Information" (with links to "Air Pollution Data", "Reach Monitoring Sites", "Bioassessment Projects", and "Drinking Water Information").

<http://cfpub.epa.gov/surf/locate/index.cfm>

# Surf Your Watershed

- Stream Segment
- Impairment Levels
- USGS Gage Data
- Watershed Groups

 U.S. ENVIRONMENTAL PROTECTION AGENCY [Share](#)

**Surf Your Watershed**

Contact Us Search:  All EPA  This Area

You are here: [EPA Home](#) » [Water](#) » [Wetlands, Oceans, & Watersheds](#) » [Watersheds](#) » [Adopt Your Watershed](#) » [Surf Your Watershed](#) » Broadkill-Smyrna Watershed -- 02040207

## Broadkill-Smyrna Watershed -- 02040207

### Broadkill-Smyrna Watershed Profile

Watershed Name: Broadkill-Smyrna  
USGS Cataloging Unit: 02040207  
DE 0th Congressional District

[Citizen-based Groups at work in this watershed](#) (Provided by [Adopt your Watershed](#))

[Water quality monitoring data from this watershed](#) (Provided by STORET)

[Environmental Websites Involving this Watershed](#)

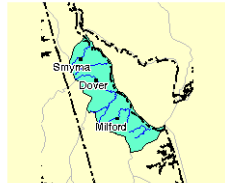

[National Watershed Network](#) (provided by [Conservation Technology Information Center](#)) [EXIT Disclaimer](#)

#### Assessments of Watershed Health

- [Impaired Water for this watershed](#)
- [Assessed Waters by Watershed](#)
  - [Delaware](#)

#### Information provided by the United States Geological Survey (USGS) [EXIT Disclaimer](#)

- [Stream Flow](#) (Source: USGS)
- [Science in Your Watershed](#)
- [Water use data \(1985-2000\)](#): Information about the amount of water used and how it is used.
- [Selected USGS Abstracts](#)



[http://cfpub.epa.gov/surf/huc.cfm?huc\\_code=02040207](http://cfpub.epa.gov/surf/huc.cfm?huc_code=02040207)

# Any Questions?

