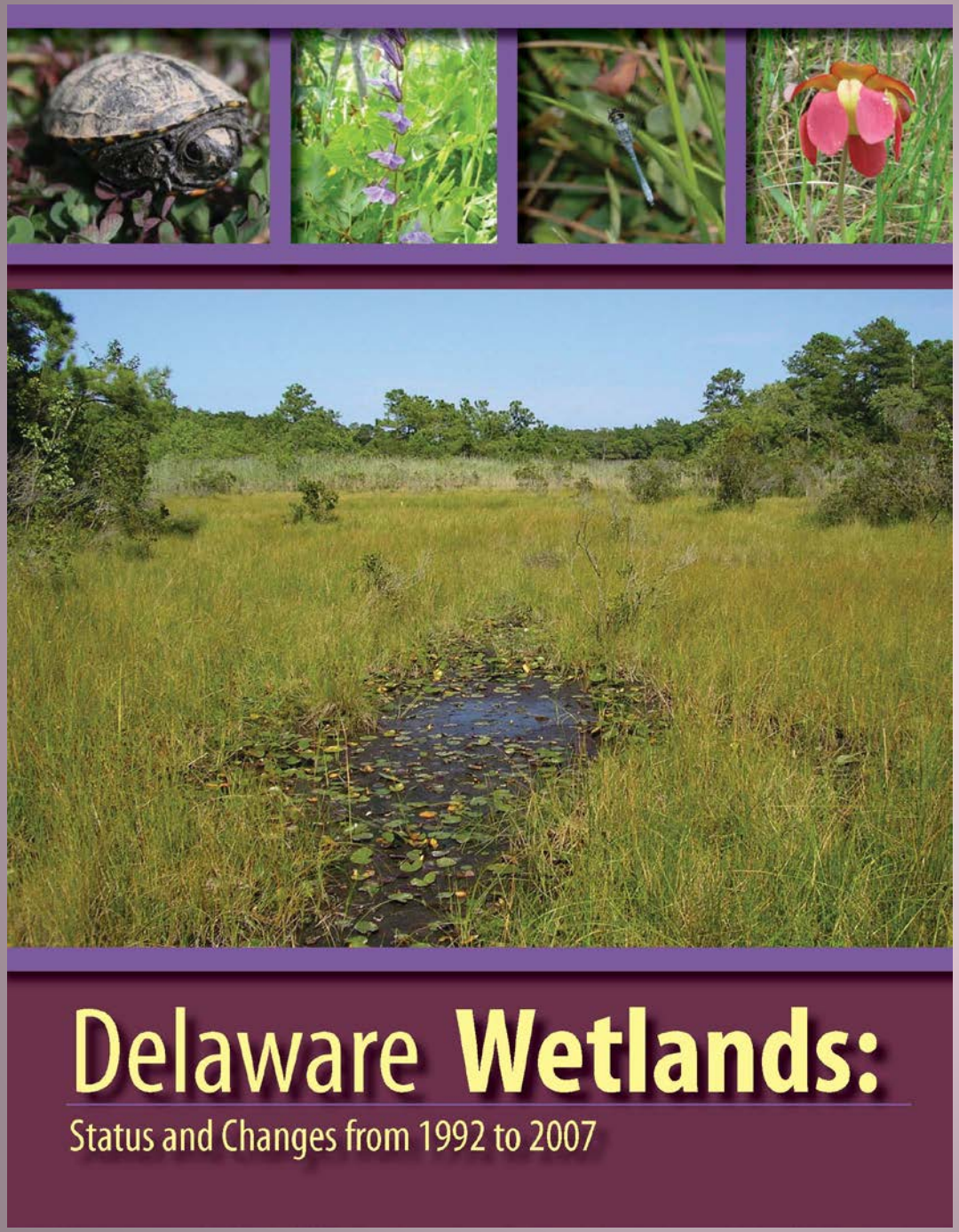


Wetland Inventory and Condition

September 25, 2013

Mark Biddle

Delaware Department of Natural Resources and Environmental Control

Delaware Wetlands

Purify Provide Protect

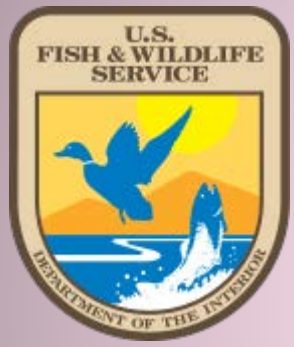
www.dnrec.delaware.gov/admin/delawarewetlands

What is a wetland?

- Water at or near the surface
- Hydric soils
- Plants that can tolerate wet soils

Delaware Wetlands:

Status and Changes from 1992 to 2007

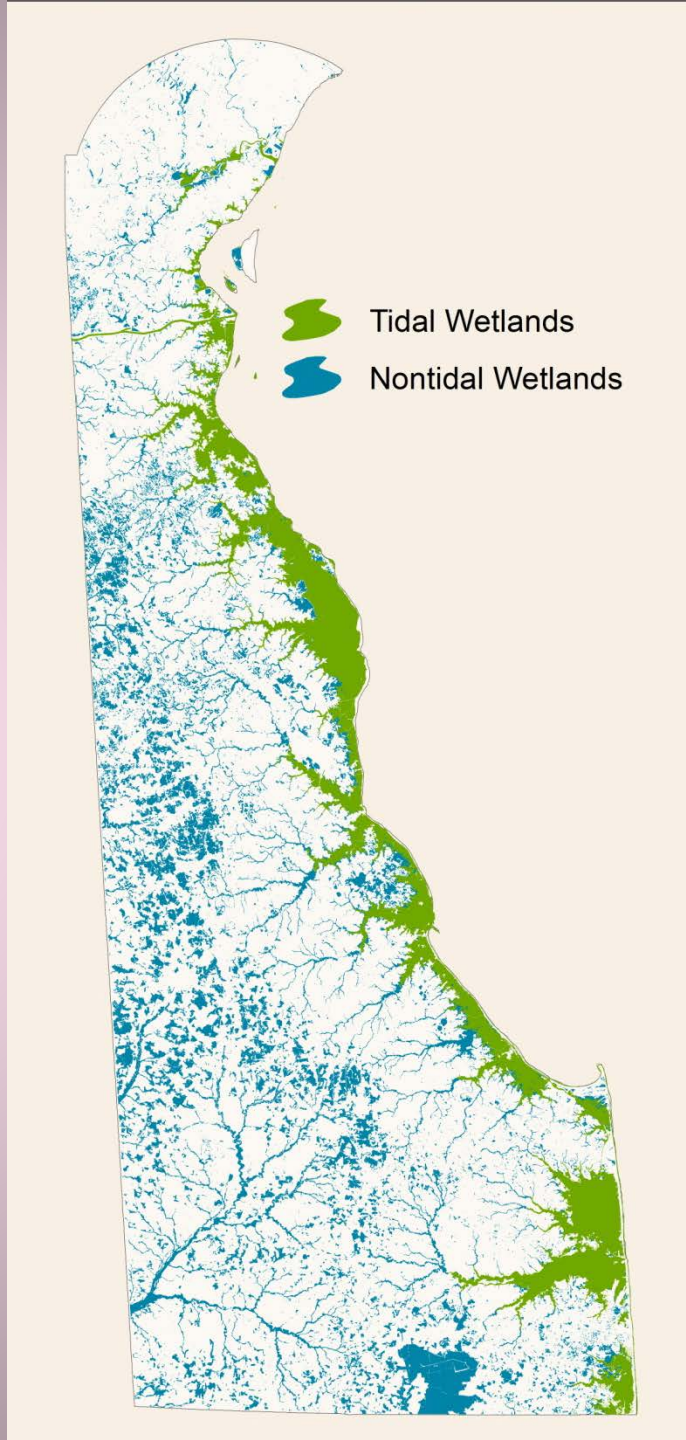


NWI

- A 3-year project
- Used most recent “leaf off” aerial photography (2007)
- Inventoried current wetlands and recent changes
- Produced GIS layers and detailed report

How Many Wetlands Do We Have?

- 25% of Delaware's land area is covered by wetlands
- 320,000 acres identified
- Non-tidal wetlands comprise roughly two-thirds of the State's wetlands

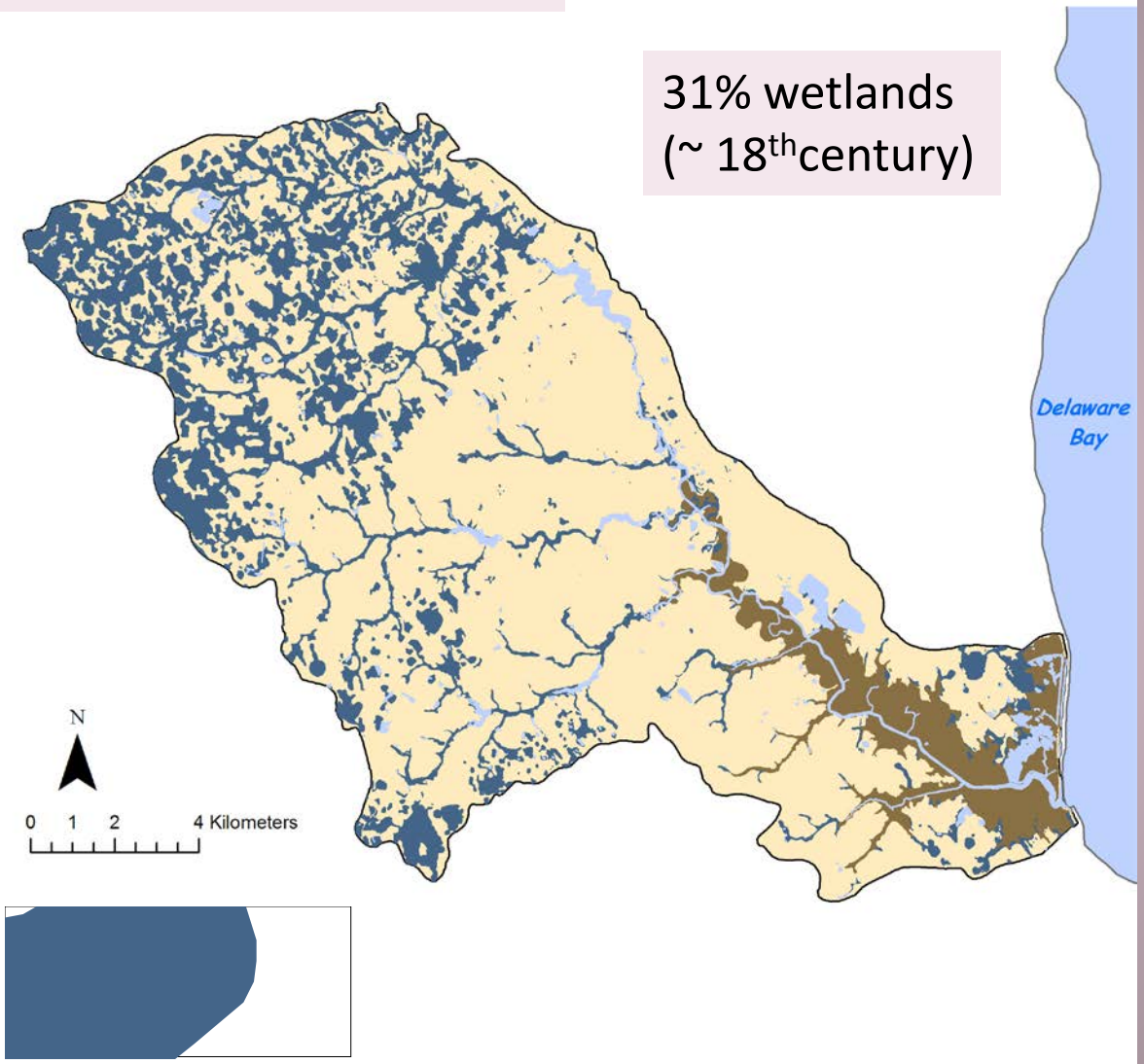


Historic Wetland Loss

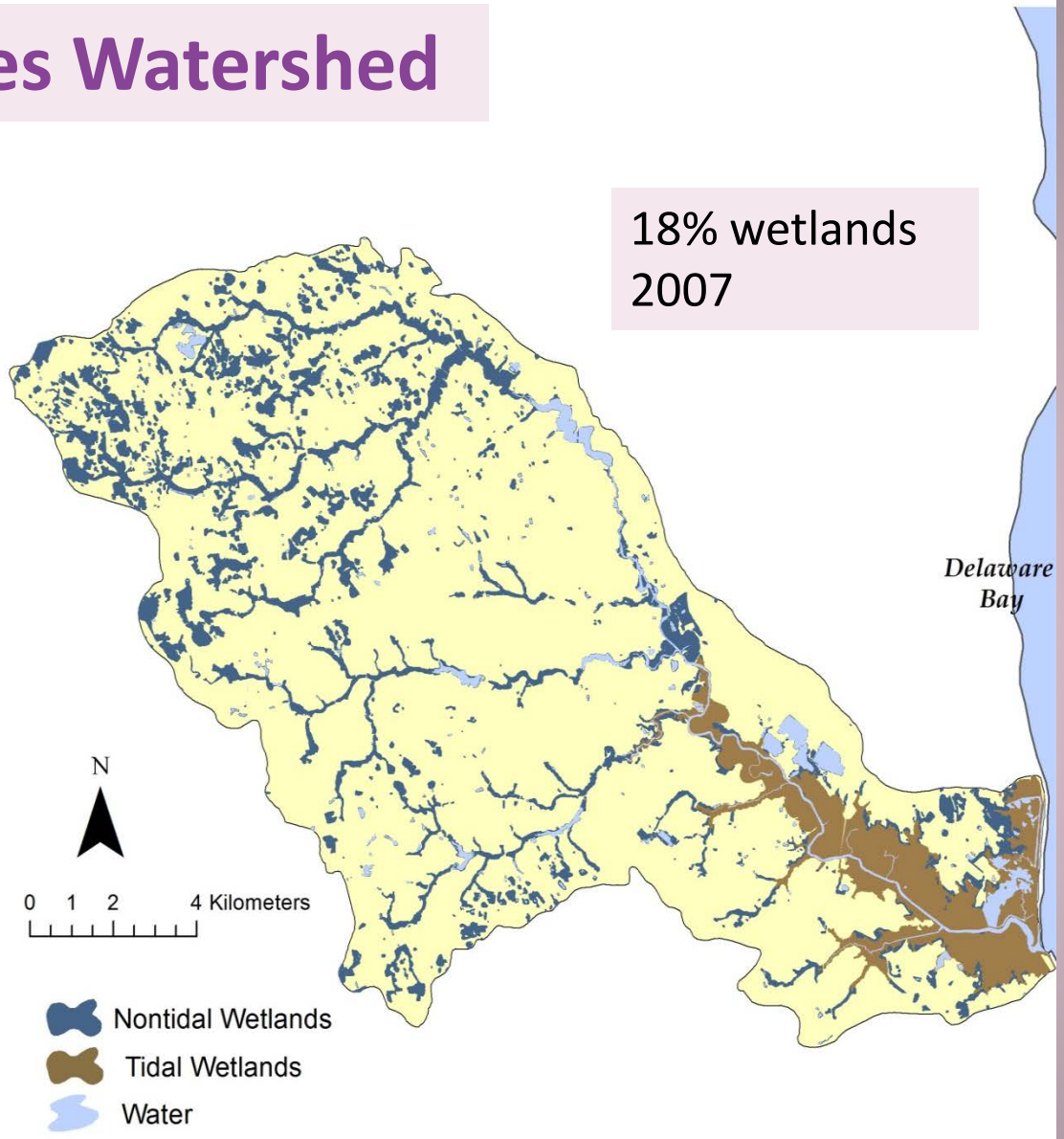
54% of Delaware's wetland acreage was lost between 1780's and 1980's

Most historic loss due to ditching and channelization and direct conversion of large forests to other uses

St. Jones Watershed



St. Jones Watershed



Most losses occurred to nontidal wetlands high in watershed

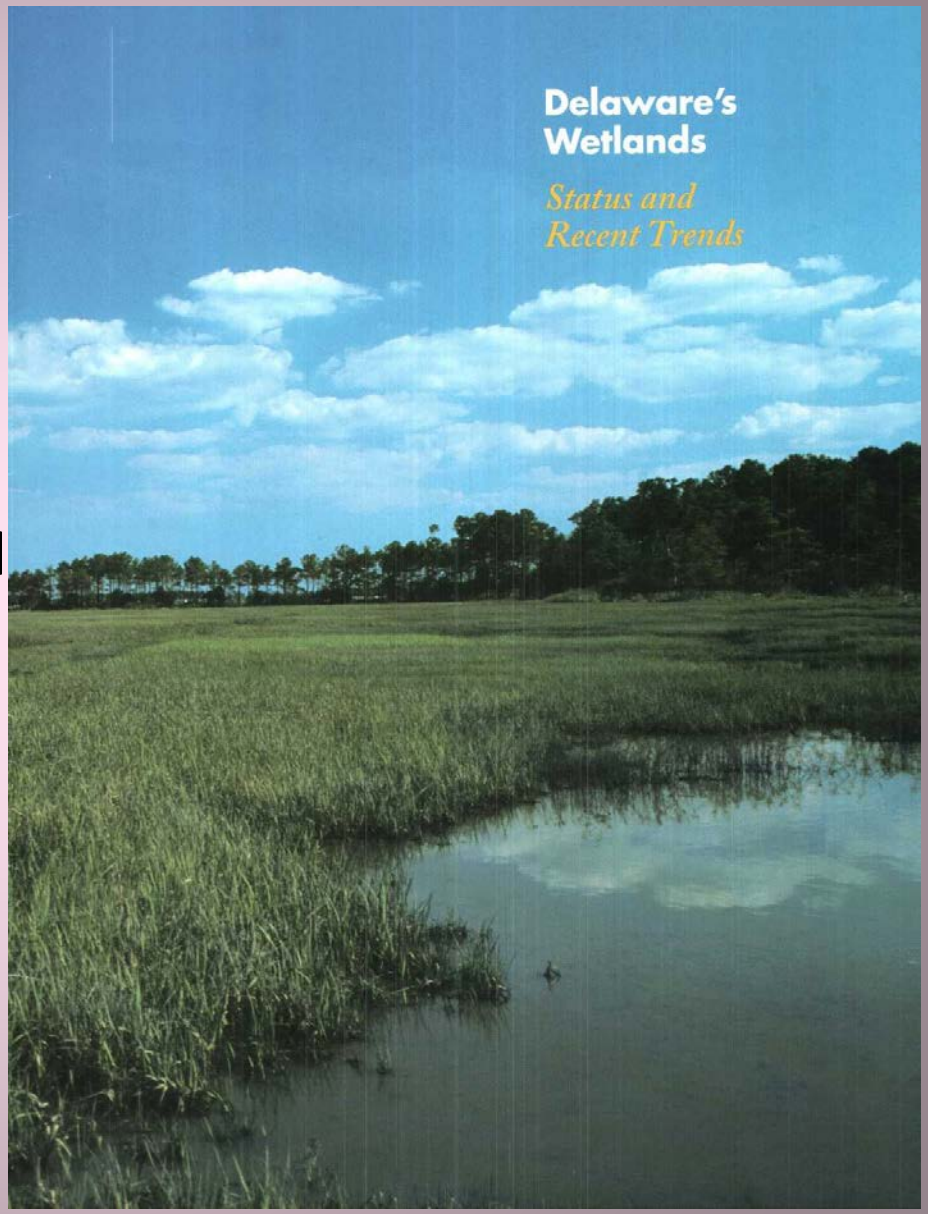
Previous status and trends report 2001

First effort to track wetland losses and gains statewide

Based on period of 1982 NWI to 1992 Delaware **S**tate **W**etland **M**apping **P**roject (SWMP)

Reported losses of 1900 acres over 10-year period

Used for comparison to the 2011 status report



Changes to Wetlands

Human activities:

- Filling
- Dredging
- Channelization
- Pollutant discharge
- Draining
- Pond Construction
- Conversion to other uses

Natural processes:

- Droughts
- Floods
- Fire
- Invasive Species
- Hurricanes
- Animal activity
- Climate Changes

Gauging Wetland Changes in Acreage and Function

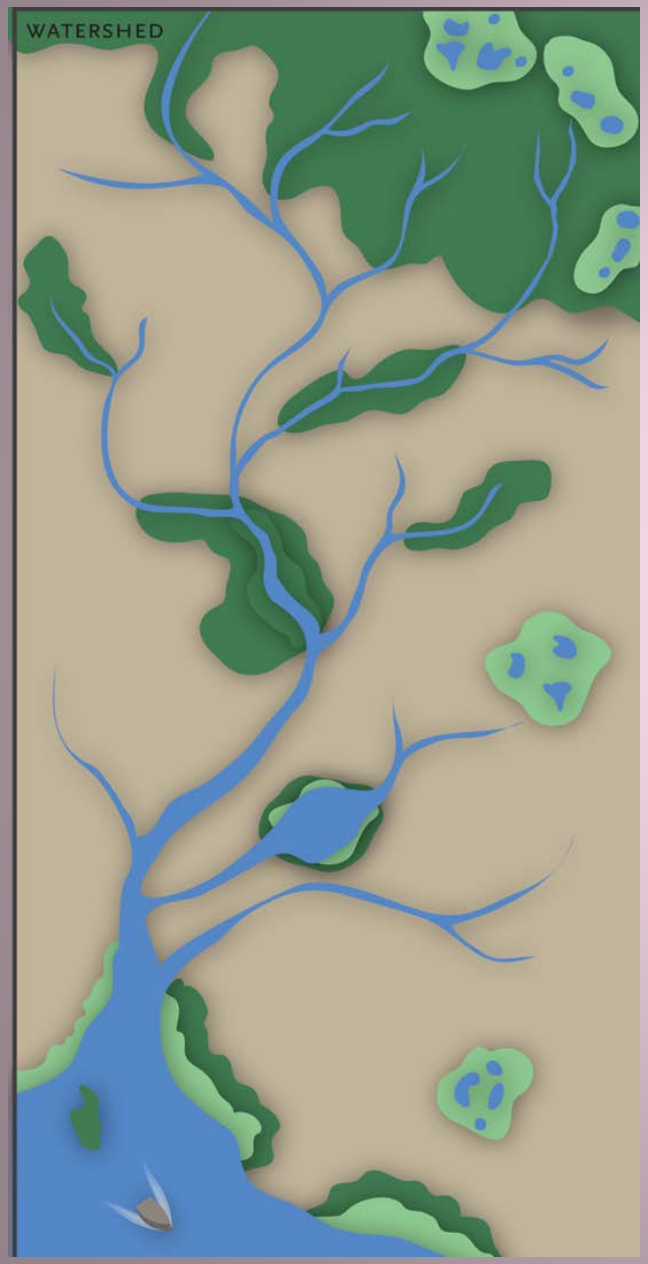
Past status report only tracked acreage

Need to measure wetland functional capacity--the services wetlands provide (e.g. flood protection)

Ability to track direct impacts and secondary impacts to existing wetlands due to surrounding land use (@ landscape and local level)

1. Slow the flow of runoff **2.** Improve water quality **3.** Control erosion
4. Provide fish and wildlife habitat **5.** Provide recreation **6.** Supply groundwater
7. Absorb floodwaters and reduce flooding **8.** Protect the coast from storms

New Mapping Project



Combined National Wetland Inventory and Delaware effort – same maps

Mapped wetlands by ecological (Cowardin) and abiotic properties (LLWW; landscape position, landform, water flow path, water body type)

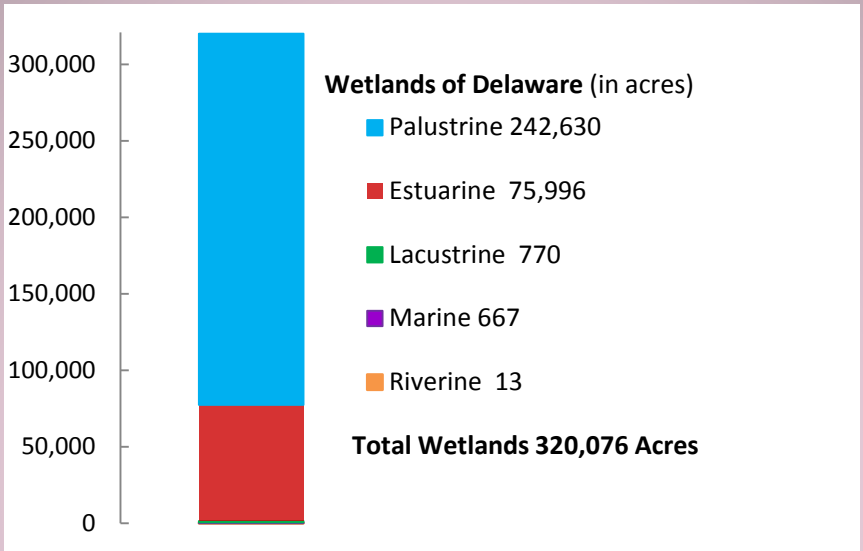
<u>Associated data layers</u>:
Trends, Potential Restoration, Historic, Cowardin, LLWW, H-wetlands, Urbanized hydric soils, special DE modifiers

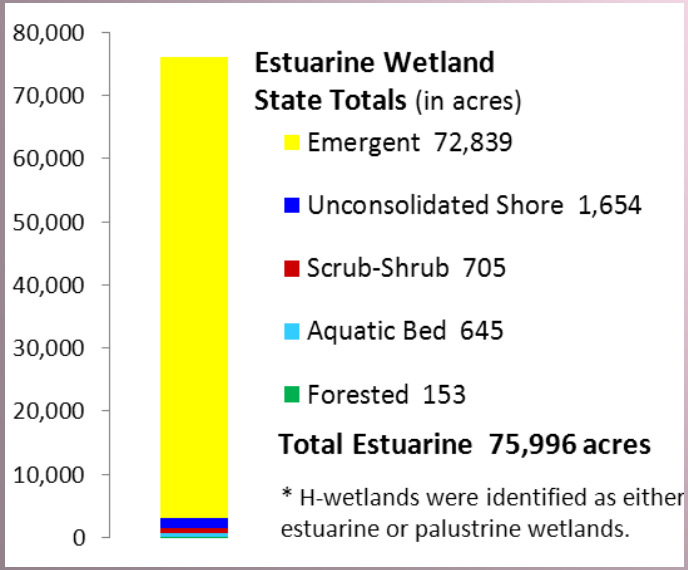
Landscape Scale Functional Assessment

Functions predicted:	
Surface water detention	Coastal storm surge detention
Streamflow maintenance	Nutrient transformation
Carbon sequestration	Sediment and other particulates retention
Bank and shoreline stabilization	Provision of habitat for other wildlife
Provision of waterfowl and waterbird habitat	Provision of fish and aquatic invertebrate habitat
Provision of unique, uncommon or highly diverse wetland plant communities	

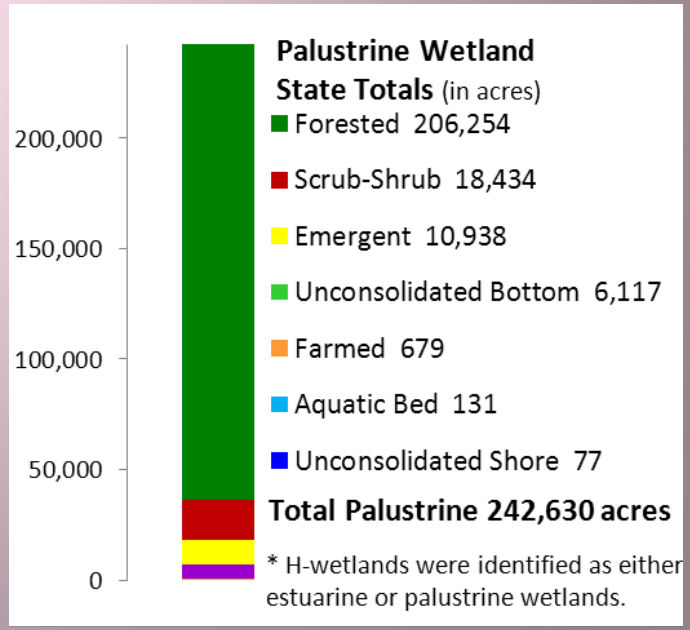
2007 Delaware Wetlands- Status
(by ecological classification)

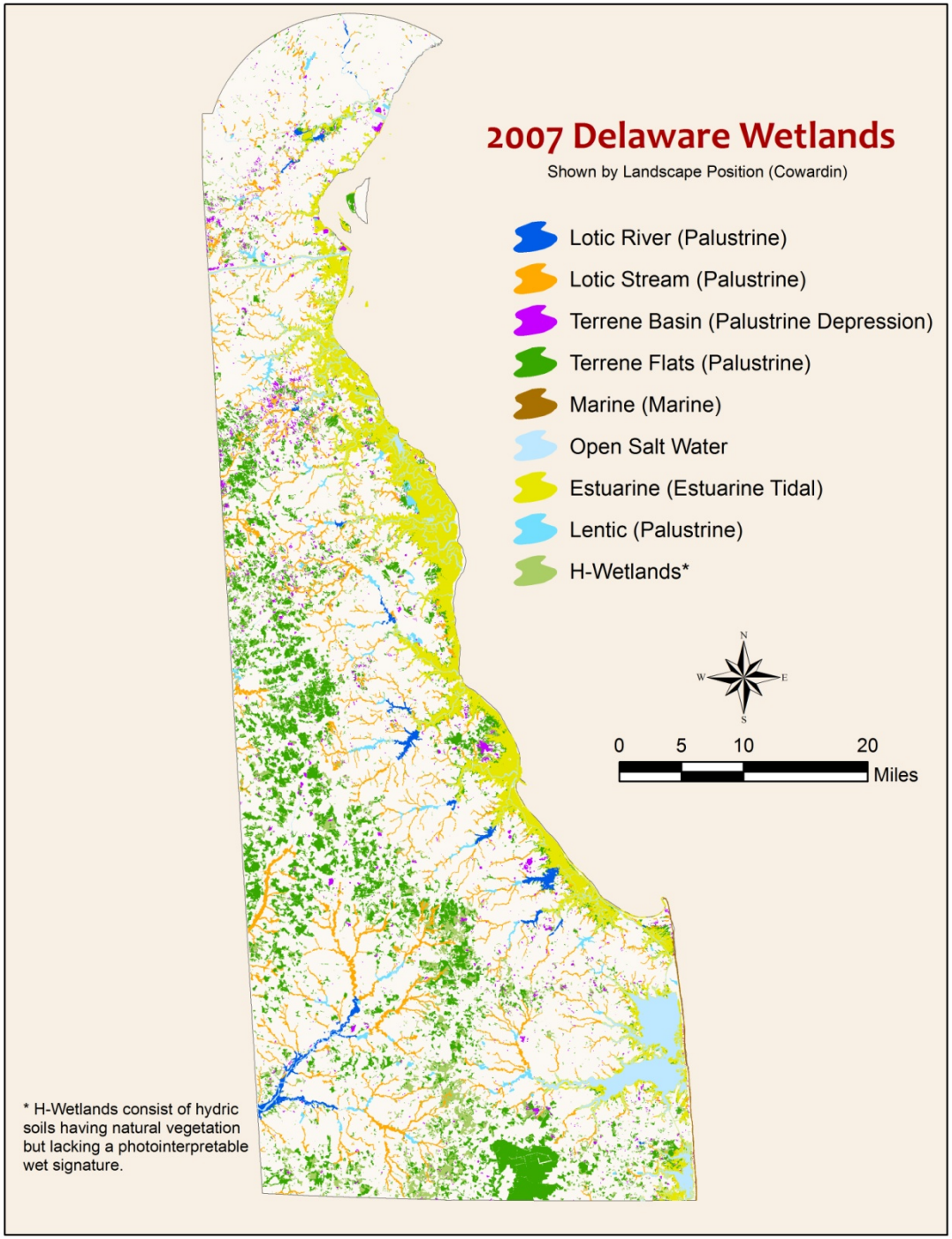
2/3 of state wetlands are non-tidal



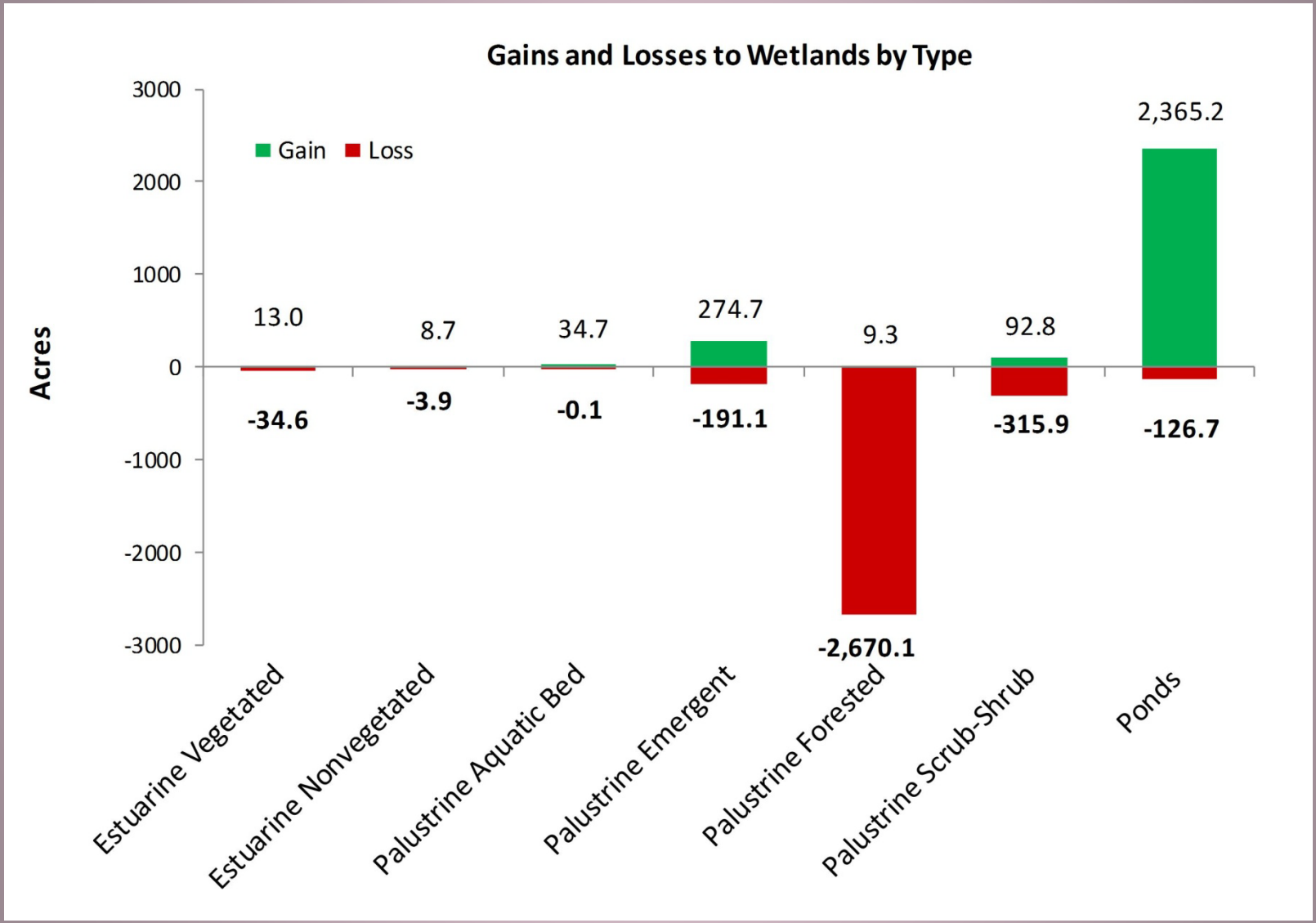


85% of nontidal wetlands are forested




2007 Delaware Wetlands
Shown by Landscape Position (Cowardin)
Lotic River (Palustrine)
Lotic Stream (Palustrine)
Terrene Basin (Palustrine Depression)
Terrene Flats (Palustrine)
Marine (Marine)
Open Salt Water
Estuarine (Estuarine Tidal)
Lentic (Palustrine)
H-Wetlands*
N
W
E
S
0 5 10 20
Miles
* H-Wetlands consist of hydric soils having natural vegetation but lacking a photointerpretable wet signature.

Delaware Wetlands – Changes 1992 to 2007



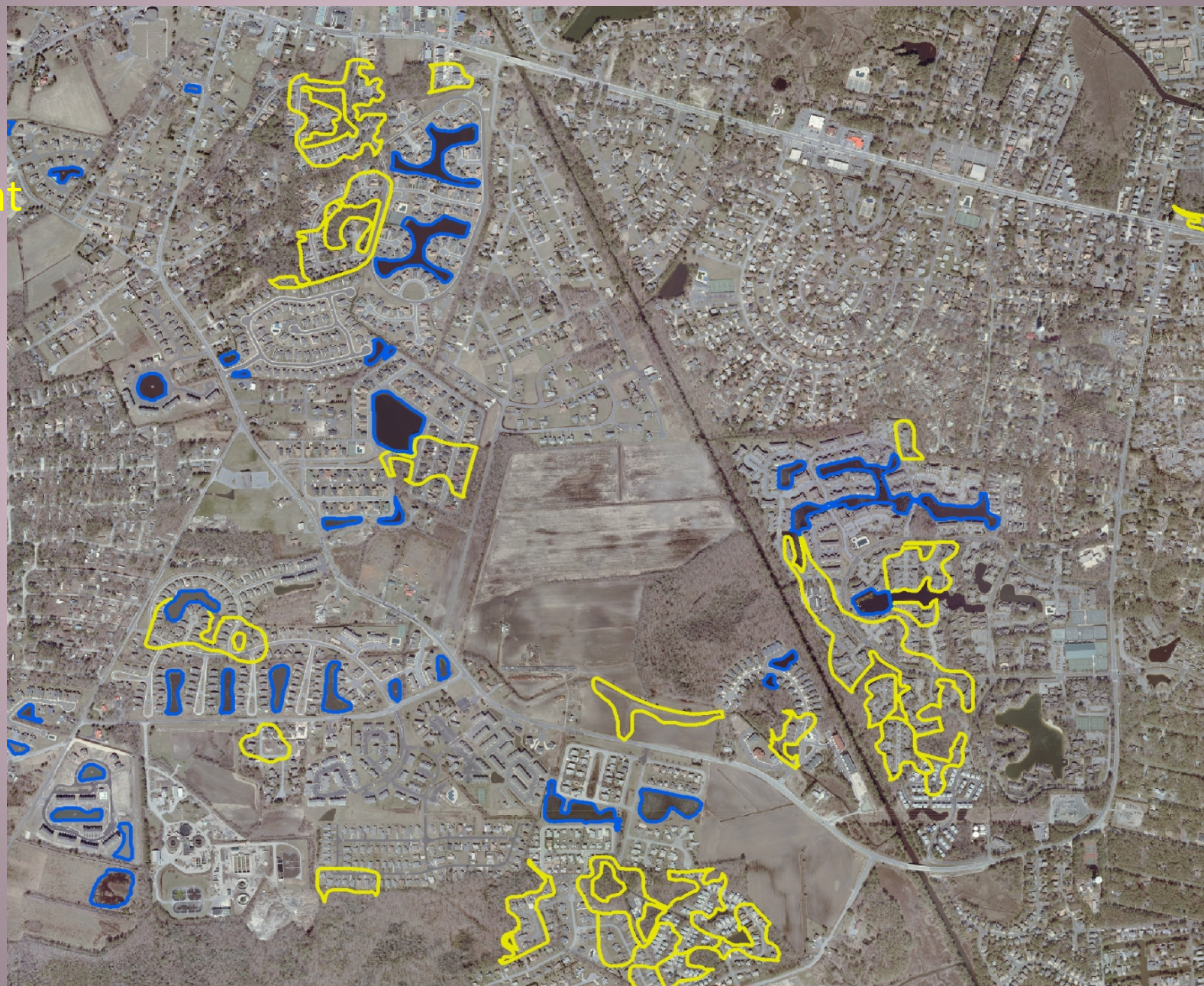
NOTE: Ponds do not provide near as many functional benefits as natural forested wetlands.

1992

2007

93 acres forested & emergent lost

37 acres Ponds gained



Delaware Wetlands – Changes 1992 to 2007

Gross loss 3,894 acres *vegetated wetlands*

Gross gain 768 acres

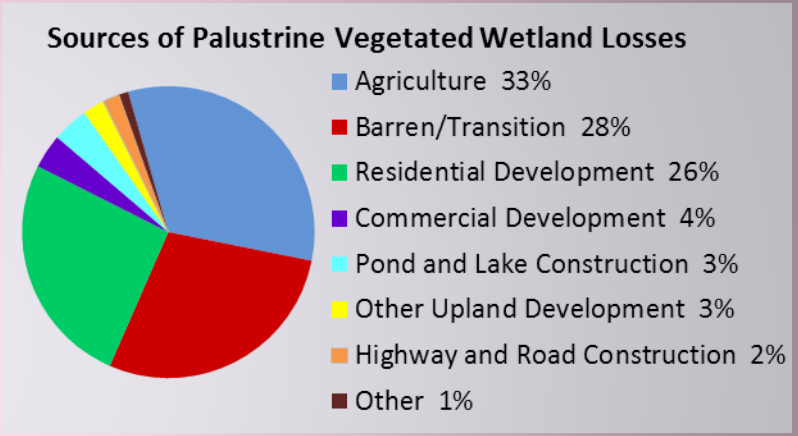
Net loss of 3,126 acres

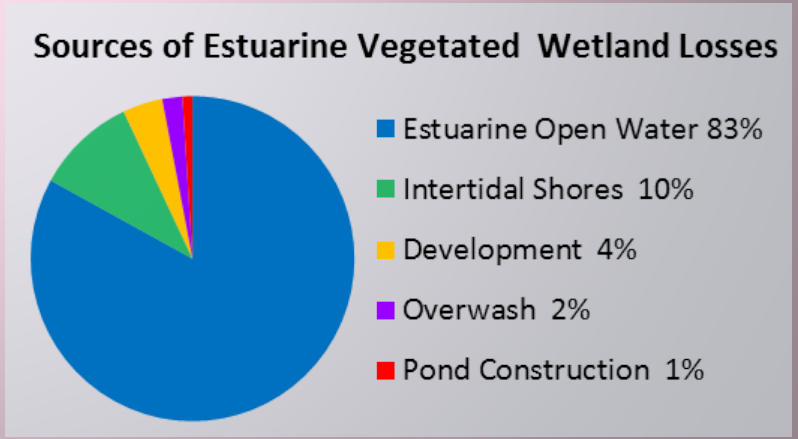
92% of all lost were non-tidal wetlands (mostly forested headwaters)

Tidal wetland net loss of 238 acres (gross loss of 580 acres due to submergence of marshes and gains were open water)

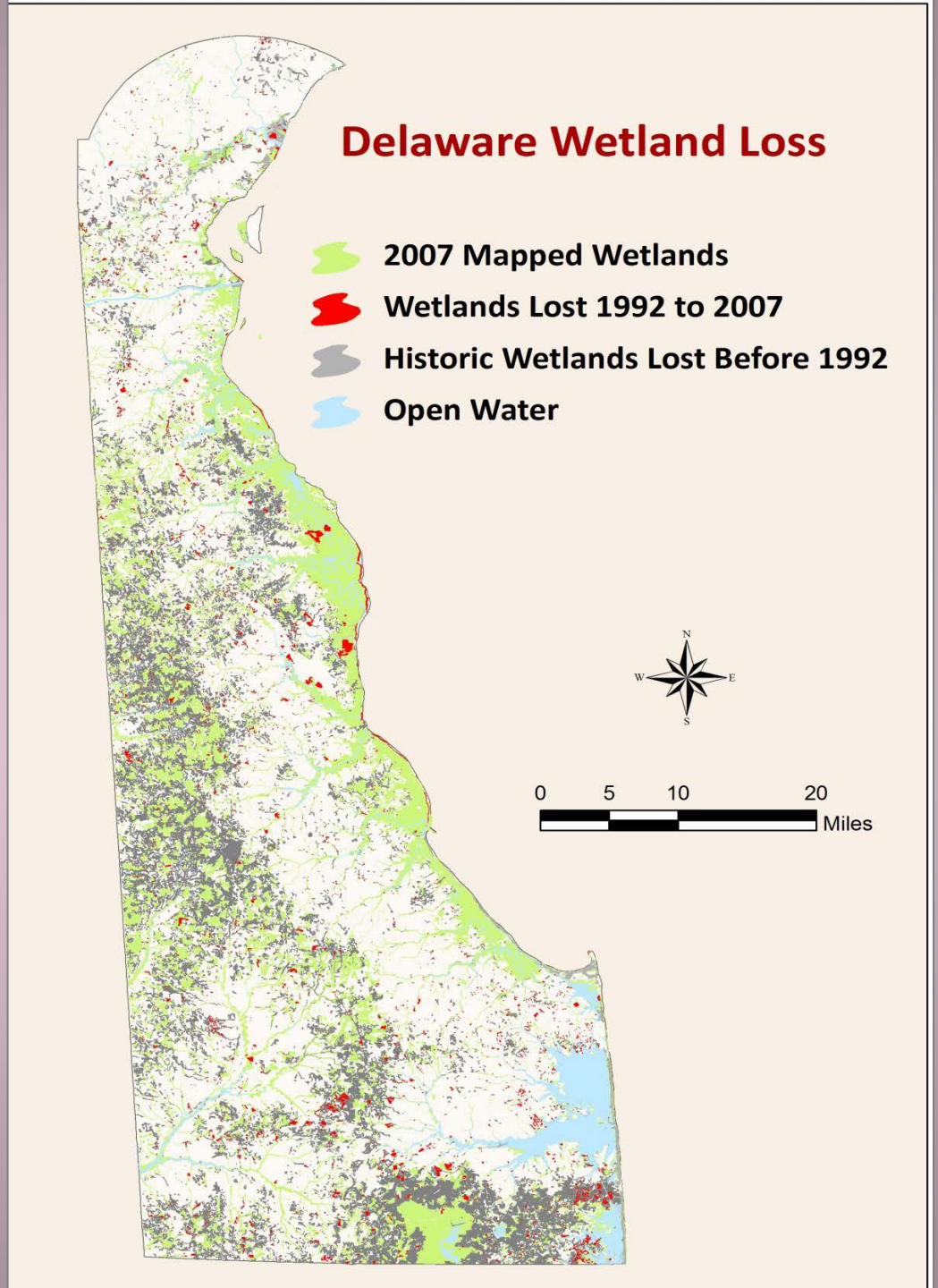
Pond gain of 2,285 acres

65% of created ponds came from ag land being converted to development





Statewide losses (3,894 acres) equal to the size of Smyrna (3,807 acres)



Wetland Monitoring and Assessment Program

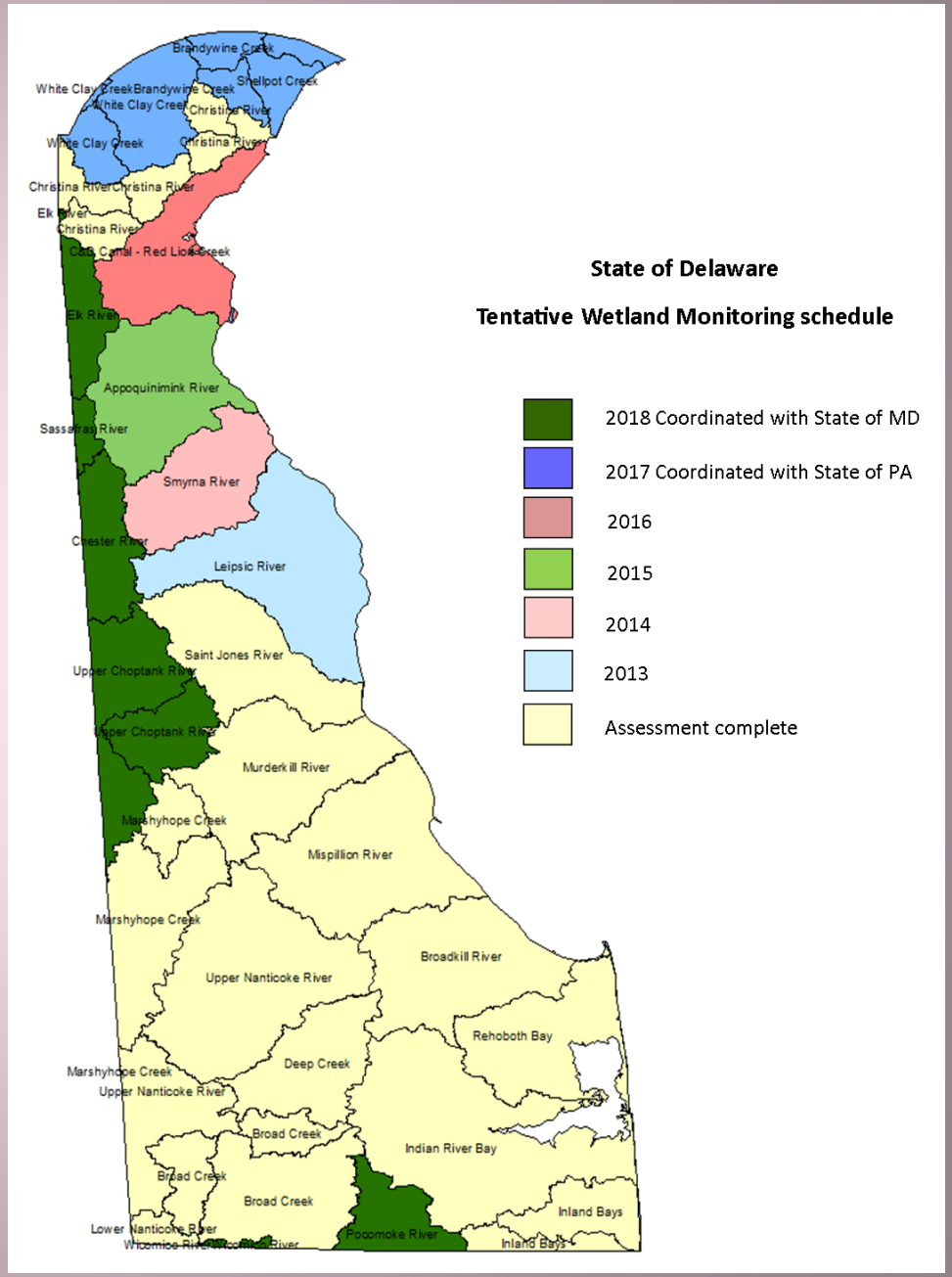
Track acreage and condition of wetlands in Delaware

Provide supporting scientific data to improve wetland protection and conservation

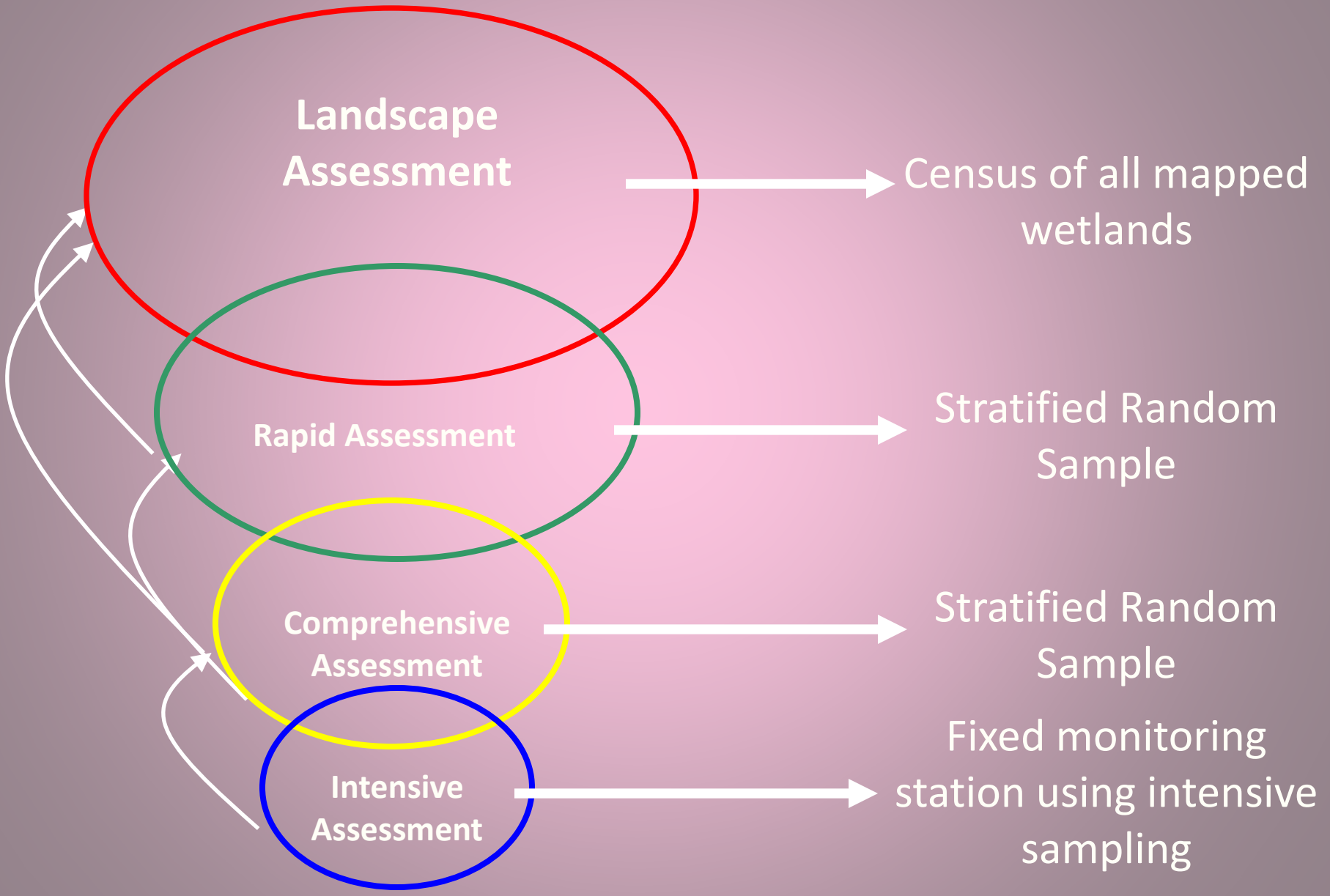
Educate the importance of wetlands to our welfare and quality of life

Wetland Condition

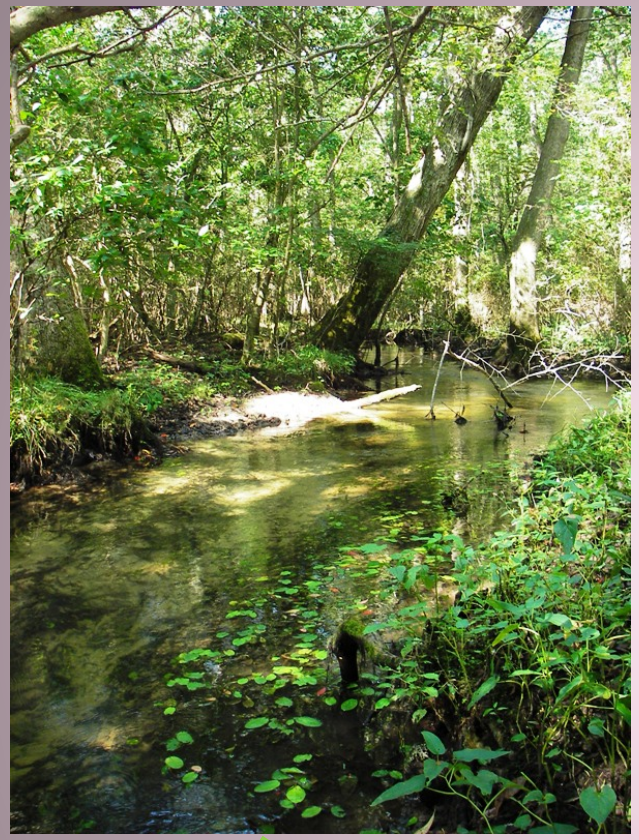
- 22 watersheds assessed for wetland condition 1999-2013
- Over 900 rapid assessments
- Over 275 comprehensive assessments



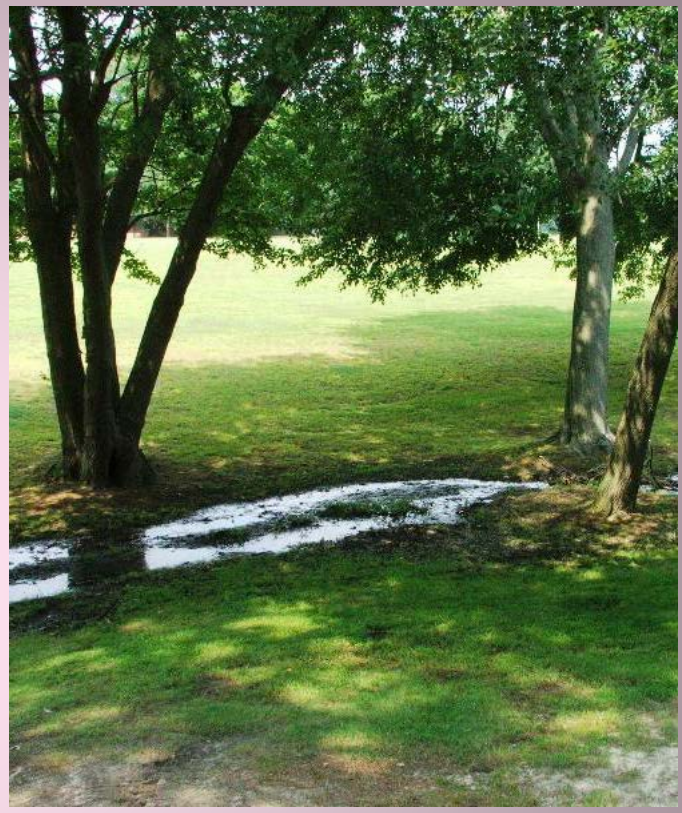
4-tiered Approach

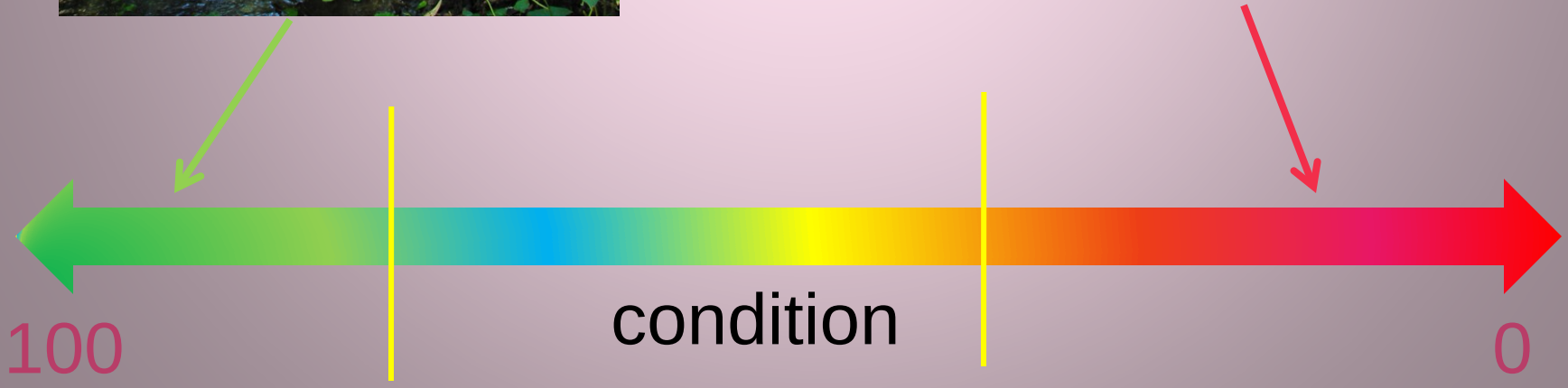


Natural and healthy



Altered and degraded





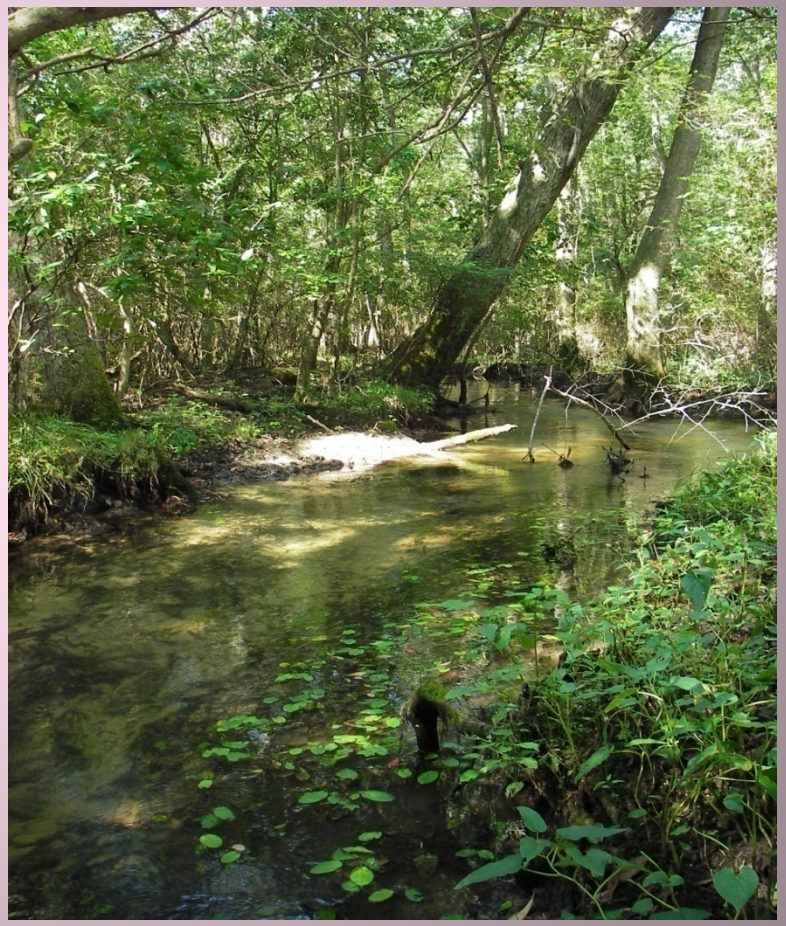
Condition of Wetlands Varies

Lower functioning

Higher functioning

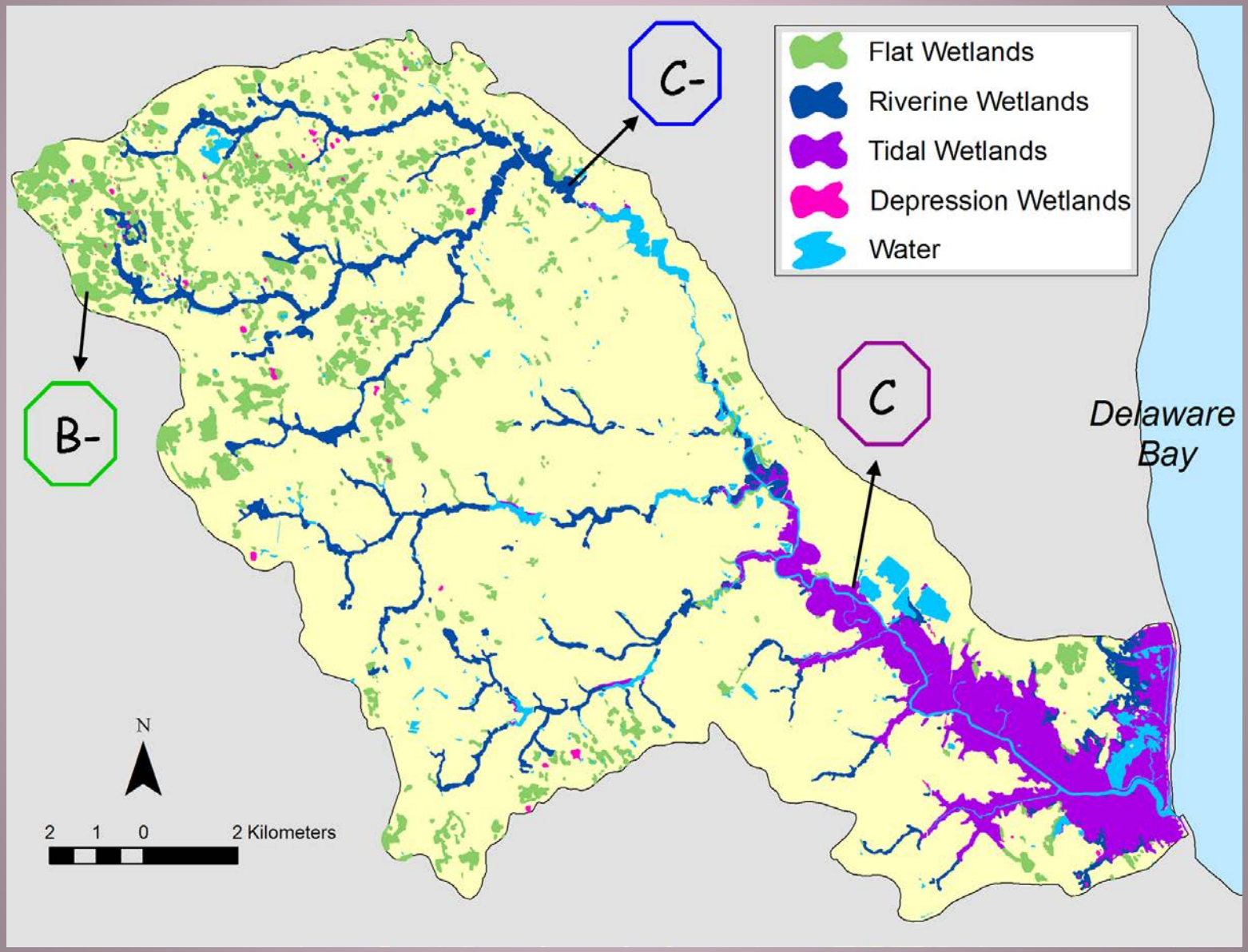
Condition of Wetlands Varies

Lower functioning



Higher functioning

Condition of Wetlands St. Jones Watershed

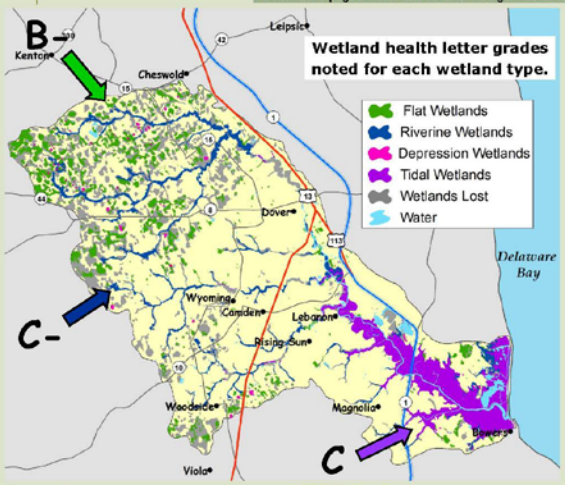


St. Jones Wetland Health Report Card

Wetlands provide valuable and often irreplaceable services on the landscape. They contribute to our quality of life by protecting us from floods and storm damage, providing habitat for rare plants and animals, and purifying our water. They store water during storms thereby reducing flooding, serve as nursery grounds for commercial fisheries, and provide recreation and education opportunities.

In Delaware, we have lost about half of our original wetlands and many of our remaining wetlands have been degraded by human activities. The St. Jones River watershed has lost over 47% of its wetlands. In the watershed, the average condition of wetlands scored a C- for riverine, a B- for flats, and a C for tidal. This supports the need to prevent additional loss and focus on improving the health of the remaining wetlands so that they can continue to provide services to the citizens of Delaware.

Continue to page 2 for details on where we go from here to protect our wetlands from degradation and loss.....



Wetland types and their value to the landscape.

All wetlands provide critical services that contribute to our well being. Below are highlights of different types of wetlands found in the St. Jones Watershed and some of the services they provide.

Flat Wetlands - are typically located at the upper reaches of the watershed. They are seasonally wet and often appear dry. They absorb precipitation and filter water slowly to surface and groundwaters, prevent flooding downstream, improve water quality, and provide wildlife habitat. They represent approximately 33% of the watershed's wetlands.

Riverine Wetlands - occur along streams and rivers and provide storage for flood waters and groundwater. The water that moves into these wetlands is cleansed before it moves downstream. They form corridors of valuable wildlife habitat. They represent approximately 25% of the watershed's wetlands.

Most of the wetland loss (in dark gray) in the St. Jones river watershed is comprised of flats which are vulnerable due to less regulatory protection. This loss has caused expansive habitat fragmentation in the northwest portion of the watershed.

Depressions - occur in low lying areas that form depressions such as coastal plain ponds. They are seasonally wet and provide critical habitat for amphibians. Their sample size was too small to assign them a grade for the watershed as they represent approximately 2% of the watershed's wetlands.

Tidal Wetlands - are regularly flooded by the tide and are some of the most productive ecosystems on earth supplying habitat for important fisheries. They provide coastal populations with critical services by reducing flooding and storm damage. They represent approximately 40% of the watershed's wetlands.

Delaware Wetlands

Purify | Provide | Protect

For more information:

The full St. Jones Wetland Condition Report is available at:
http://de.gov/delawarewetlands

Wetlands Outreach Specialist:
Margaret.Pletta@state.de.us
302-739-9939

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Wetland health

How stressors impact wetland health and how we can all work together for the St. Jones!

How are wetlands monitored?

Staff from the Department of Natural Resources and Environmental Control (DNREC) researched 116 wetland sites in the watershed with the Delaware Wetland Assessment Protocols in 2007-2008. Measurements of biological and physical indicators of wetland condition were taken including vegetation, soils, hydrology, surrounding land use, and stressors impacting the wetlands (e.g., invasive plants, ditching, filling, development and agriculture). The overall condition (grade) for each wetland type is an average based on a statistically representative sample in the watershed.

Below are the predominate stressors listed for each wetland type and recommendations to better manage or protect them. A restoration plan will be developed by DNREC and conservation partners based on the results of this study.

Riverine Wetlands

Stressors: Invasive plants, garbage, filling, and stormwater inputs.

Recommendations:

- Strengthen buffer regulations to protect wetlands from the stressors above associated with development.
- Ensure enforcement of existing Kent County buffer regulations.

What you can do:

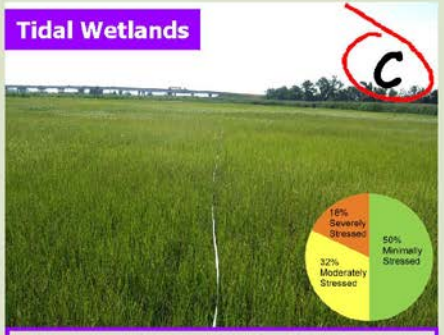
Live a watershed friendly lifestyle by reducing or eliminating the use of fertilizers and pesticides on your lawn. Pollutants travel downstream!

Get involved with local land use decisions to improve buffers and reduce building in and too close to wetlands.

For details look to the **Wetlands Public Participation Guidebook** on the Delaware Wetlands website on the "How You Can Help" page.
www.dnrec.delaware.gov/Admin/DelawareWetlands

Volunteer at or visit DNREC's St. Jones Reserve.
www.swc.dnrec.delaware.gov/coastal/DNERR/Pages/StJonesReserve.aspx

Tidal Wetlands



Stressors: Ditching, invasive plants, barriers to landward migration, and soil disturbance.

Recommendations:

- Minimize hardened shorelines (e.g., rip rap, bulkhead, roads) adjacent to wetlands.
- Strengthen buffer regulations to allow room for wetlands to move landward with sea level rise.

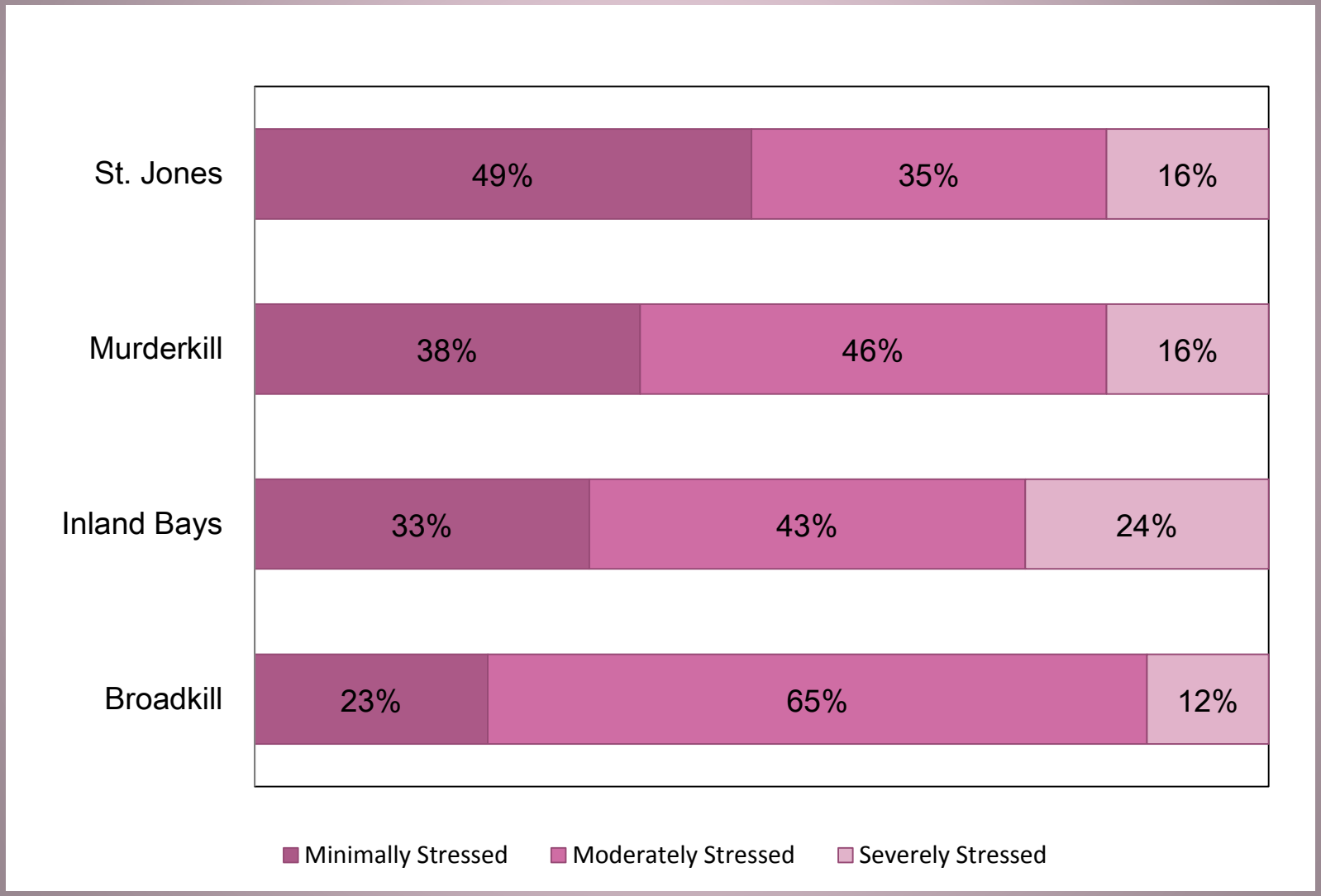
Flat Wetlands

Stressors: Invasive plants, ditching, and soil disturbance. These habitats are highly fragmented due to wetland conversion to other land uses and limited regulatory protection.

Recommendations:

- Better regulatory protection is needed at the State and/or County level since flats are the most vulnerable for loss in the St. Jones watershed.
- Increase landowner enrollment in voluntary conservation programs.
- Forestry best management practices should be utilized.

Comparing overall watershed wetland condition proportions



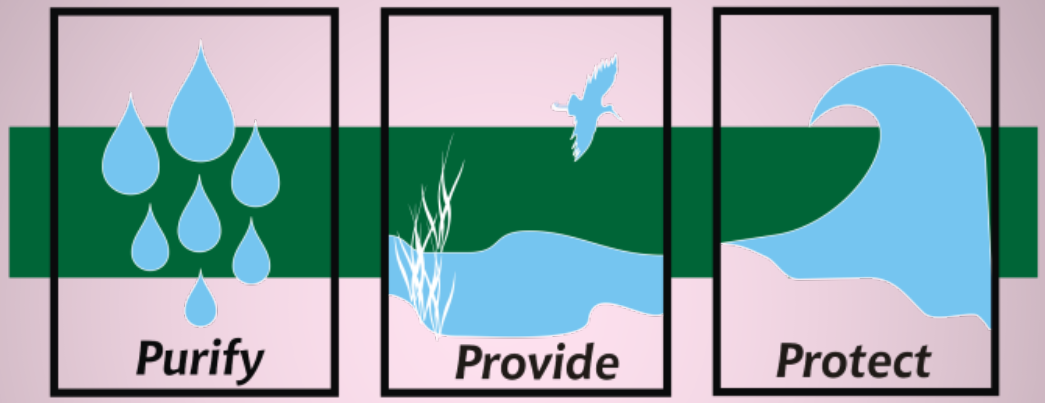
Summary

- Wetlands are a valuable resource for the citizens of Delaware

- Wetland status and trends reports show an increasing annual rate of loss for nontidal wetlands

- A large portion of wetlands are degraded from a reference (natural) condition

Delaware Wetlands



www.dnrec.delaware.gov/admin/delawarewetlands

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