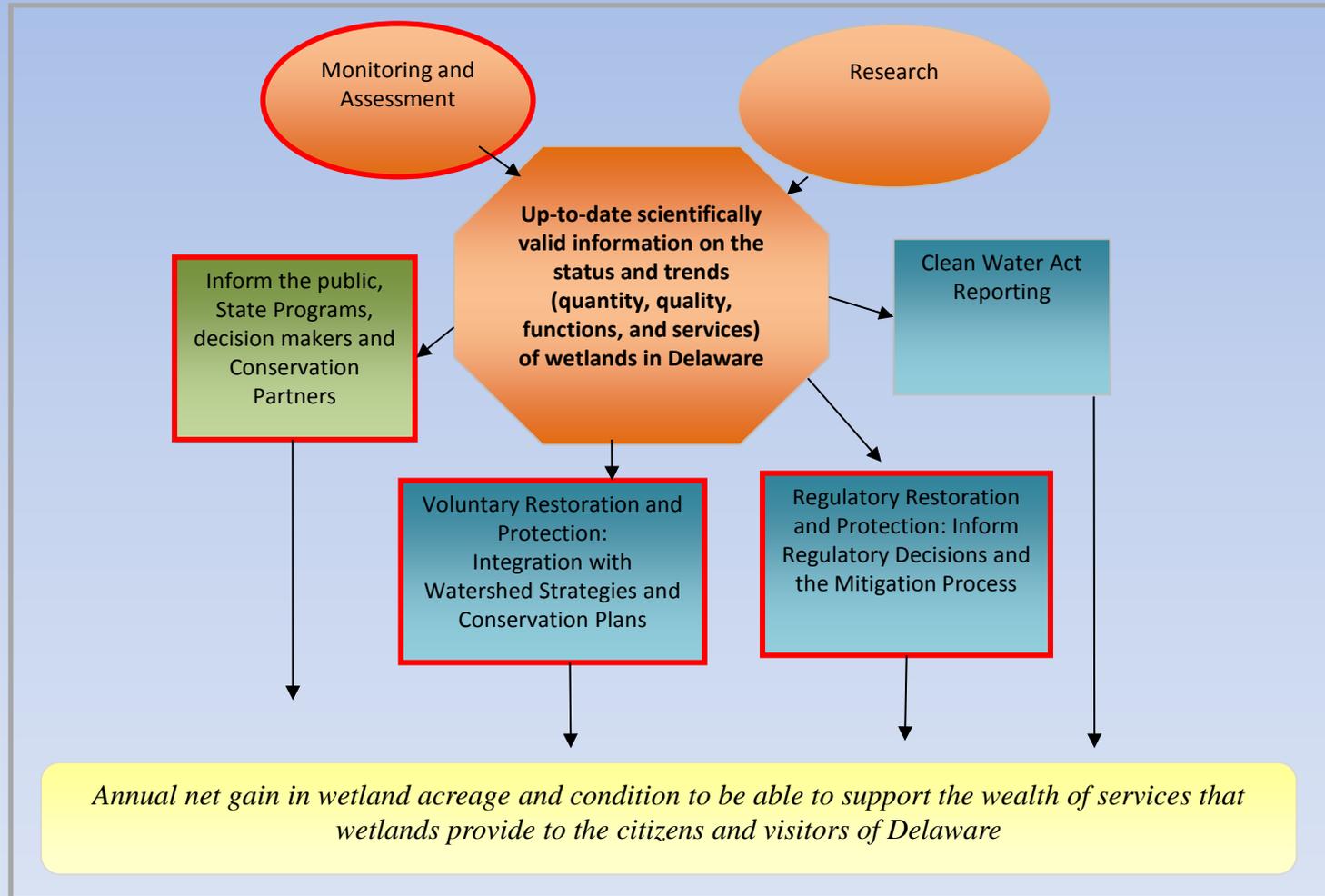


# Use of Monitoring and Assessment to inform wildlife conservation and restoration activity and planning



Alison Rogerson  
Delaware Department of  
Natural Resources and  
Environmental Control

# Program goal to use M&A to feed our education, voluntary restoration and regulatory protection

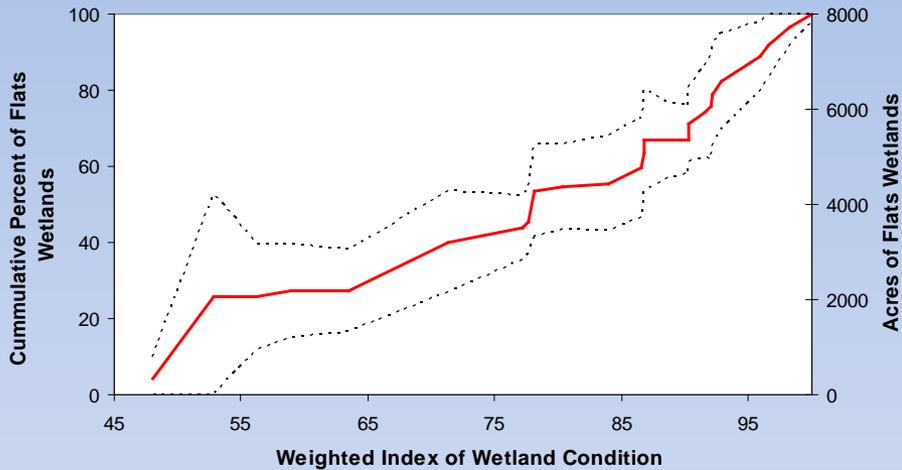


Components of the Delaware Wetland Monitoring and Assessment Program (WMAAP) from the Delaware Wetland Monitoring Strategy

# Inform state programs, decision makers and conservation partners: technical reports on condition by wetland type, measures of function and specific management recommendations

## Nontidal Rapid Assessment

Estimate condition of wetland population

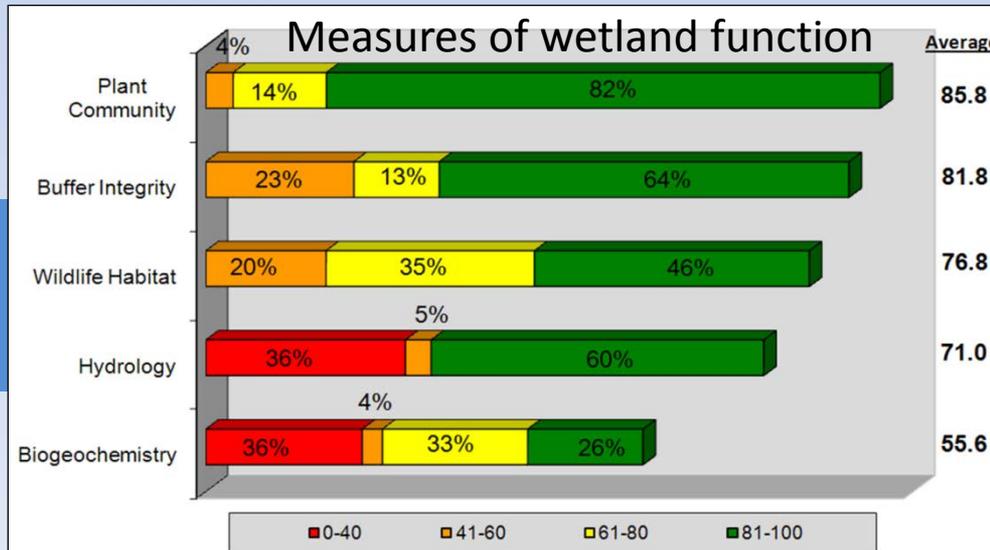


## Tidal Rapid Assessment

Tidal wetland shoreline obstruction



## Nontidal Comprehensive Assessment



# Inform the public

- Summarize assessment results to educate
- Improve local awareness of common stressors
- Gain support for management recommendations

## Wetland Health - Inland Bays Example

### Why do we assess and monitor the health of our wetlands?

By better understanding the health of our wetlands, we can better understand how to protect them from actions that cause damage. Wetlands provide many important services to humans and the environment including: water quality, providing habitat for fish, wildlife and rare plants, protecting us from flooding and storm damage, and providing open space on the landscape. An unhealthy wetland is less likely to provide these services to its fullest abilities. Data we obtain from scientifically assessing our wetlands is being used to design wetland restoration plans for watersheds and help us better understand how land use decisions impact the health of wetlands.

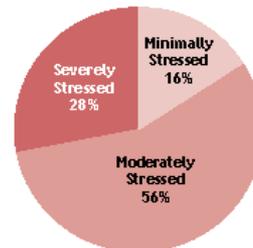
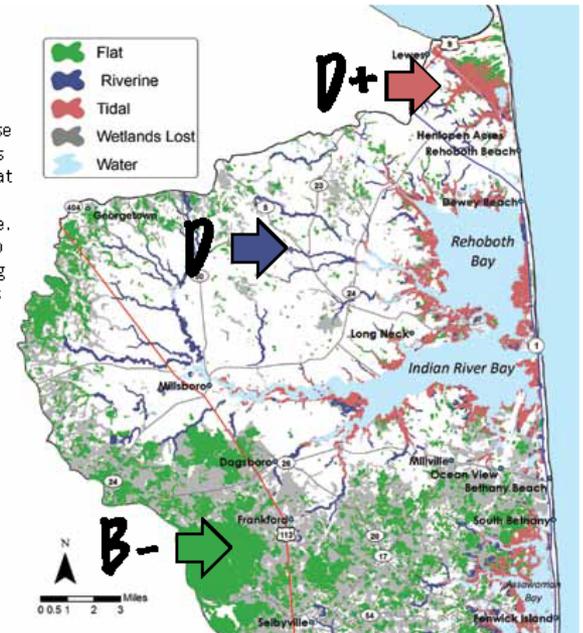
Assessments have been completed in the Nanticoke, Inland Bays, St. Jones, and Murderkill watersheds. Thus far, the data indicates that the majority of Delaware's remaining wetlands have been degraded from their Ideal condition.

The main stressors degrading our wetlands include: direct and indirect impacts listed on page 15.

As reports are completed for each watershed, they will be placed at the link below.

[www.wr.dnrec.delaware.gov/Information/OtherInfo/Pages/WetlandMonitoringandAssessment](http://www.wr.dnrec.delaware.gov/Information/OtherInfo/Pages/WetlandMonitoringandAssessment)

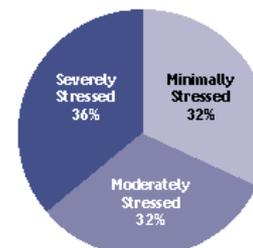
## Inland Bays Watershed Wetlands



#### COMMON STRESSORS DEGRADING TIDAL WETLANDS:

- Wetland diking
- Wetland ditching and draining
- Invasive plants
- Hard surfaces that limit marsh migration
- Development adjacent to marsh

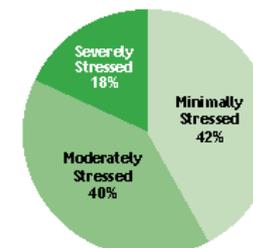
**Recommendations:**  
Minimize development adjacent to wetlands, restore natural distribution of water, control invasive plants



#### COMMON STRESSORS DEGRADING RIVERINE WETLANDS:

- Channelized streams and ditches (disconnecting wetlands from streams)
- Invasive plant species
- Fill or excavation

**Recommendations:**  
Restore channelized streams to more natural streams, remove invasive species



#### COMMON STRESSORS DEGRADING FLAT WETLANDS:

- Fill or excavation
- Roads
- Ditching to remove water
- Forest harvesting

**Recommendations:**  
Protect large forest blocks, restore natural distribution of water, implement sustainable forest management

In addition to the outright loss of wetlands, many of the remaining wetlands in Delaware have been degraded by human activities which reduces the services that they provide. Based on an assessment of wetlands in the Inland Bays watershed the majority of wetlands have been degraded which further supports the need to prevent additional loss and focus on improving the condition of the remaining wetlands so that they can continue to provide services to the citizens of Delaware.

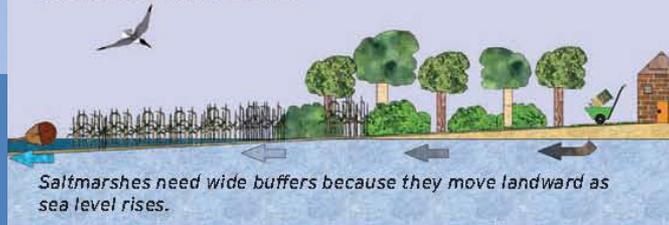
*Data was collected between 2005 and 2008.*

# Inform the public

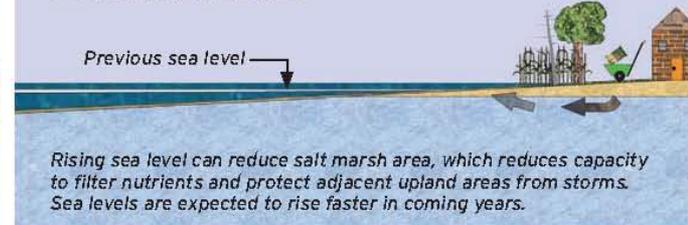
- Use assessment results to focus our restoration/protection messages
- Packaging our M&A results for public consumption

## sea level rise

### CURRENT SEA LEVEL



### FUTURE SEA LEVEL



### what is being done

Research on the impact of sea level rise and determining wetlands that are most at risk.

### goal

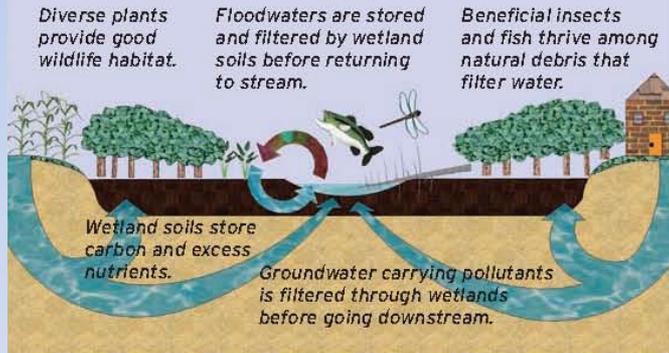
Allow marshes the ability to migrate landward and adapt to sea level rise by providing buffers between wetlands and development or construction.

### what you can do

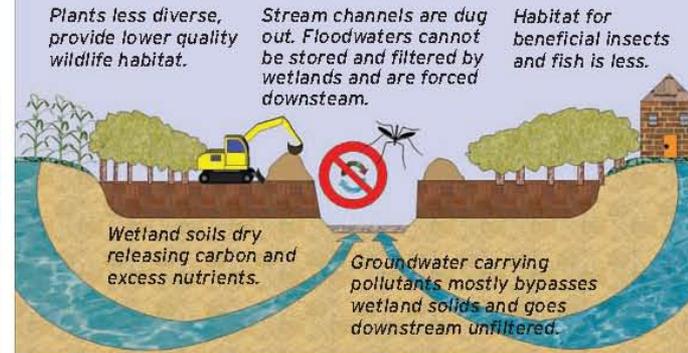
Request that resource and landuse planning agencies require buffers that better preserve wetlands and reduce hardened surfaces near wetlands.

## stream channelization & ditching

### NATURAL RIVERINE WETLAND



### CHANNELIZED RIVERINE WETLAND



Determined to be the greatest stressor in the watershed. Presently, 87% of waterways are channelized or ditched. Above is a generalized depiction of the effects of channelization.

### what is being done

Using our wetland condition data to develop restoration and protection plans to target areas most in need.

### goal

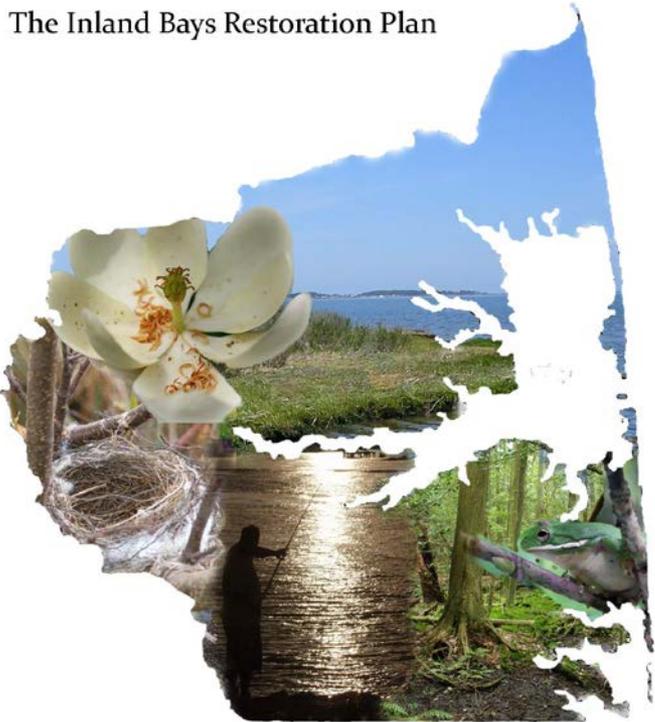
Where feasible, reconnect streams with their adjacent riverine wetlands.

### what you can do

Consider voluntary restoration programs if you're a landowner, support the funding of restoration through conservation partners such as the Natural Resources Conservation Service (NRCS), the U.S. Fish and Wildlife Service, and Ducks Unlimited.

# Voluntary restoration: Watershed specific restoration plans

The Inland Bays Restoration Plan



Developed by:

The Inland Bays Restoration Group

March 2013

Forest block size

Wetland features

Delaware Ecological Network

Heritage program data

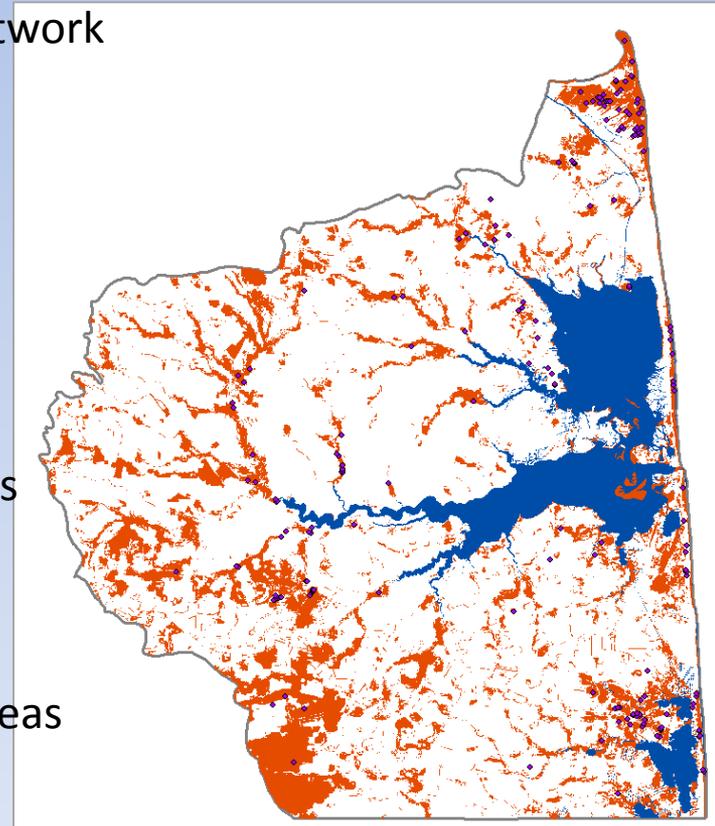
Ditches

Flood Zones

Nutrient reduction areas

Impaired streams

Groundwater Source Areas



Heritage Program rare wildlife species hotspots and occurrences

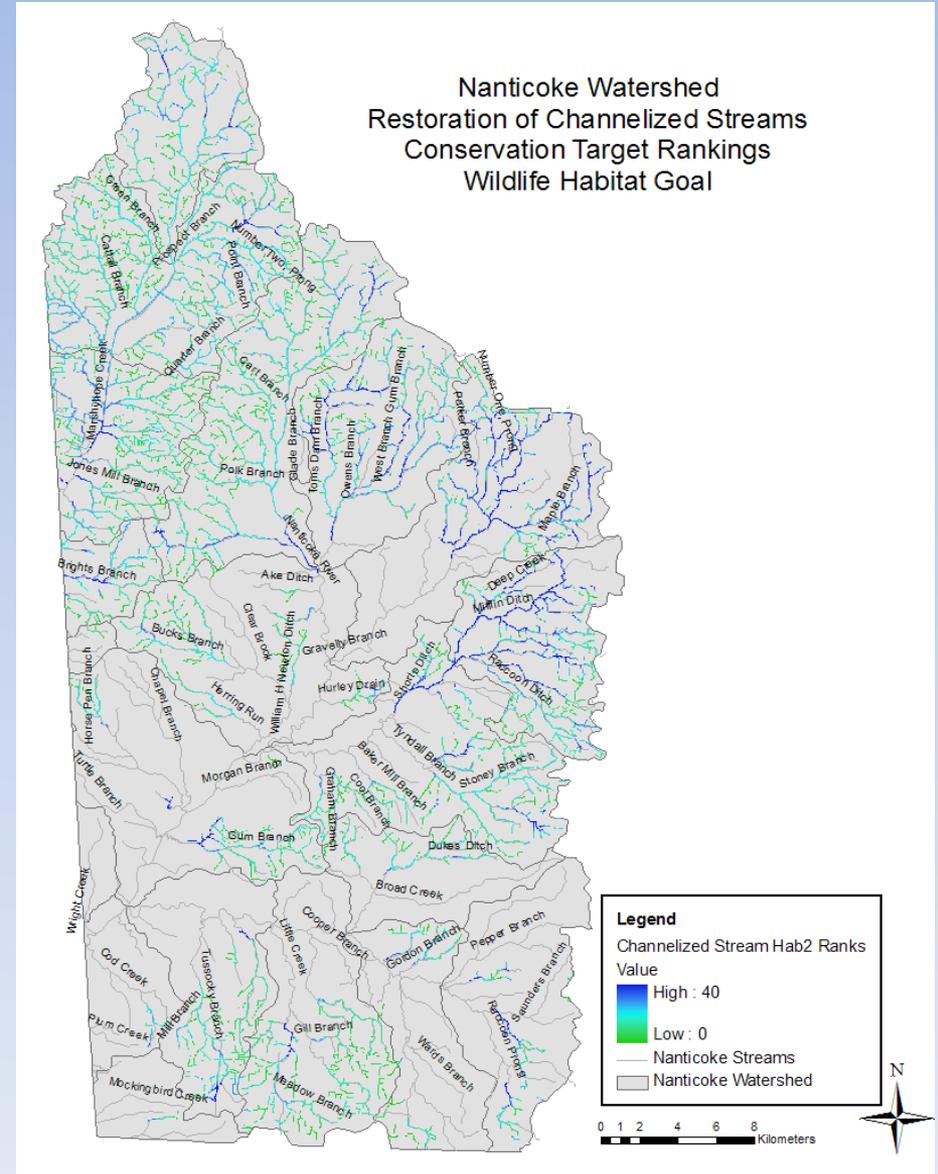
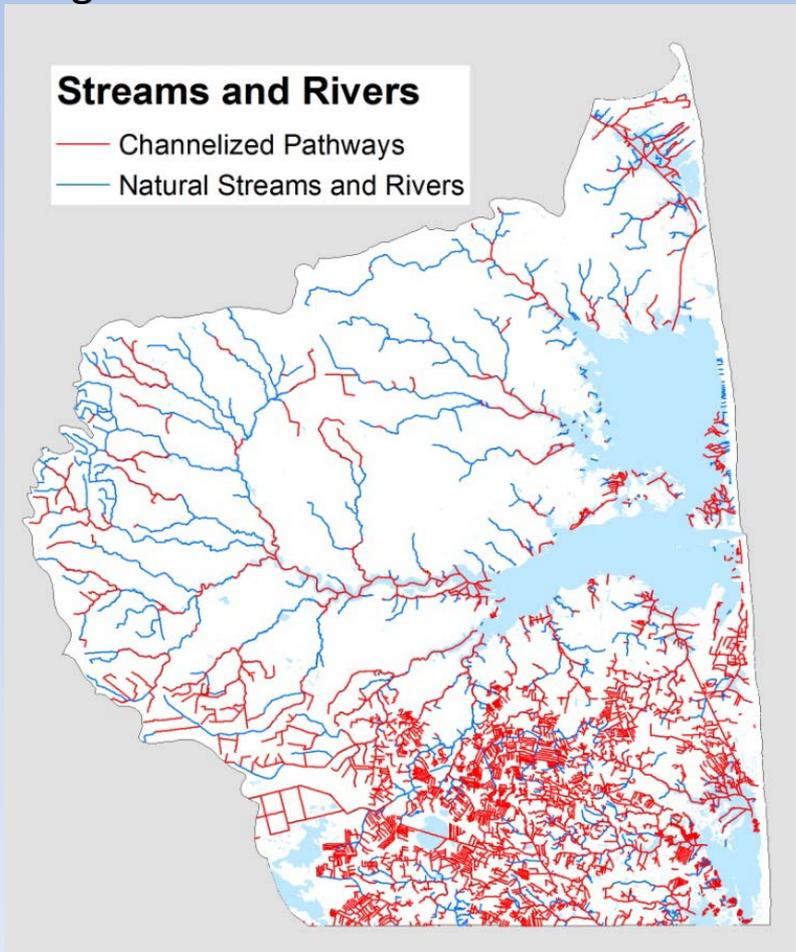
# Voluntary restoration: Watershed specific restoration plans

Inland Bays: 87% of waterways are ditched, excavated or channelized

Hydrology functional scores were low

Target 5: Restore Channelized Streams

Example results prioritizing restoration opportunities



# WETLAND RESTORATION IN DELAWARE: A Landowner's Guide

## PART 2: RESOURCES FOR RESTORATION

### *Restoration options and opportunities*

By working with nature, these restoration alternatives to traditional approaches are able to provide improved functions and enhanced benefits. Beside being attractive, the restored environments reduce excess nutrients and sediments, increase water infiltration (soaking in), and enhance habitat for wildlife. Once put in place, these alternatives are typically cheaper to maintain as well. **Note:** Many of the techniques described in this section (and the pages following) are dependent on appropriate on-site soil conditions, based on consultation/evaluation by a technical expert.

#### Existing situations



**Ag wet spot:** typically has low productivity, can bog down equipment, and require extra work-around. These areas are often inefficient to till, especially for irregularly-shaped fields.

#### Restoration options



**Water quality wetland:** Plants and microbes in the wetland cleanse water running off the land. Adjacent fields often produce better due to improved drainage. Good habitat for wildlife.



**Wet spot near woods:** This section of field in the Blackbird forest area was too wet to farm, and had limited use as wildlife habitat. But its nearness to the woods presented a prime opportunity for restoring wildlife habitat.



**Habitat for wildlife:** Close-up of Blackbird wet spot after restoration. The new wetland now provides vital habitat for a variety of wildlife, including rare salamanders and treefrogs, which need both woods and wetlands to survive.

# Construction Techniques for Restoring Wetlands

Wetland restoration projects utilize techniques that promote greater variety in habitat conditions, which translates to higher plant and animal diversity. A lot of the work involves using materials from nature in ways that replicate natural wetland processes. Key aspects of the process include:



**Locating your site:**  
Look for that low-lying, poorly drained section of a field, especially the awkward corner or odd-shaped area. Such areas are often hard to cultivate and harvest, and typically do not produce well.

An ideal spot for a restored wetland

This wet field edge is a prime site for a wetland project

**Irregular shapes and edges:**  
Wetlands with irregular edges are not only more natural looking, but they also provide enhanced benefits. This includes a greater surface area for absorbing nutrients running off the land, and more nooks and crannies for aquatic life.



This restored wetland offers good habitat variety



Plants and animals can find many places to live here

**Varying the topography:**  
When a wetland is restored, moving the soil around to create lots of humps and bumps and varying water depths promotes greater plant and animal diversity, resulting in higher quality aquatic habitat.

# Environmentally-Friendly Water Management

Historically, water management systems in Delaware were approached with a ditch and drain focus, as a means of reducing flooding problems in agricultural fields, roads and communities. In recent years, as efforts have shifted to managing water in more environmentally friendly ways, alternative designs for drainage systems have been developed that maintain the drainage benefits, but do so in ways that are more in tune with nature. These projects feature an emphasis on techniques that improve water quality and enhance wildlife habitat, as described in the following:



Giving a once straight ditch a more natural look

**Restructure ditches to enhance benefits:**  
Transform that straight deep ditch to the more naturally-winding look of a coastal plain stream and its adjacent floodplain. This spreads water flow over a wider area, reducing erosion and providing improved filtering of runoff from adjacent lands.

**Create or restore adjacent wetlands:**  
Adding wetlands to a water management project creates a natural floodplain for absorbing drainage. Wetlands also retain water on the land - an important benefit in times of drought. They also clean the water and provide great wildlife habitat.



new winding ditch  
created wetlands  
old straight ditch



Preserve adjacent habitat wherever possible

**Avoid ecologically-sensitive areas:**  
In planning a drainage project, steer clear of areas that provide unique habitat, or that would bisect or fragment forests and other natural ecosystems. If a tree canopy is present, minimize clearing. Trees stabilize ditch banks. They also provide shade to keep waters cooler and better aerated.



# Regulatory restoration and protection:

## Inform regulatory decision and mitigation process

Goal to use assessment data to formulate performance standards

Incorporate rapid and comprehensive assessment methods into federal review process for requested permits

Use comprehensive assessment method to evaluate mitigation bank project credits

Adapt nontidal rapid assessment to incorporate non-condition metrics for state permit review

Alison Rogerson

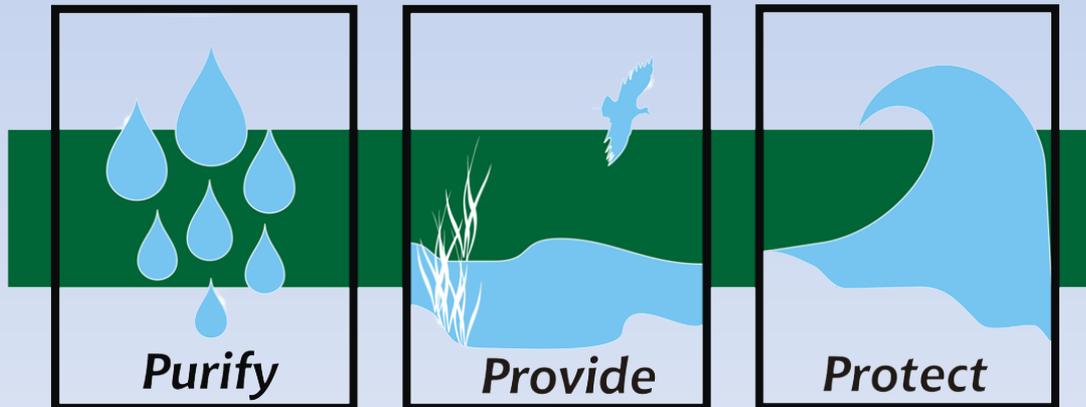
Delaware DNREC

Wetland Monitoring and Assessment Program

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302-739-9939

# *Delaware Wetlands*



<http://de.gov/delawarewetlands>