Wetland Projects in Agricultural Landscapes in Maryland

Establishing a Systems Approach to Wetland Crediting
Chesapeake Bay Program STAC Workshop
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Wetland BMP Definitions

BMP Category	NRCS Practice	Definition*	Change/Credit
Wetland Restoration or Re-establishment	Wetland Restoration (657)	The manipulation of a site with the goal of returning natural/historic functions to a **former** wetland	Acreage Gain
Wetland Rehabilitation	Wetland Restoration (657)	The manipulation of a site with the goal of repairing natural/historic functions of **degraded** wetland	Functional Gain
Wetland Creation or Establishment	Wetland Creation (658)	The manipulation of a site to develop a wetland that did **not** previously exist on an upland or deepwater site	Acreage Gain
Wetland Enhancement	Wetland Enhancement (659)	The manipulation of a site to heighten, intensify, or improve specific function(s) or for a purpose such as water quality improvement, flood water retention or wildlife habitat.	Functional Change
Constructed Wetland	Constructed Wetland (656)	An artificial wetland ecosystem with hydrophytic vegetation for biological treatment of wastewater, agricultural runoff, or stormwater	Acreage or Functional Change

* Definition is not specific to the Chesapeake Bay Program

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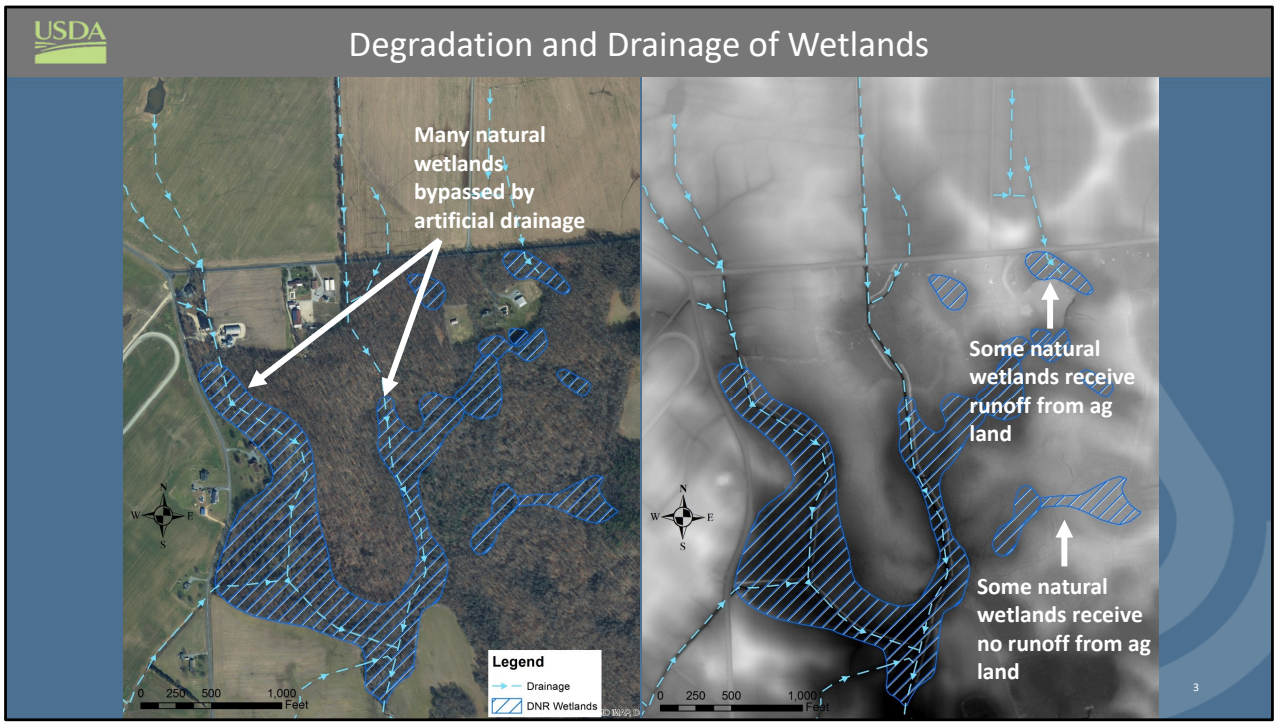
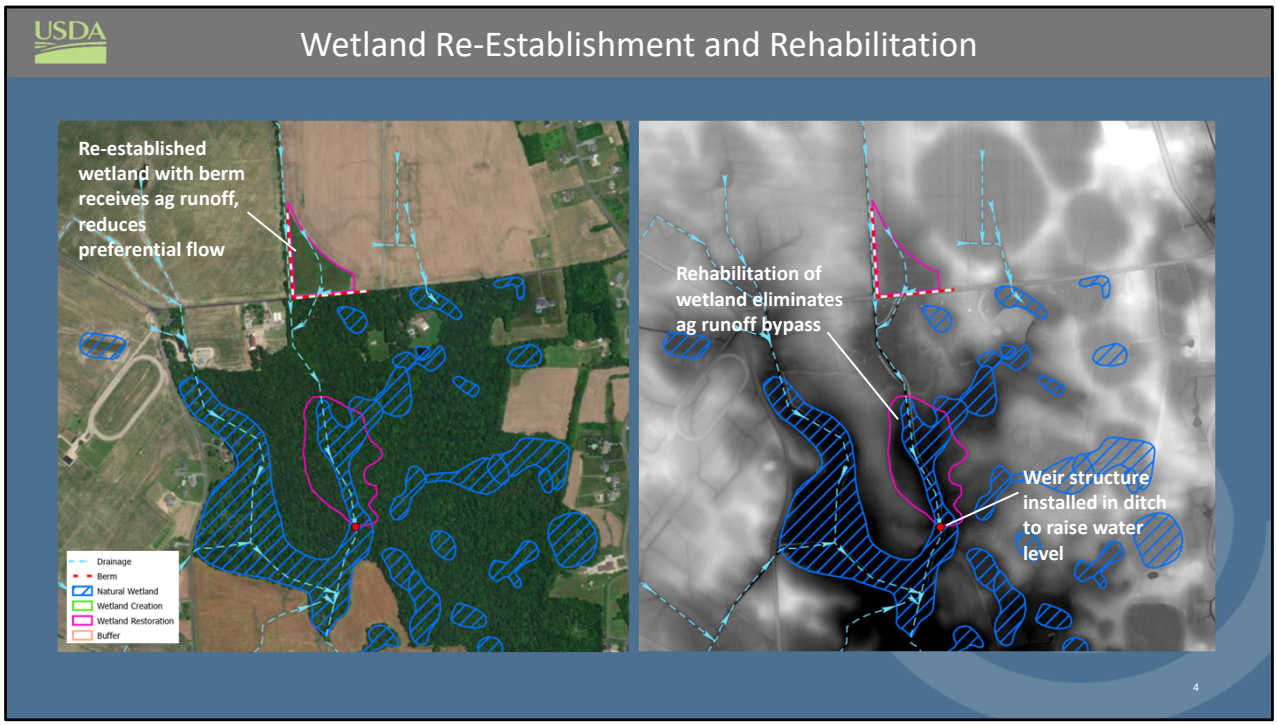
Reason for including this is to understand how I use the terms in this presentation



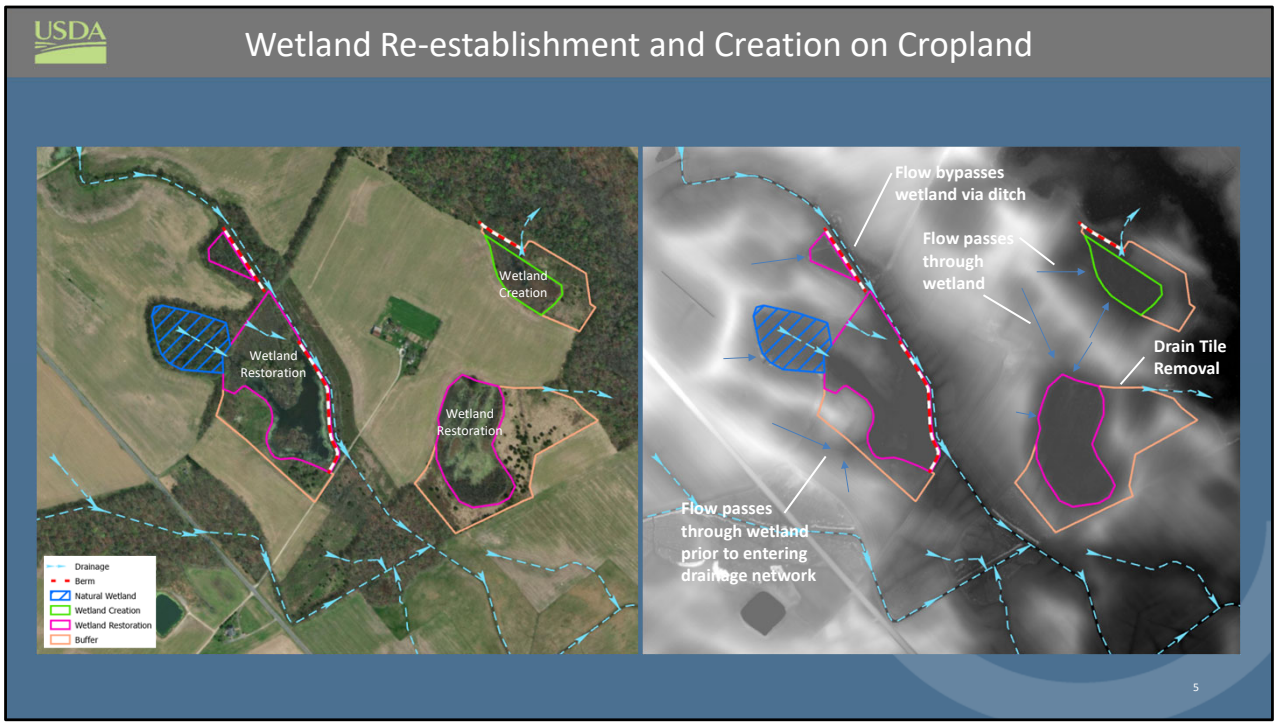
History of drainage has not only reduced the amount of wetlands, but has also disconnected natural wetlands from the agricultural landscape
Some natural wetlands do receive ag runoff
Many are bypassed by artificial drainage
Some natural wetlands do not receive any ag runoff



Re-established wetlands within agricultural fields can trap ag runoff and mitigate preferential flow paths

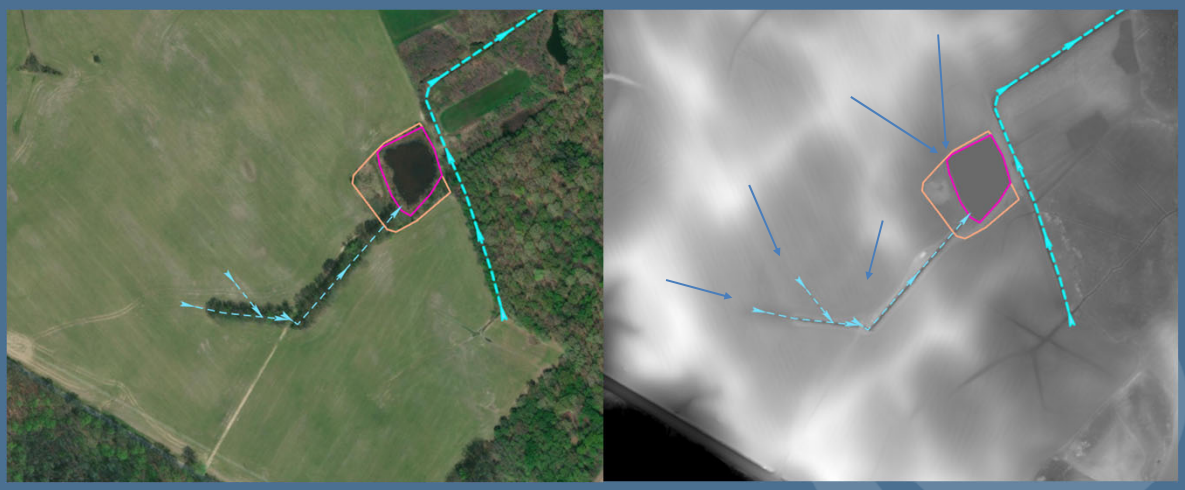
This type of wetland restoration is what you commonly see in ag fields

Bypassed wetlands can be rehabilitated to reduce bypass by installing ditch plugs or weir structure



The topography in this landscape contains many depressional features
This takes more wetlands to capture agricultural runoff

Wetland Re-establishment on Cropland – Landscape Influences



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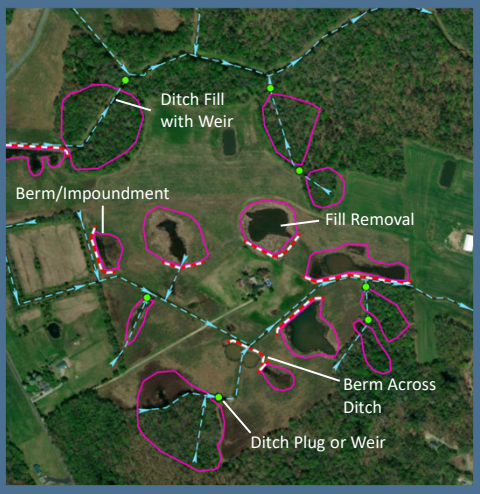
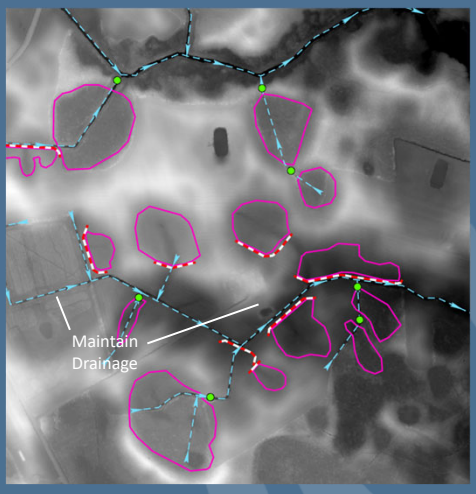
The topography in this landscape provides more opportunity to place a wetland that can accept runoff from an area of cropland of significant size

Wetland Re-establishment – Delmarva Bays and PDA Ditches

Woody veg removal is another method of rehabilitating hydrology in Delmarva Bays



Delmarva Bays
- Depressional wetlands, often herbaceous and isolated, providing critical habitat for amphibians
- Occur in Queen Anne's and Caroline Counties in MD



Public Drainage Association (PDA) Ditches (aka tax ditch)
- PDA ditches generally cannot be plugged
- Occur in Caroline, Queen Annes, Somerset, Wicomico and Worcester Counties in MD and Sussex County in DE

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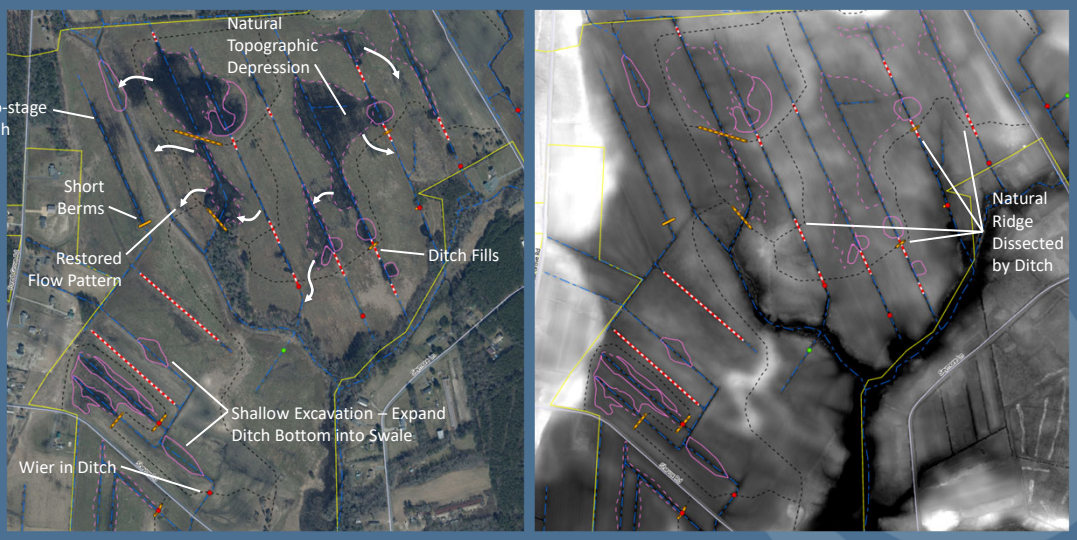
Landscape with high concentration of depressions and tax ditches
Landowners often want to include the upland contributing area in these landscapes because their fields will be broken up too much to just do the wetland restoration
Not all ditches can be plugged, particularly in the case of tax ditches or ditches draining other people's lands
Often embankments are constructed along the ditch to restore a wetland while maintaining drainage
With sufficient elevation changes, some ditches can be partially blocked and still provide drainage to upstream lands – ditch fill with weir

Wetland Re-establishment Making Use of Natural Topography



Utilize natural topography to restore natural drainage patterns when possible
Opportunities for water quality treatment when practical

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Ditches were often cut through ridges disrupting natural flow paths
Utilizing natural topography to redirect channelized flow back through overland flow paths
Reduces flow velocities and increases infiltration
Where we can block drainage, shallow excavation adjacent to ditch can provide inline treatment
Small weirs in ditch can slow flow and spread it out upstream for more treatment time
2-stage ditch can be created to provide treatment during higher flows – wetlands created adjacent to ditch

Some have open water habitat
Others are dominated by emergent wetland vegetation
And some are planted with appropriate woody vegetation

Wetland Creation

Swale Inline with Ditch

2-stage Ditch (Newly Constructed)

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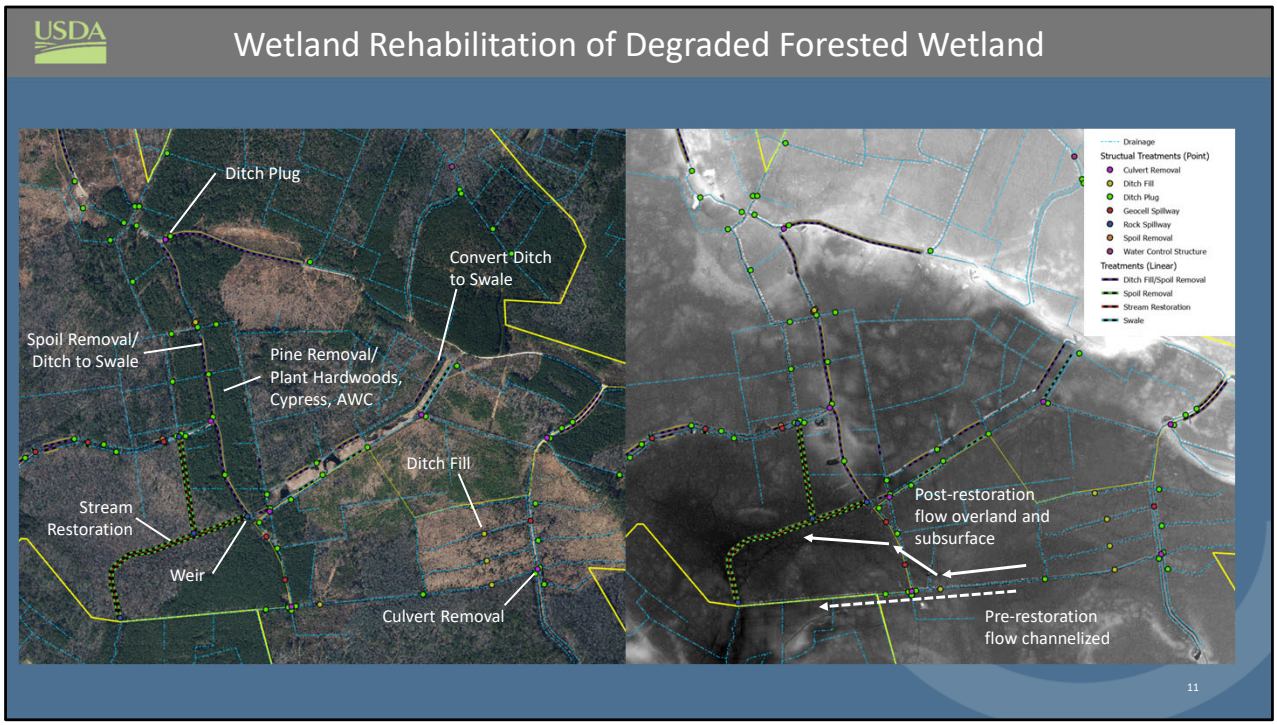
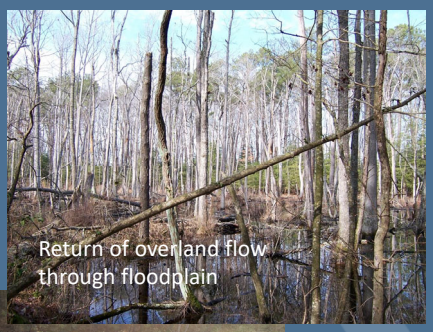
Swale constructed in line with ditch to increase filtration capacity
2-stage ditch constructed to provide treatment during high flows and storm events
Both add wetland acreage



Another common type of wetland restoration is rehabilitating degraded wooded wetlands
Ditching and stream channelization occurred either for pine production or prior conversion for agriculture
These areas are typically still wetland, but channelized flow increases flow downstream, disrupts natural flow paths, and reduces hydroperiod and infiltration
Some are headwaters of stream systems, and some have agricultural runoff flowing through them, but within channels rather than across surface
On this site, we saw significant flow return to it's natural flow path over land rather than bypassing site through ditch

Wetland Rehabilitation



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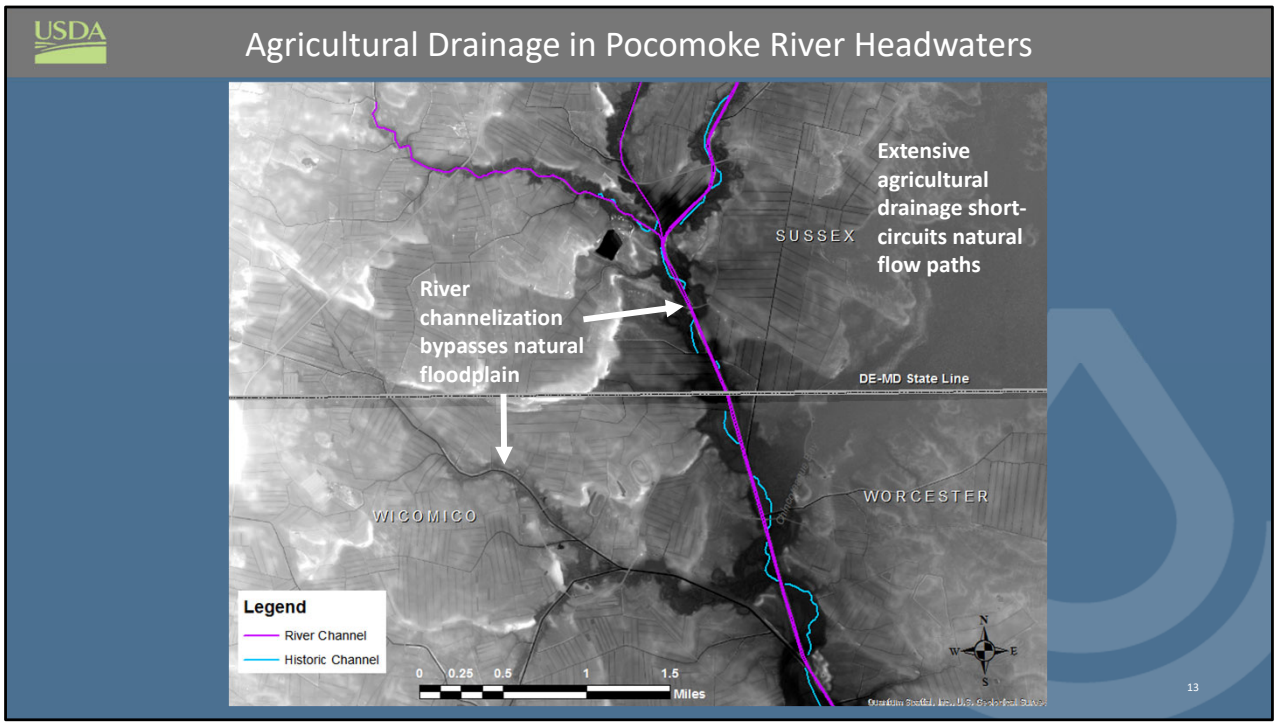
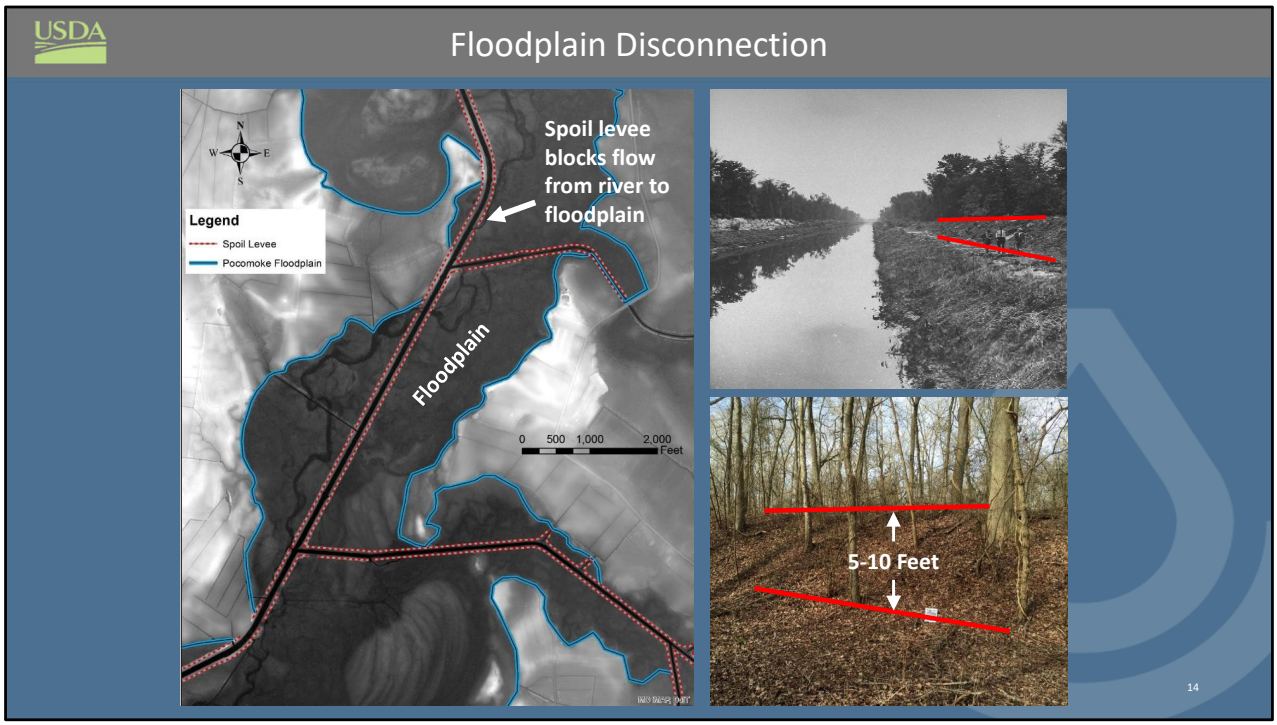


Channelization and dredging of river and extensive agricultural drainage short-circuit groundwater flow paths

Increases velocities in channel, in-stream erosion, and flood levels



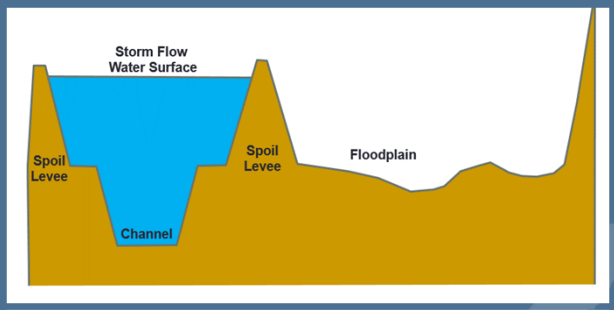
Dredge spoil was placed on banks, restricting hydrologic connections between river and floodplain

Subsidence/decomposition of highly organic soils due to reduced flood frequency

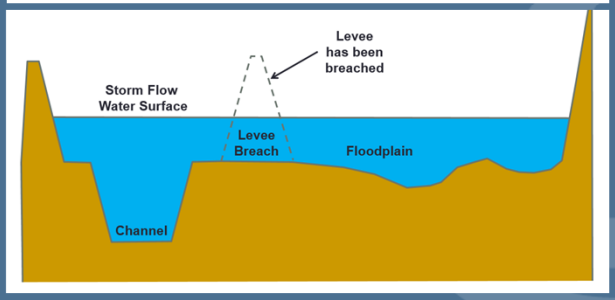
Bald cypress survive in less flooded environment, but conditions for recruitment are lacking

Floodplain Reconnection/Wetland Rehabilitation

BEFORE RECONNECTION



AFTER RECONNECTION



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Floodplain reconnection by creating 100-ft breaches in spoil levee
Hundreds of breaches have been installed along channelized Pocomoke

Floodplain Reconnection/Wetland Rehabilitation

Increased flooding promotes cypress regeneration

Sediment deposits on breach

Newly constructed breach

Flow over breach after storm event

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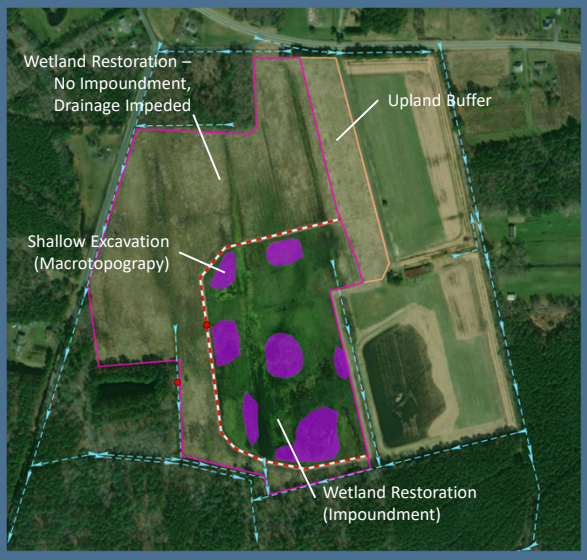
Cypress regenerating again
Breach is receiving flows during and after storm events
Sediment deposition of sands are evident in breaches

Wetland Restoration with Marsh Migration Opportunity



Objectives:

- Maintain incentive for landowners while providing opportunities for marsh migration
- Facilitate migration of high marsh grasses such as Spartina patens and Distichlis spicata

Marsh Migration Criteria

- Limit embankment heights to 1.5 feet
- When embankments need to be taller than 1.5 feet, exclude at least 30 percent of the project area within the near marsh zone from the impoundment area
- When excavating to provide deeper water, limit the area of excavation to 30 percent of the pool area
- Use side slopes of 10:1 on both sides of all embankments within the near marsh zone

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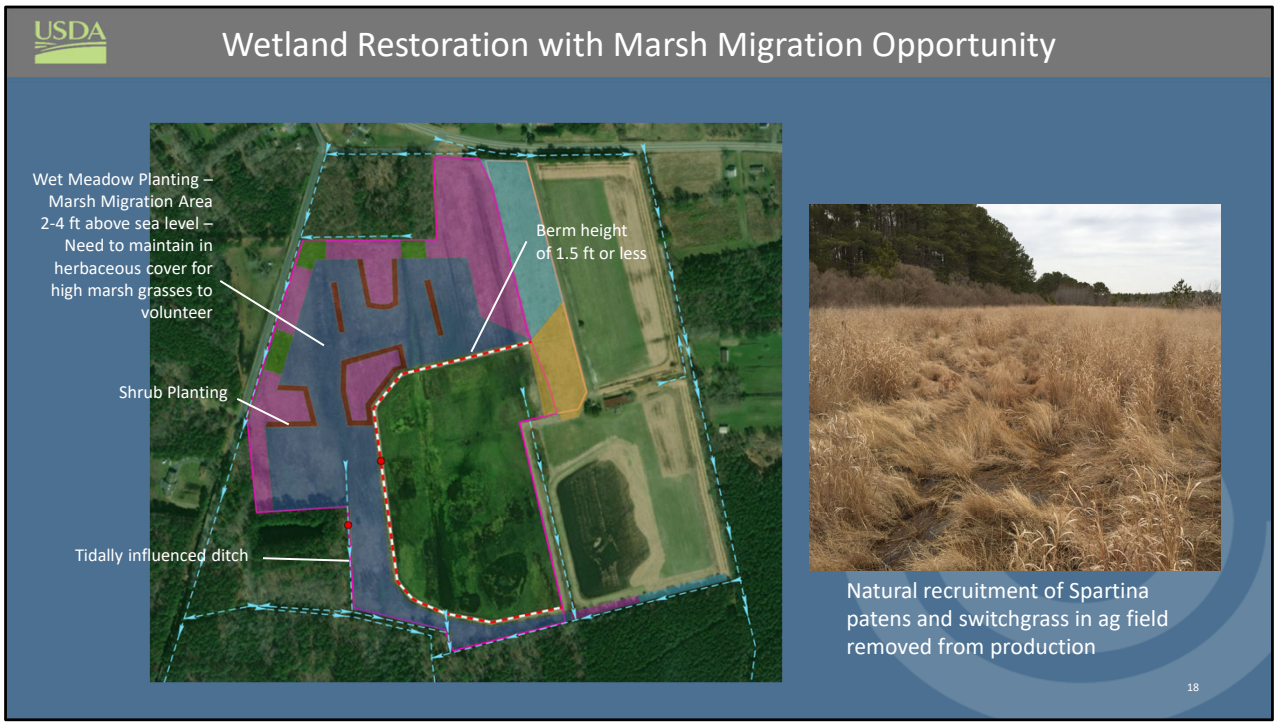
Ag fields within a few feet of sea level present opportunities for marsh migration
Many landowners want the waterfowl habitat provided by impoundments
Deeper impoundments will never have opportunity to develop into marsh – will become open water
Can achieve both demand for waterfowl habitat and maintain opportunity for marsh migration
Developed a set of criteria for the zone within 4 feet of sea level



Plant mostly native grasses that are adapted to wetland and brackish conditions (e.g. switchgrass)
Maintain herbaceous cover via mowing or burning
Keeping trees out of the area appears to be critical for natural recruitment of marsh grasses, i.e. Spartina patens and Distichlis spicata, which need open canopy
Forested areas adjacent to marsh often become dominated by phragmites in understory, preventing recruitment of high marsh grasses

In the piedmont where spring-fed wetlands have become dominated by woody vegetation
Habitat for federally-listed bog turtle, Baltimore checkerspot, Canada burnett
Woody veg in these systems promotes preferential flow paths and increases evapotranspiration
Tree and shrub removal returns shallow subsurface flow paths
Incised and eroded streams reduce hydrology and degraded habitat
Stream restoration raises surface water profile to promote natural hydrology and provide habitat

Wetland Rehabilitation and Restoration - Revegetation

Woody Vegetation Control & Replant

Wet Meadow Planting

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Removal of monoculture pine and control of sweetgum followed by less shade-tolerant hardwoods such as oaks and black gum restores more natural plant community
Wet meadow plantings on cropland and pasture

Wetland Rehabilitation or Enhancement? Phragmites Control

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Phragmites control via aerial spraying is a common practice to increase marsh plant diversity

Generally doesn't last forever, but provides habitat benefits for waterfowl and other wetland birds


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QUESTIONS?
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