



# Determining wetland condition in the Murderkill Watershed, Delaware

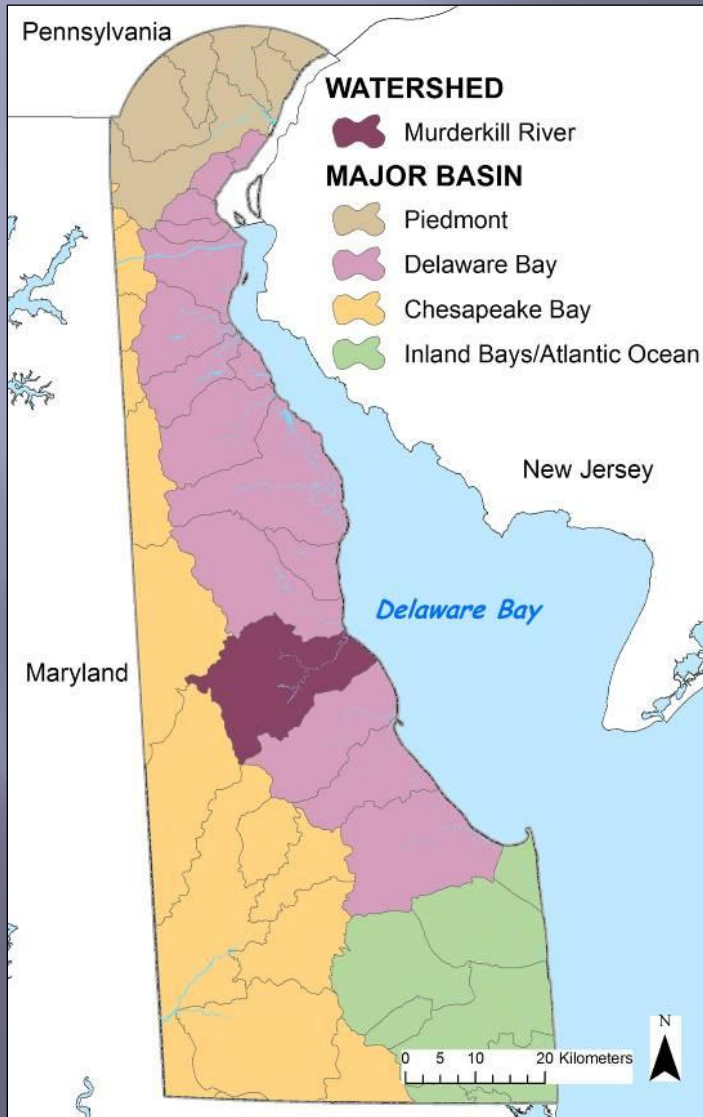
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Mark Biddle

Delaware Department of Natural Resources and  
Environmental Control

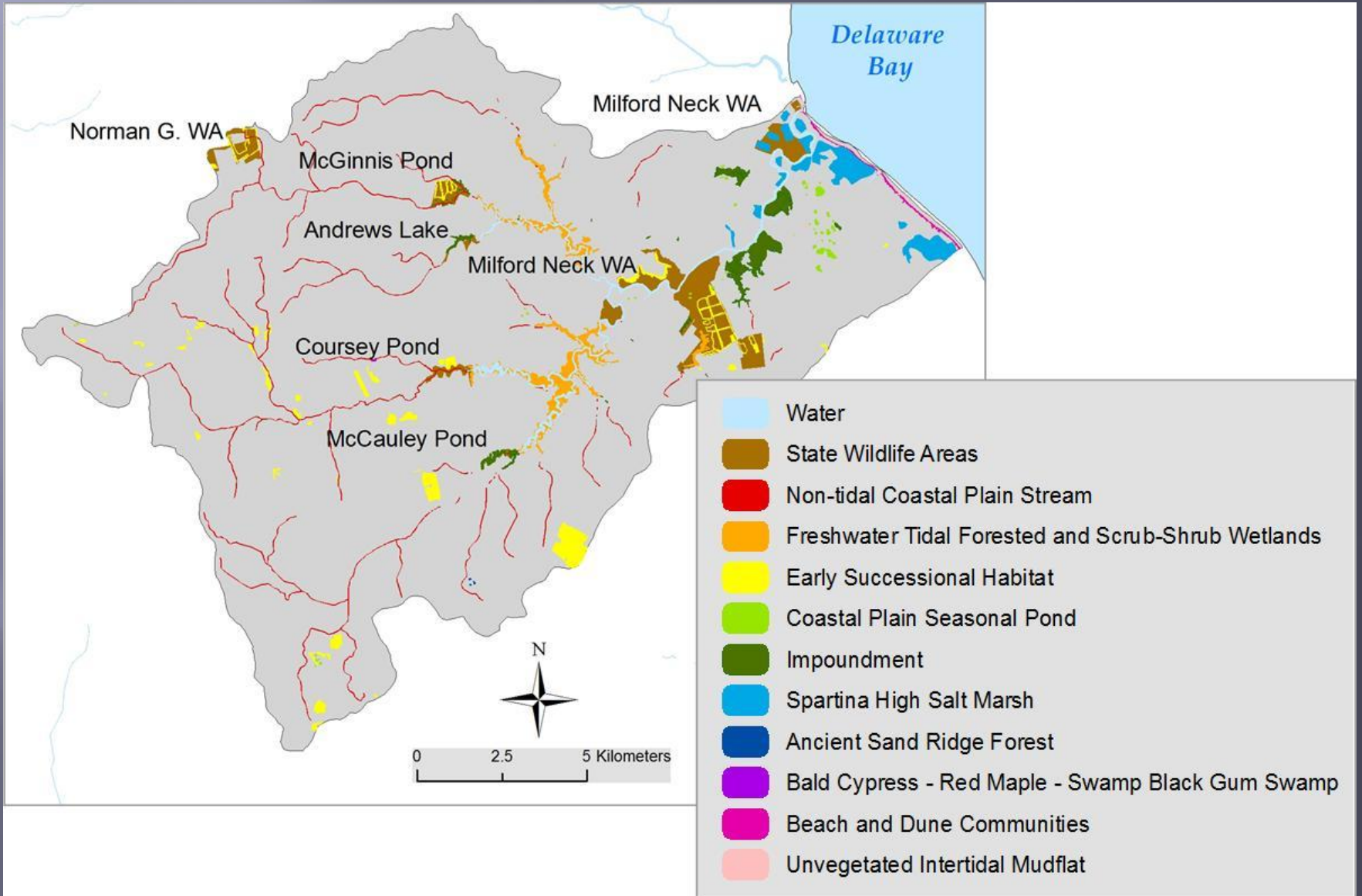
Division of Watershed Stewardship



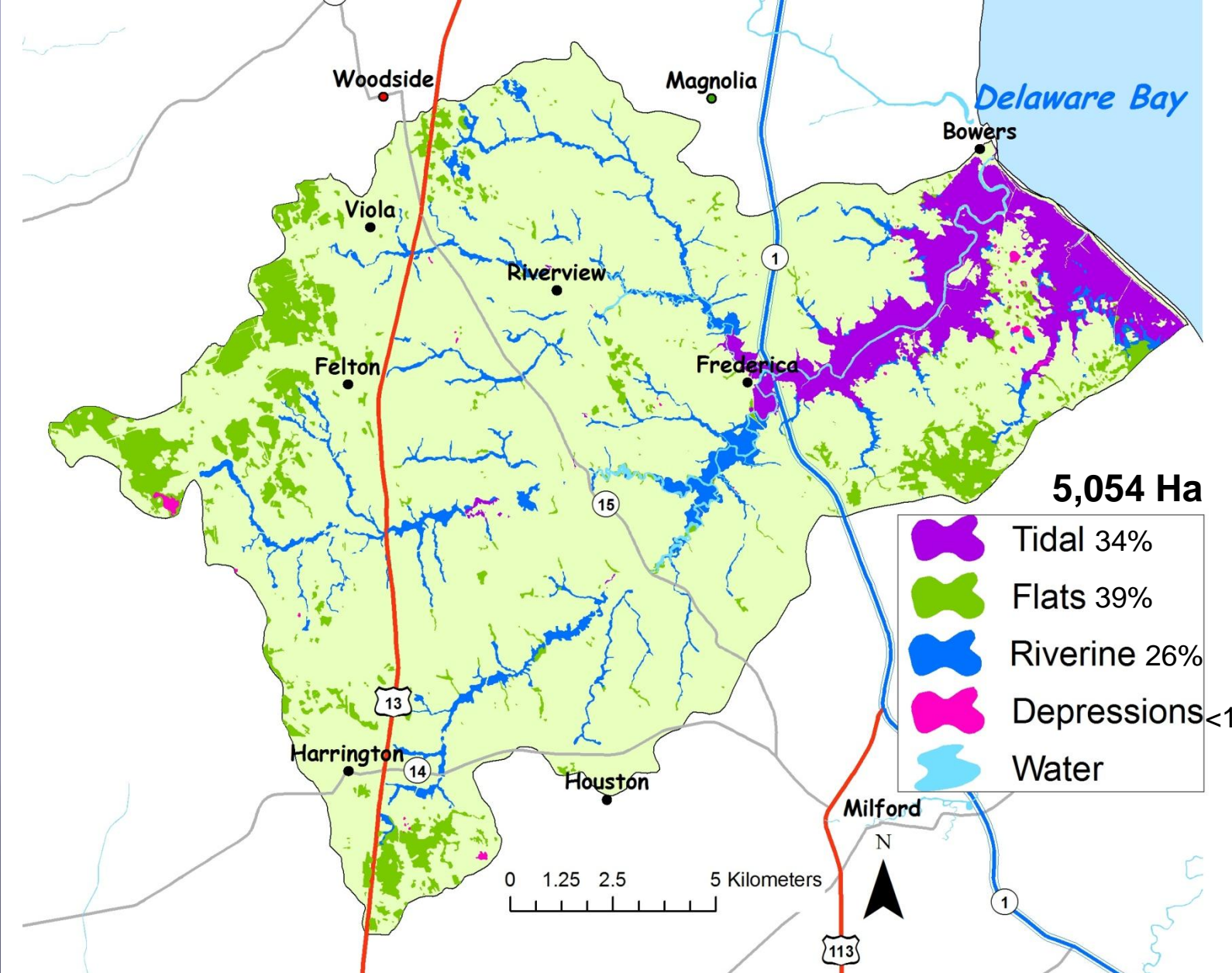
# Condition assessment of Murderkill River Watershed Wetlands



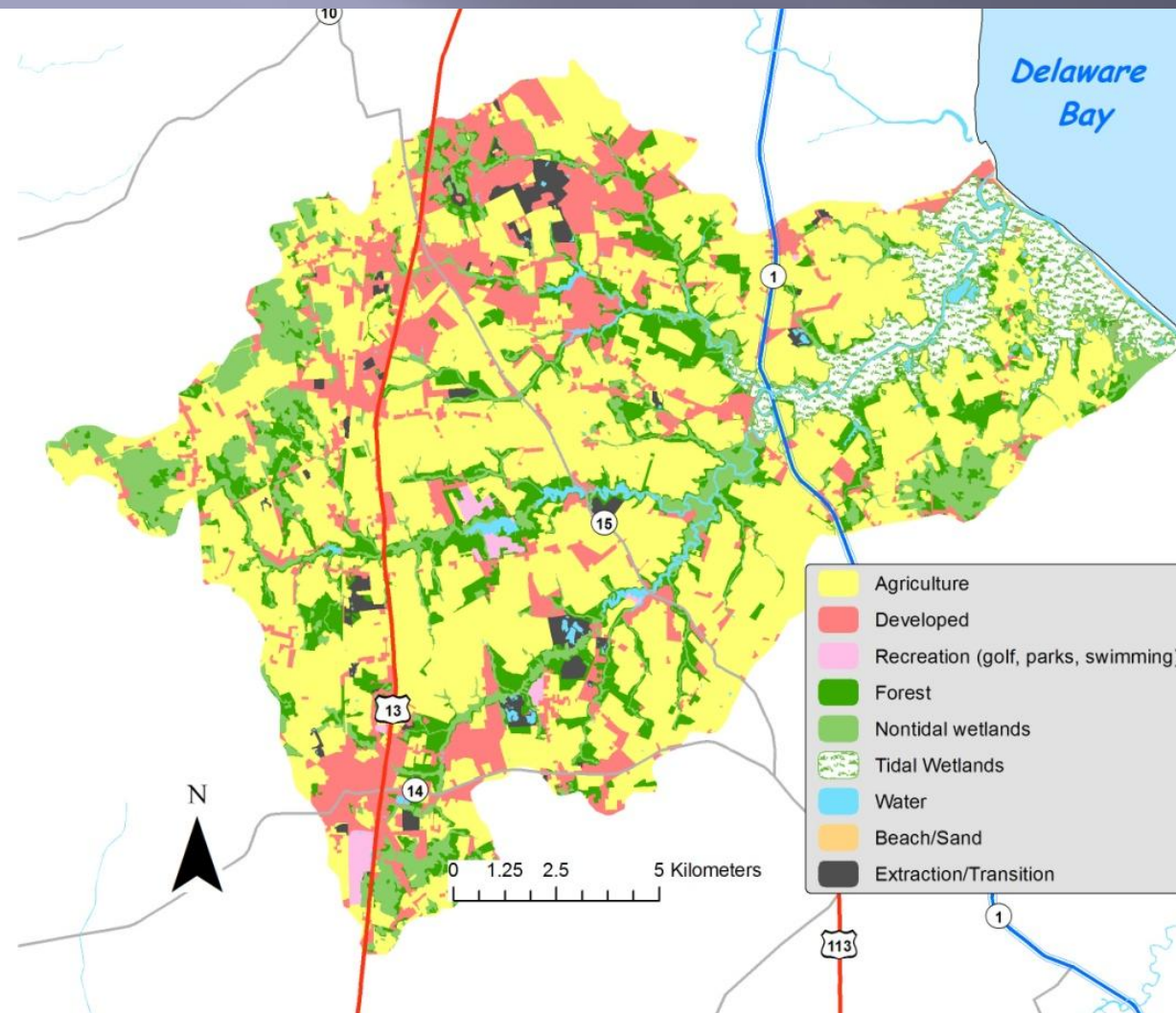
# Key Wildlife Areas



# Wetlands across the watershed



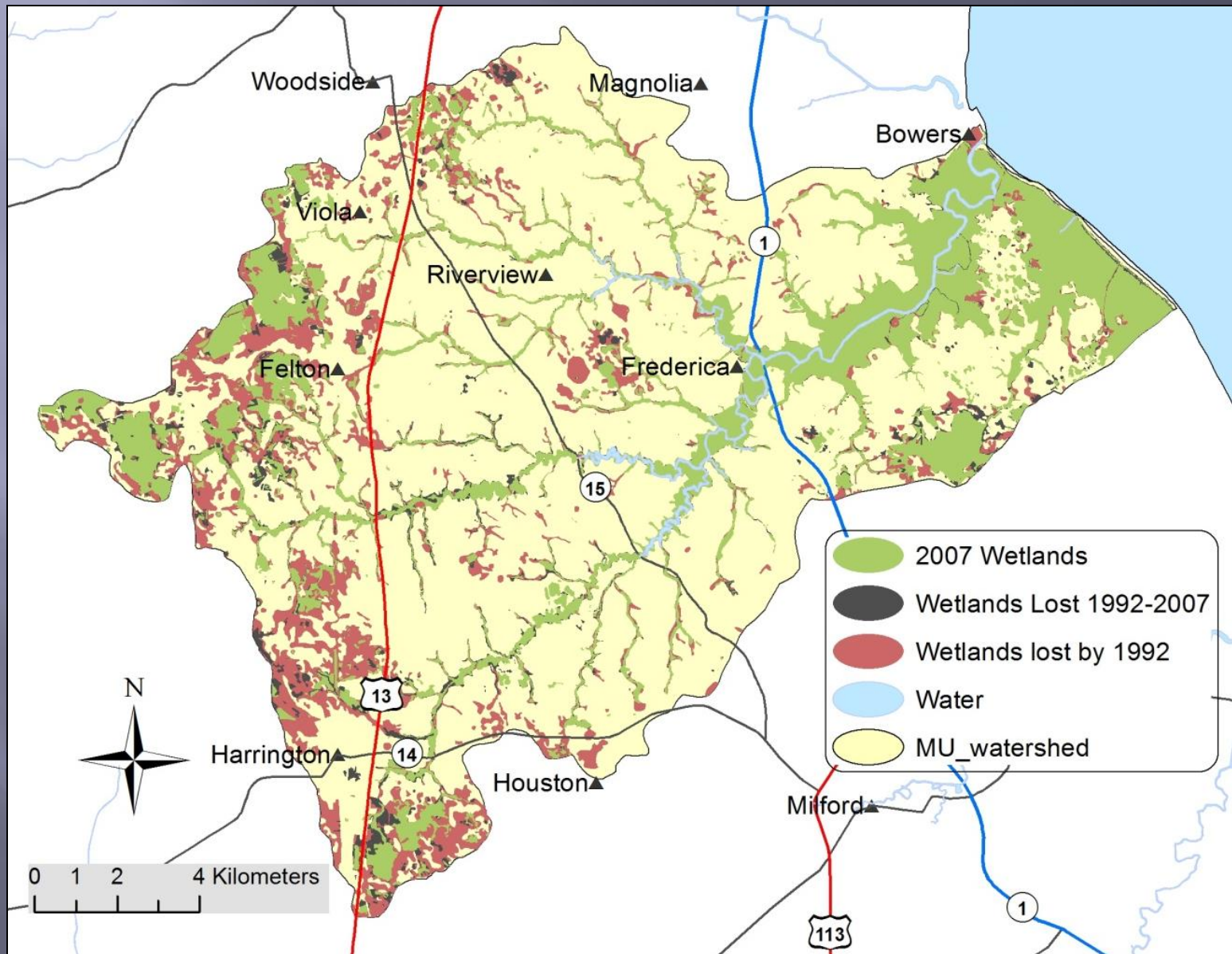
# Landuse 2007



## Changes from 1997-2007

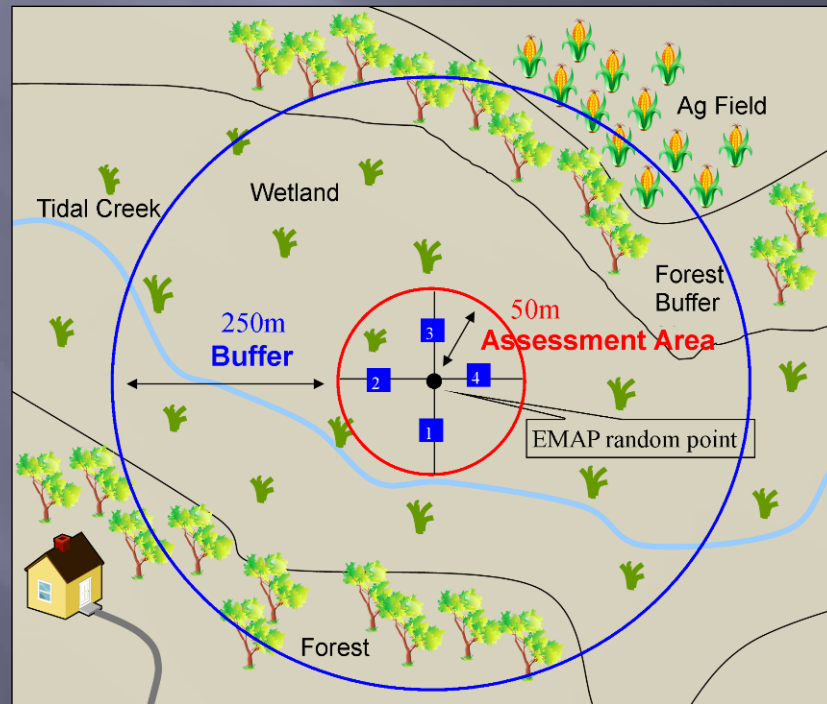
- Development +3.7
- Extraction/Transitional +0.8
- Wetlands -0.1
- Agricultural -4.3

# Change in wetland Acreage



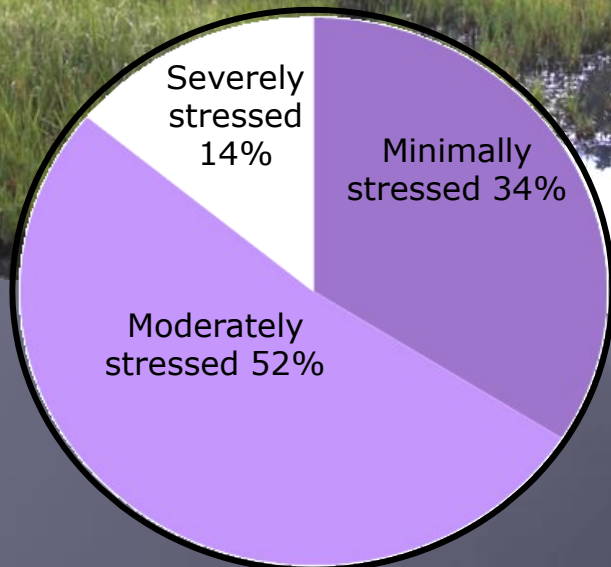
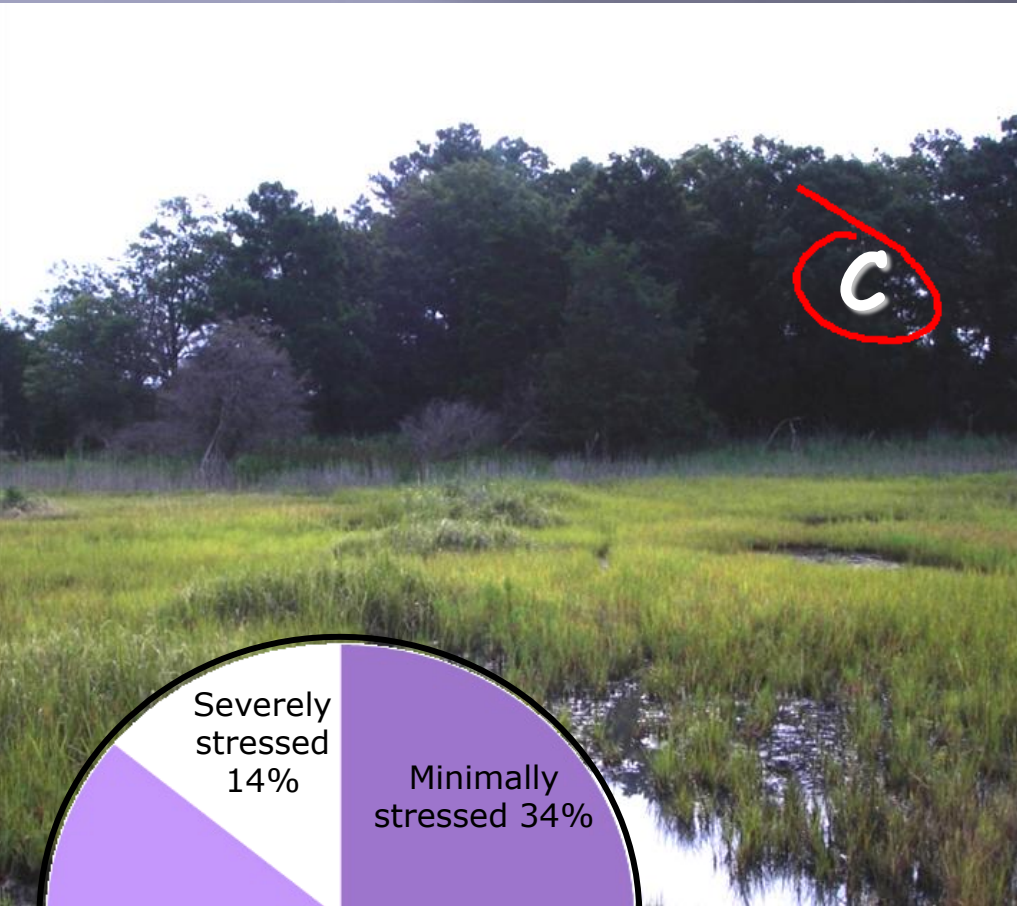
# MidTRAM

Condition based rapid sample  
Comprehensive supporting data



Habitat (5), Hydrology (4), Buffer/Landscape (5)

# Tidal Wetland Condition



**Stressors:** Ditching, invasive plants, barriers to moving landward, and soil disturbance

**Recommendations:**

- Minimize hardened shorelines adjacent to wetlands.
- Strengthen buffer regulations to allow room for wetlands to move landward with sea level rise.
- Control the spread of non-native invasive plants (e.g. Phragmites)



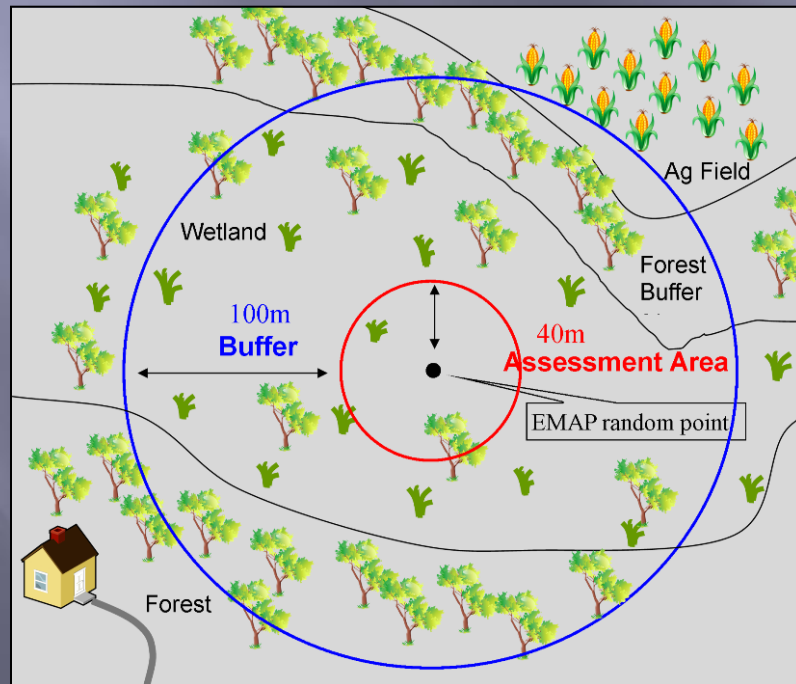


# DERAP

Calibrated to Comprehensive assessment IWC

Three attribute groups:

- Habitat (14)
- Hydrology (11)
- Buffer features (15)



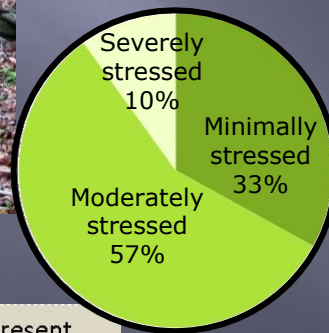
# Wetland Condition - Flats



**Stressors:** Forestry, ditching, disturbances, excavation, filling, and adjacent development

**Recommendations:**

- Improve regulatory protection is needed at the State and/or County level.
- Increase landowner enrollment in voluntary conservation programs.
- Promote/endorse forestry best management practices.



Stressor Name	Proportion with Stressor Present		
	Minimally Stressed N=10	Moderately Stressed N=17	Severely Stressed N=3
Invasive plants in the AA	30%	24%	67%
Ditches in the AA	0%	41%	100%
Tree Basal Area (m <sup>2</sup> /ha)	78	79	43
Forest clear cutting	0%	18%	33%
Presence of both fill and microtopo alterations	30%	29%	67%



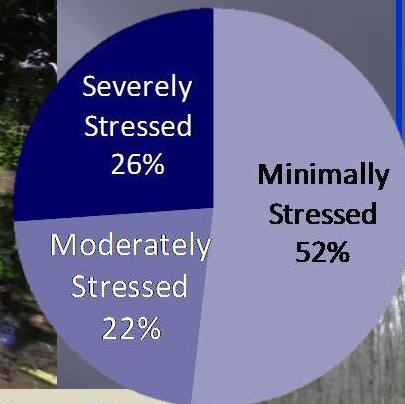
# Wetland Condition - Riverine



**Stressors:** Invasive plants, filling, stormwater inputs, channelized streams, and adjacent development and agricultural fields

**Recommendations:**

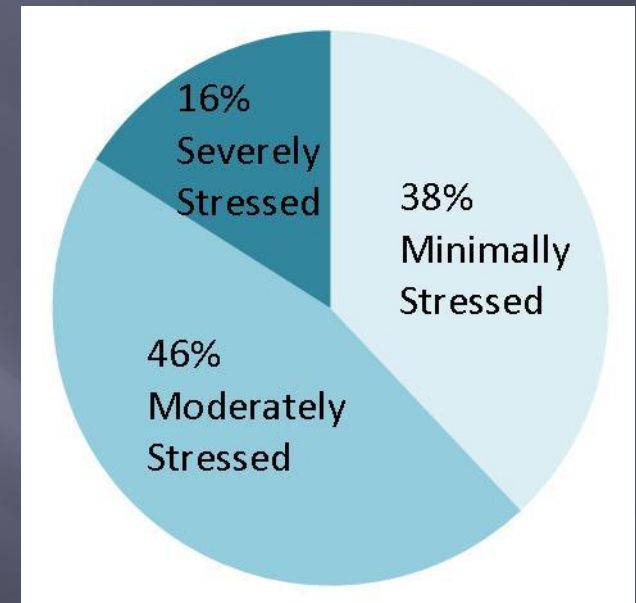
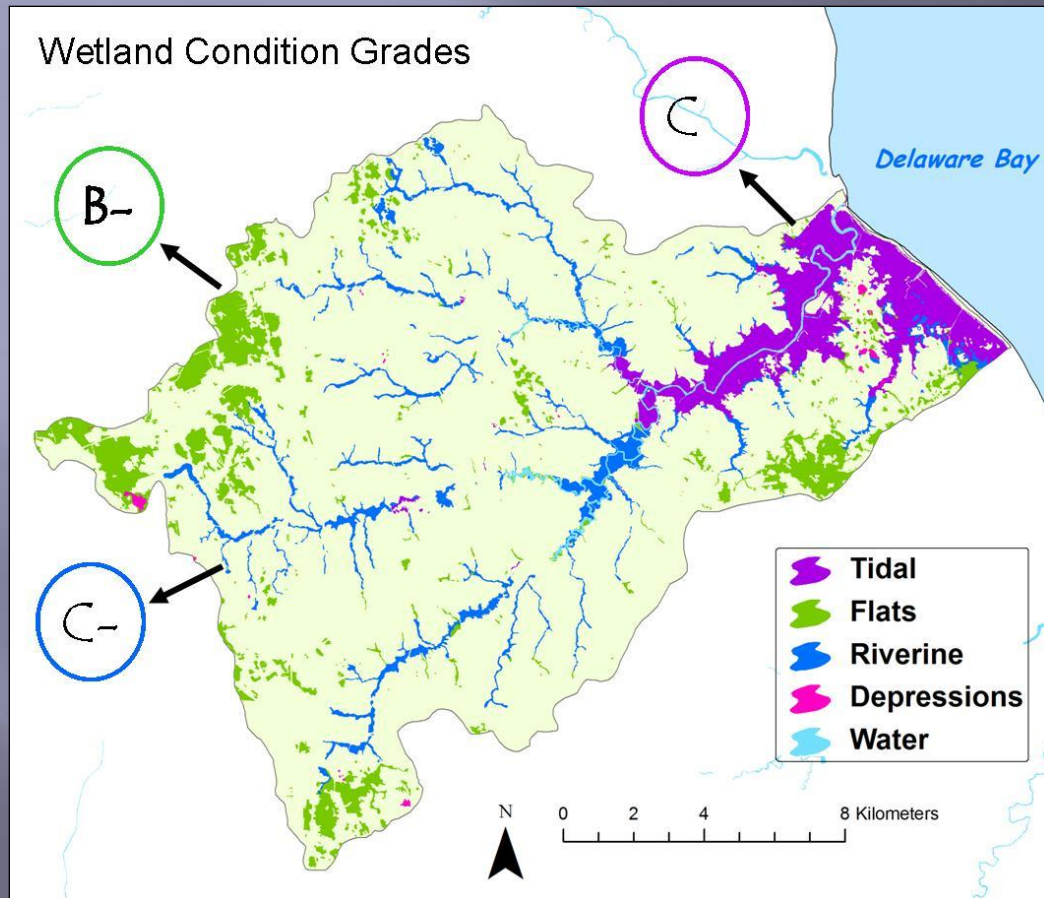
- Strengthen buffer regulations to protect wetlands
- Ensure enforcement of existing County buffer regulations.
- Restore channelized streams to allow overbank flooding



Stressor Name	Proportion with Stressor Present		
	Minimally Stressed N=16	Moderately Stressed N=7	Severely Stressed N=8
Invasive plants in the AA	75%	100%	100%
Channelized streams	0%	71%	100%
Fill in the AA	19%	14%	100%
Tree Basal Area (m <sup>2</sup> /ha)	117	67	44
Residential development in the buffer	31%	57%	75%
Agriculture in the buffer	63%	100%	50%



# Overall Scores for Watershed



# Compared to other watersheds



■ Minimally Stressed   ■ Moderately Stressed   ■ Severely Stressed

# Questions?

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## *Delaware Wetlands*

