

# **Condition of Wetlands in the Inland Bays Watershed**



**DNREC Division of Water Resources**

**Wetland Monitoring and Assessment Program**

Amy Jacobs, Alison Banning, Andy Howard, Rebecca Rothweiler

























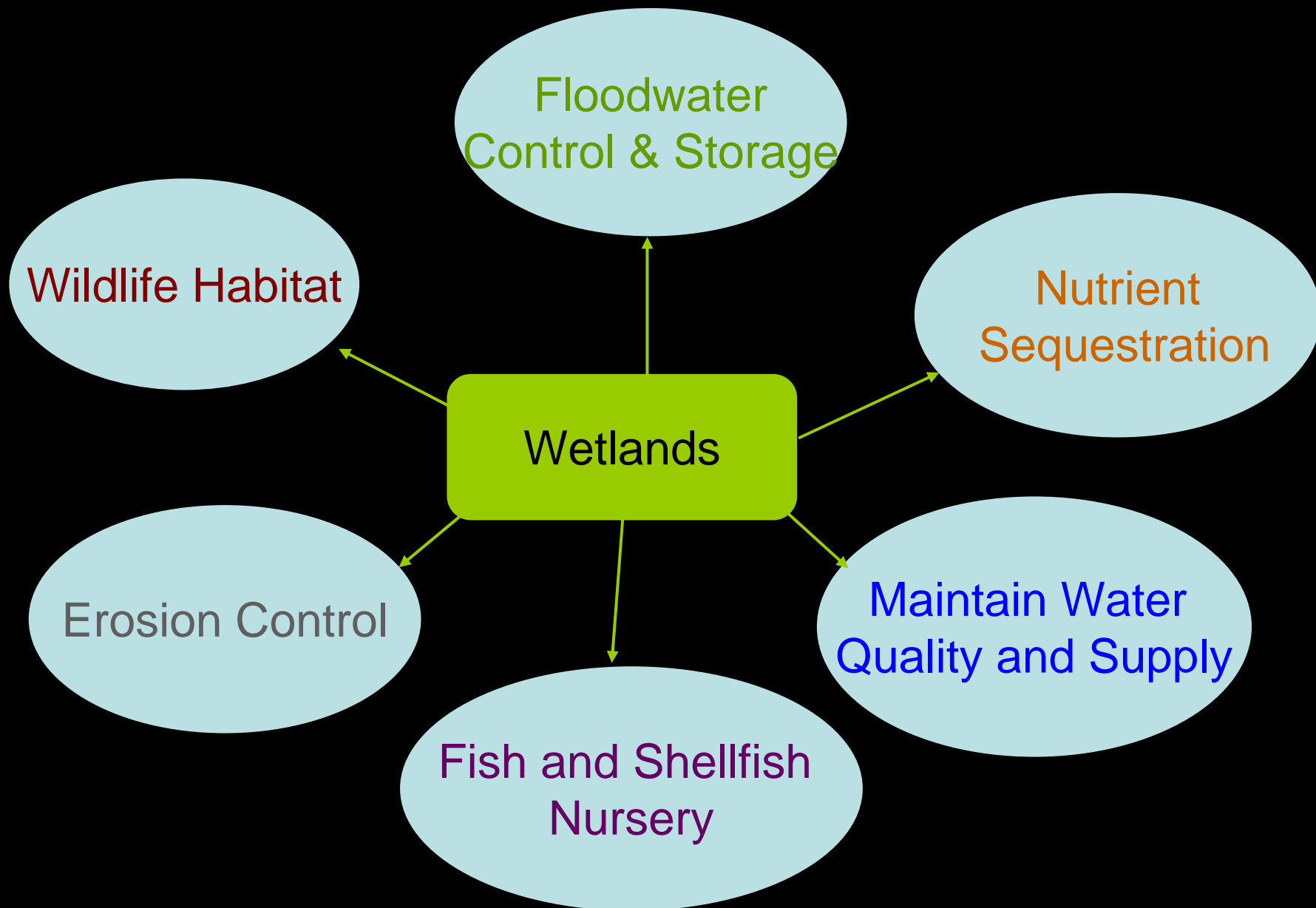






















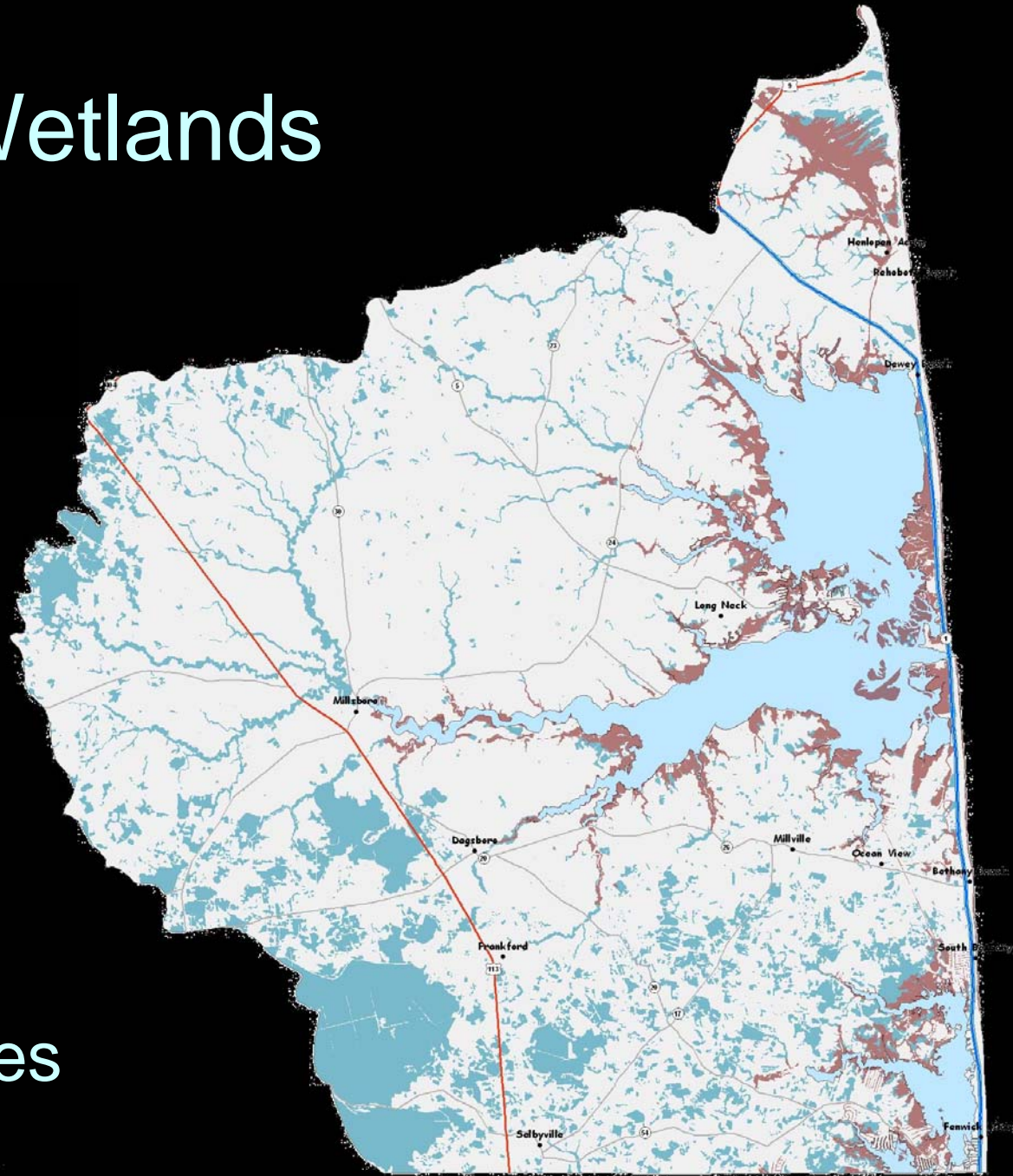




# Inland Bays Wetlands

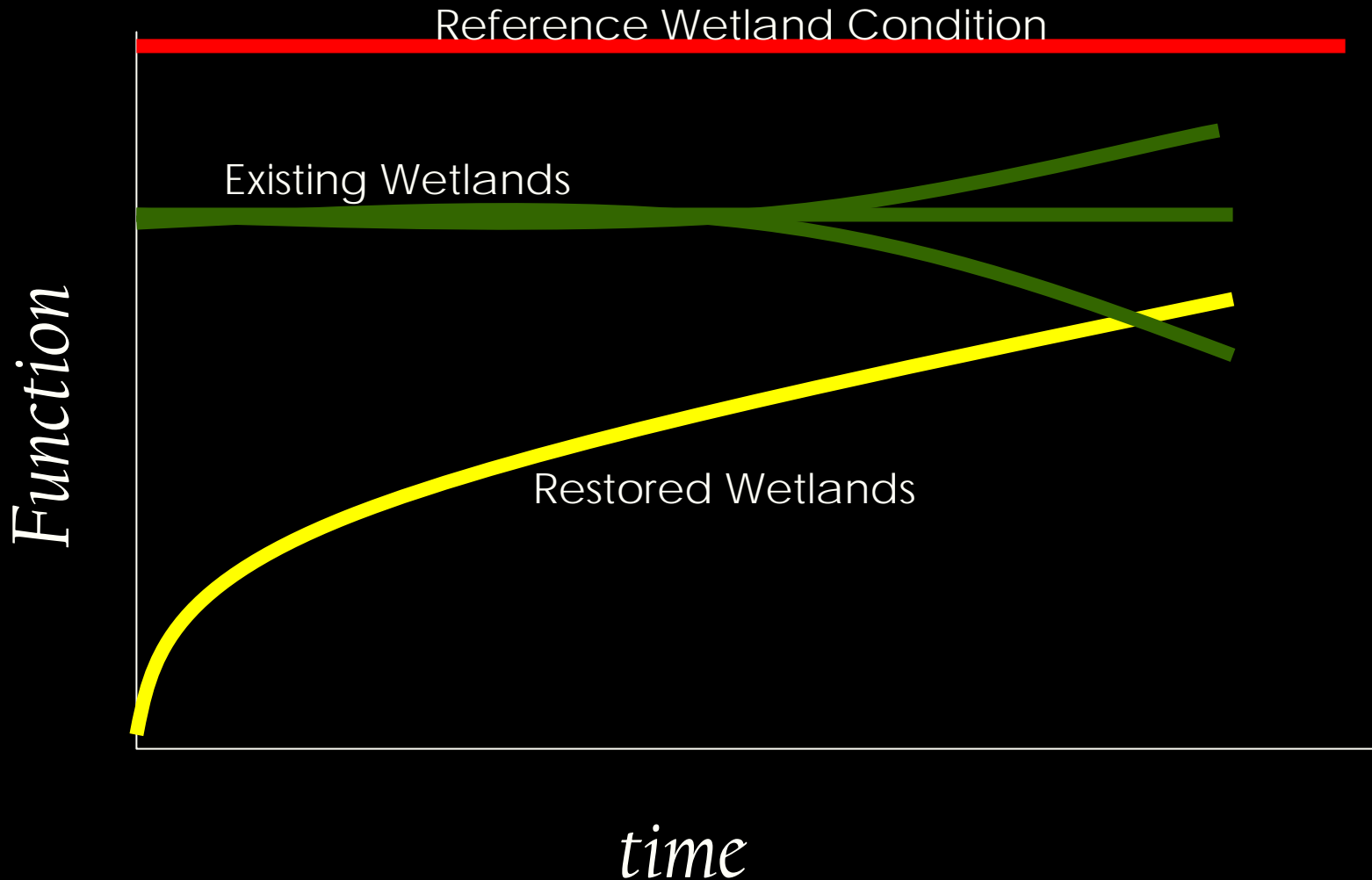
30,000 acres

Lost >45,000 acres





# Changes in Wetland Function Natural versus Restored





# Overview

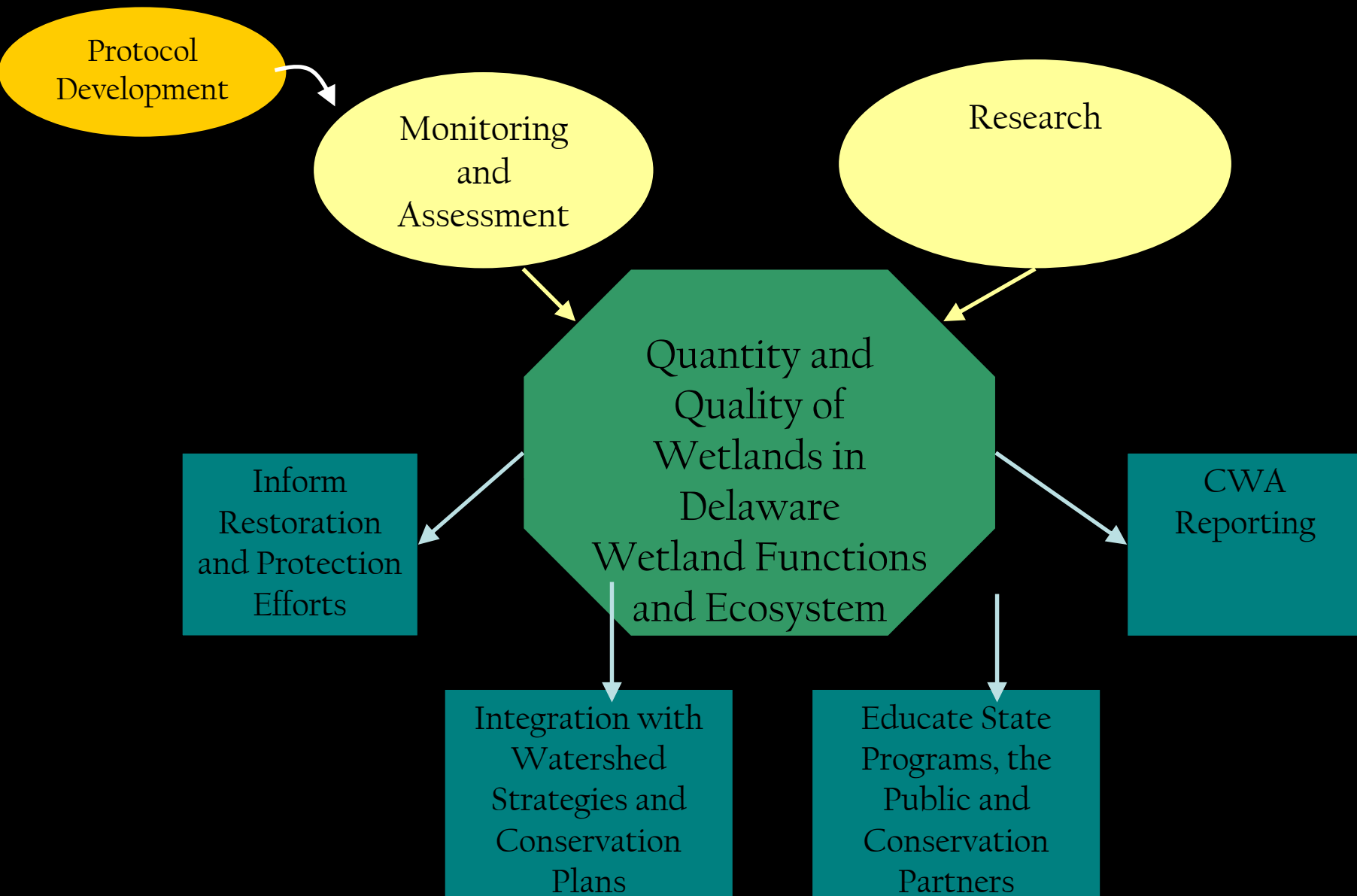
- Who we are and what we do
- Condition of nontidal wetlands
- Assessment of tidal wetlands
- How do we use this information to make a difference in the Inland Bays
- Impact of wetland dieback







# Delaware Wetland Monitoring Program







Develop scientifically valid  
Assessment methods



Assess the ambient  
condition of wetlands by  
watershed in Delaware  
and identify major  
stressors that are  
impacting wetlands





# Delaware Wetland Monitoring Program



Perform research to improve our understanding of wetland functions, the impact of stressors, and ecosystem services

Evaluate the performance of wetland restoration and other compensatory wetland mitigation in replacing wetland acreage and function

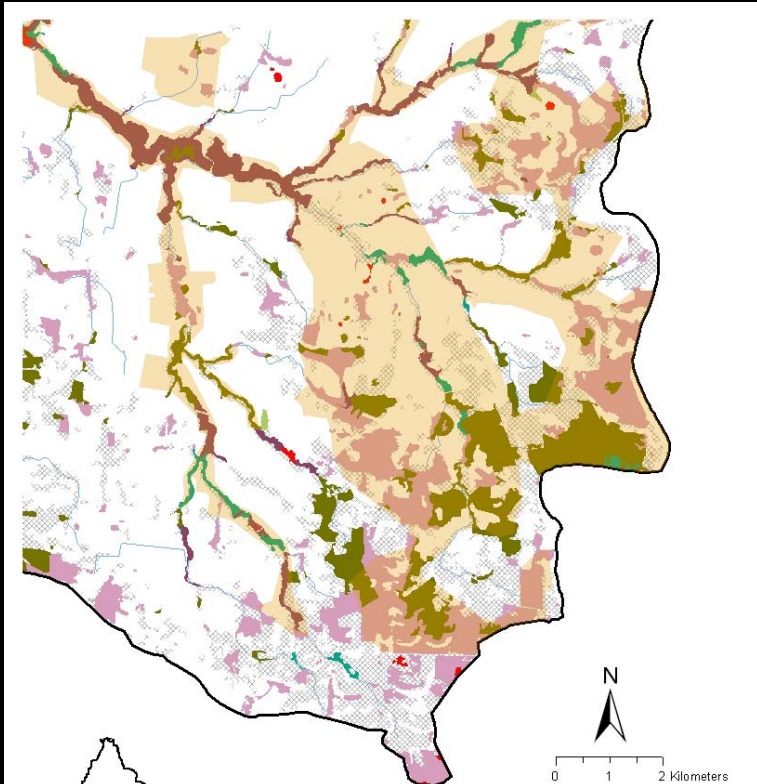






# Delaware Wetland Monitoring Program

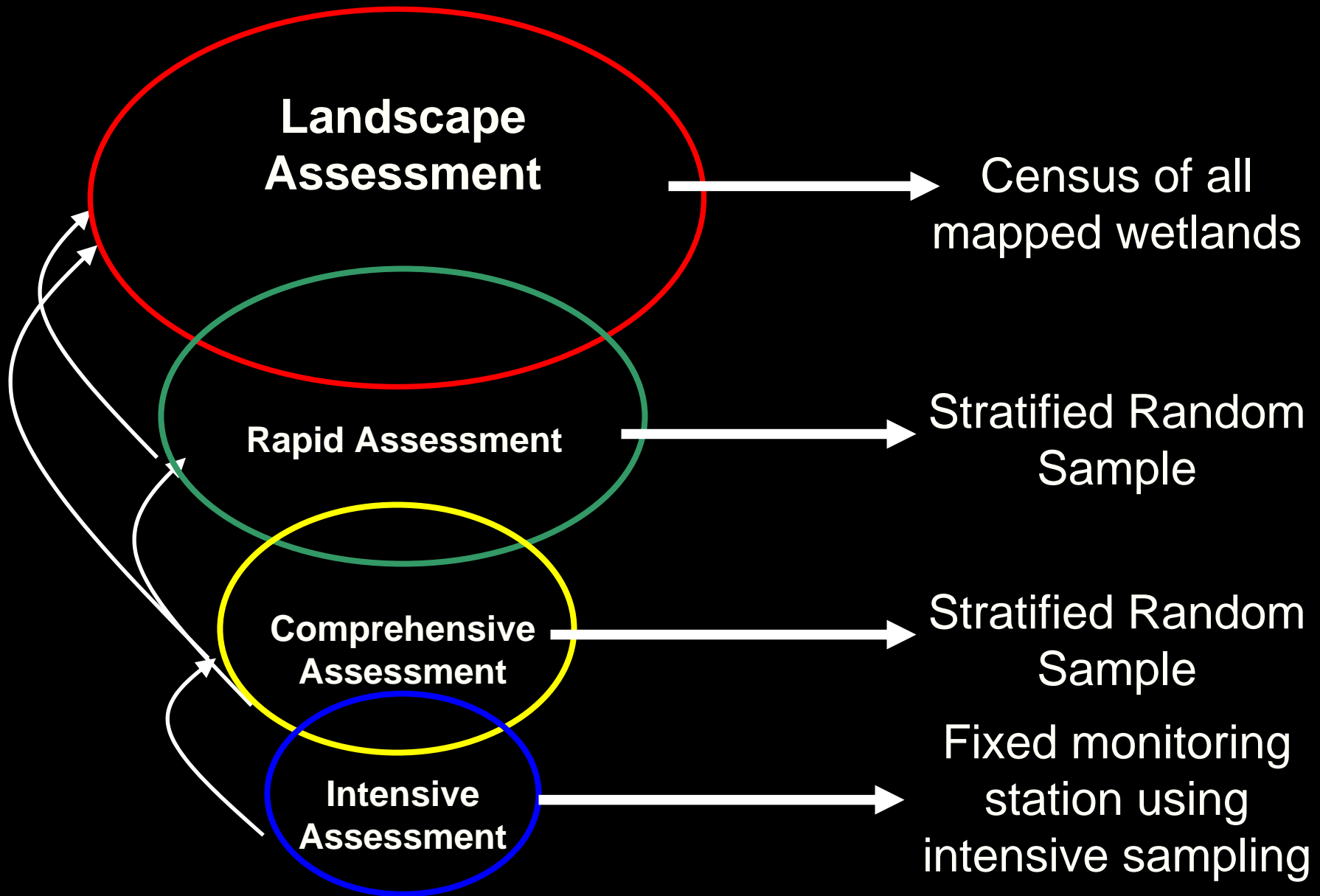
Educate State programs, conservation partners, and the general public to improve efforts to protect and restore wetlands



Integrate monitoring and assessment data into watershed restoration plans and other conservation strategies



# 4-tiered Approach





# Landscape Assessment

- Wetland Extent
- Wetland Buffer
- Remotely sensed plant community integrity
- Shoreline Condition





# Rapid Assessment

- Qualitative Assessment
- Indicator Checklist
  - Hydrology
  - Habitat/ Plant com.
  - buffer
- Calibrated to Comprehensive Assessment





# Comprehensive Assessment

- Reference-based models
- Plant Community Integrity (FQAI, Invasives)
- Vegetation Structure
- Hydrology
- Topography
- Buffer characteristics
- Estimates functions





# Intensive Assessment

- Sediment budgets
- Nutrient cycling
- Carbon storage
- Long-term community changes
- Accretion/ subsidence





# Inland Bays Wetland Study 2005-2008







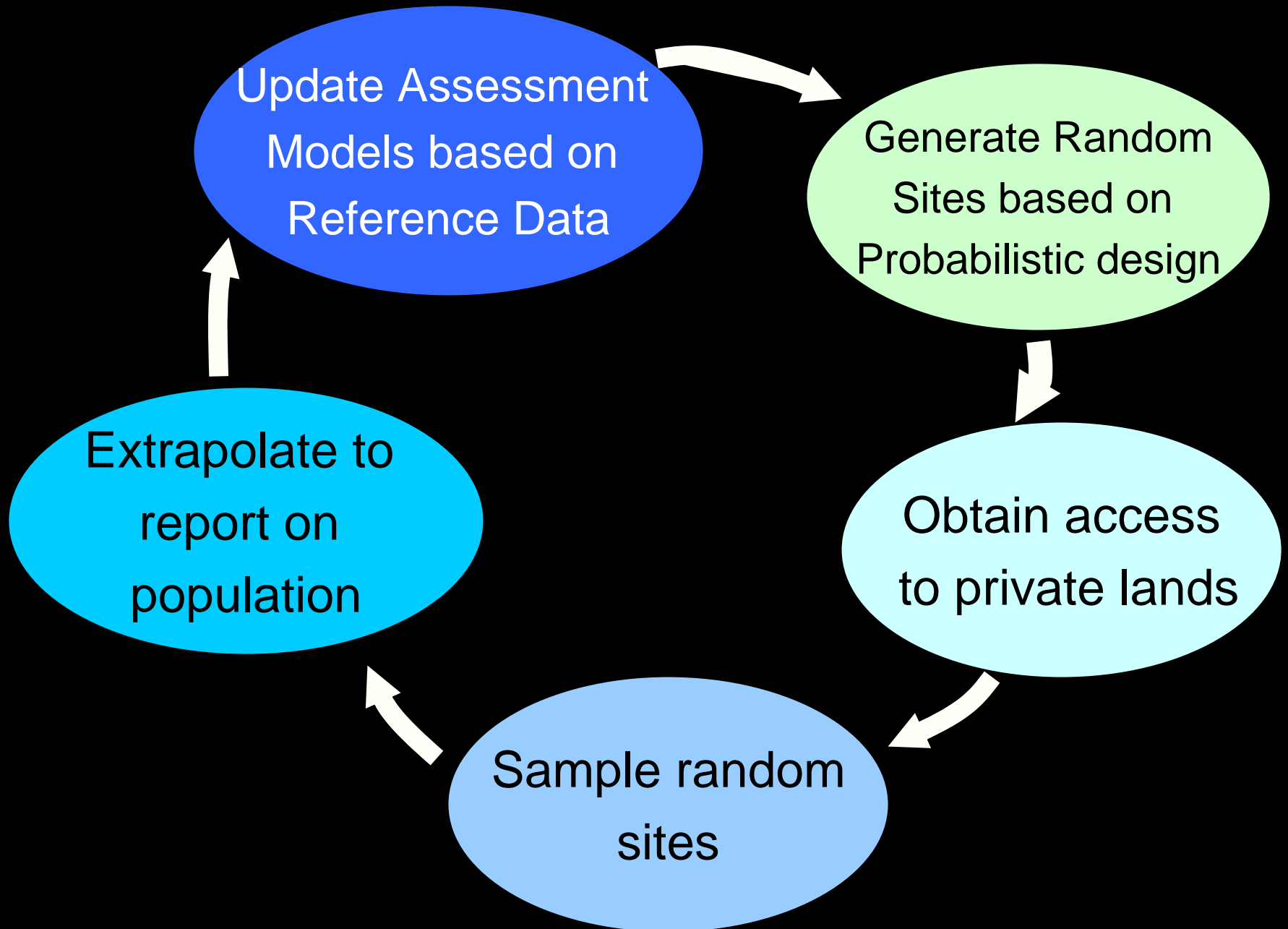
2005/ 2006 Sampled  
nontidal reference  
Sites

2006/2007 Assessed  
nontidal wetlands,  
Sampled tidal  
reference sites

2008 Assess tidal  
wetlands







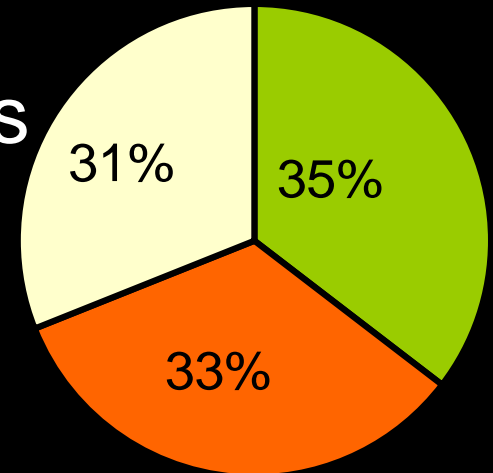




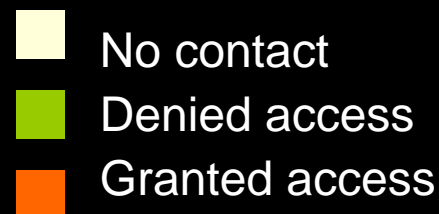
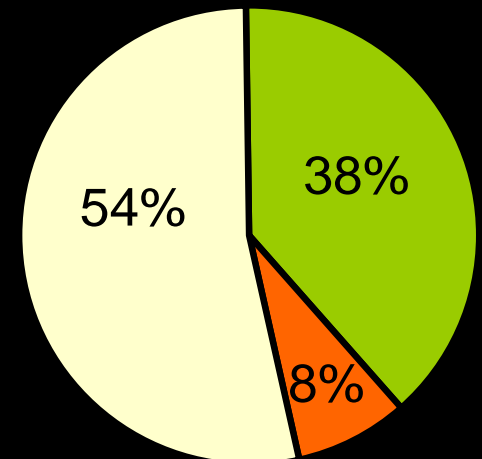
Attempted to sample 266  
random sites

92% on private lands

Nontidal Flats



Nontidal  
Riverine





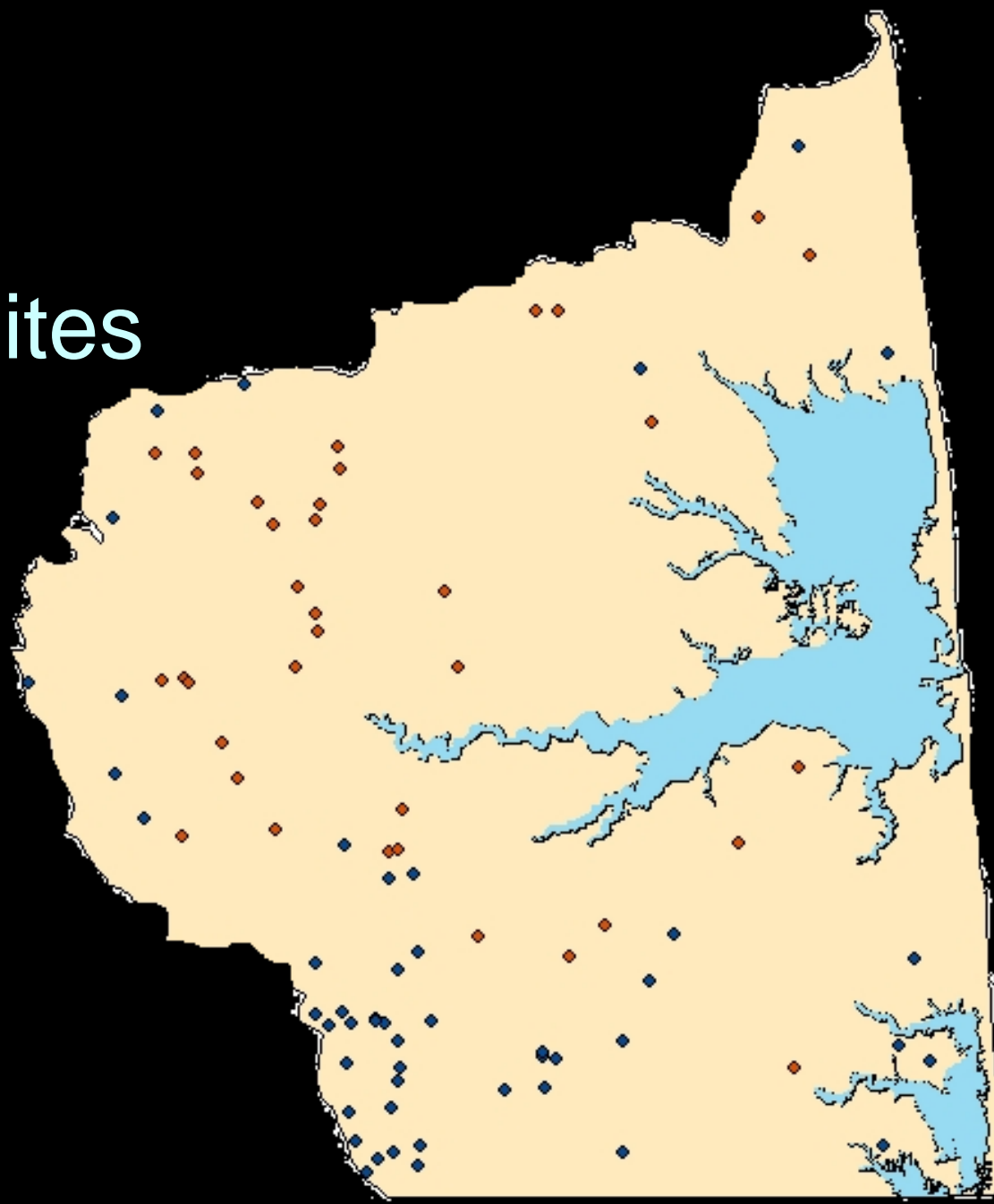
Nontidal

Assessment Sites

49 Flats

50 Riverine

6 Depressions







## Rapid Assessment

- Habitat and Plant Community
- Hydrology
- Buffer



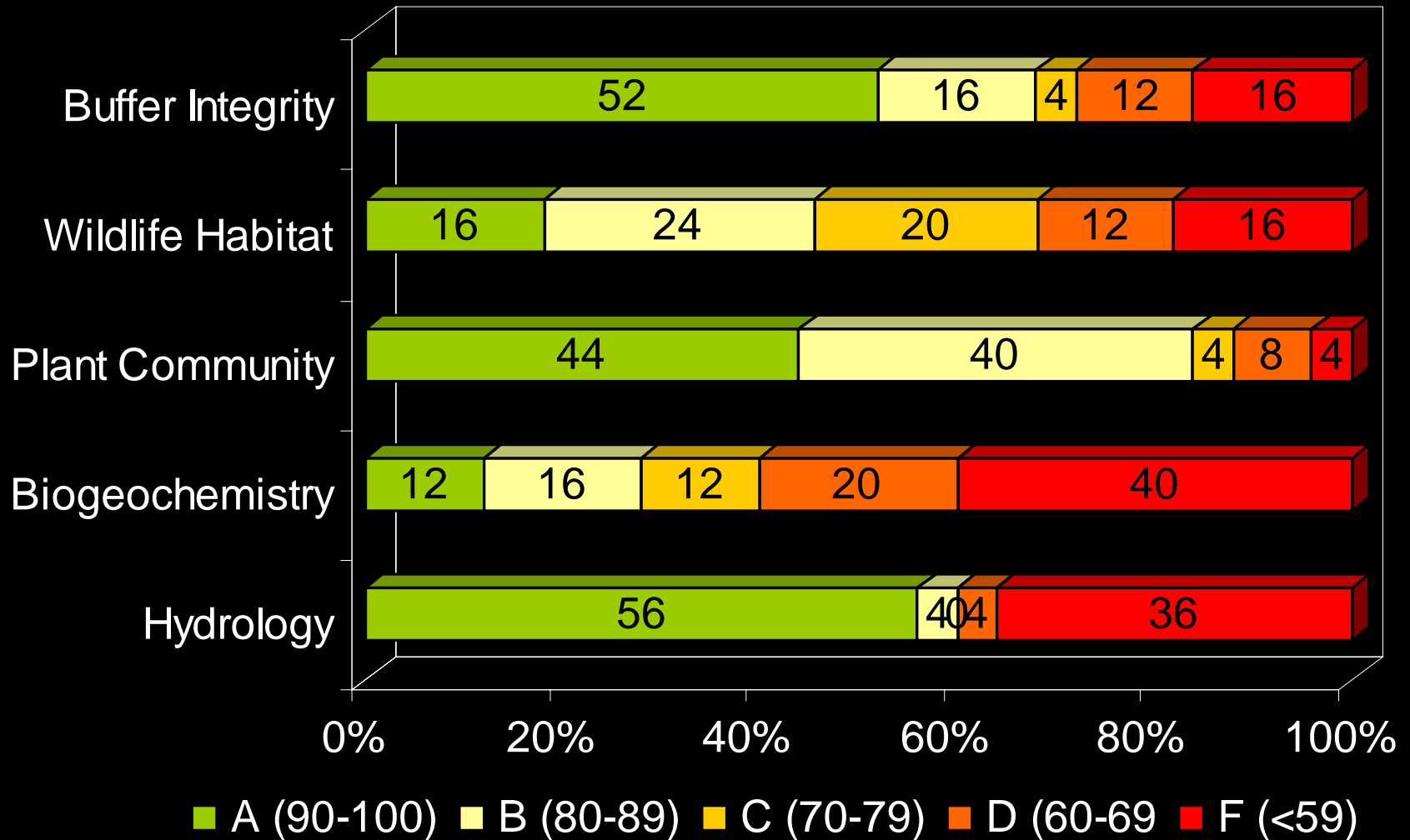


## *Function Wildlife Habitat*

$$(V_{\text{disturb}} + ((V_{\text{tba}} + V_{\text{tden}})/2) + V_{\text{shrub}} + V_{\text{snag}})/4$$

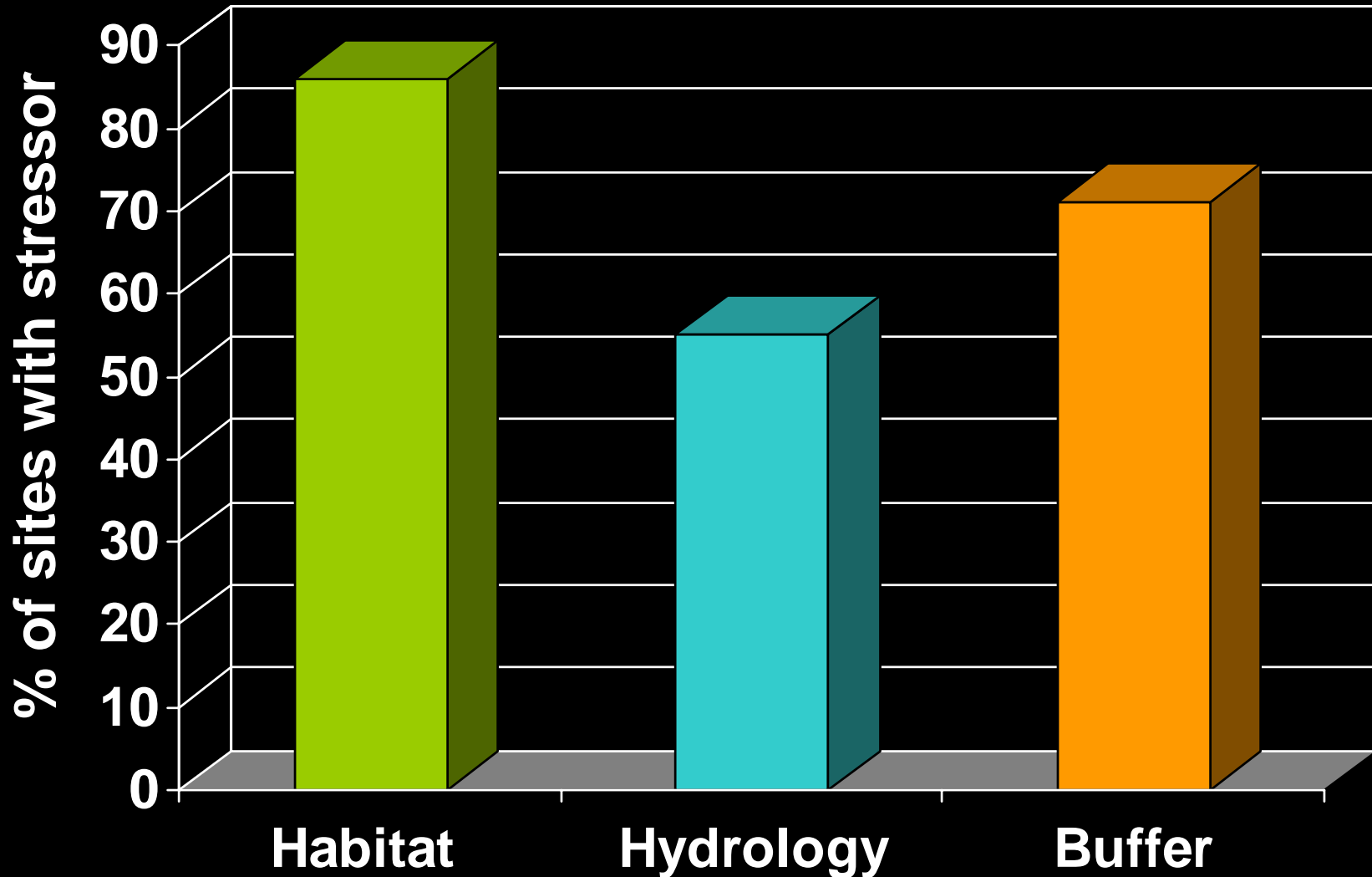


# Flat Functions





92% of Flat Wetlands had at least 1 stressor present







**51% of flats has forestry activity within 50 years**

**6% converted to pine plantation**





43% of flats has filling or excavation

33% of flats had ditching

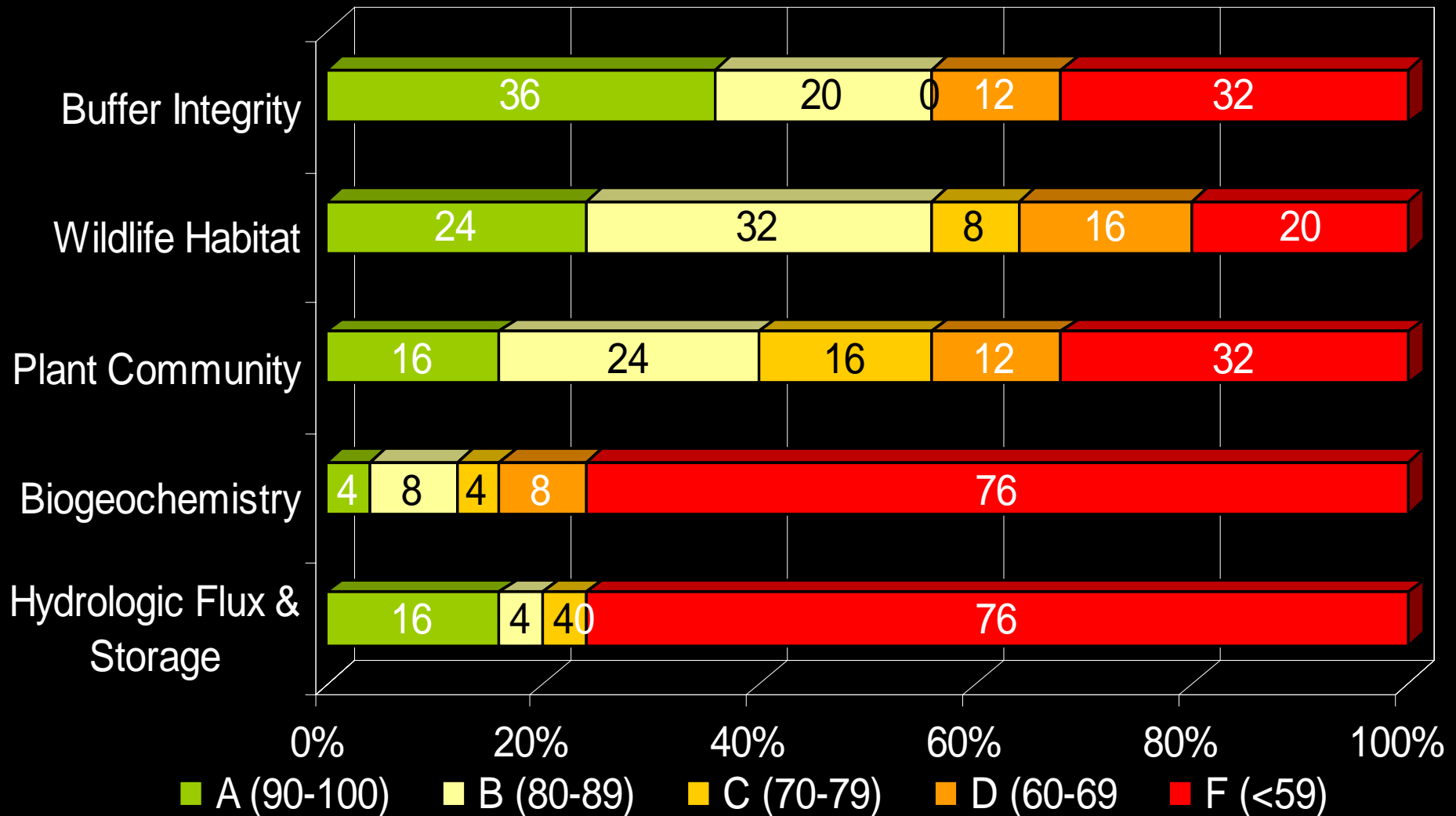




37% of flats had a road within 100m

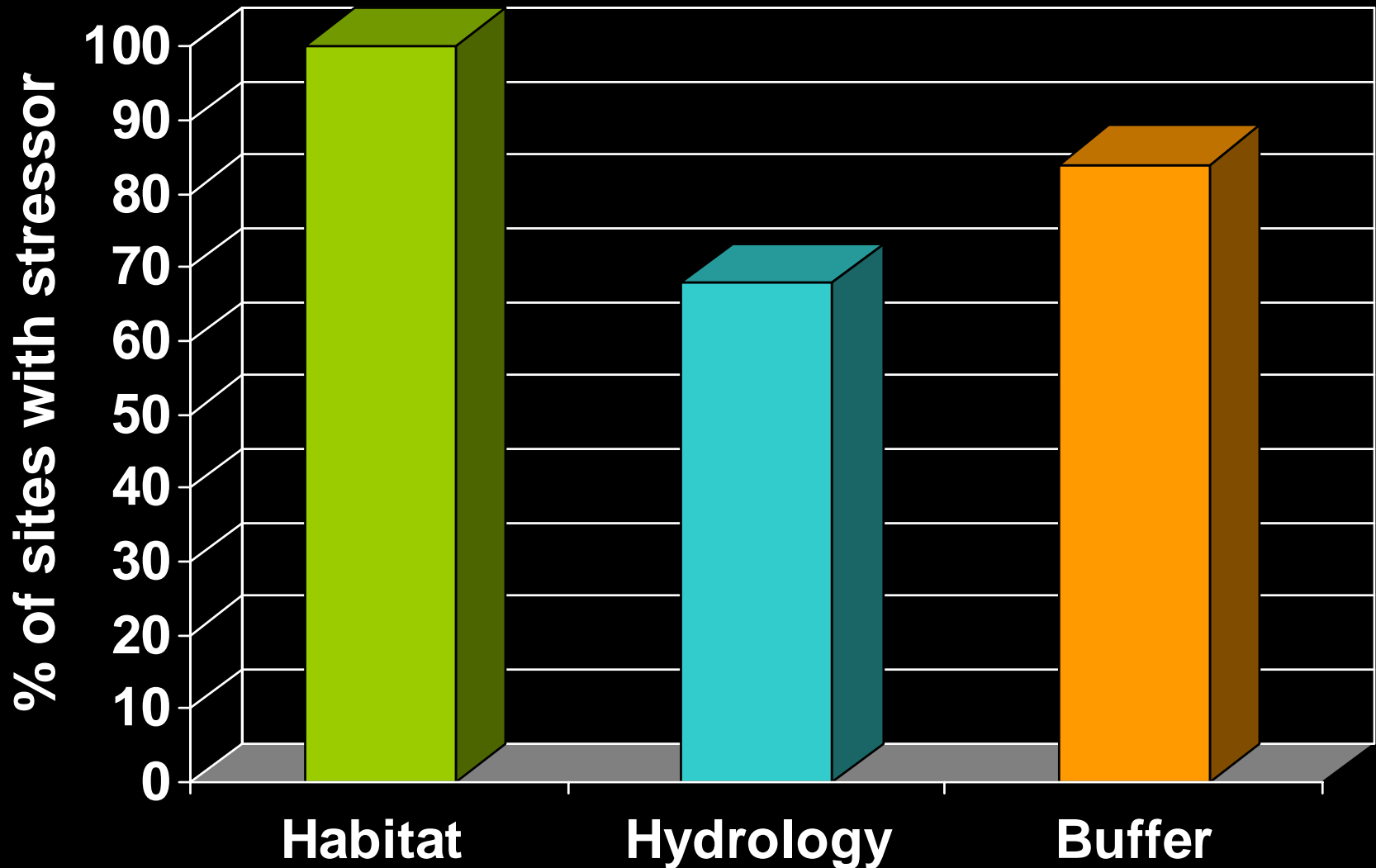


# Riverine Functions





All Riverine Wetlands had at least 1 stressor present







72% of Riverine sites had Garbage or Isolated Dumping





64% of Riverine Sites had invasive species





44% of Riverine sites were channelized





48% of Riverine sites have a road within 100m



# Summary Nontidal Wetland Condition

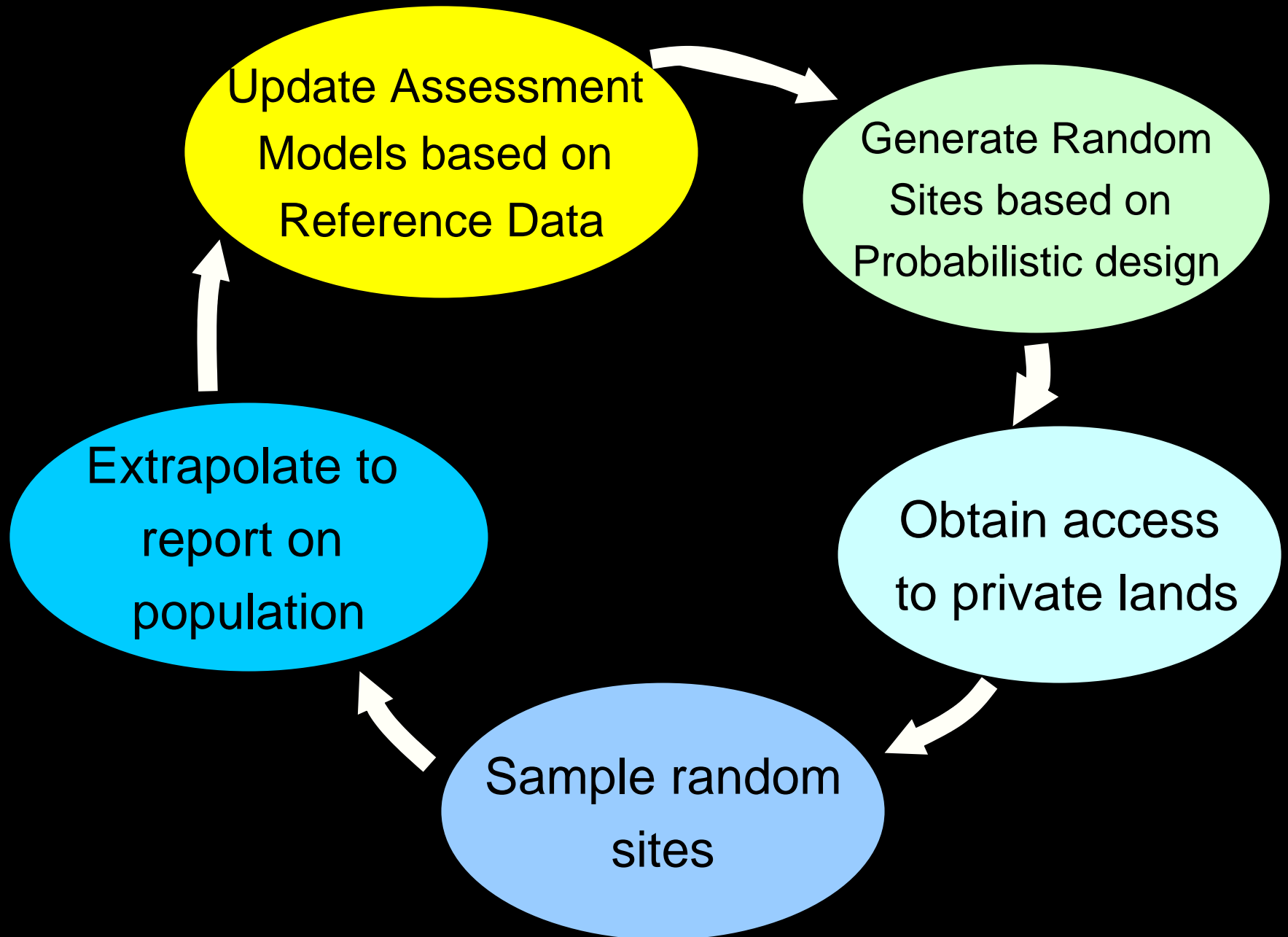
- The majority of nontidal wetlands in the Inland Bays watershed have been degraded from reference condition
- The most impacted functions for flats are Wildlife Habitat and Plant Community
- The most impacted functions for Riverine wetlands are Hydrology and Biogeochemistry
- The majority of stressors can be removed to improve wetland condition



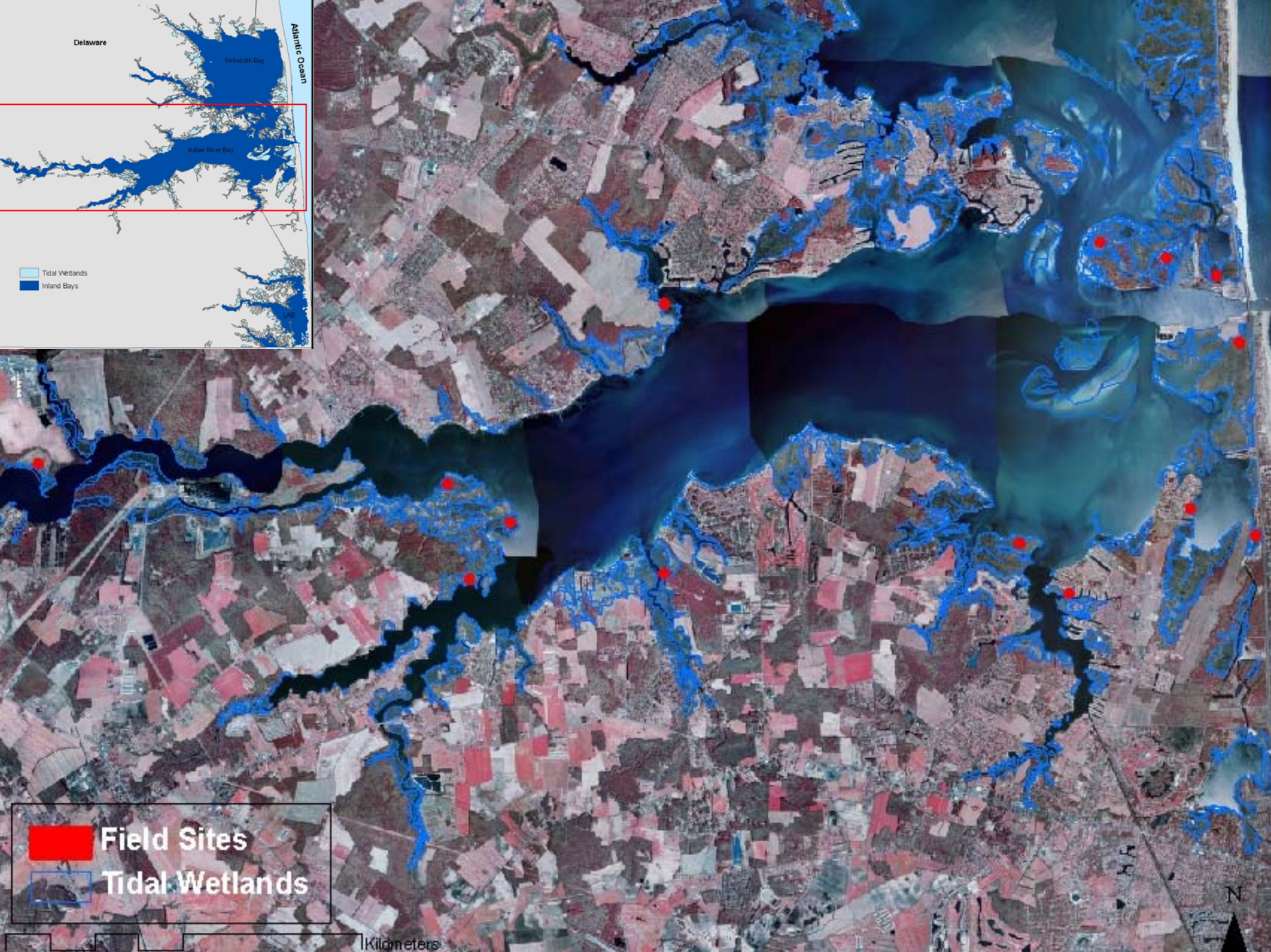
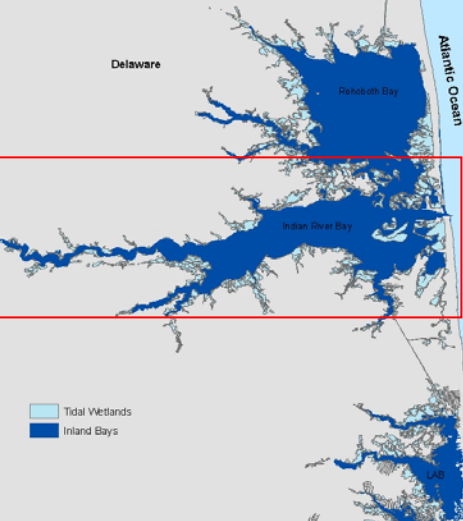
# Inland Bays Tidal Wetland Monitoring and Assessment











Field Sites



Tidal Wetlands

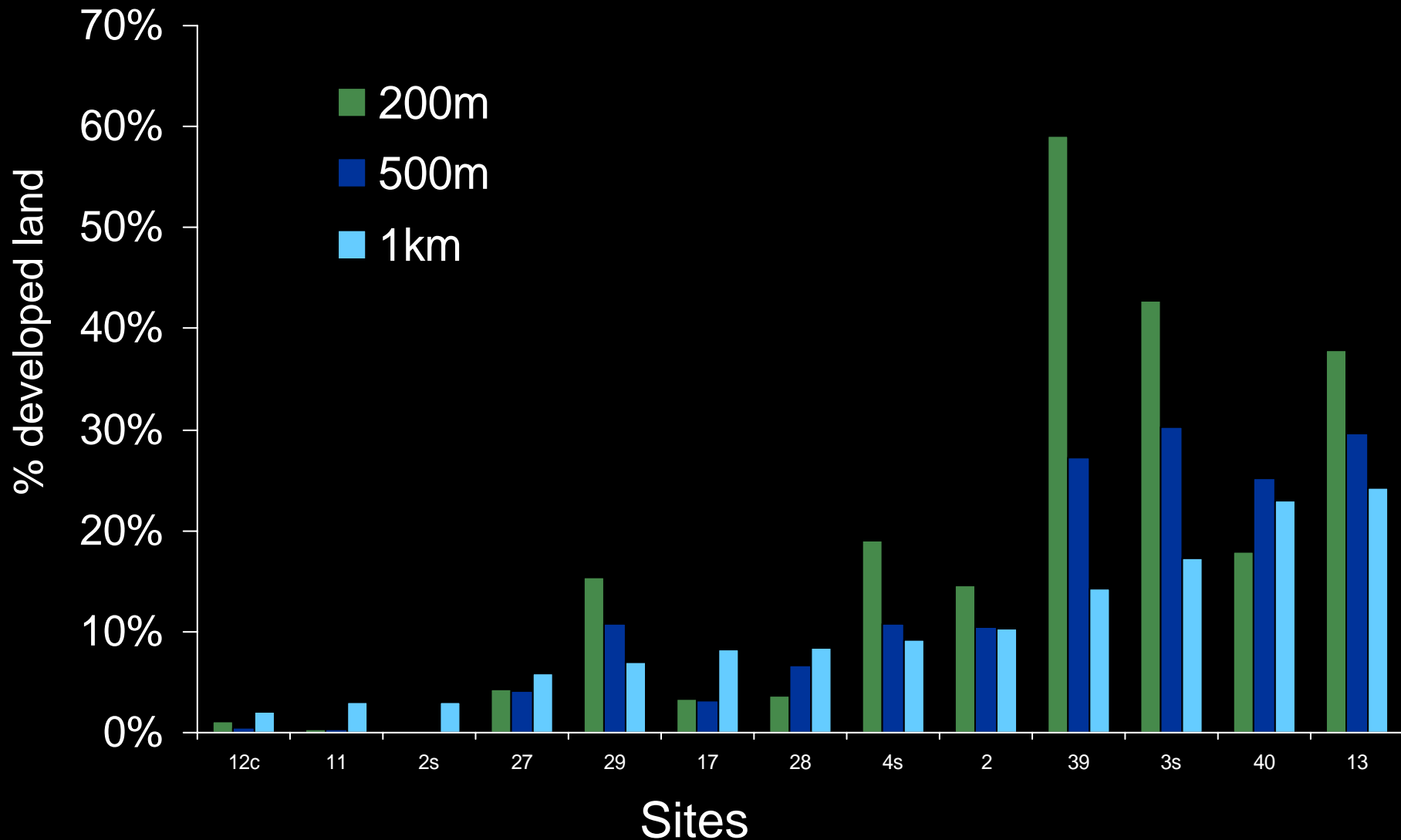
1 Kilometers

N



# Percent Developed Land 2005

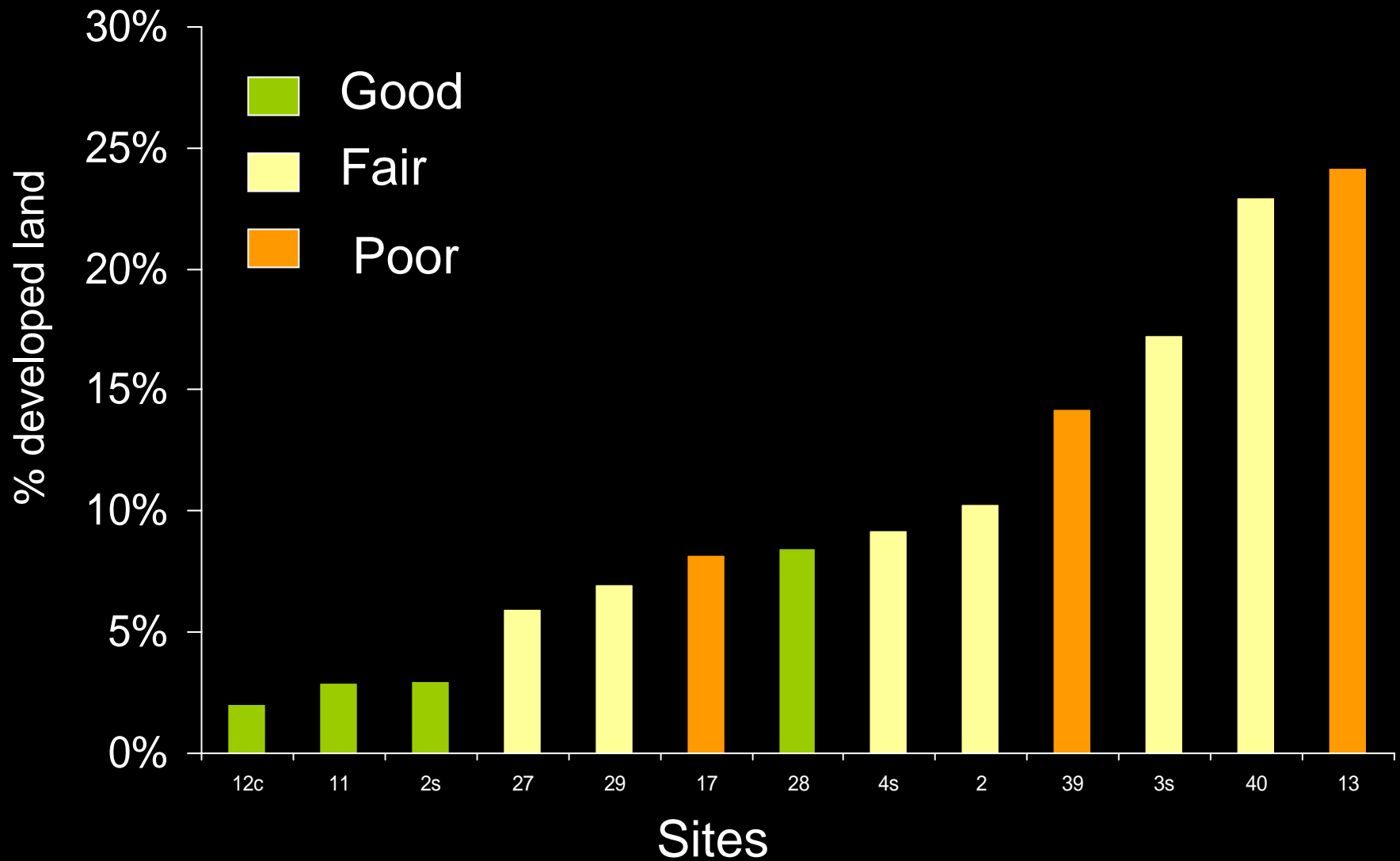
From edge of wetland





# Percent Developed Land 2005

## within 1km by Qualitative Ranking





# Vegetation

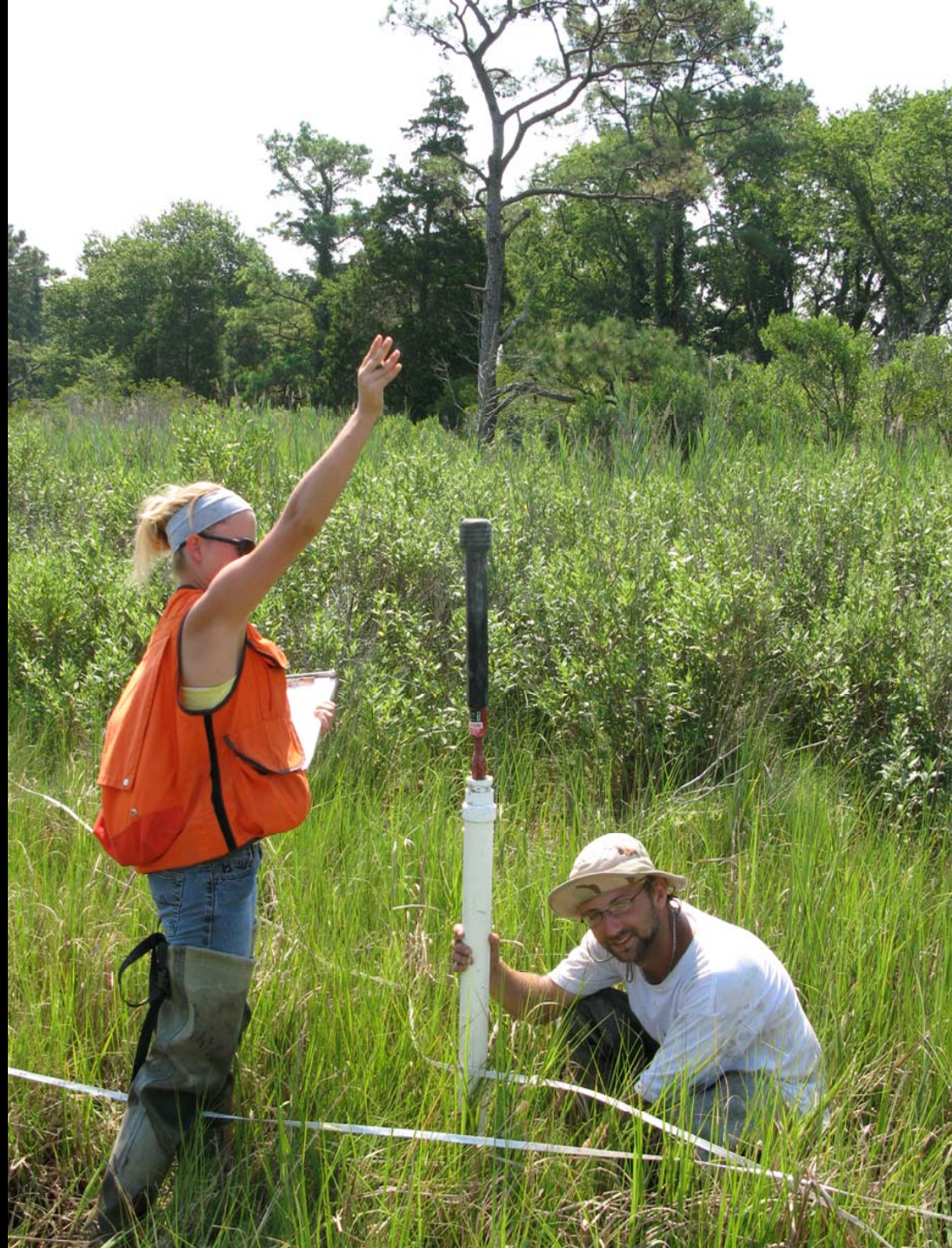
- Stem counts
- Percent Cover
- Obstruction
- Stem height





# Soils

- Biomass
- Plant fragments
- Soil resistance
- Soil properties





# 2008 Field Season

- Assessing 50 random sites in Inland Bays watershed





# How can You Make a Difference to Wetlands in the Inland Bays?

- Advocate for protecting remaining wetlands
- Encourage compensate land use activities with wetland enhancement and restoration
- Focus restoration on hydrology for riverine wetlands and habitat for flat wetlands



# How can You Make a Difference to Wetlands in the Inland Bays?

- Control invasive species
- Educate decision makers about the importance of wetlands