

Goal 1: Protect the Way of Life in Hyde County

Monitoring & Research

- Documentation of septic system failure
 - Organization: Hyde County Health Department
- Land cover/use change analysis
 - Organization: USGS
- CropScape assessment
 - Organization: USDA NASS
- Analysis of soil samples
 - Organization: NRCS, NC Cooperative Extension, Crop Management Companies
- Waterfowl population surveys
 - Organization: USFWS and NCWRC
- Fish stock assessments
 - Organization: NCWRC

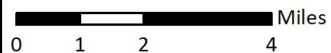
Hot Spot Flooding Regions Surrounding Lake Mattamuskeet



Hot Spot Flooding Regions surrounding Lake Mattamuskeet were broken down into two categories, Residential and Farming. These regions exist in lower elevation or depressional regions surrounding the lake.

Residential areas represent portions of those communities surrounding Lake Mattamuskeet which experience regular flooding during storms, strong winds, or severe weather events.

Farming areas represent regions of farmland which regularly experience flooding during storms or severe weather events.

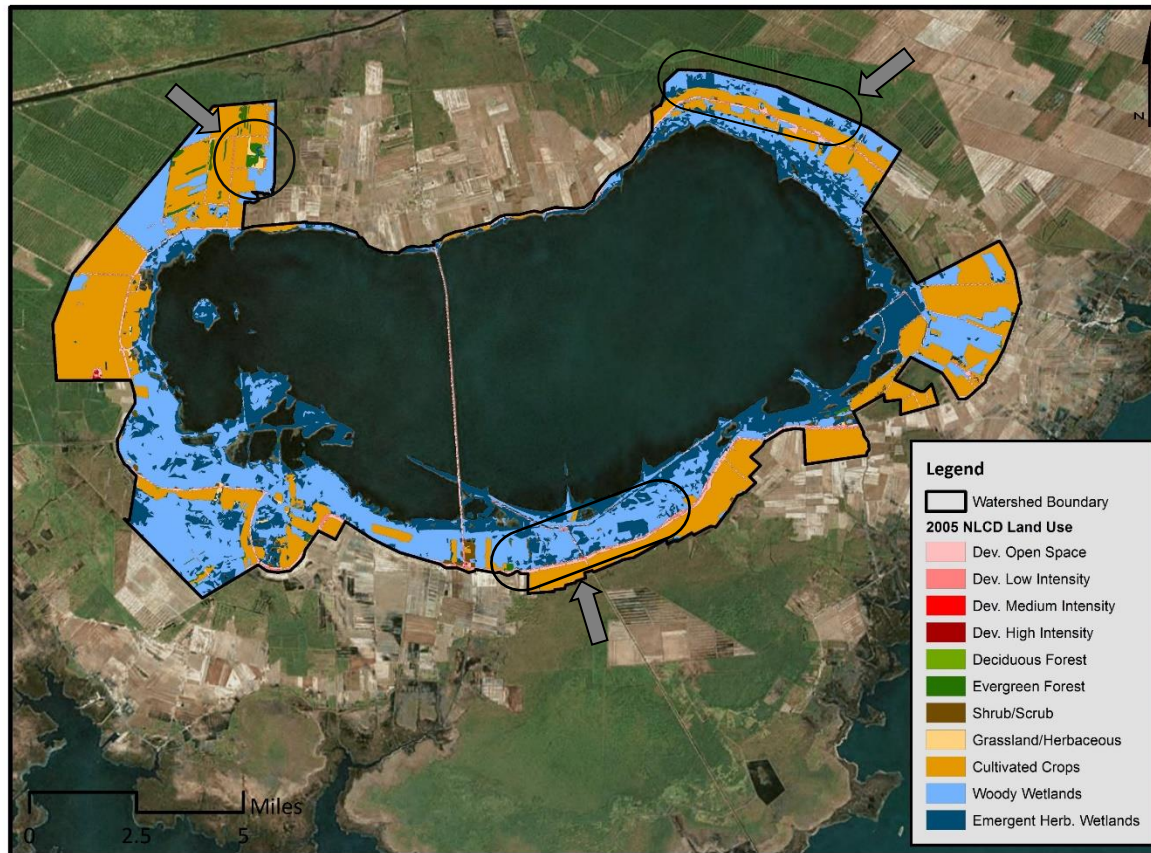


Tracking Changes in Land Use

Lake Mattamuskeet Watershed Land Use: 2001-2006-2011

| NLCD Land Use Class | 2001 (Ac) | | 2006 (Ac) | | 2011 (Ac) |
|---------------------|-----------|---|-----------|---|-----------|
| Developed | 1,569 | | 1,569 | | 1,569.8 |
| Forest | 279.8 | ↓ | 246.4 | | 250.5 |
| Shrubland | 222.2 | | 222.2 | ↓ | 195.8 |
| Herbaceous | 34.2 | ↑ | 67.6 | ↑ | 89.1 |
| Planted/Cultivated | 10,110.0 | | 10,110.8 | | 10,106.1 |
| Wetlands | 17,267 | ↑ | 17,330 | ↓ | 15,010 |

Lake Mattamuskeet Watershed Land Use: 2011



Top Three Land Uses:

1. Woody Wetlands
2. Cultivated Crops
3. Developed Open Space

Summary: Minor changes in land use over the last 15 years. No significant changes in developed land or agricultural lands

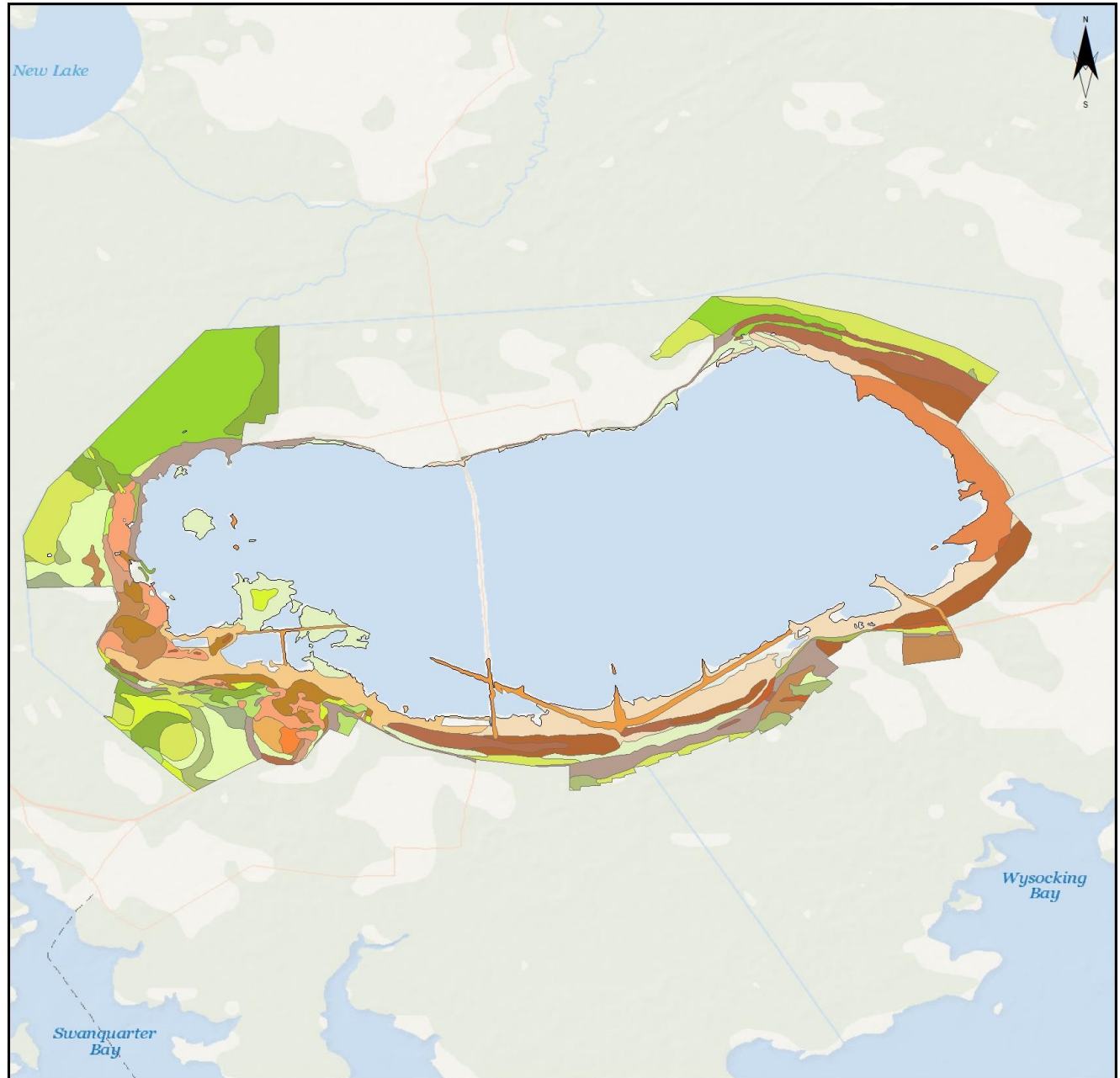
Next Step: Analysis 2016 data set when available; Identify any data for pre-2001 land use.

Composition of Soils within the Lake Mattamuskeet Watershed

- Brown Shades- Mineral
- Green Shades- Organic

The map to the right represents a classification of the soil series present within the Lake Mattamuskeet Watershed. Soil series were classified as either mineral or organic dependent upon their parent material and percentage of mineral or organic matter content.

0 1 2 4 Miles



CropScape Assessment

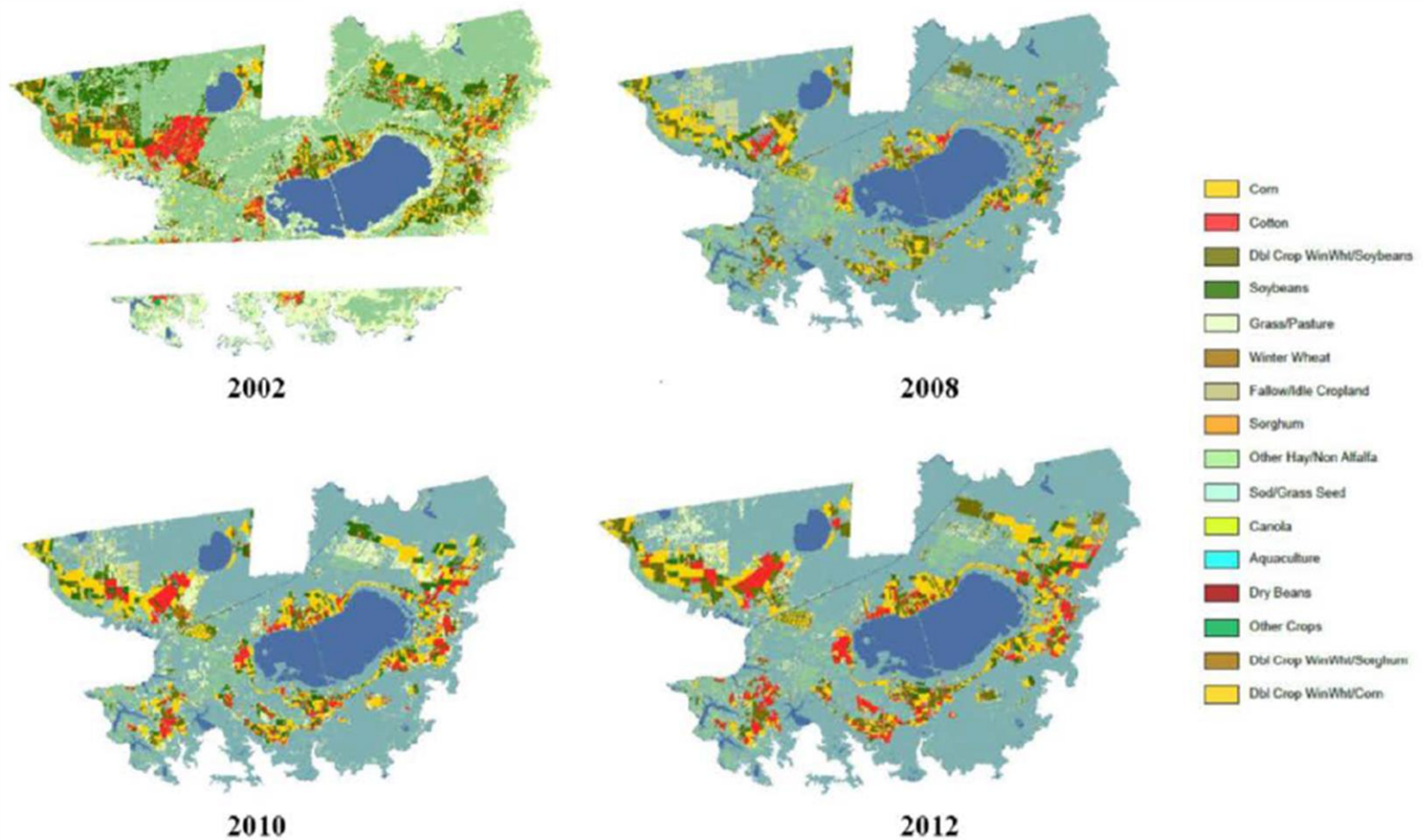
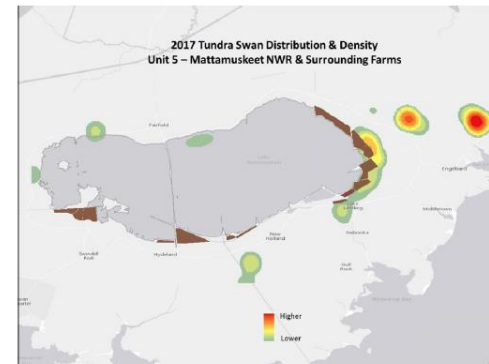
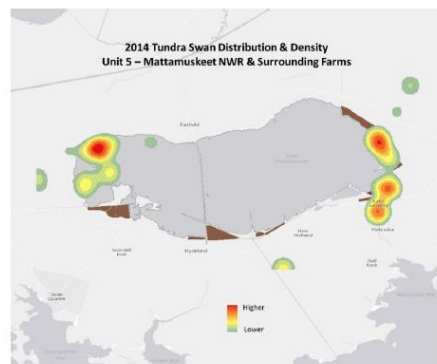
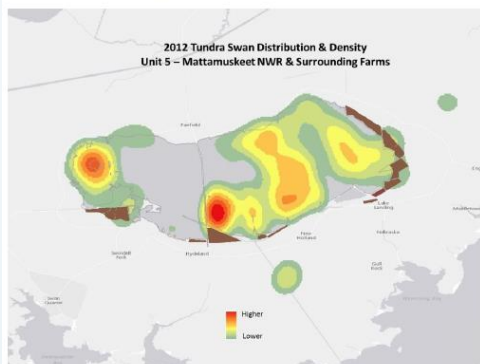
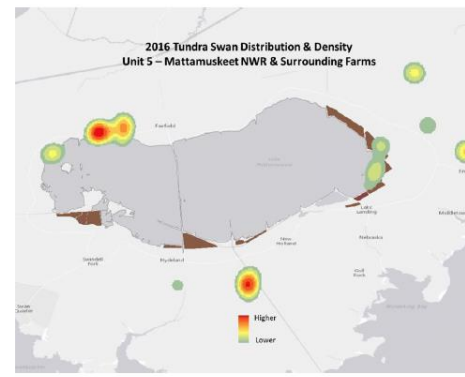
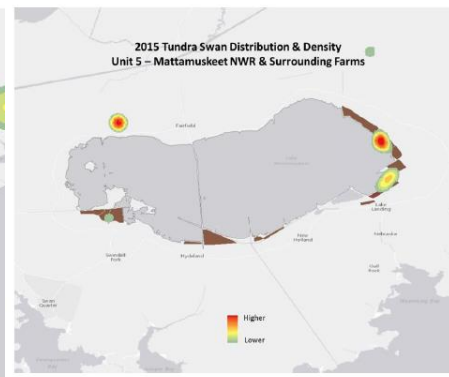
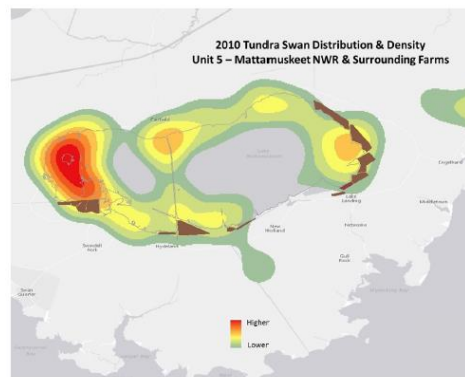
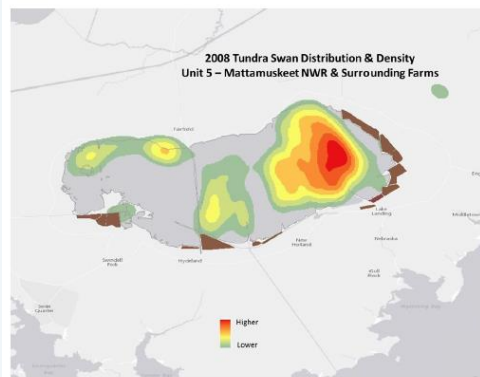


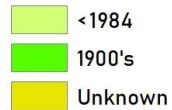
Figure from Powell et al. 2017

Annual Mid-Winter Waterfowl Survey



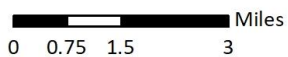
Lake Mattamuskeet Watershed Impoundment Development

Year Developed



Historic aerial imagery and google earth timescales were utilized to track the development of waterfowl impoundments within Hyde County over the years.

Most impoundments were developed during the late '80s and early to mid '90s during the height of the CPR program which promoted the conversion of low producing cropland into waterfowl impoundments.



Hyde County Shellfish Growing Areas

..... Lake M. Canals

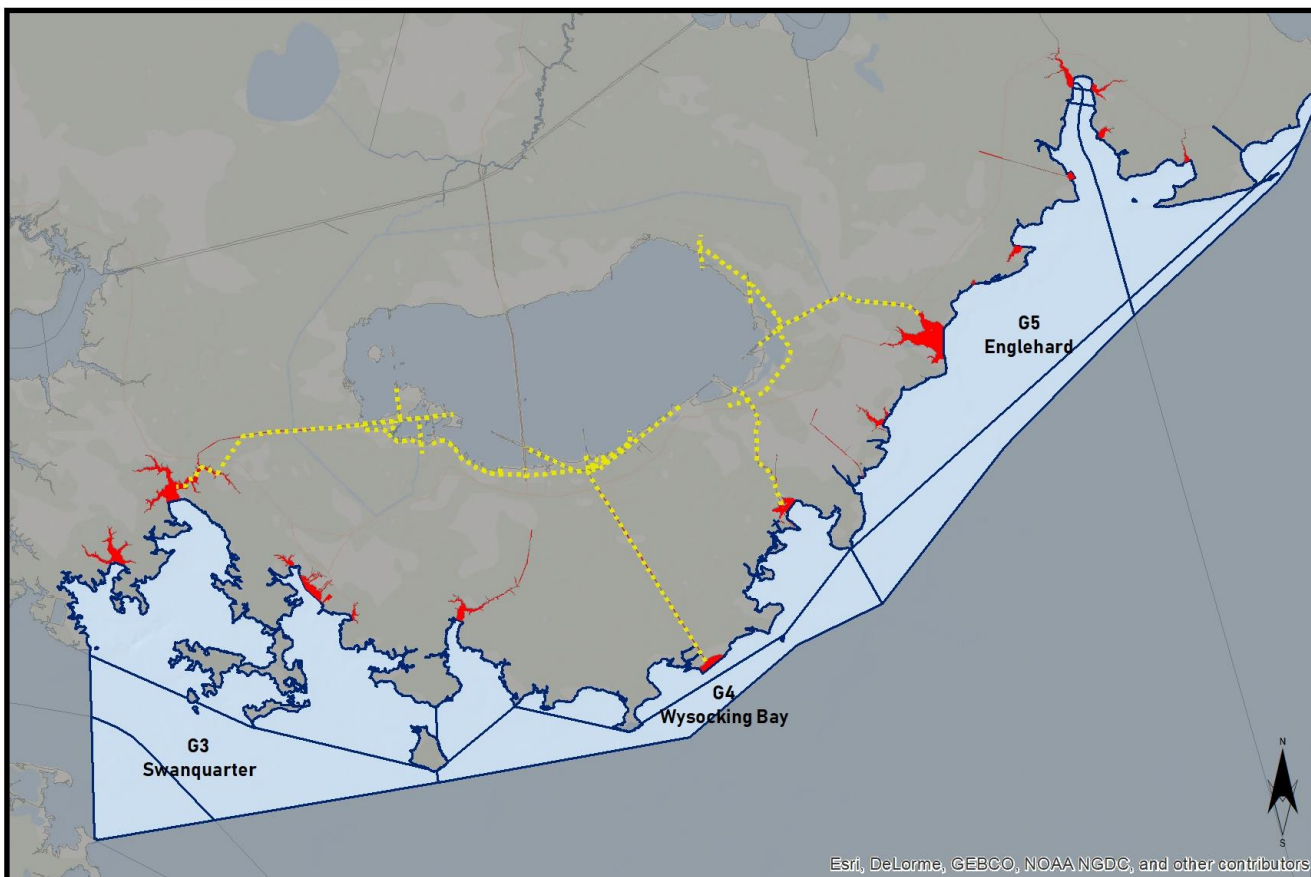
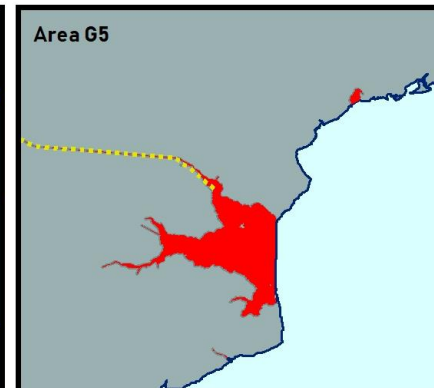
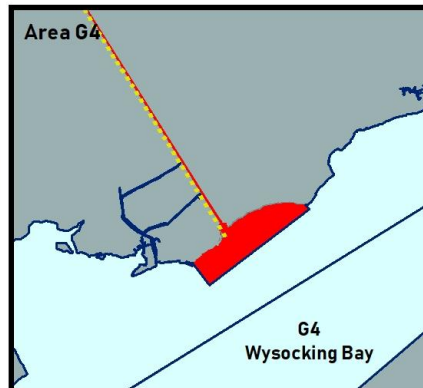
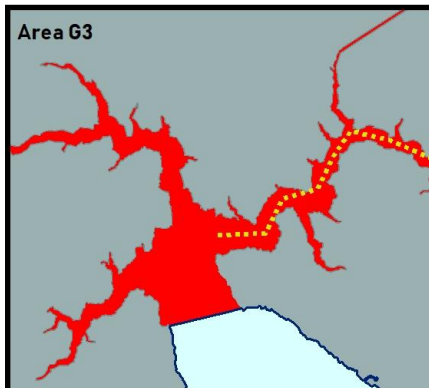
Shellfish Growing Areas

- CSHA - Approved
- CSHA - Prohibited
- Other Areas

Shellfish Growing Areas of interest surrounding Lake Mattamuskeet include G3, G4 and G5. These regions were designated in Feb. 2004 and each region includes portions which are classified as CSHA Prohibited. These regions are not designated for shellfishing under any circumstances.

The inset maps display the portion of each growing area where a canal leading from the lake meets the ocean.

0 2 4 8 Miles



Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

Goal 1: Protect the Way of Life in Hyde County

Management Actions to Consider

- Institute active lake level management
- Upgrade/repair septic systems or connect to centralized sewer
- Preserve the agricultural industry
 - Continue to follow nutrient management plans or alter based on recommendations
 - Continue to follow or alter herbicide/pesticide application guidelines based on recommendations
 - Practice no till or strip till where appropriate
 - Preserve space for growth of filter strips along edges of drainage ditches
 - Construct sediment basins/settling ponds
 - Alter water management of croplands (i.e. pump automation)
 - Perform maintenance dredging on drainage canals and ditches
 - Consider converting to organic farming practices

Goal 1: Protect the Way of Life in Hyde County

Management Actions to Consider

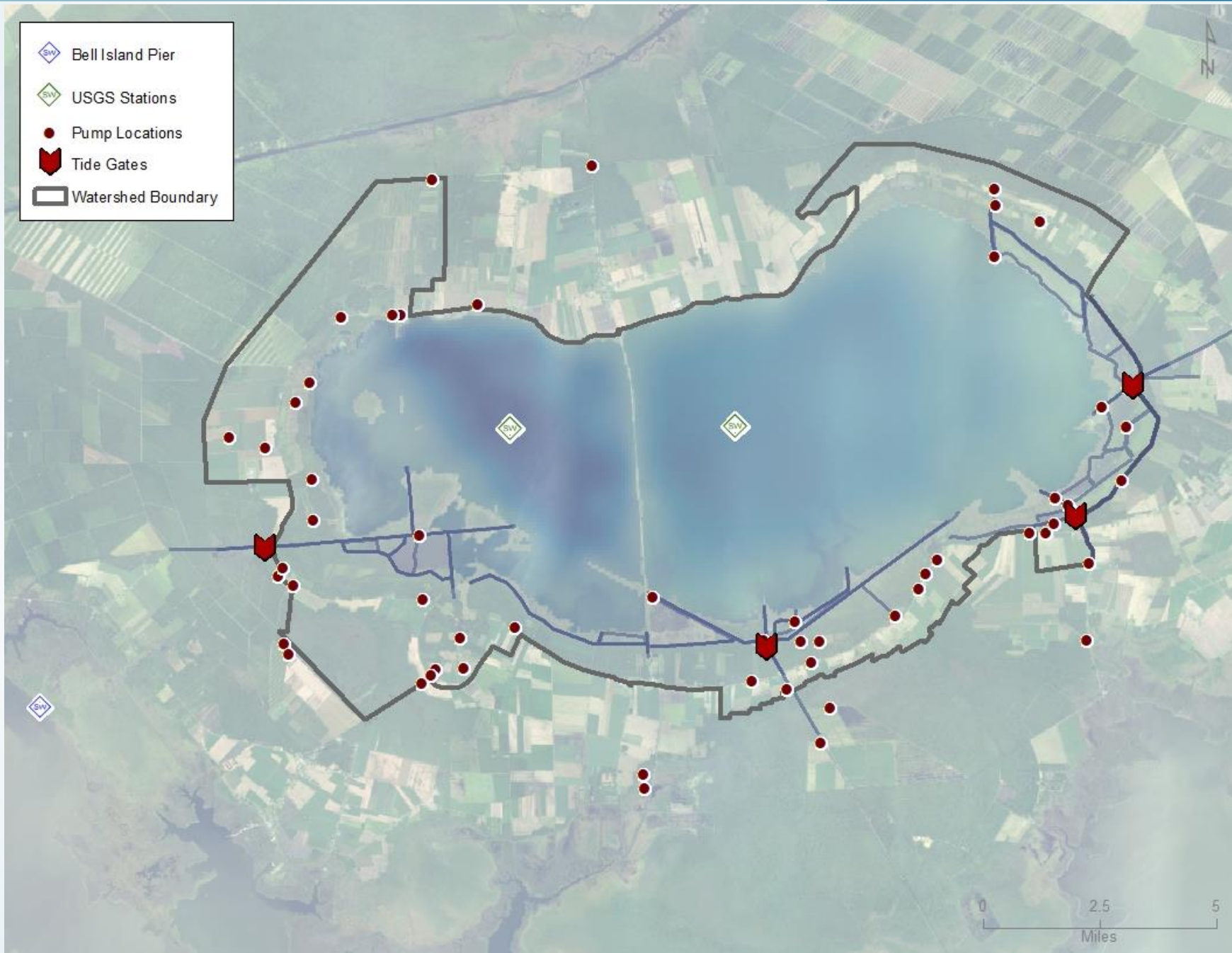
- Preserve waterfowl hunting heritage
 - Alter impoundment water management (i.e. stage drawdowns, pump automation)
 - Preserve space for growth of filter strips along edges
 - Construct sediment basins/ settling ponds
 - Convert impoundments from corn feedstock to MSM units
- Preserve recreational fishing heritage
 - Review and update fishing and crabbing regulations as necessary
 - Manage tide gates for anadromous/ catadromous fish and larval blue crab passage
 - Stock fish/ zooplankton

Goal 2: Active Management of Lake Water Level

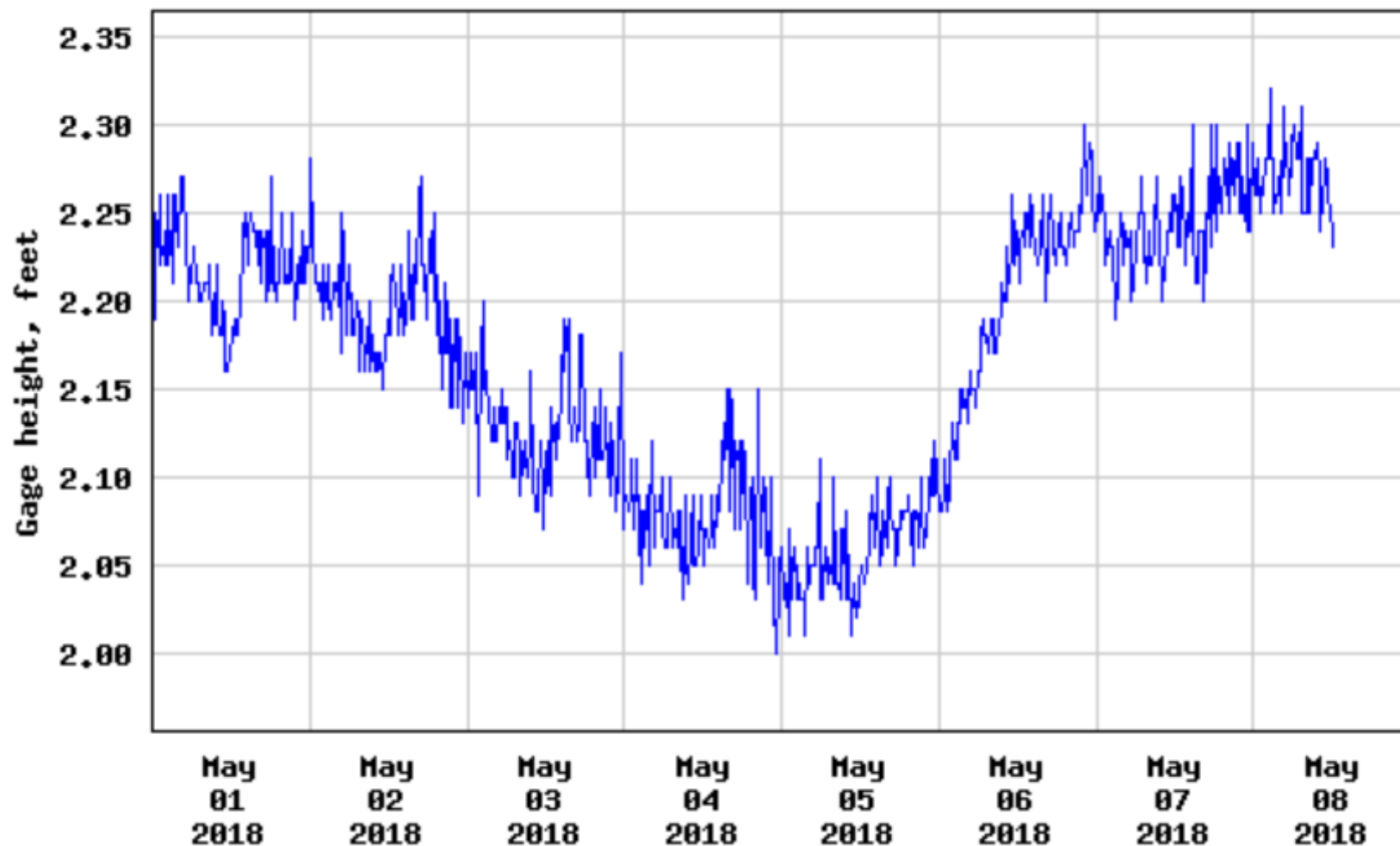
Monitoring & Research

- Real-time hydrologic data
 - USGS monitoring stations
 - Bell Island Pier station
- Weekly lake level and canal flow rate monitoring program
 - Organizer: USFWS staff- informed the development of the water budget and stage-volume relationship for the lake
- Modeling the impact of sedimentation and SLR on the outflow canals
 - Organizer: Dr. Etheridge, ECU
- Lake Level Monitoring Project
 - Organizer: Dr. Pavelsky, UNC
- Sea Level Rise Projections
 - Organizer: NOAA, NC CRC Science Panel

- ◆ Bell Island Pier
- ◆ USGS Stations
- Pump Locations
- 🚪 Tide Gates
- ▭ Watershed Boundary



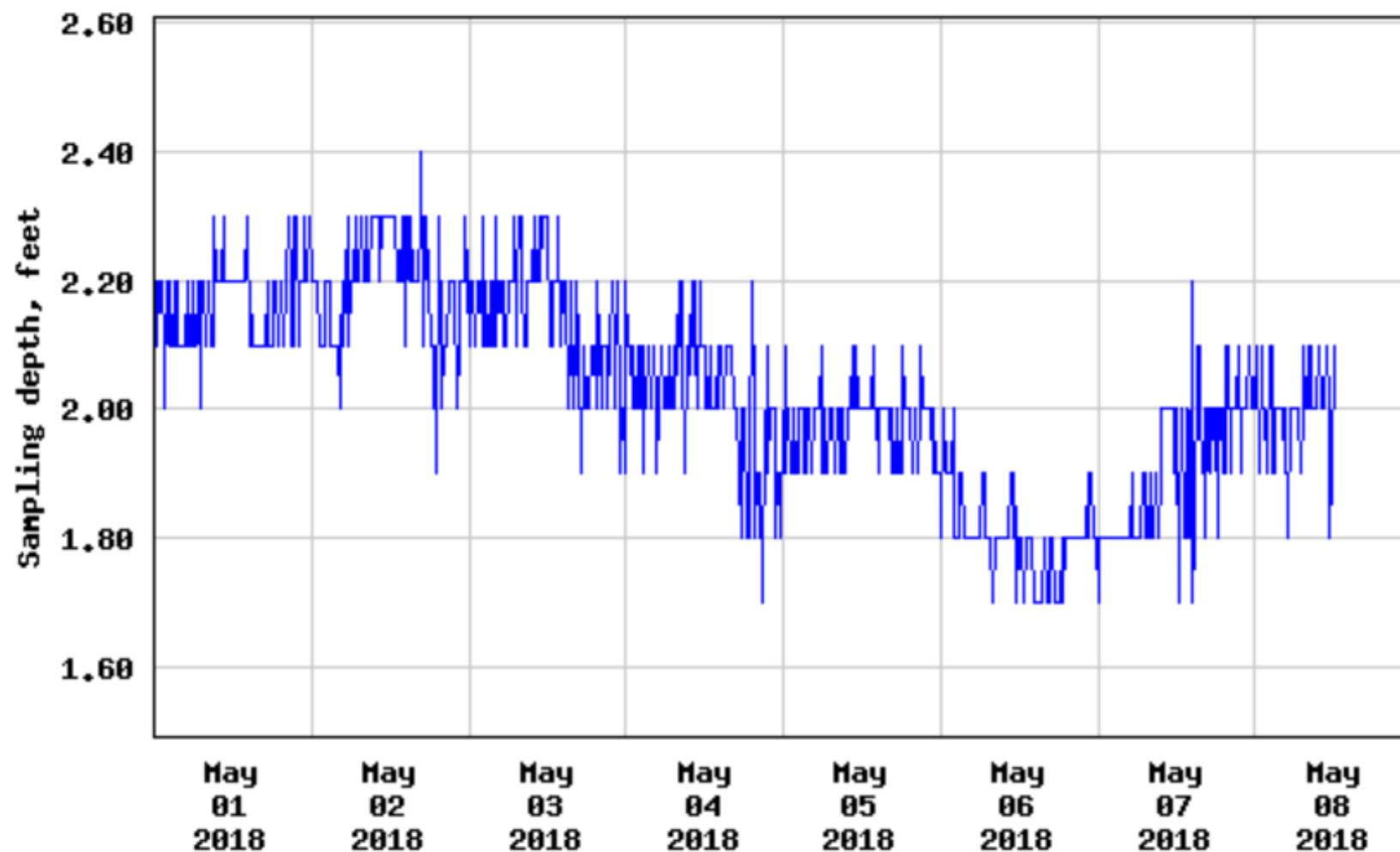
USGS 0208458892 LAKE MATTAMUSKEET W OF NC HWY 94 NR FAIRFIELD, NC



---- Provisional Data Subject to Revision ----

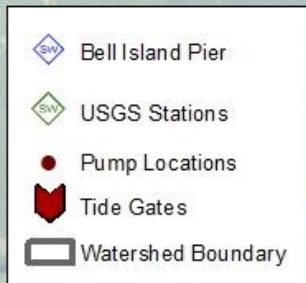


USGS 0208458893 LAKE MATTAMUSKEET E OF NC HWY 94 NR FAIRFIELD, NC



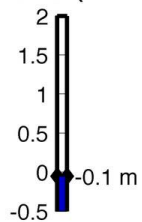
---- Provisional Data Subject to Revision ----

0 2.5 5
Miles

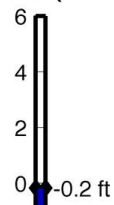


Conditions at
Bell Island Pier:
05/08/18, 09:30

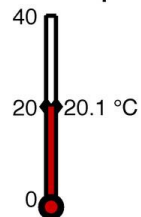
Water Level (NAVD88)



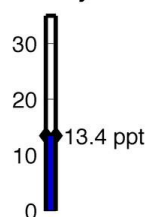
Water Level (NAVD88)



Water Temp



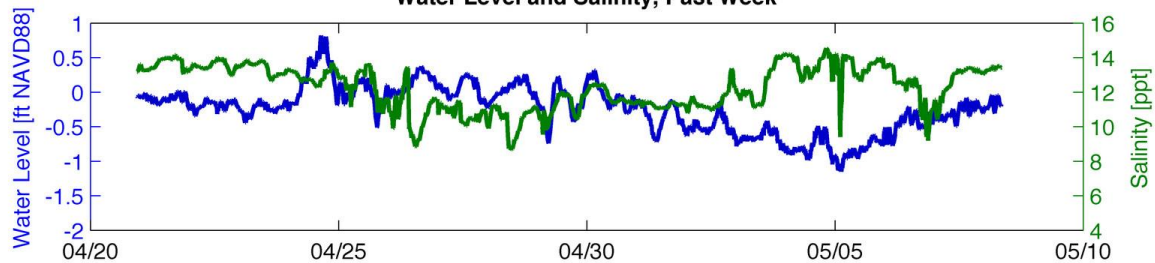
Salinity



Specific Conductance



Water Level and Salinity, Past Week



Goal 2: Active Management of Lake Water Level

Management Actions to Consider

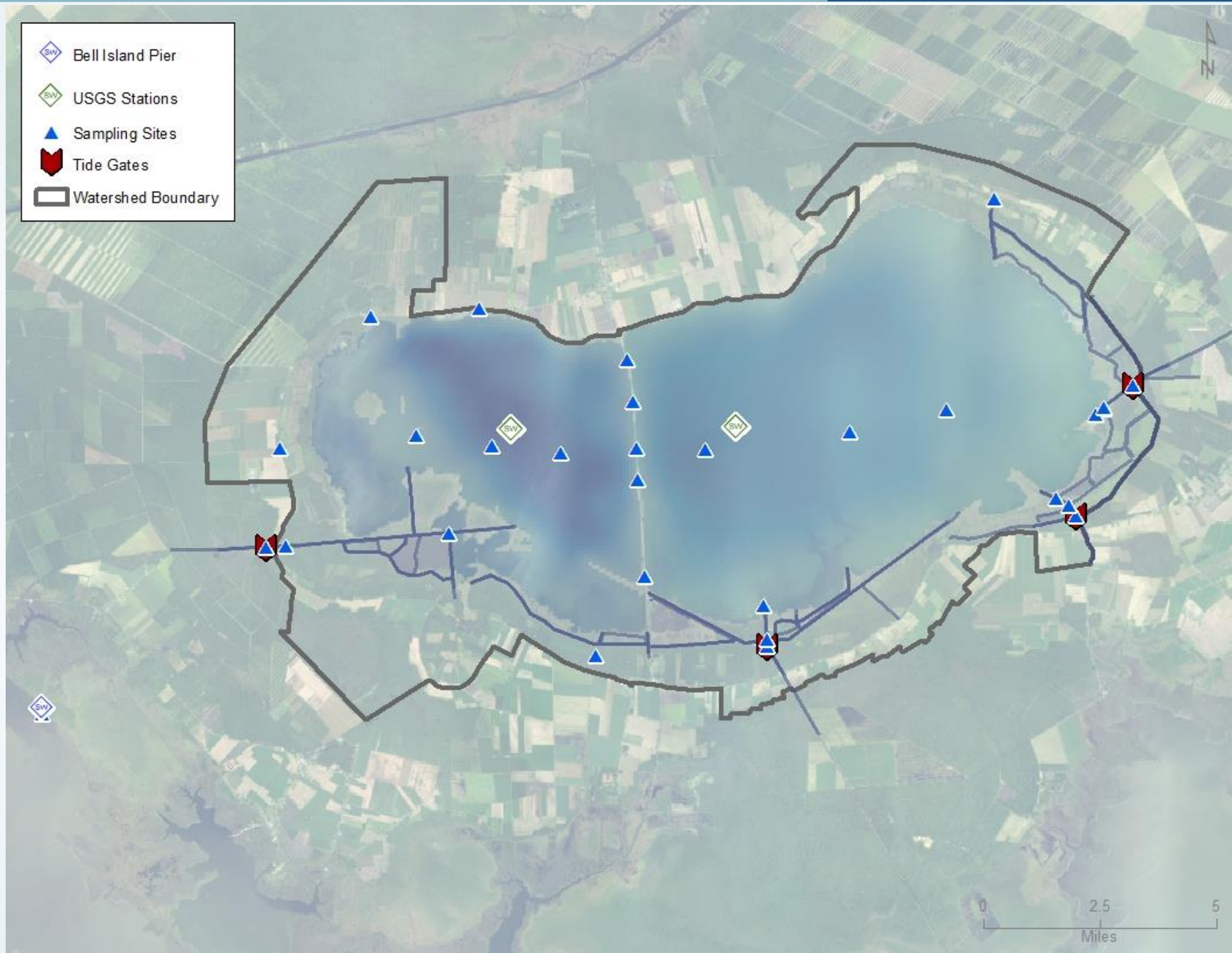
- Continue monitoring and research efforts
- Clean and snag canals where appropriate
- Keep tide gates free of debris
- Replace flap gates with side gates where appropriate
- Perform maintenance dredging of internal lake canals and outlets, if advisable
 - Consider beneficial use of dredge material to construct emergent vegetation zones or maintain earthen dikes
- Perform temporary drawdowns to increase storage capacity
 - Consider use of pumps to manage lake level and water diversion
- Conduct localized hydrological studies
- Consider excavating an additional outlet canal
- Re-delineate existing service districts and drainage associations
- Establish a drainage district for the watershed

Goal 3: Restore Water Quality

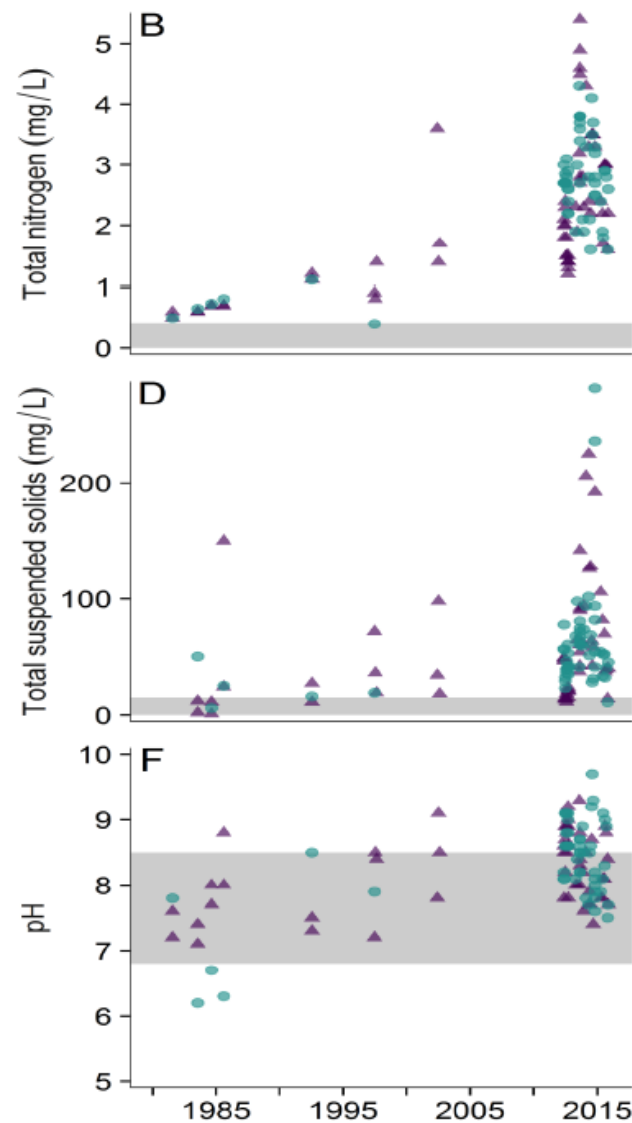
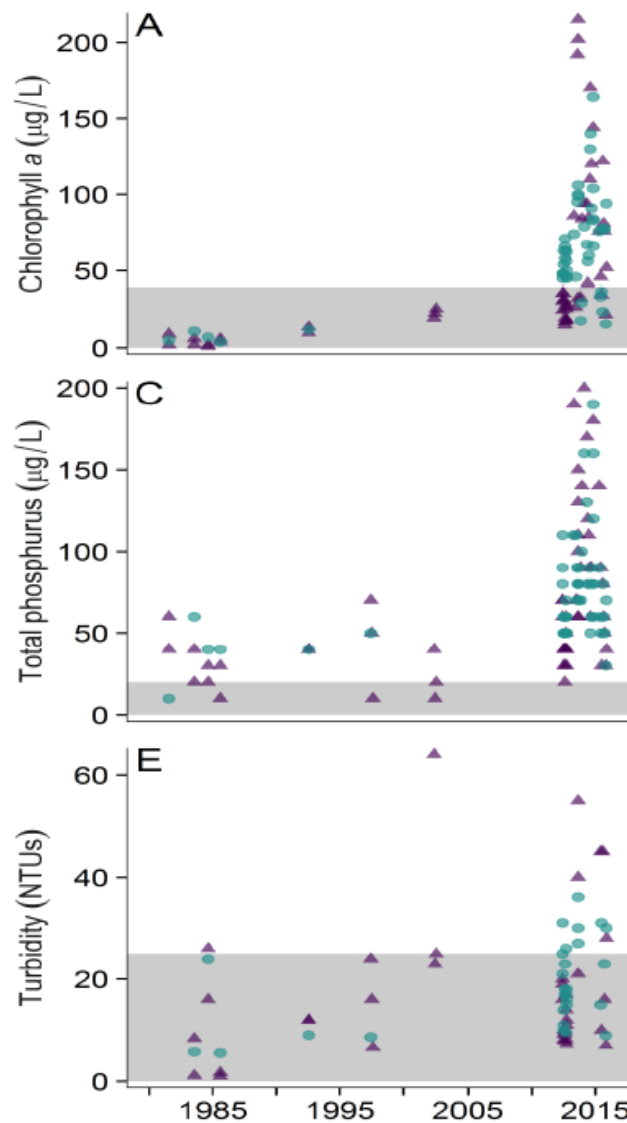
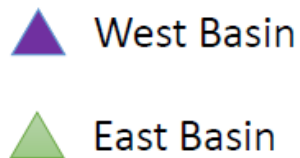
Monitoring & Research

- Continuous water quality monitoring of pH, DO, turbidity, temperature, and salinity in lake and weekly monitoring in canals
 - Organizer: USFWS & USGS
- Monthly monitoring of nutrients, suspended sediment, and chl-*a*
 - Organizer: USFWS & NCDWR
- Phytoplankton and cyanotoxin community assessments
 - Organizer: USFWS
- Nutrient bioassays and sediment nutrient flux analysis
 - Organizer: Dr. Piehler, UNC
- Impact of waterfowl impoundments
 - Organizer: Dr. Etheridge, ECU

- ◆ Bell Island Pier
- ◆ USGS Stations
- ▲ Sampling Sites
- Tide Gates
- ▭ Watershed Boundary



Water Quality Monitoring Results

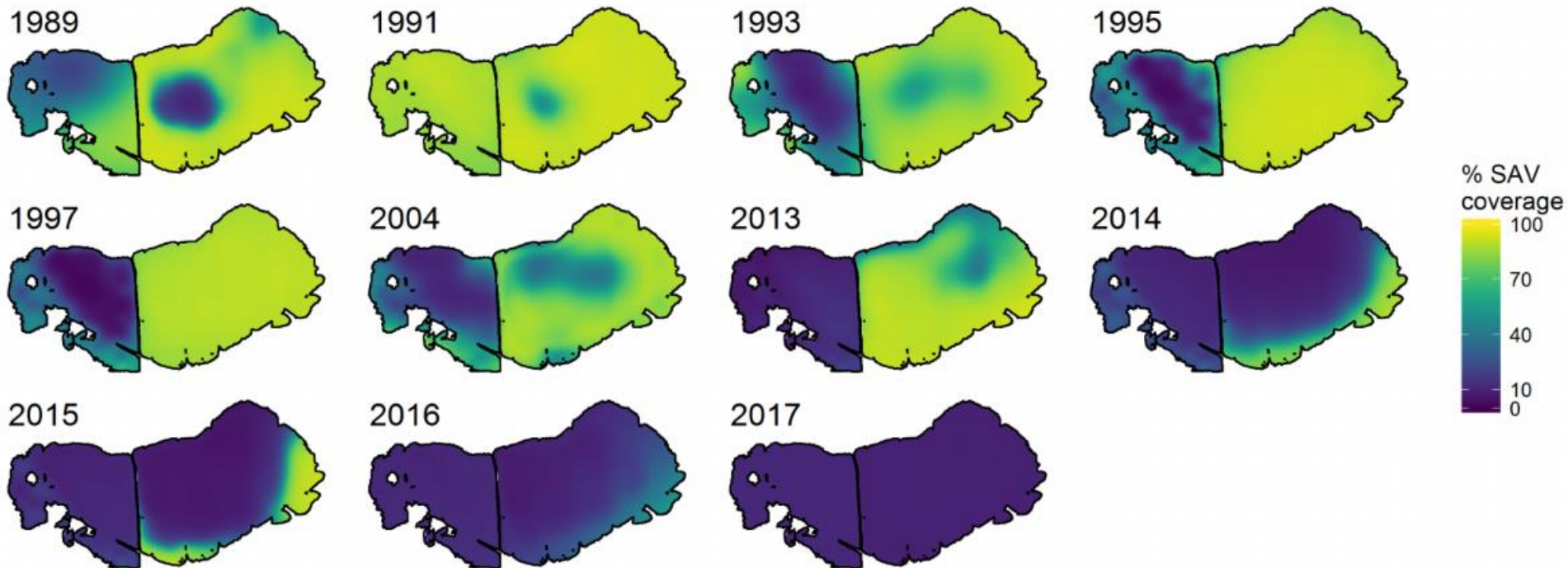


Goal 3: Restore Water Quality

Monitoring & Research

- Annual SAV coverage survey
 - Organizer: USFWS staff
- SAV planting experiment
 - Organizer: Dr. Piehler, UNC
- Assessing the risks of agricultural herbicides
 - Organizer: Anna Alicea and Dr. Greg Cope, NCSU; Celeste Journey, USGS
- Carp biomass removal feasibility study
 - Organizer: April Lamb, Dr. Fischer, and Dr. Layman, NCSU
- Modeling nutrient dynamics in Lake Mattamuskeet
 - Organizer: Dr. Obenour and Dr. Del Giudice, NCSU

Annual SAV Survey: 1989 - 2017



Goal 3: Restore Water Quality

Management Actions to Consider

- Continue monitoring and research efforts
- Preserve space for growth of filter strips along edges of drainage ditches
- Construct woodchip bioreactors
- Construct sediment basins/settling ponds
- Sheet flow water over wetlands
- Perform temporary drawdowns to facilitate sediment deposition
- Perform temporary drawdowns to re-establish emergent zones
 - Plant emergent marsh grasses
- Plant SAV
- Alter herbicide applications on croplands if advisable

Goal 3: Restore Water Quality

Management Actions to Consider

- Alter impoundment water management (i.e. stage drawdowns, pump automation)
- Convert impoundments from corn feedstock to MSM units
- Perform common carp biomass removal
 - Mechanical
 - Chemical
- Stock fish/zooplankton
- Consider coagulation and flocculation treatment system