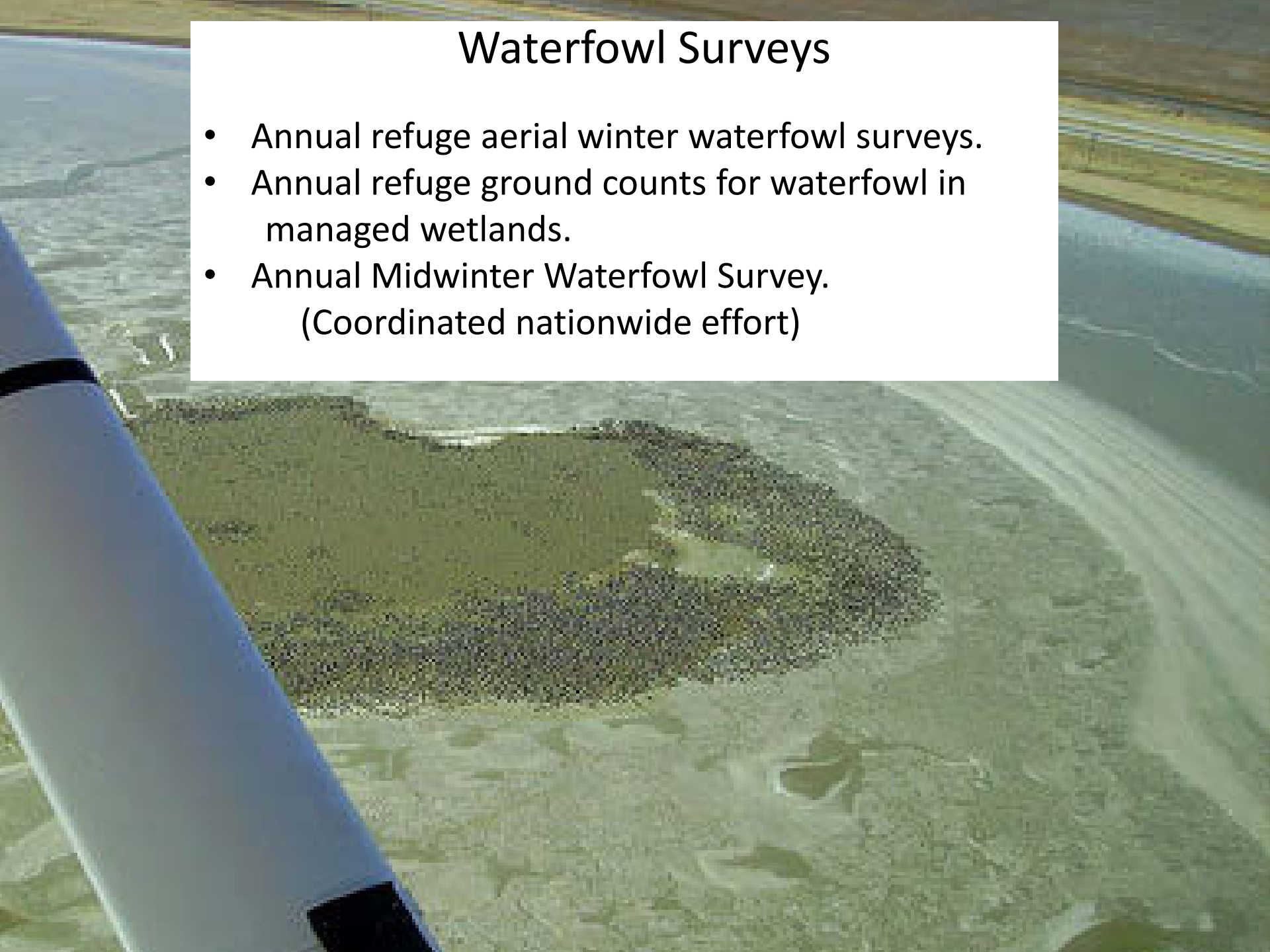

Mattamuskeet NWR
Waterfowl populations & wetland habitats

Waterfowl Surveys

- Annual refuge aerial winter waterfowl surveys.
- Annual refuge ground counts for waterfowl in managed wetlands.
- Annual Midwinter Waterfowl Survey.
  (Coordinated nationwide effort)



Midwinter Survey Units for North Carolina
Units 1-43

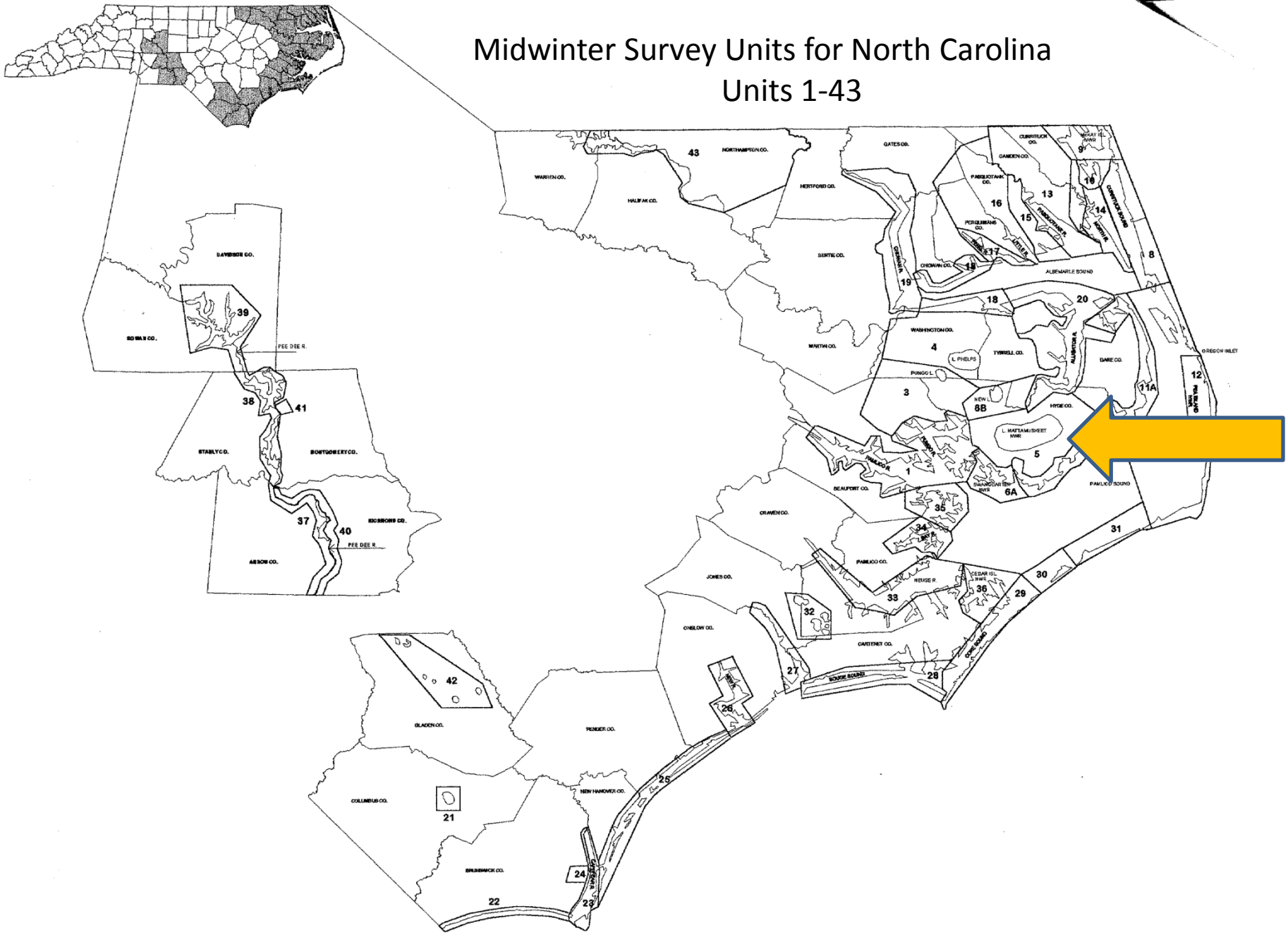
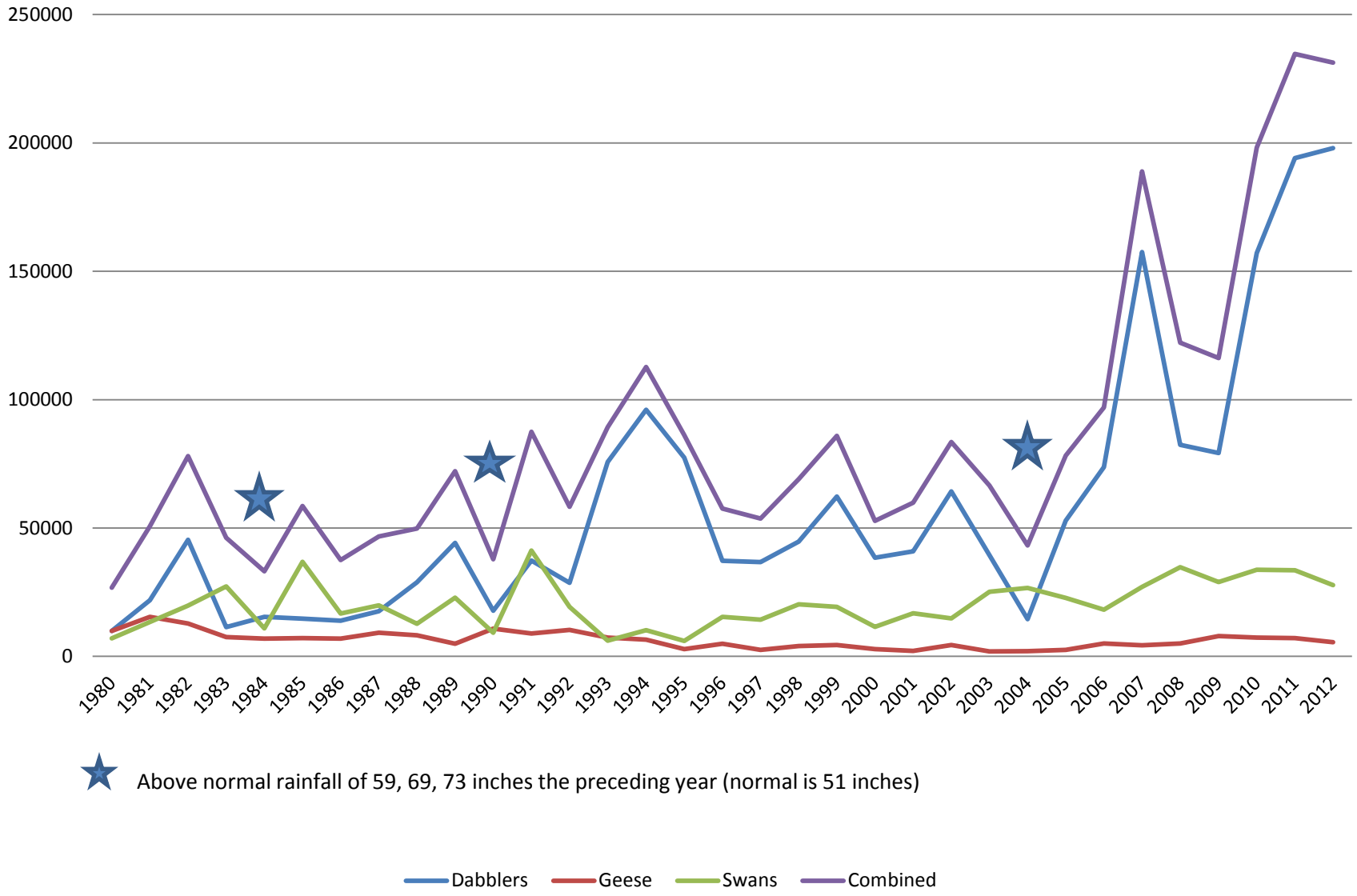
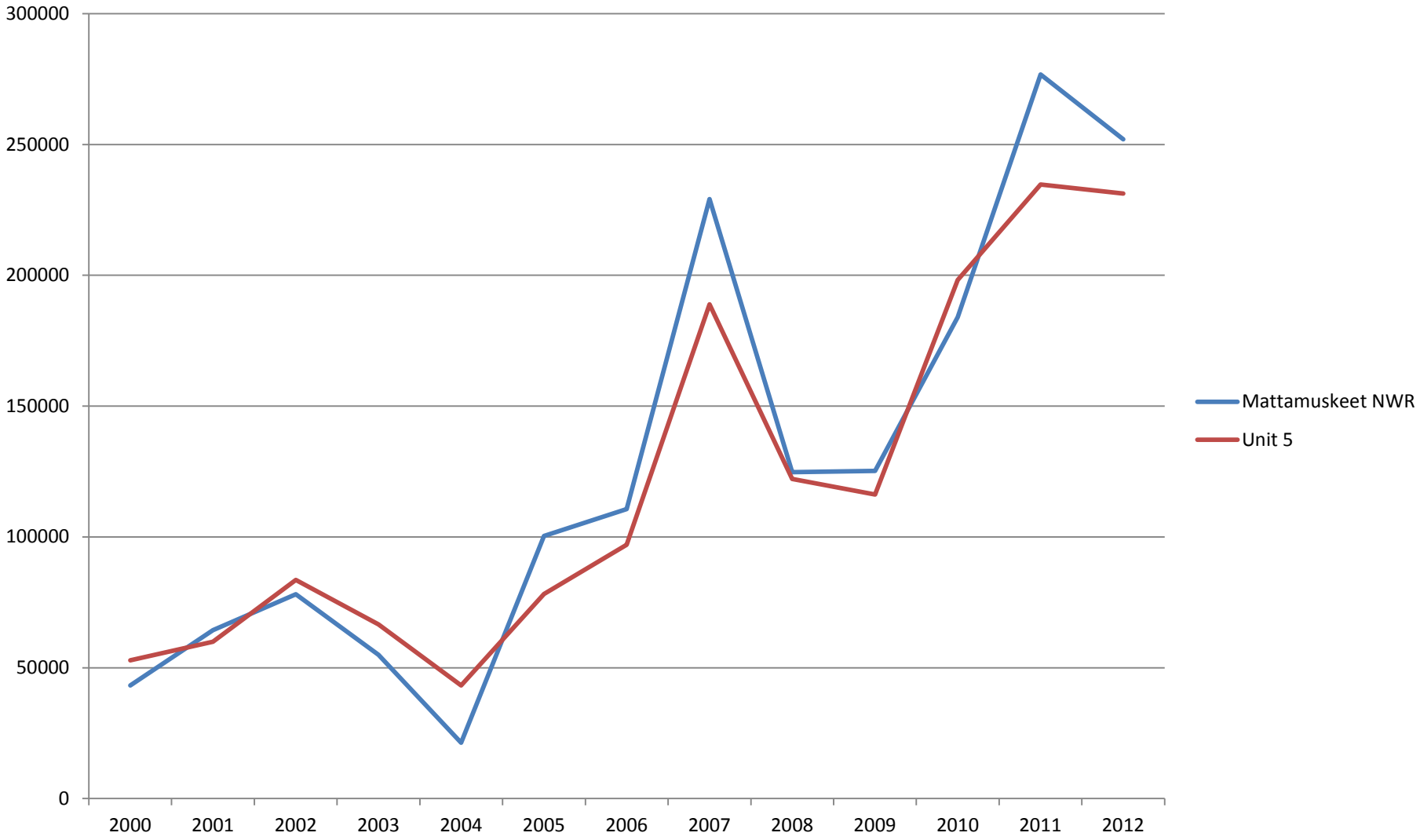


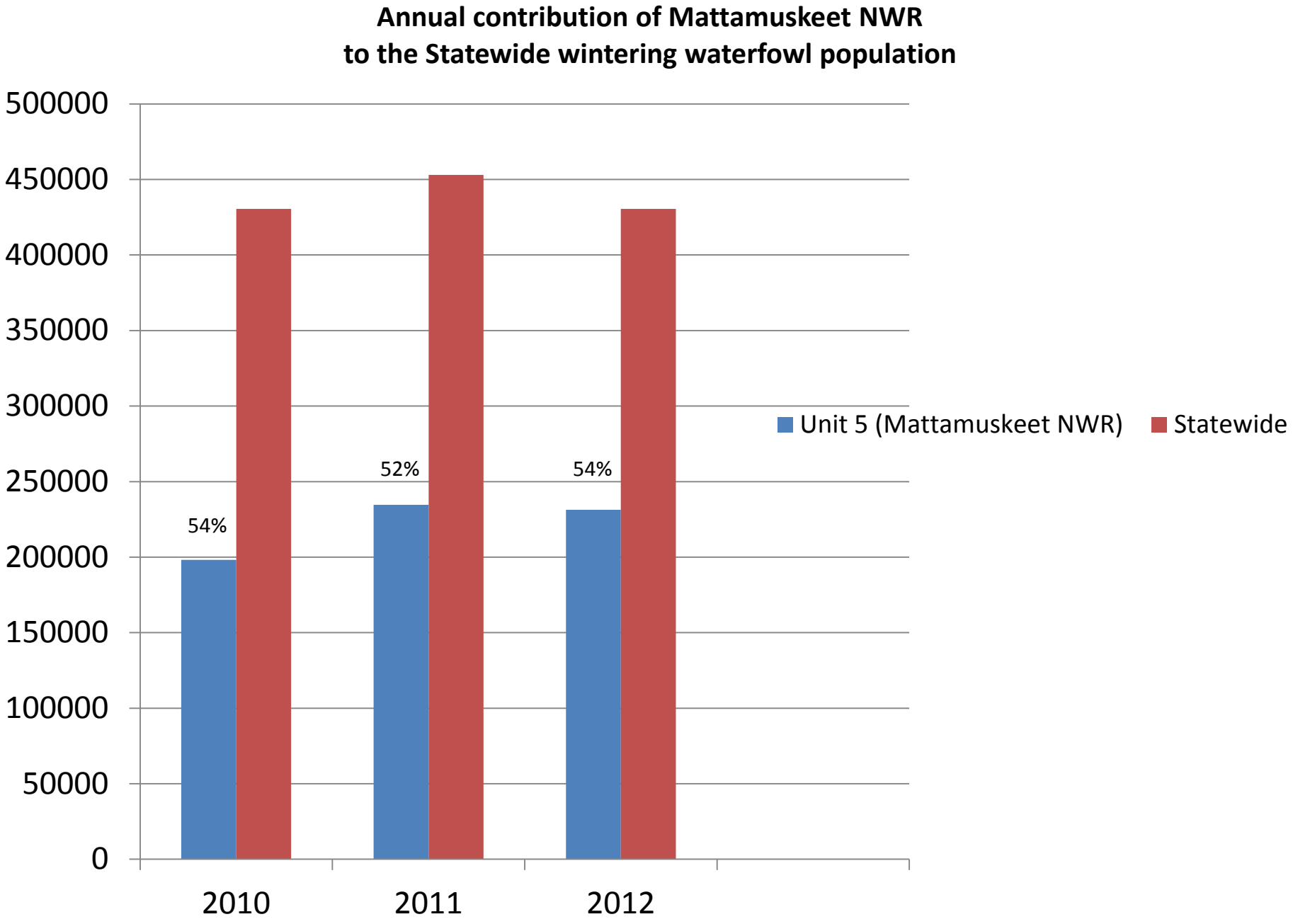
Figure 1. Locations of North Carolina's mid-winter waterfowl survey units

Midwinter Survey Results for Unit 5
1980-2012
(excludes American coots/Snow Geese)



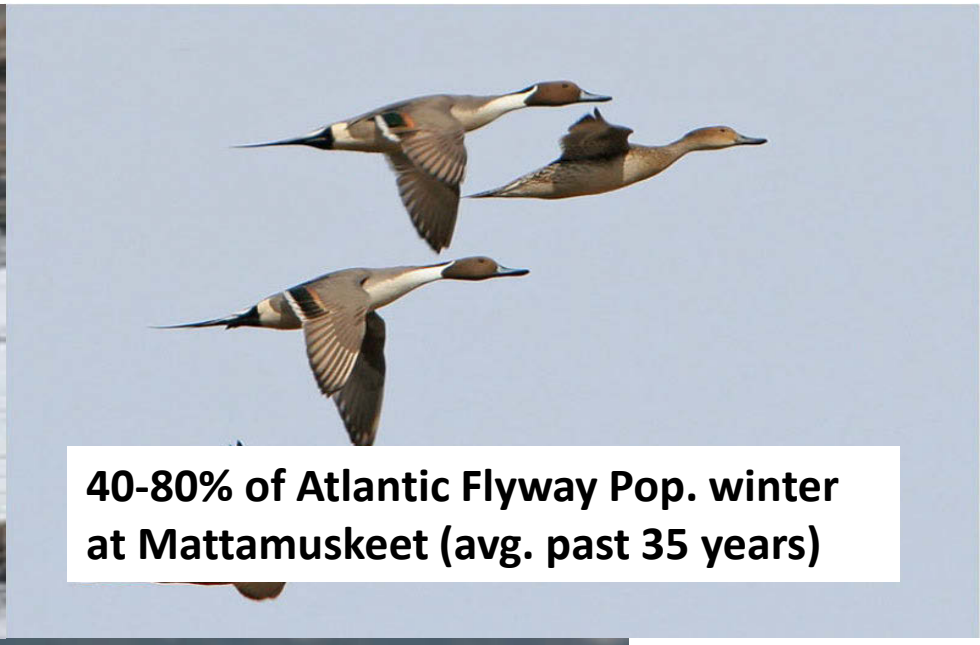
Contribution of Mattamuskeet NWR to Midwinter Survey Totals for Unit 5 2000-2012




Annual contribution of Mattamuskeet NWR
to the Statewide wintering waterfowl population
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
54%
52%
54%
2010
2011
2012
Unit 5 (Mattamuskeet NWR)
Statewide

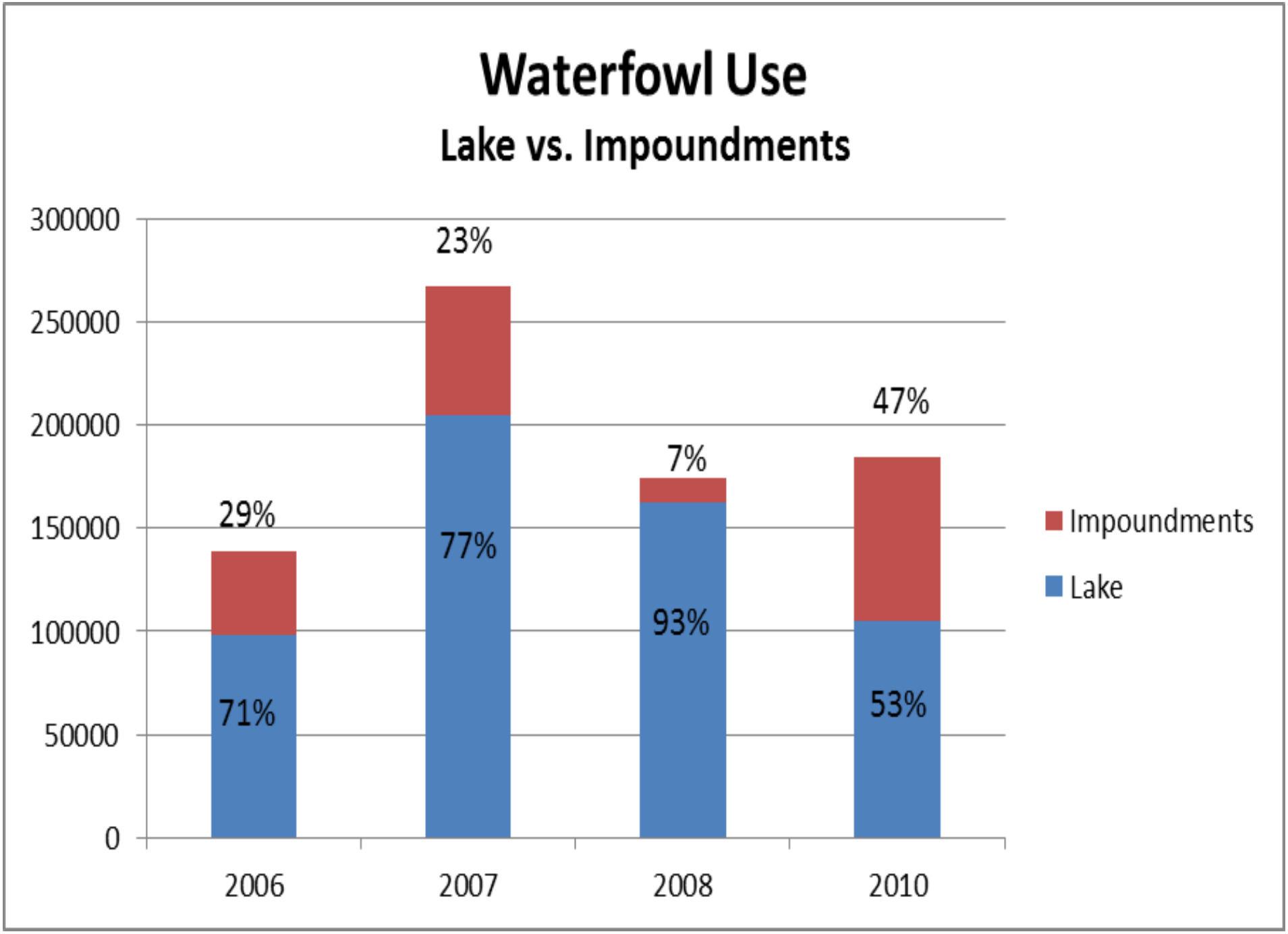
Importance of Mattamuskeet NWR
to
Selected waterfowl species in the Atlantic Flyway

20-30% of Atlantic Flyway Pop. winter at Mattamuskeet



40-80% of Atlantic Flyway Pop. winter at Mattamuskeet (avg. past 35 years)

25-35% of Atlantic Flyway Pop. winter at Mattamuskeet (avg. past 35 years)


Waterfowl Use
Lake vs. Impoundments
300000
250000
200000
150000
100000
50000
0
2006
2007
2008
2010
29%
71%
23%
77%
7%
93%
47%
53%
Impoundments
Lake

Habitat Management for Wintering Waterfowl
Mattamuskeet NWR

Preferred waterfowl foods in natural habitats on Mattamuskeet NWR

Submerged Aquatic Vegetation (SAV)-approx ~35,000 acres (potential)

Common SAV in Lake Mattamuskeet:

- Wild Celery
- Southern naiad
- Redhead grass
- Muskgrass
- Nitella

Lake Emergent Zone- approx. 2,000-5,000 acres

American three-square, cattails, spikerushes, rushes

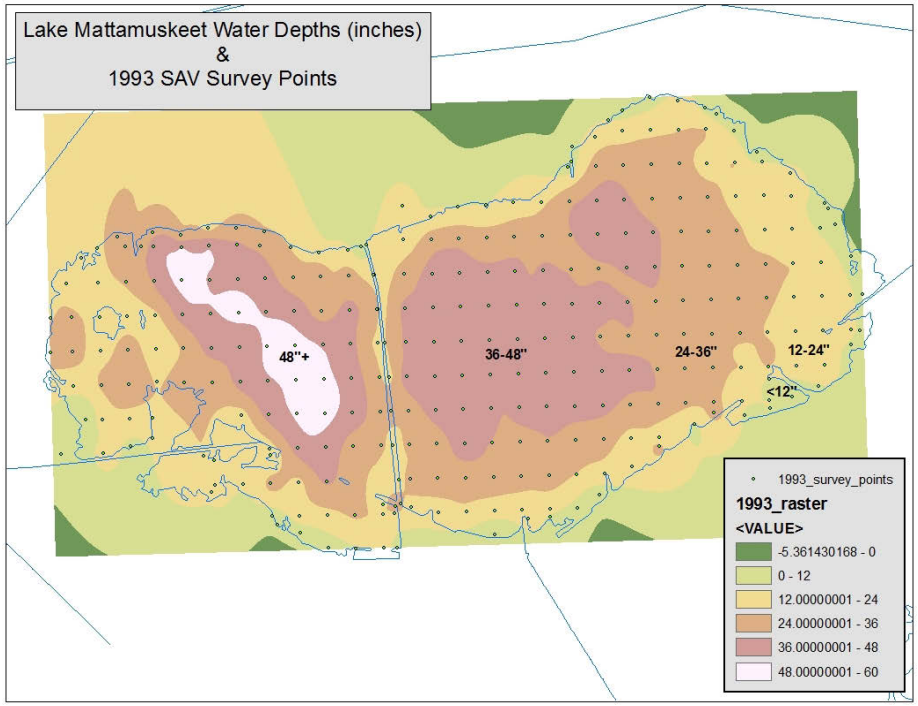
Moist-soil management in wetland impoundments – approx. 2600 acres

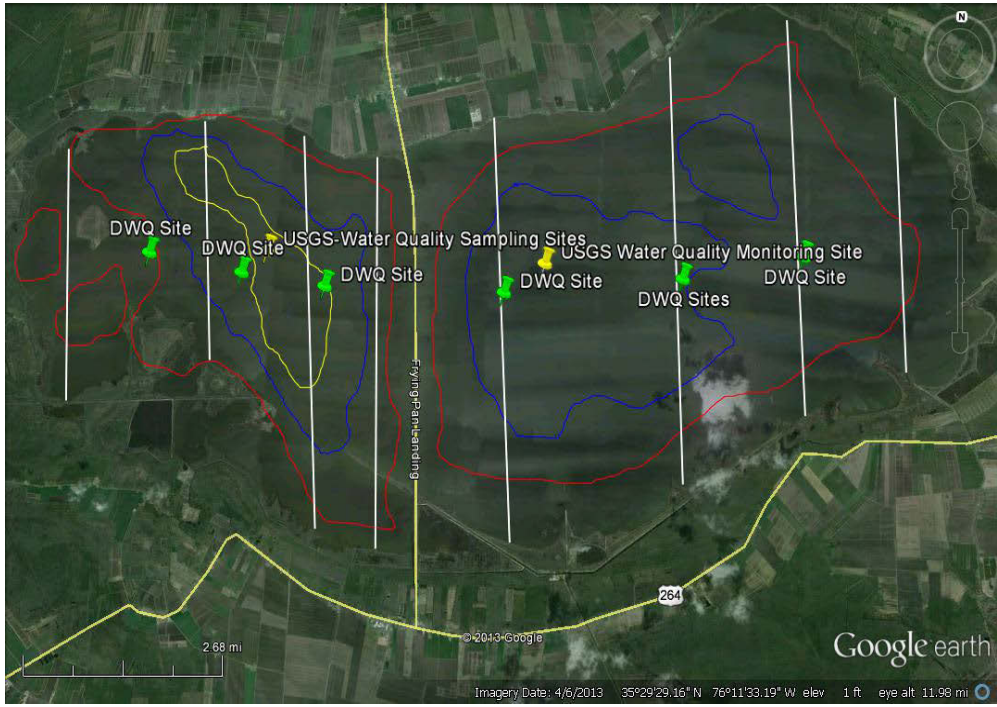
Annual, seed-producing plants: wild millets, panicums, spikerushes, smartweeds, and flatsedges

Submerged Aquatic Vegetation

Lake-wide SAV Vegetation Surveys

Historic reports
Lake-wide grid (~300 Survey plots: 1989-2004)
Lake-wide transects (2013)

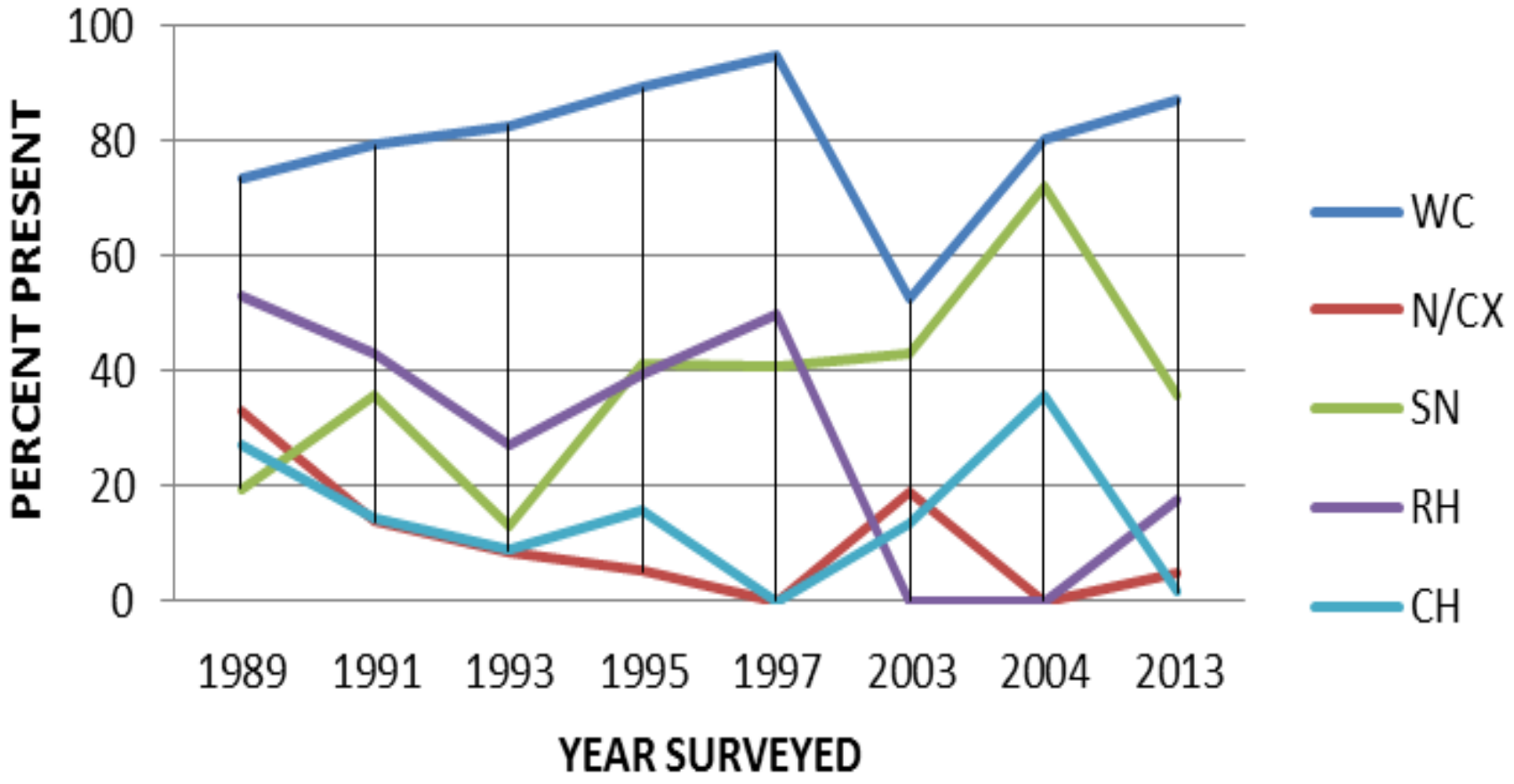




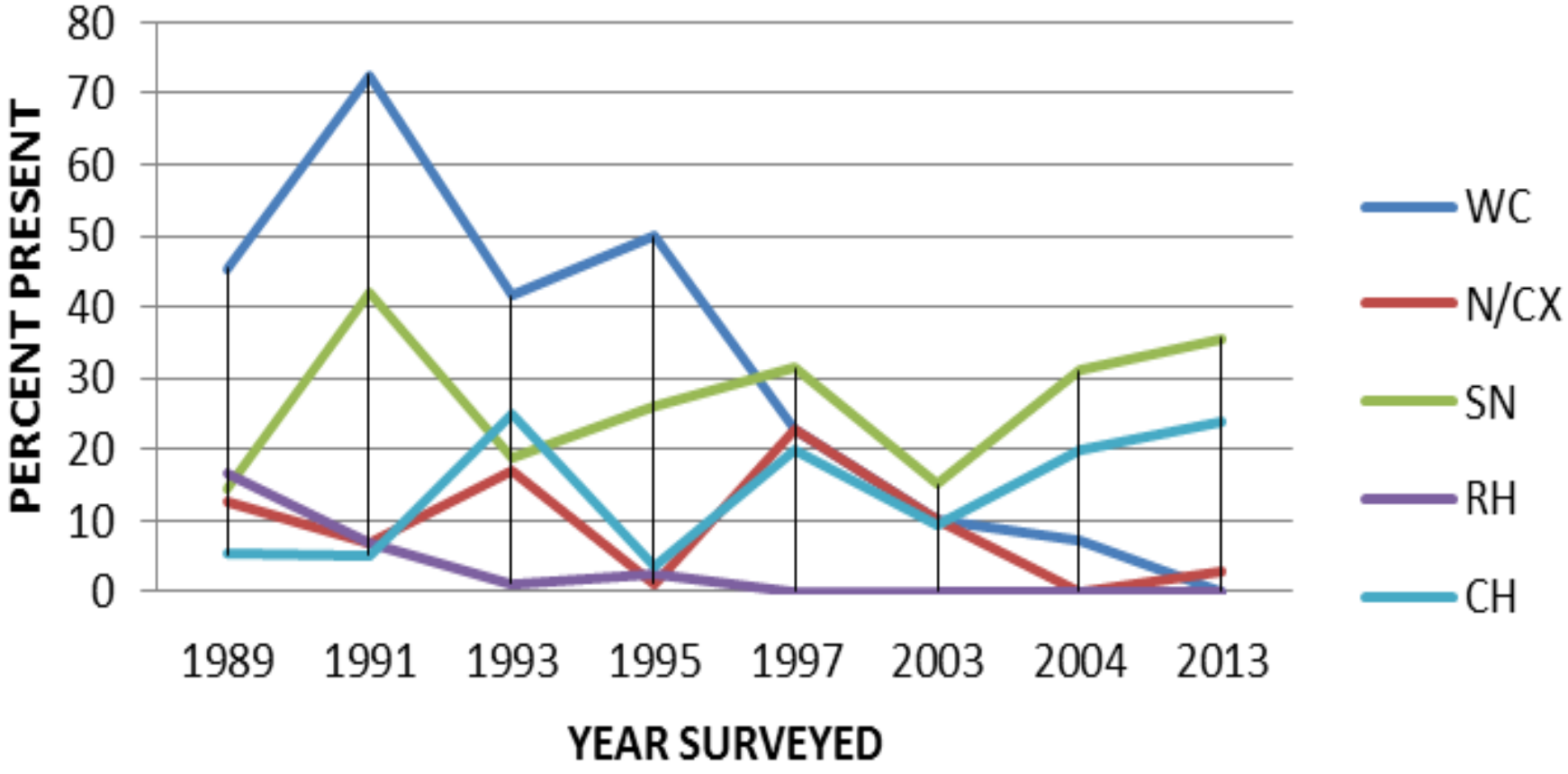
Historical Records on Lake Vegetation

- 1915-1932 Large portions of the lake drained and farmed.
- 1934 Refuge established.
- 1940-1957 Commercial carp removal in the lake.
  (Note: Source of turbid conditions= no SAV present)
- 1951 Muskgrass (Characeae) establishes itself (7,500 acres).
- 1952 Muskgrass abundance doubles in the lake (15,000 acres).
- 1957 Lake clarity increased to 3-4 feet in depth.
- 1957 Pondweeds (Naiads) colonize the lake & other SAV species are introduced.
- 1958-60s SAV introductions continue (e.g. wild celery, etc.)
- Present Day

LAKE MATTAMUSKEET SAV (EAST SIDE) 1989-2013

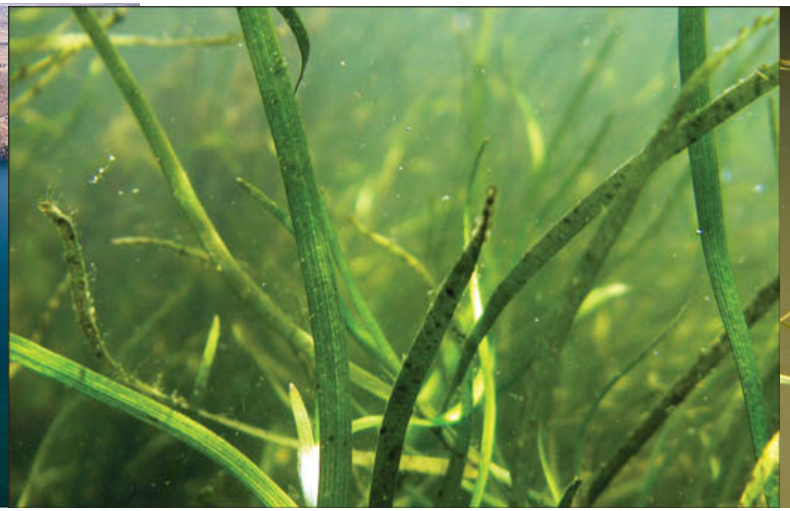


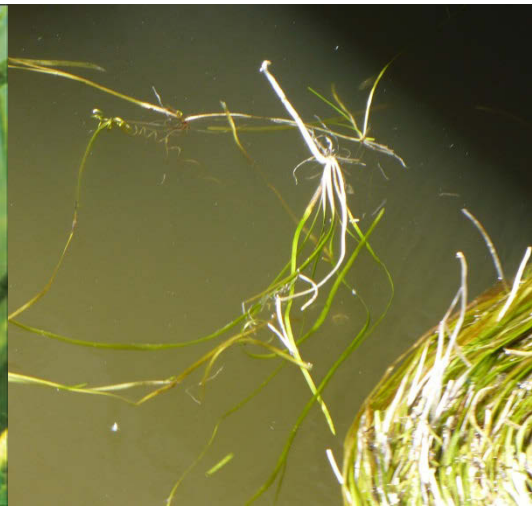
LAKE MATTAMUSKEET SAV (WEST SIDE) PRESENCE 1989-2013



Factors that limit SAV growth

- **Light**
  - -Suspended solids (reduced light penetration)
  - -Eutrophication (shading)
- Salinity (fresh vs. saltwater)
- Toxicity (herbicides & heavy metals alter SAV metabolism)
- Biomass removal
  - - Grazers (Waterfowl, fish, turtles)
  - - Waves & currents (Storms, floods)
  - - Sedimentation (Burial)





Lake Salinity (p.p.t.)

(selected records of measurements taken in the "middle" of the lake)

1939-49	Averaged 0.9 ppt
1977-86	Averaged 1.95 ppt
1989-94	Averaged 1.74 ppt
1995-2000	Averaged 0.4 ppt
2013	Average reading was 1.4 ppt (during lake-wide SAV survey)

Salt tolerances of selected Submerged Aquatic Vegetation (SAV)

- Wild celery — Range 0-10ppt
- Redhead grass — Range 0-20ppt
- Southern naiad — Range 0-10ppt
- Muskgrass (Chara) — Range 0-15ppt

Experimental SAV Transplantings Summer 2013

Wild celery rootstock and plugs from East side of the lake
Transplanted at 2 Sites on the West side

Lake Emergent Zone

- High quality wintering waterfowl habitat
- Highly-dependent on seasonal drawdown (evaporation cycles)
- Dramatically increases habitat available for migrating shorebirds
- Susceptible to encroachment by invasive Phragmites (Common reed) that requires chemical/mechanical treatments

Moist-soil impoundments

- High quality wintering waterfowl habitat
- Intensive management
- Infrastructure (dikes, water control structures, pumps) requires maintenance


Current & Future Management Strategies

Mattamuskeet NWR Comprehensive Conservation Plan 2008

Objective 1-1: Migratory waterfowl –Provide foraging, sanctuary, and needs of 20-30% of North Carolina's wintering tundra swan population (15,000-26,000 swans); 40,000-60,000 northern pintails and green-winged teal; 5,000 migrant Canada geese; 40,000-60,000 other ducks, including 2,000-4,000 American black ducks, during fall and winter.

Some Selected Strategies:

- Complete annual waterfowl surveys.
- Annually collect continuous lake water quality monitoring data (e.g. suspended solids, nutrients, toxins, etc.).
- In cooperation with NCDENR develop a SAV monitoring plan for the lake.
- Maintain 2,600 acres of managed wetlands in high quality waterfowl habitat.
- Continued to treat common reed (*Phragmites*) infested areas with herbicides or other management practices (lake emergent zone & within managed wetlands).

Note: these strategies are constrained annually by staffing levels and funding.


The End