The First Complete Mapping of North Carolina's Submerged Aquatic Vegetation Resources

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SAV Partnership

- Federal: ACE, FWS, NOAA, NPS, NRCS
- Mixed: APNEP, NERR
- State: DCM, DMF, DWQ, DWR, EEP, WRC, DOT
- Academia: ECSU, ECU, NCSU, UNC-CSI, UNC-IMS, UNC-W, NC Sea Grant, DUML, CW&M-VIMS
- NGOs: NCCF, TNC

Monitoring and Mapping Objective

Monitor and map the distribution and abundance of Submerged Aquatic Vegetation (SAV) in North Carolina's and southeastern Virginia's estuarine and coastal waters. The network will cover the waters from Back Bay, VA, to the NC/SC boundary.

Environmental Parameters for Submerged Habitat Mapping

- Winds low – preferably 5 mph or less
- Sun Angle 20 – 45 degrees to reduce glint
- Low tide
- Turbidity low
- No clouds or haze
- Adequate biomass of target

2007 Monitoring Activities

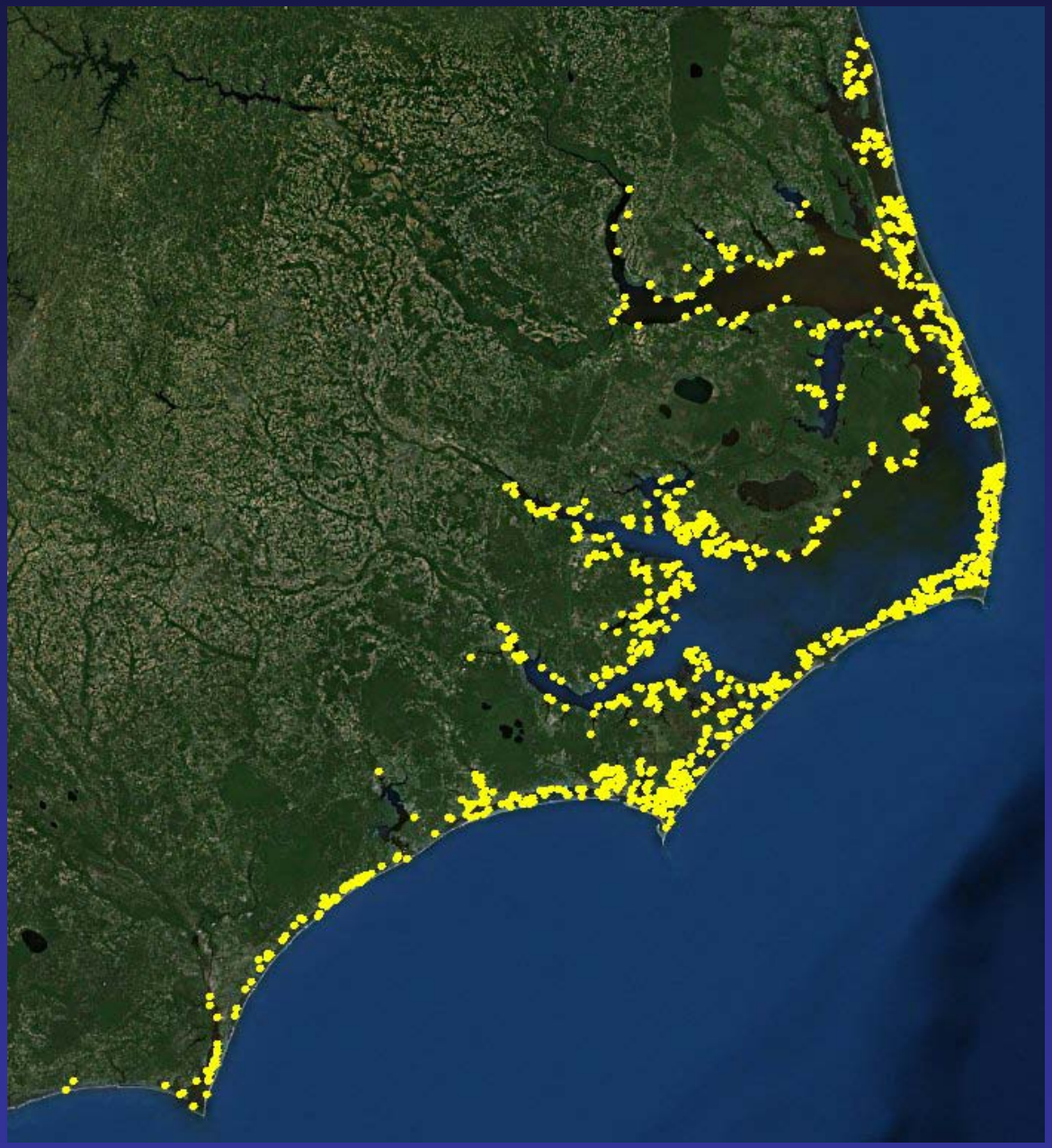
- Resources: APNEP, FWS, DMF
  - NOAA IDIQ Contract Mechanism
- Flights: Aerometric, Dewberry
- Water Clarity Volunteer Network (Chappell-DMF)
  - 25 citizens: secchi depth
- Ground Truth Network (Conrad – DMF)

Aerial Monitoring Phases

- Image acquisition: Intergraph's Z/I Digital Mapping Camera (DMC)
  - 24K feet above mean terrain
  - 1 m pixel resolution – 4 bands – Blue, Green Red and Near IR
- Photogrammetric control coordination: airborne GPS + ground-based GPS receivers
- Softcopy aero-triangulation
- Digital imagery orthorectification using DEMs

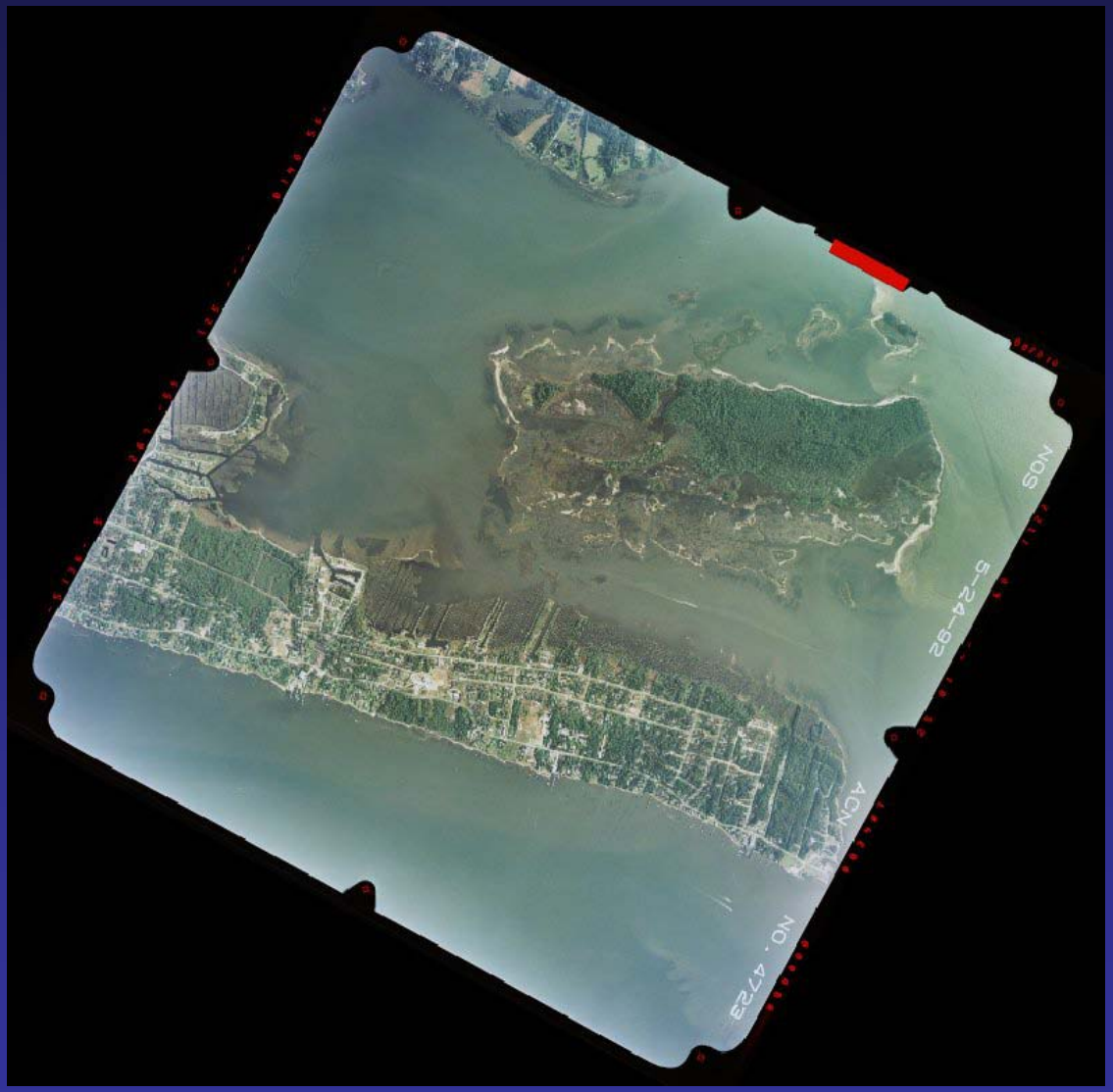
Field Verification Parameters: Autumn 2007

- Position
- Water Clarity
- Temperature
- Salinity
- Depth
- Species Identification
- SAV Density



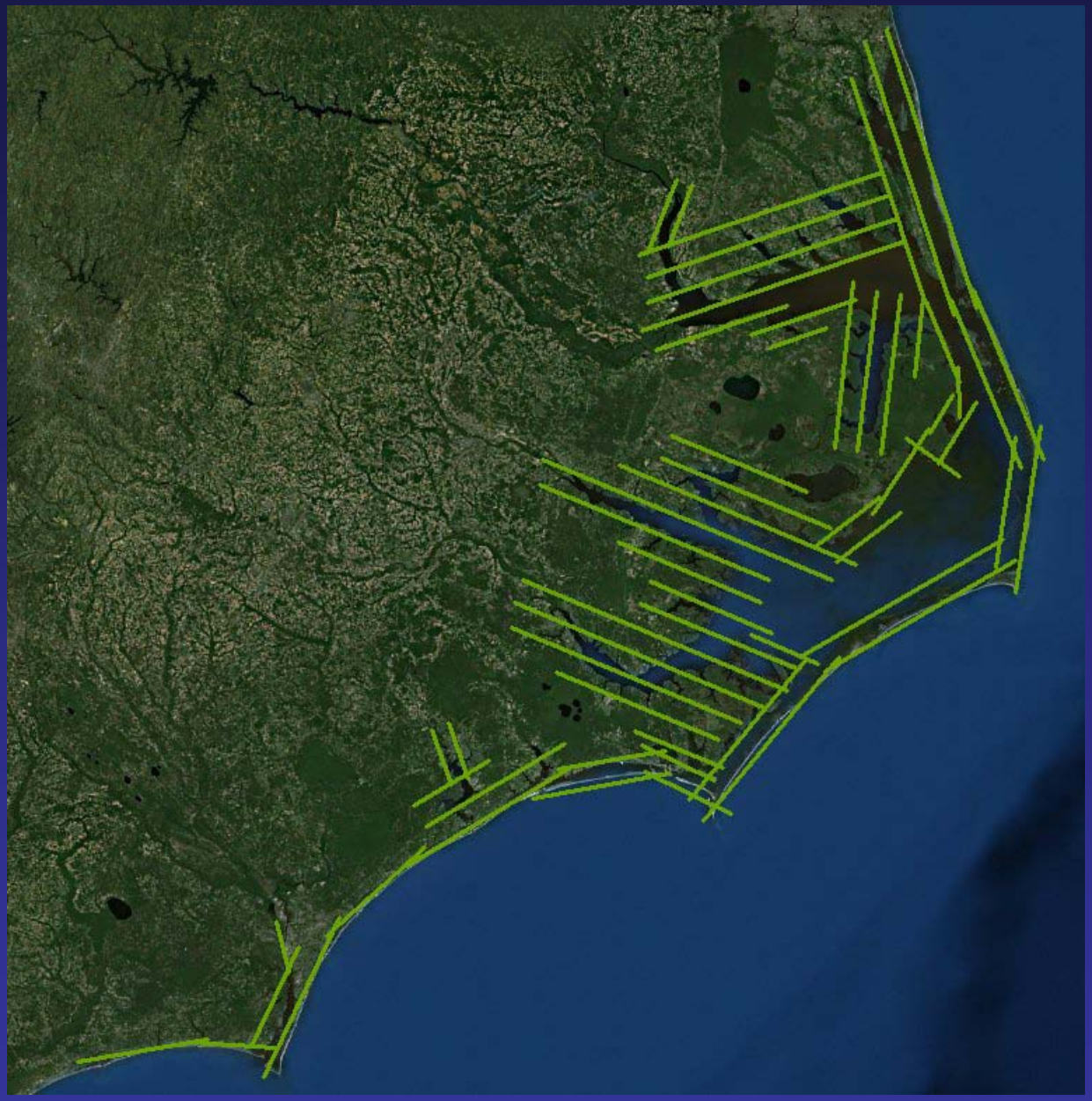
2007 Field Verification Points

- 1056 random points visited (82% by DMF)
- Points selected from areas where SAV was previously mapped or areas not previously mapped down to depth of 2m
- Points visited with small boats, SAV visualized from boats when possible, wading when possible and rakes when water too deep and too turbid.



1:24,000 Scale Natural Color Air Photo - 1992 – East Harkers Island

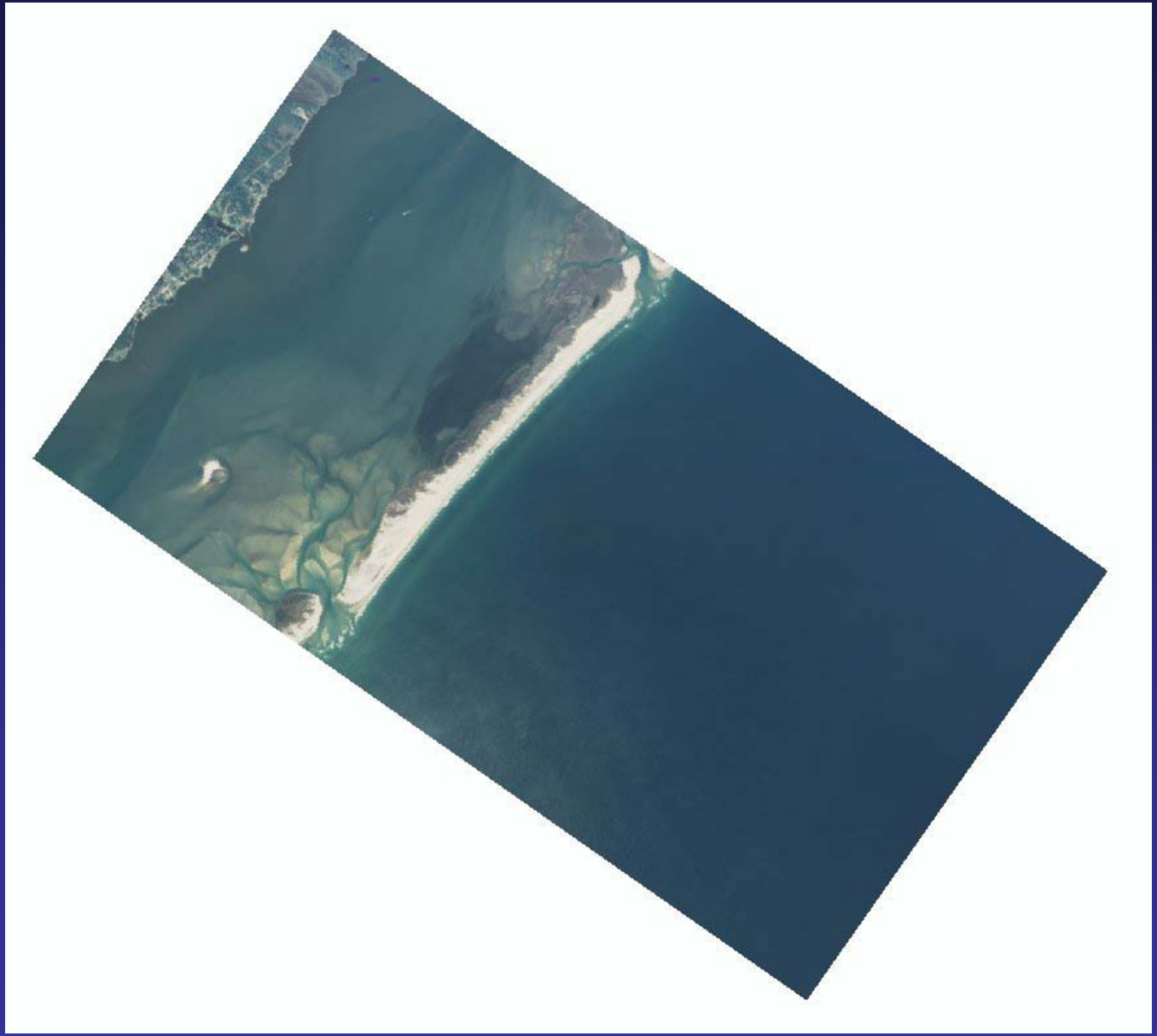
Intergraph's Z/I Digital Mapping Camera (DMC)



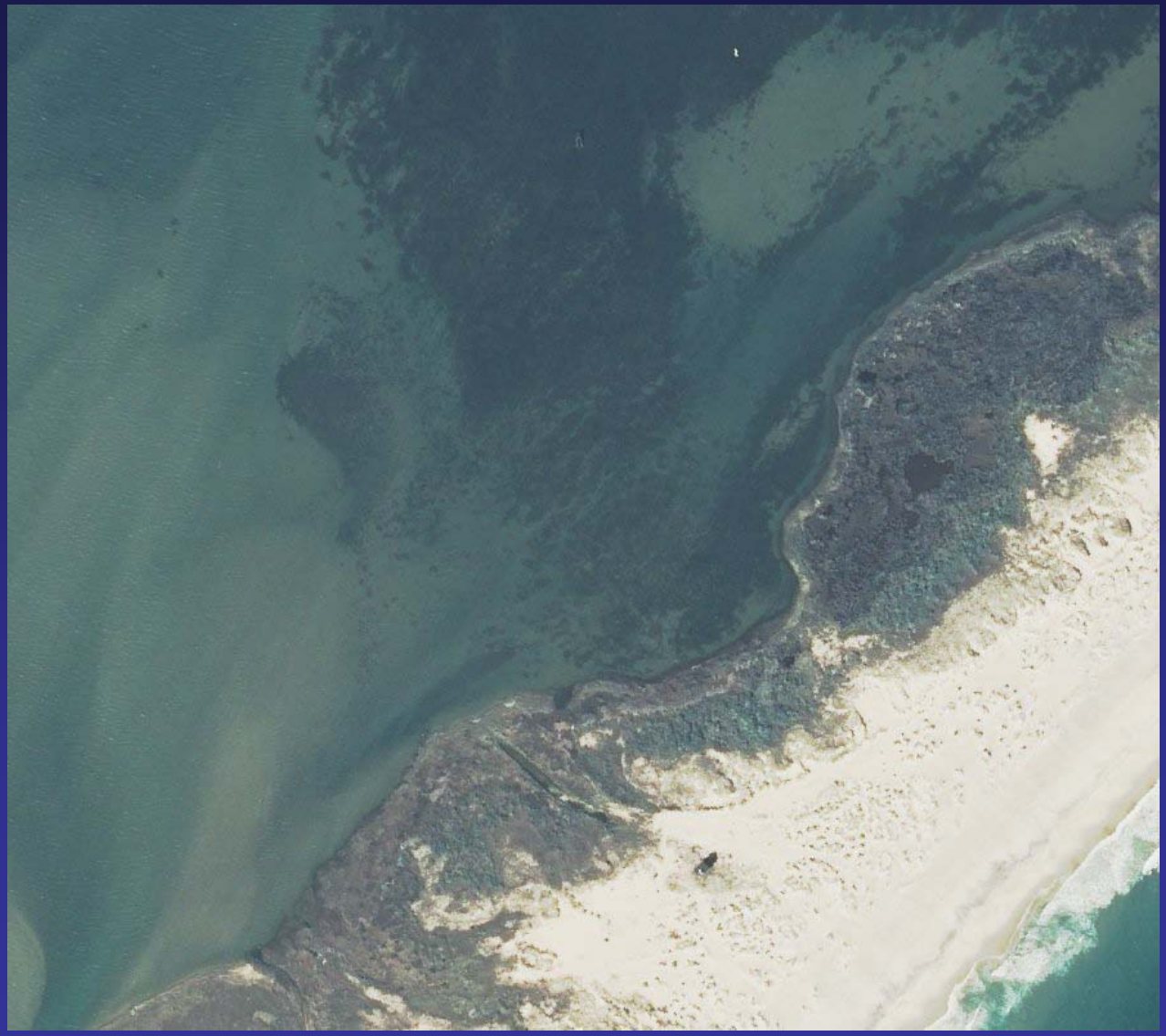
Autumn 2007 Spring 2008 Acquisition

- 1,795.45 flight line miles
- 1,347 images
- Bogue, Back, and the mainland side of Core Sounds from 2006 – 0.3 m pixel size flown at 10,000 ft.

2007 1 m DMC imagery – Drum Inlet, NC



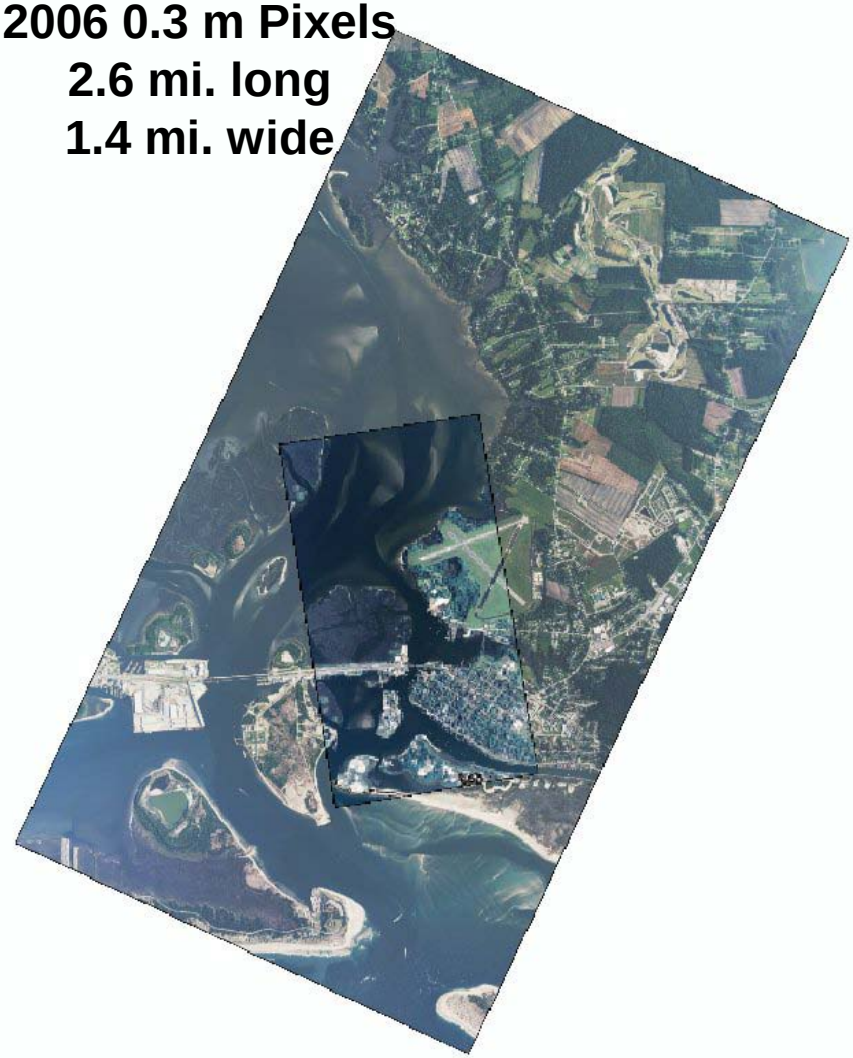
2007 1 m DMC imagery – Drum Inlet, NC



2006 0.3 m vs. 2007 1 m DMC imagery

2007 1m Pixels
6.4 mi. long
3.6 mi. wide

2006 0.3 m Pixels
2.6 mi. long
1.4 mi. wide

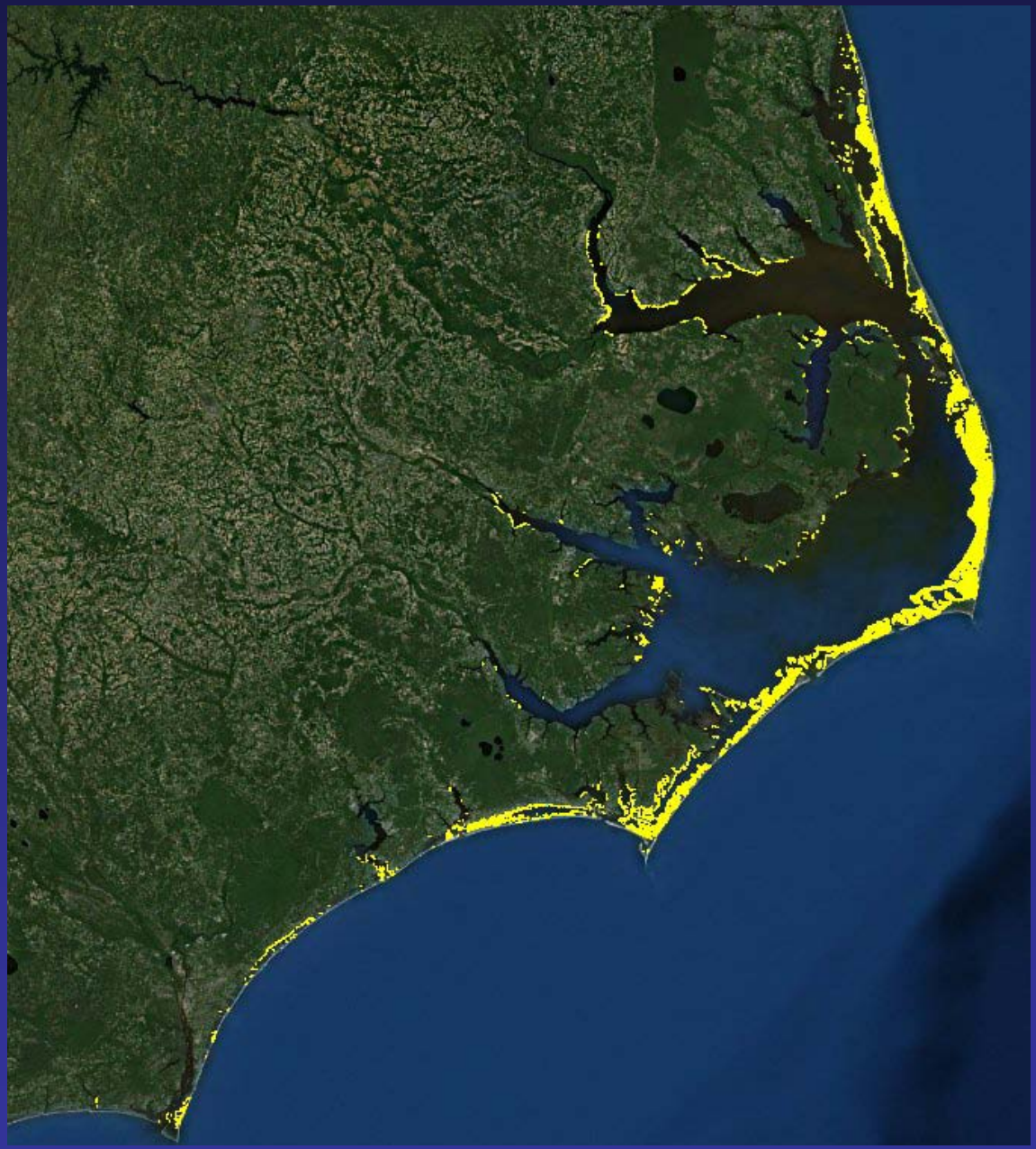


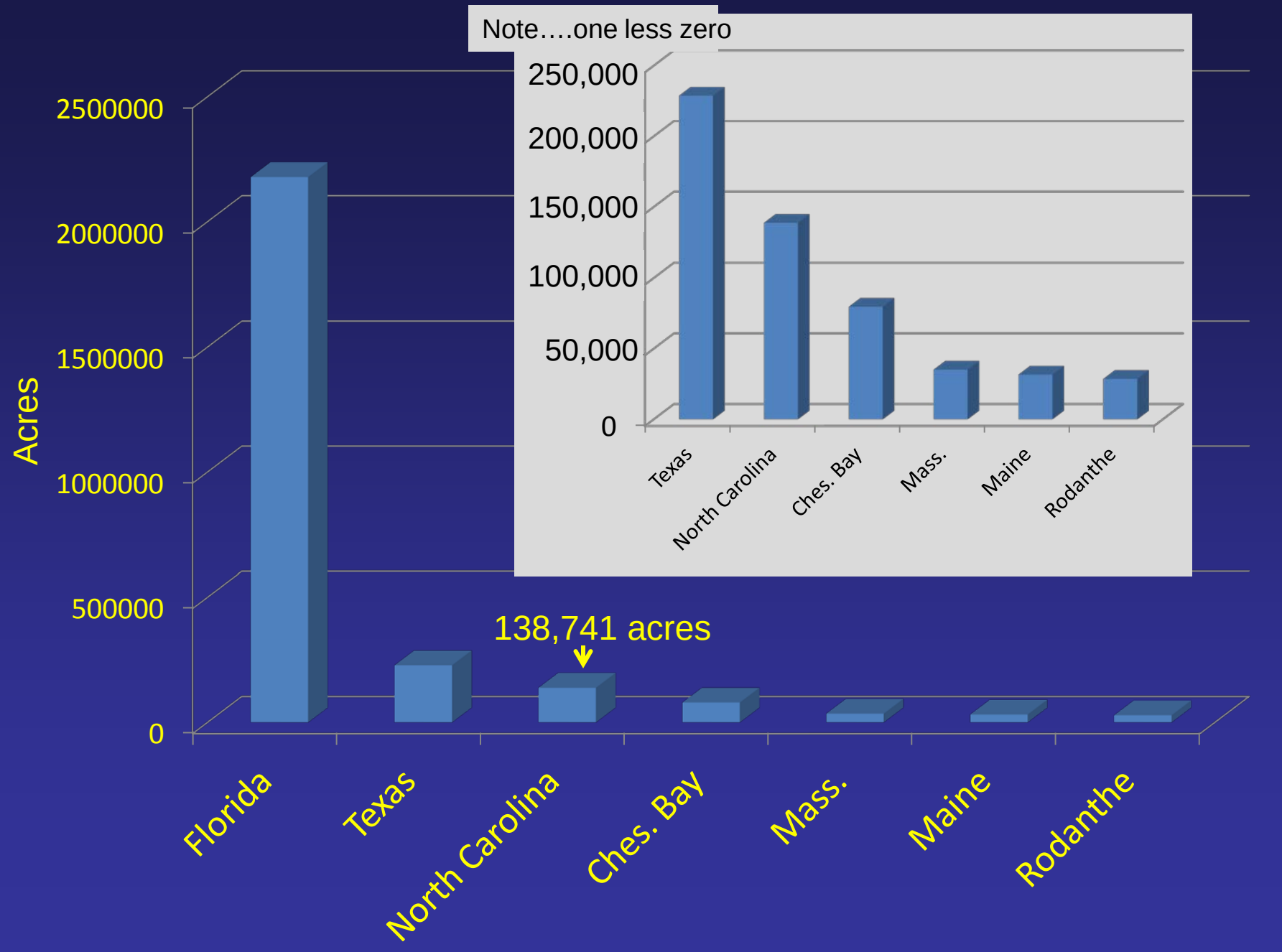
0.3 m image ~ 0.7 GB; 1.0 image ~ 0.25 GB

Manual On-Screen Digitization of SAV Polygons

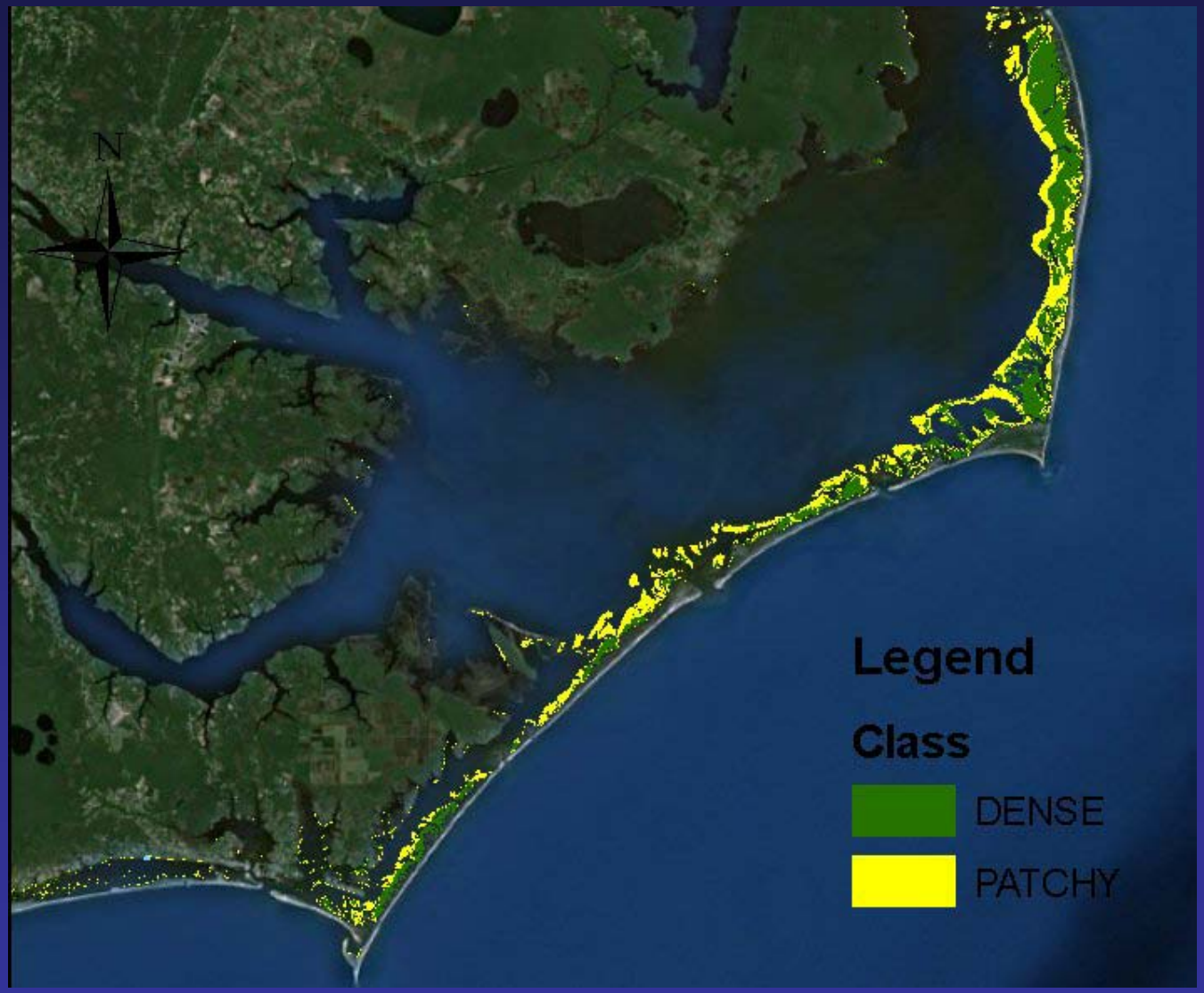
- Initially by DMF Personnel
- NOAA – Bogue Inlet to Oregon Inlet
- APNEP Funded Contract to finish off all other areas

SAV in NC and Back Bay, VA 2006-2008

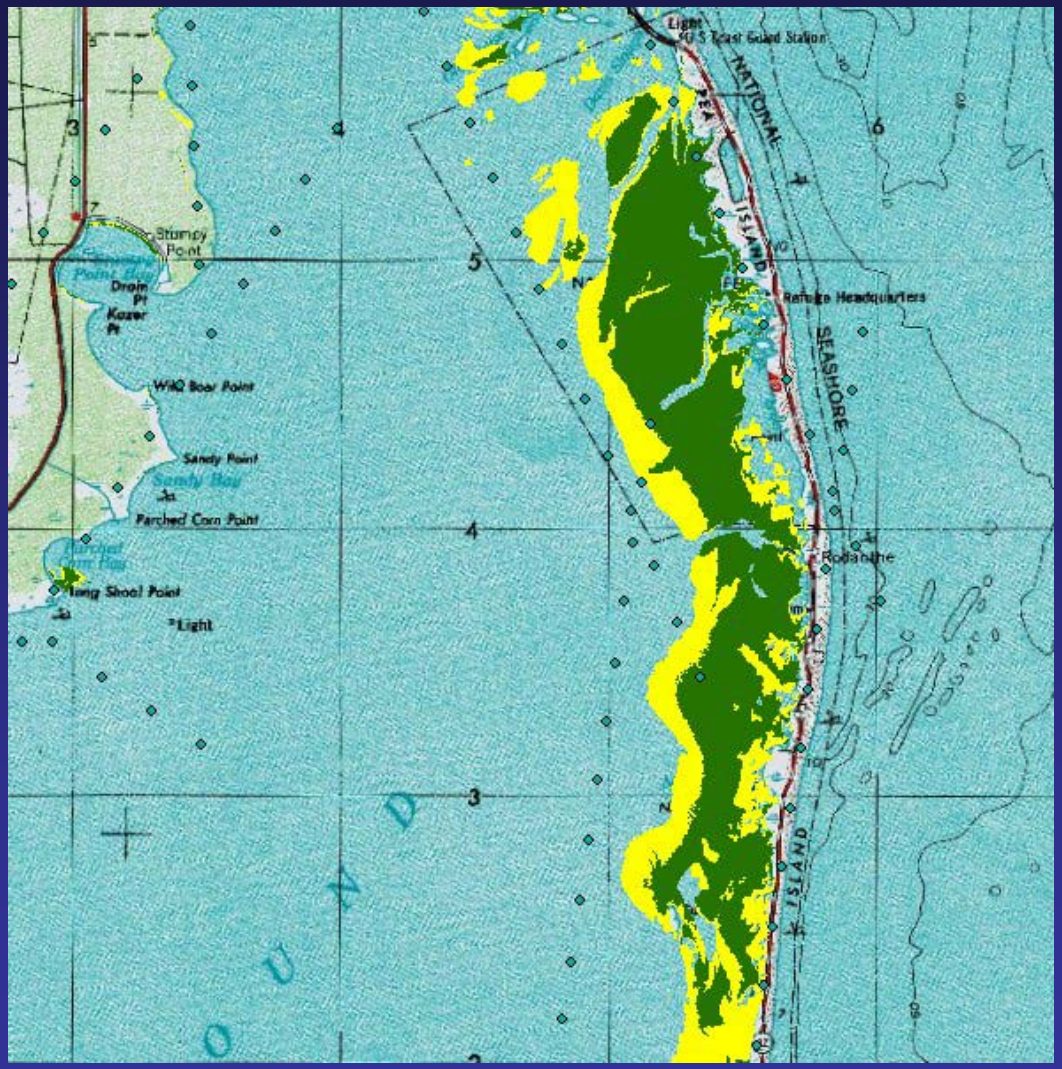



Note….one less zero
250,000
200,000
150,000
100,000
50,000
0
Texas
North Carolina
Ches. Bay
Mass.
Maine
Rodanthe
Acres
2500000
2000000
1500000
1000000
500000
0
138,741 acres
Florida
Texas
North Carolina
Ches. Bay
Mass.
Maine
Rodanthe

Oregon Inlet to Cape Lookout



- 86,103 acres
-71% of State Total



Area South of Oregon Inlet

- Length – 20 miles
- Width – 4 miles
- Total Area – 28,642 acres
- 7th most SAV “State”

2007 1.0m DMC – Core Sound, North of Atlantic

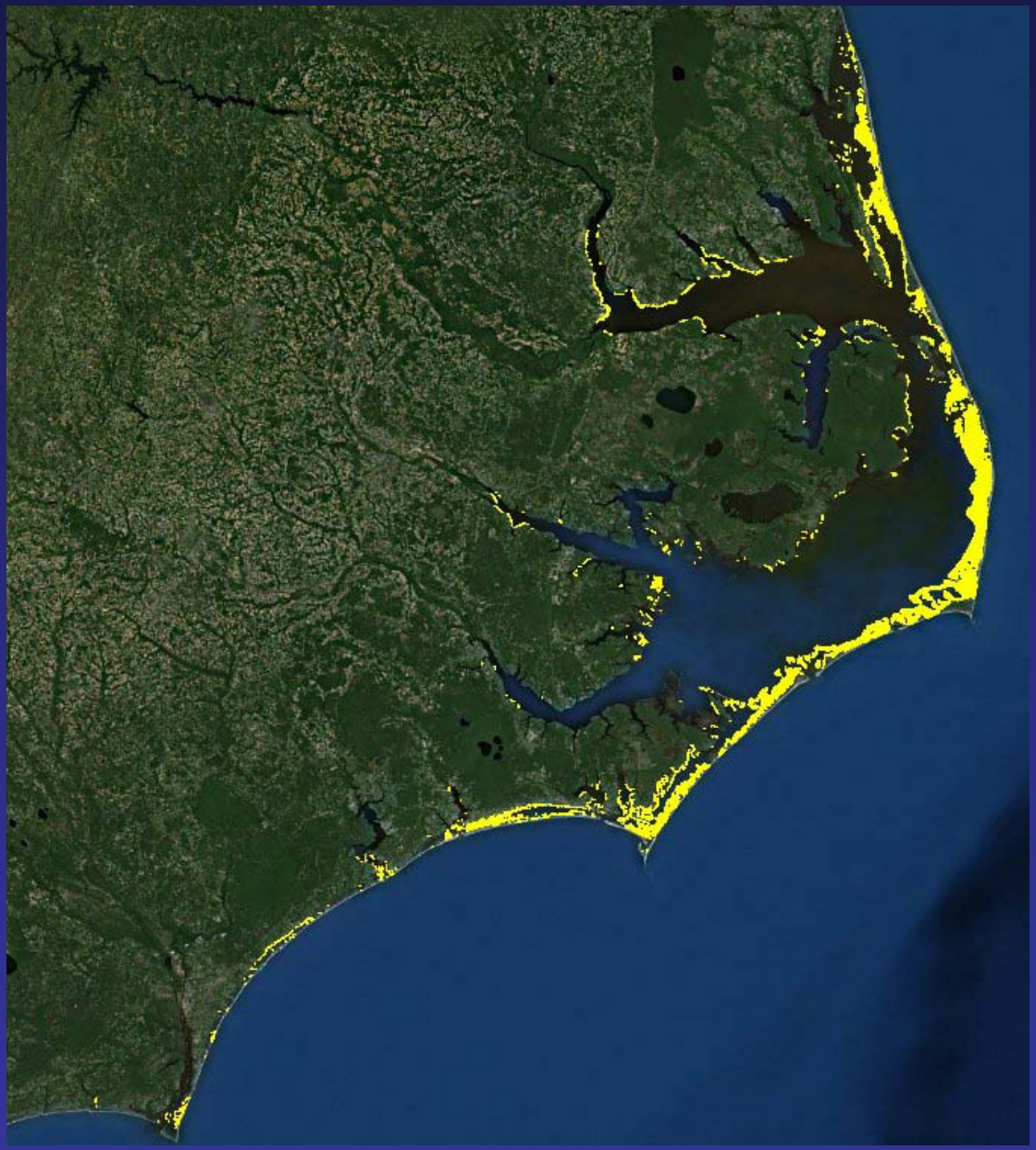
1992 Air Photo – Goose Creek, Bogue Sound

2006 DMC Data – Goose Creek, Bogue Sound

Cape Lookout Jetty – May, 2006 – 0.3 m

Cape Lookout Jetty – Oct, 2007 – 1 m

SAV in NC and Back Bay, VA 2006-2008



http://portal.ncdenr.org/web/apnep/resources/maps

Where Do We Go From Here?

- Already at the 4 year period from the initial acquisitions
- Monitoring – NOAA, ECU, NCSU, APNEP obtained a CRFL grant to try to develop a statewide monitoring program
- Biggest Challenge – Improving the map for the western side of the sounds