

# South Carolina Aquatic Nuisance Species Program



# South Carolina Aquatic Nuisance Species Program

- Established by Executive Order in 1980, then by law in 1990. (Formerly the SC Water Resources Commission, then merged with SC Wildlife to create the SCDNR in 1994)
- Program administered by DNR and Aquatic Plant Management Council.



# South Carolina

## Aquatic Nuisance Species Program

- Early funding was primarily from USACOE Established Aquatic Plant Management Trust Fund which can carry over funds from year to year
- Recently funding for the Trust Fund has been established from South Carolina's Water Recreation Resource funds.
  - Derived from gas-tax based on the number of registered boats in South Carolina.
  - South Carolina has the second largest per-capita boat registrations in the United States.



# Aquatic Plant Management Council

- 10 member board.
  - DNR (3), DHEC, DHEC-OCRM, Clemson Univ., Santee Cooper, Dept. of Agriculture, PRT, Governor's Office
- Responsible for interagency coordination.
- Serves as the principal advisory body to the DNR on all aspects of aquatic plant management and research.
- Establishes management policy and approves all management plans.
- DNR has approval authority for sections that do not receive two-thirds approval by the Council.





# South Carolina

## Aquatic Nuisance Species Program - Planning

- Public notice and are held across the state. Draft management plan developed in December based on local input and DNR surveys.
- APM Council reviews and approves draft for public review and comment. (Jan.-Feb.)
- Draft Plan has 30-day public review (Feb.-Mar.)
- APM Council approves final plan after review and consideration of public comments (March).



# South Carolina Aquatic Nuisance Species Program

## Problem:

- Invasive species are rapidly changing South Carolina's waters. Pristine coastal marshes, rivers, streams, lakes and ponds are being overrun by ever increasing numbers of invasive species.



# South Carolina Aquatic Nuisance Species Program

## **Purpose:**

- Prevent and control the introduction, spread and impact of aquatic invasive species in South Carolina's public waters.
- Improve habitat and minimize the problematic impacts to water use caused by invasive species through management and prevention efforts



# South Carolina Aquatic Nuisance Species Program

- SC AIS Task Force
- Southeastern Association of Fish and Wildlife Agencies Aquatic Nuisance Species Committee
- Association of Fish and Wildlife Agencies Aquatic Nuisance Species Committee
- Gulf States and South Atlantic Regional Panel
- SC Exotic Plant Pest Council
- Aquatic Plant Management Council
- Aquatic Plant Management Society





# South Carolina Aquatic Nuisance Species Program

## South Carolina Invasive Species Advisory Committee

- **Newly formed** - established by statutory regulation and is tasked with reviewing requests from state agencies, industry stakeholders, agricultural and environmental representatives and concerned citizens to make recommendations for additions or deletions to the official list of regulated plant pests in this state including both terrestrial and aquatics
- Chair: Clemson University, Department of Plant Industry



# South Carolina

## Aquatic Nuisance Species Program – Goals

- Increase the coordination of aquatic invasive species activities
- Monitor occurrence and spread of aquatic invasive species
- Provide habitat enhancement by:
  - Eradication of newly discovered and established invasive species
  - Management of aquatic invasive species when eradication is not possible
  - Identification and implementation of needed research on impacts and control of aquatic invasive species



# South Carolina

## Aquatic Nuisance Species Program – Goals

- Educate public and private stakeholders on the impacts of aquatic invasive species and how they can assist in preventing introductions and minimizing harm
- Strengthen legislative and regulatory authority
- Secure long-term funding for AIS activities



# South Carolina

## Aquatic Nuisance Species Program - Partnerships

- Coordination with USFW, USACOE and regional DNR staff for phragmites, hyacinth, and Chinese tallow control in the lowcountry (Additional Treatment of Phragmites).
- Partnership with The Nature Conservancy, Historic Ricefields Foundation, USF&W for phragmites and water hyacinth control in the Pee Dee and Waccamaw River area.
- Coordination with Santee Cooper for habitat enhancement on DNR properties.





# Aquatic Nuisance Species Program

- *New Problems:*
  - *Lake Marion – *Salvinia molesta**



# Aquatic Nuisance Species Program

- *The big three:*



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# Aquatic Nuisance Species

## Hydrilla Update

- **Problem:** *Hydrilla verticallata* can cause decreased flows, low dissolved oxygen levels, navigation issues, and others.
- Municipal and power supply water intakes can become clogged.
- Recreational boating can be severely impacted.
- On the positive side; hydrilla has been significantly controlled through an integrated management approach using herbicide and biological control methods.



# Aquatic Nuisance Species Hydrilla Update

- 1982 - 2007 – 50,376 acres treated with herbicides at a cost of \$15,039,433.
- Triploid grass carp stockings have reduced the herbicide treatment of hydrilla drastically in SC's major lakes.



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# Aquatic Nuisance Species Hydrilla Update

- Hydrilla control efforts have drastically been reduced due to stocking of triploid grass carp and selective herbicide applications.
- From 1991 – 1996 Lake Marion averaged treating 2684 acres a year.
- Since 1996 when control by the carp was evident they have only averaged <50 acres a year with the majority of the work done in impoundments off of the main lake.



# Aquatic Nuisance Species Hydrilla Update

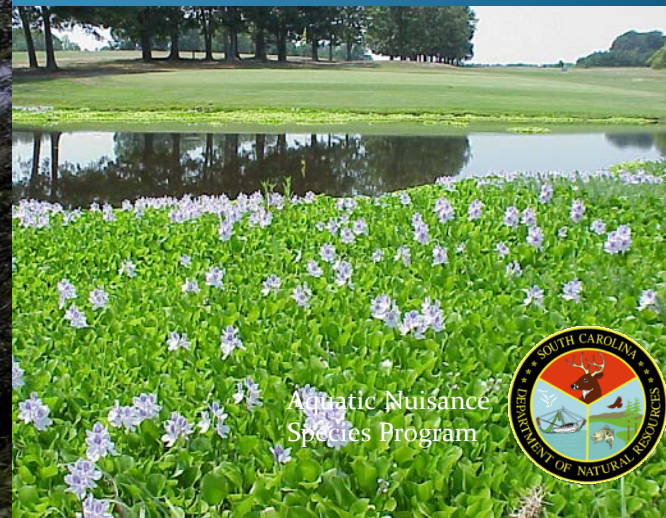
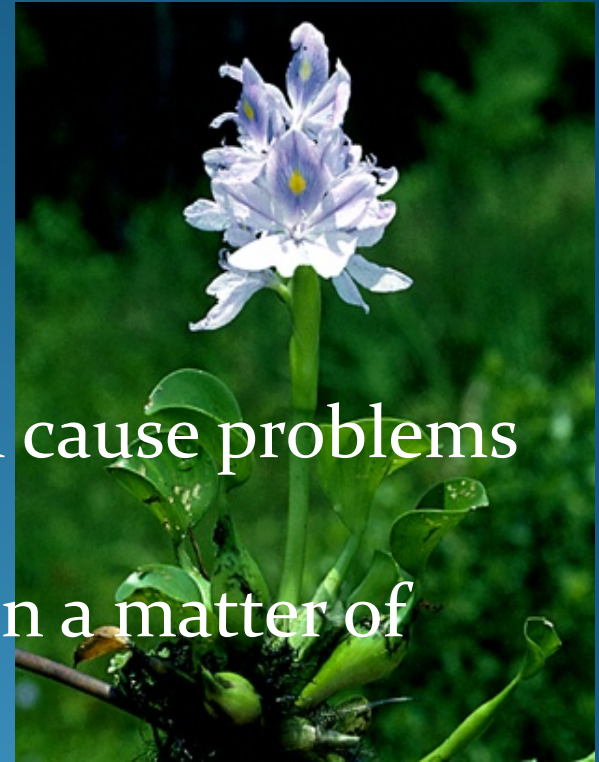
## Grass Carp Stockings

- Santee Cooper – 1989-2019 – 1,062,178 – 160,000 acres
- Lake Greenwood – 2009-2019 – 7,510 – 11,400 acres
- Lake Murray – 2003-2019 – 278,100 – 50,000 acres
- Goose Creek Reservoir – 1991-2019 – 20,815 – 600 acres
- Stocked areas include Lake Bowen, Lake Croft, Lake Keowee, Lake Prestwood, Lake Wylie, Lake York, and others. The USACOE has also implemented stocking on Lake Thurmond.



# Aquatic Nuisance Species Water hyacinth Update

- Problem:  
*Eichhornia crassipes* invasions can cause problems similar to hydrilla.
- Hyacinth can double it's biomass in a matter of days.
- Prolific vegetative reproduction
- Common in water garden trade



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# Aquatic Nuisance Species Water Hyacinth Update

- 1991 – Current  
32,161 acres treated at a cost of \$2,999,662 (Avg/Ac \$93.27).
- Present – Control continues







Most hyacinth work around Coastal South Carolina is done by airboats because of the large expanses it covers in most coastal rivers, streams, and impoundments.

With a reduction in acreage of hydrilla and phragmites; hyacinth remains the largest problem in South Carolina waters.



# Aquatic Nuisance Species

## Phragmites Update

- **Problem:**

*Phragmites australis* invasion alters the structure and function of diverse marsh ecosystems by changing species composition, nutrient cycles and hydrological regimes. Dense *Phragmites* stands in South Carolina decrease native biodiversity and quality of wetland habitat, particularly for migrating waders and waterfowl species.

# Aquatic Nuisance Species Phragmites Update

- Since 2003 when phragmites control was first initiated in some small test plots, a total of 19,706 acres at a total cost of \$3,254,273 has been treated when monies were available. It was cyclic in nature with little maintenance work done in the interim periods due to manpower and dollar shortages. Many areas were controlled redundantly every 5 years. In recent years with increased wildlife program funding maintenance control has been effective.







Most Phragmites work around Coastal South Carolina is done by helicopter because of the large expanses it covers in relatively undeveloped areas.

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Phragmites starts as small clumps and gradually through expansion grows together and forms large colonies.

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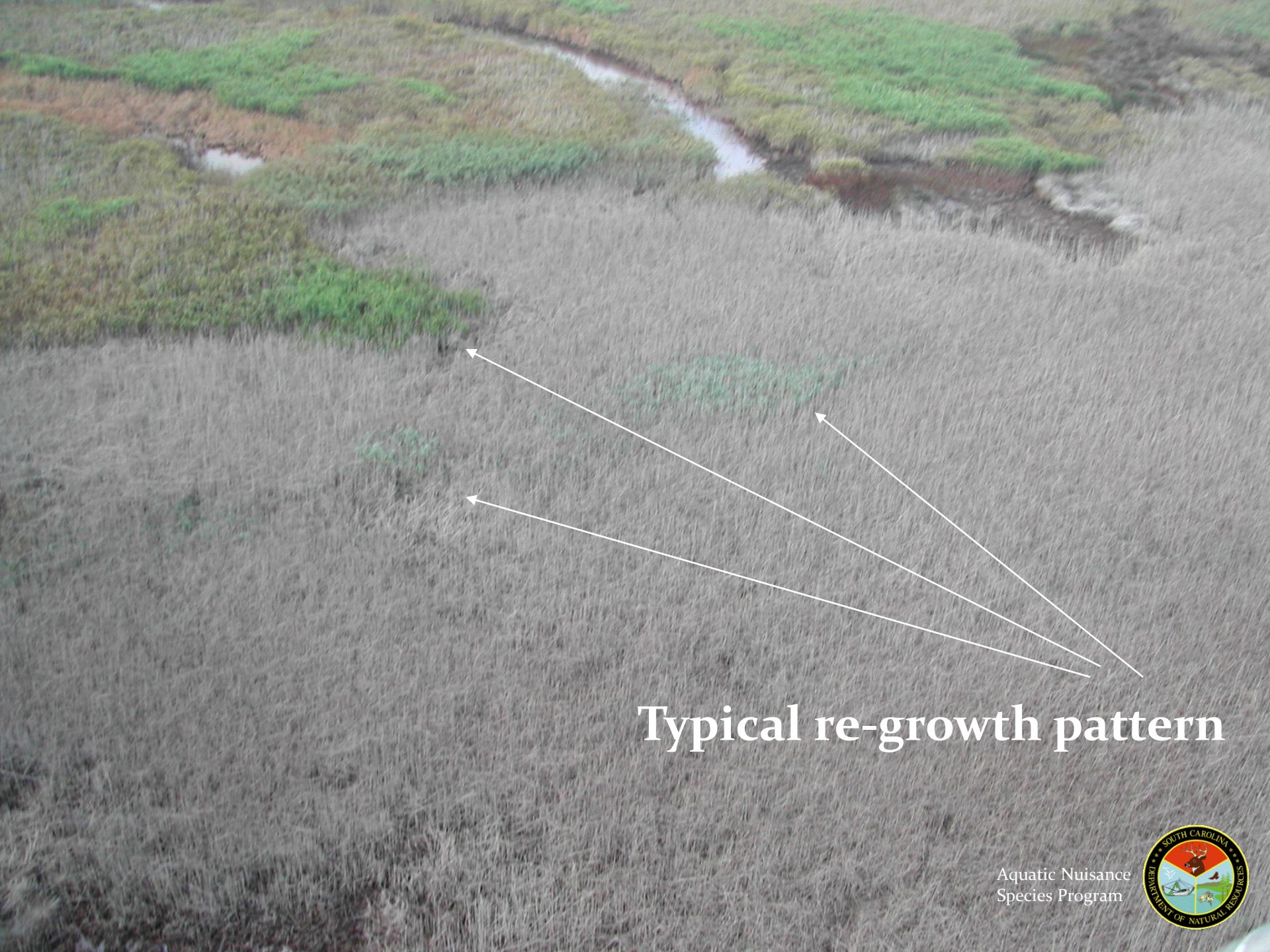


Flight paths are clearly visible from the previous years herbicide application.

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Typical re-growth pattern

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...and the cycle starts all over again!

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But it can grow in developed areas and cause some major problems!

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# Santee Coastal Reserve

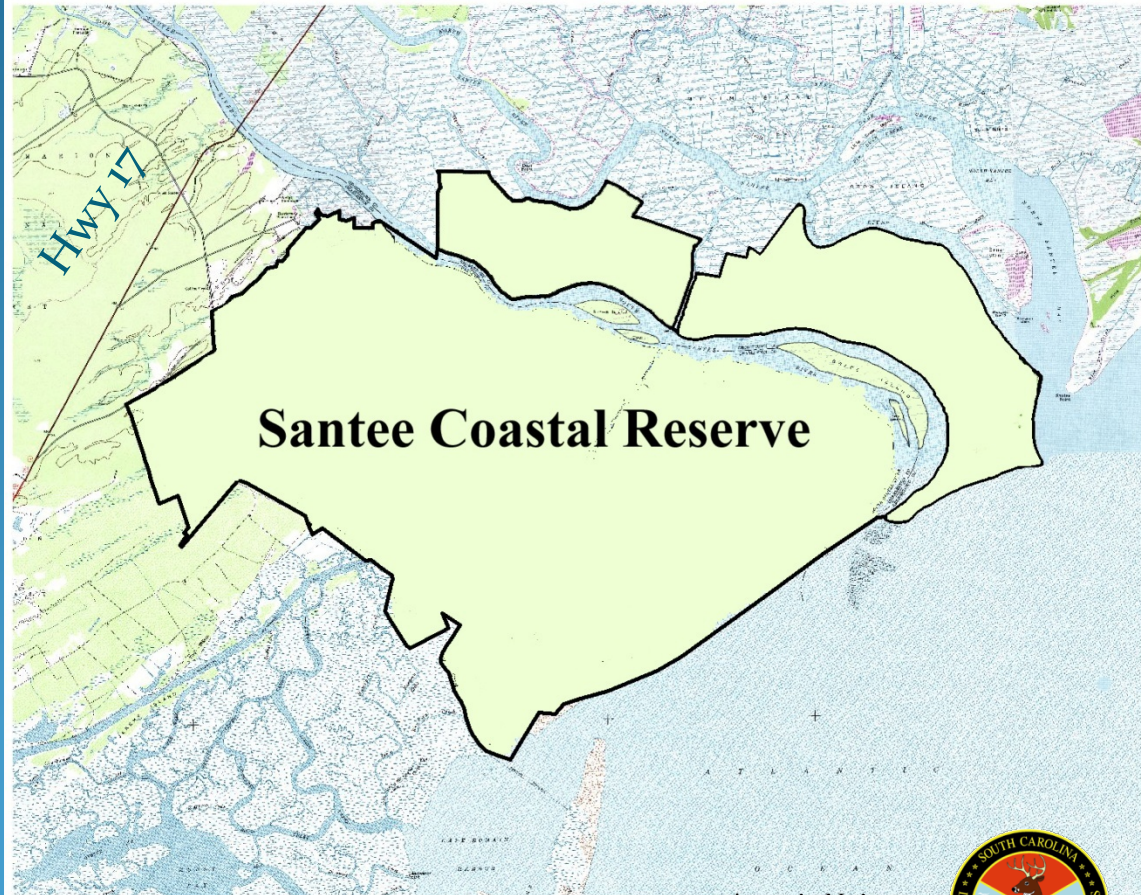
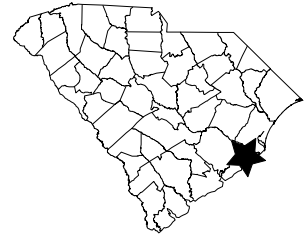
## Problem species: Phragmites

2005-Current  
15356 acres - \$2,636,640

Cost share-SCDNR

Habitat, Clearcast  
48-96 oz per acre with  
with 96 oz of glyphosate  
with MSO  
Helicopter Rate 15 GPA

## Santee Coastal Reserve



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22.25 % of total managed impoundments unusable by waterfowl because of phragmites. (35.53% of Murphy Island)

**Santee Coastal Phragmites Control  
Estimated Total Acreage Impacted**

4%	Thompson - 112 acres
64%	Rushes - 1023 acres
12%	Cape - 445 acres
55%	Horns - 966 acres
7%	Cedar - 193 acres







SprOn

## Santee Coastal Phragmites Control



2004 - 494 acres



Map prepared by SCDNR Aquatic  
Nuisance Species Program  
6/25/2007







### Santee Coastal Phragmites Control

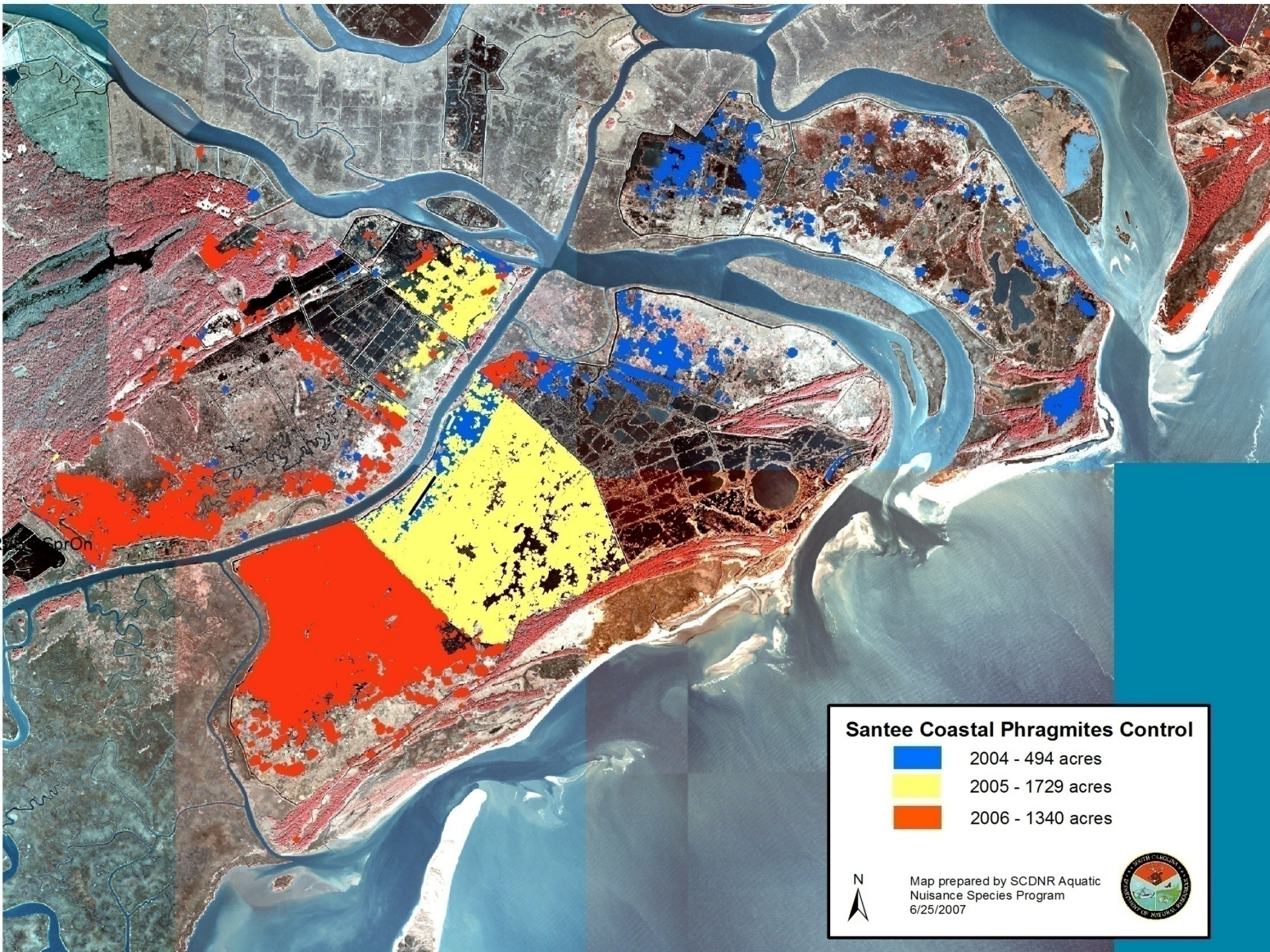
-  2004 - 494 acres
-  2005 - 1729 acres



Map prepared by SCDNR Aquatic  
Nuisance Species Program  
6/25/2007







### Santee Coastal Phragmites Control

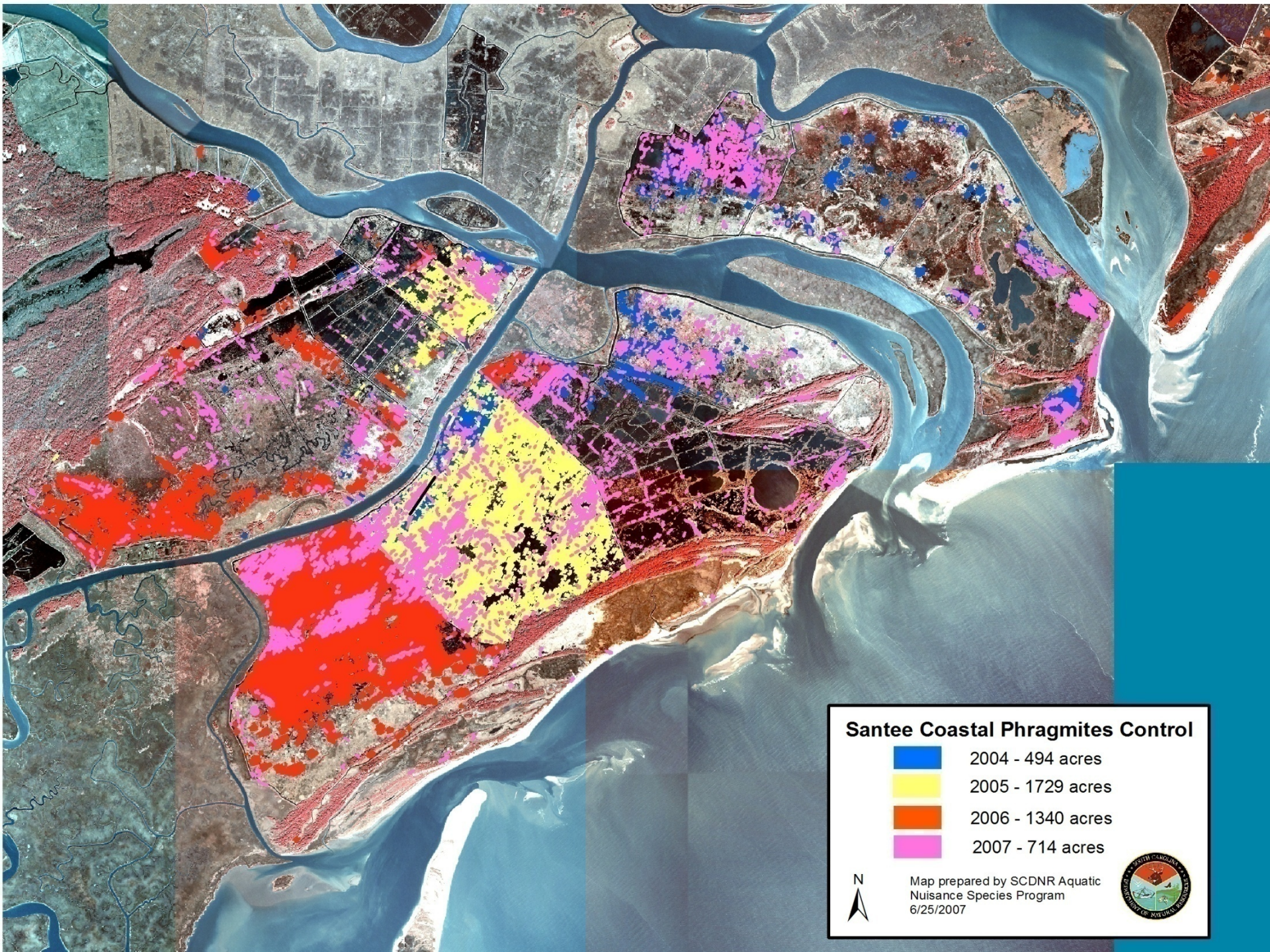
- 2004 - 494 acres
- 2005 - 1729 acres
- 2006 - 1340 acres



Map prepared by SCDNR Aquatic  
Nuisance Species Program  
6/25/2007







### Santee Coastal Phragmites Control

- 2004 - 494 acres
- 2005 - 1729 acres
- 2006 - 1340 acres
- 2007 - 714 acres



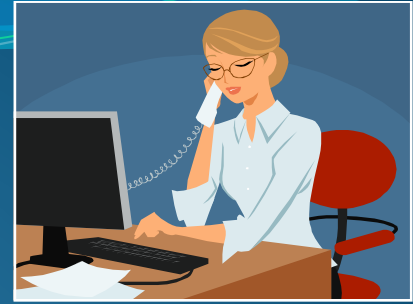
Map prepared by SCDNR Aquatic  
Nuisance Species Program  
6/25/2007







# Rapid Response Protocol



Very Informal Network Consists of :

- Clemson University Cooperative Extension Service Agents (at least one in every county in SC)
- S. C. Department of Natural Resources Field Personnel
- Public Reports

Responders:

- SCDNR-Aquatic Nuisance Species Program



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# Rapid Response in Action

Early Detection and Eradication of *Salvinia molesta*  
Colleton County and Jasper County  
South Carolina

- Clemson University Cooperative Extension Service
- S. C. Department of Natural Resources



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# Chronology of Events

## First Occurrence of *Salvinia molesta* in U.S.

### Colleton County:

- Aug. 1994-Discovered by Manager in early stages of growth
- Feb. 1995-Request to Clemson's Colleton County Extension Service
- Mar. 1995-Extension Visit-Identified *Salvinia*
- Apr. 1995-1 gallon Diquat/Acre Application
- May 1995-SCDNR & Botanical Services Identified *Salvinia Molesta*



# Chronology of Events

- June 1995-Retreat 1.5 gallon Diquat/ Acre
- July 1995-USDA APHIS & S.C. Dept. of Plant Industries
- July 1995-Salvinia Molesta confirmed USDA
- Aug. 1995-SCDNR Application - 2 quarts Fluridone / Acre

## Probable Origin of Infestation

- Ornamental Plant Introduction

## Status

- Eradicated /Monitoring



# Chronology of Events

## Jasper County:

- July 28, 2004 - first reported to Clemson Extension and SCDNR - Delta Plantation
- July 29, 2004 - Site Survey, SCDNR Staff
- July 30, 2004 - Initial Treatment, Reward 1 gallon/acre
- Aug. 20, 2004 - Follow-up Treatment – Reward 1/2 gallon/acre along with Sonar 1 quart/acre



# Chronology of Events

- Aug. 2005 + Oct. 2005 - Follow-up Treatment – Reward along with Sonar
- Probable Origin of Infestation  
Ornamental Plant Introduction
- Status  
Eradicated /Monitoring

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# Proposed Control Operations and Expenditures for 2020

- 2020 SC Aquatic Plant Management plan will be available online (March 2020).  
[www.dnr.sc.gov/invasiveweeds/plan.html](http://www.dnr.sc.gov/invasiveweeds/plan.html)
- TBD + waterbodies & areas managed - Budgeted - \$TBD
- Includes State Park Lakes
  - Barnwell SP
  - H Cooper Black Rec. Area
  - Little Pee Dee SP
  - Sesquicentennial SP
  - Huntington Beach SP
  - Charlestowne Landing SP
  - King's Mountain SP
  - Santee SP
  - NR Goodale SP
- Phragmites control will be continued.

