



Rob Emens

NC Division of Water Resources

Department of Environmental Quality



Rob Emens

- 15+ years experience in aquatic vegetation management
- Program Manager for NC Aquatic Weed Control Program
 - NCDEQ - Division of Water Resources
- Active in following professional organizations:
 - NC Invasive Plant Council
 - NC Aquatic Weed Control Council
 - SC Aquatic Plant Management Society
 - SE Exotic Pest Plant Council
 - Mid-Atlantic Panel for Aquatic Invasive Species
- Began career in aquatic vegetation management working for BioSphere, a small company in Winter Garden, FL.



Aquatic Weed Control Program Objectives:

Assist local governments burdened with aquatic weed infestations:

1. Provide technical assistance:
 - Site assessments
 - Offer management recommendations
 - Draft management plans
2. Provide financial assistance:
 - Cost sharing arrangements

The Philosophy:

By addressing localized outbreaks we can mitigate the economic and environmental impacts these species impose in the long run

NC Aquatic Weed Control Program

Financial assistance is only provided for

Noxious Aquatic Weeds

Phragmites australis is listed as a noxious weed



Department of Environmental Quality



What defines a noxious weed?

- The NC Department of Agriculture is the regulatory authority.
 - Class A (Federally listed species)
 - Class B
 - Class C
- The NC Department of Environmental Quality
 - Noxious Aquatic Weed list

NC Department of Environmental Quality

Noxious Aquatic Weeds

1. All aquatic plants listed on the Federal Noxious Weed list
2. Plus some additional plants...
 - Alligatorweed
 - Water Hyacinth
 - Parrotfeather
 - Brittle Naiad
 - Phragmites

History of Phragmites control in NC

- 2007
 - Site assessments occurred at various state parks; responding to request for assistance from Div. of Parks & Recreation
- 2008
 - First year of management at state parks
 - Also responded to a request from Dare County to assist with spraying Phragmites on Roanoke Island (25 acres @ \$10,000)
- 2009
 - Continued management at state parks
 - Roanoke Island (25 acres @ \$10,000)
- 2010
 - Continued management at state parks
 - Roanoke Island (25 acres @ \$10,000)
- 2011 - 2017
 - Continued management at state parks
 - Sprayed small areas at WRC boating access sites



Roanoke Island



Goose Creek S.P.

Nov. 2007



We learned quickly that this is not the best approach !!



Goose Creek S.P.

April, 2009



Goose Creek S.P.

Nov. 2010



Jockeys Ridge S.P.

June, 2011



Jockeys Ridge S.P.

June, 2011





Aquatic Weed Program Operating Budget:



- Program operated year to year by funding as a line item in DWR special projects.
 - Average was ~\$250K
- In 2015 program funding was written in the budget to provide up to \$500K annually.

North Carolina Phragmites Management

Year	State Area Acres	Private Cost-share Acres	Total Acres
2010	29	0	29
2011	4	0	4
2012	6	0	6
2013	2	0	2
2014	3	0	3
2015	2	0	2

Delaware Phragmites Management

Year	State Area Acres	Private Cost-share Acres	Total Acres
2010	3,715	3,192	6,907
2011	3,070	3,395	6,465
2012	4,314	2,396	6,710
2013	4,154	2,956	7,110
2014	3,575	828	4,403
2015			5,614

NC Aquatic Weed Program Funding

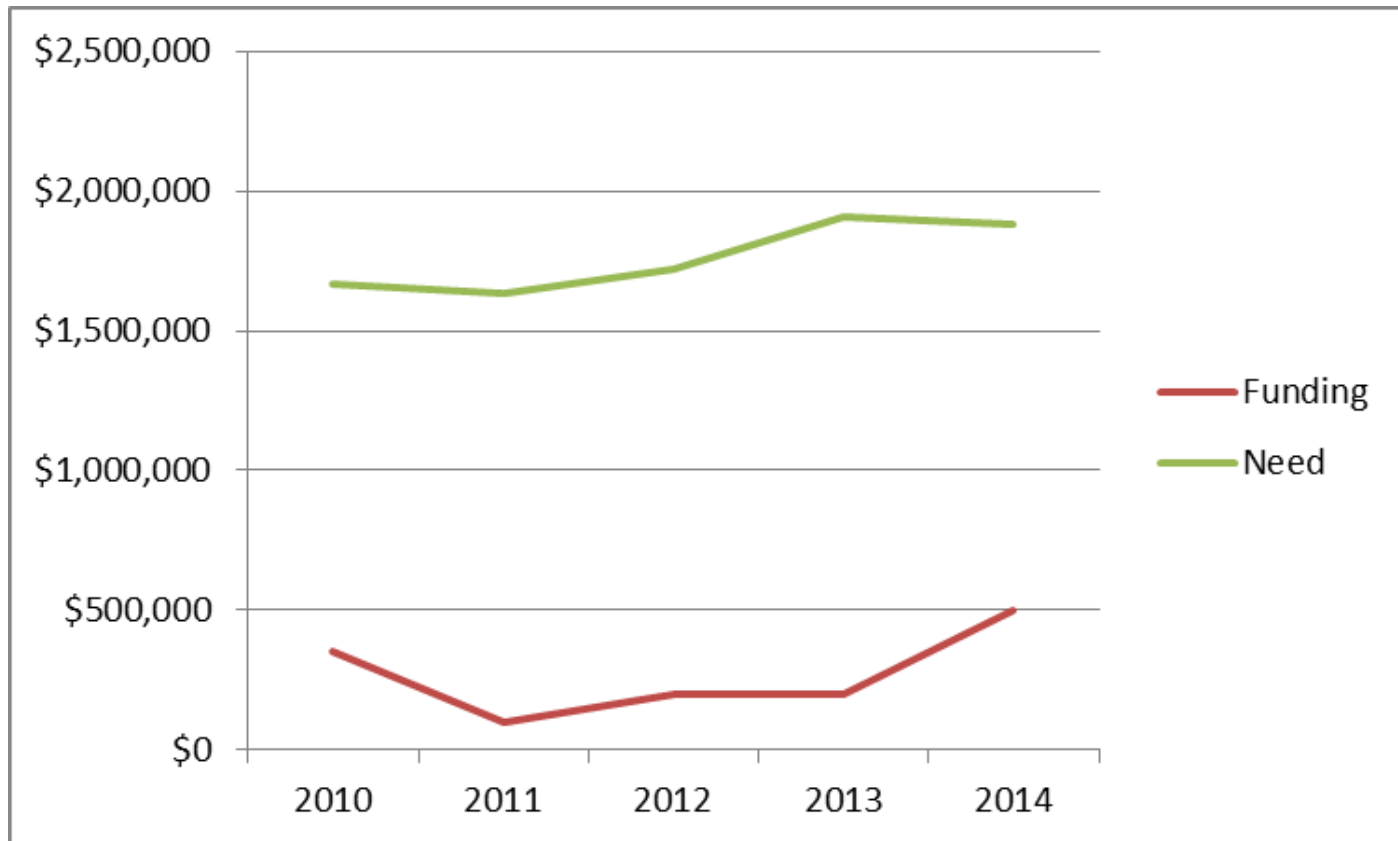
We are behind the curve:

- No financial assistance available for private lands
 - ✓ The cost-share programs of SC and DE should be considered as models
- Education and Awareness
- Funding shortfall

Weeds won't wait !!!



NC Aquatic Weed Program Funding Gap



Questions?



Native vs. Exotic Phragmites

- DNA studies by Saltonstall at Yale determined different haplotypes of the plant (ongoing research)
- Native haplotypes
 - Chesapeake Bay and north
 - Gulf coast
- Exotic haplotype
 - Closely related to European types
 - Likely introduced in the early part of the 19th century through shipping activity
 - Has become invasive in N. America
 - Replace native types in New England and expanded to the Southeast (historically had no Phragmites)

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PHRAG	<i>Phragmites</i> Adans.	reed	
PHAU7	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	common reed	
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PHAUA6	<i>Phragmites australis</i> (Cav.) Trin. ex Steud. ssp. <i>americanus</i> Saltonst., P.M. Peterson & Soreng	American common reed	
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PHKA3	<i>Phragmites karka</i> (Retz.) Trin. ex Steud. [excluded]	tall reed	

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Considered all one species



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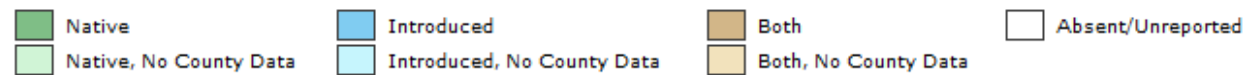
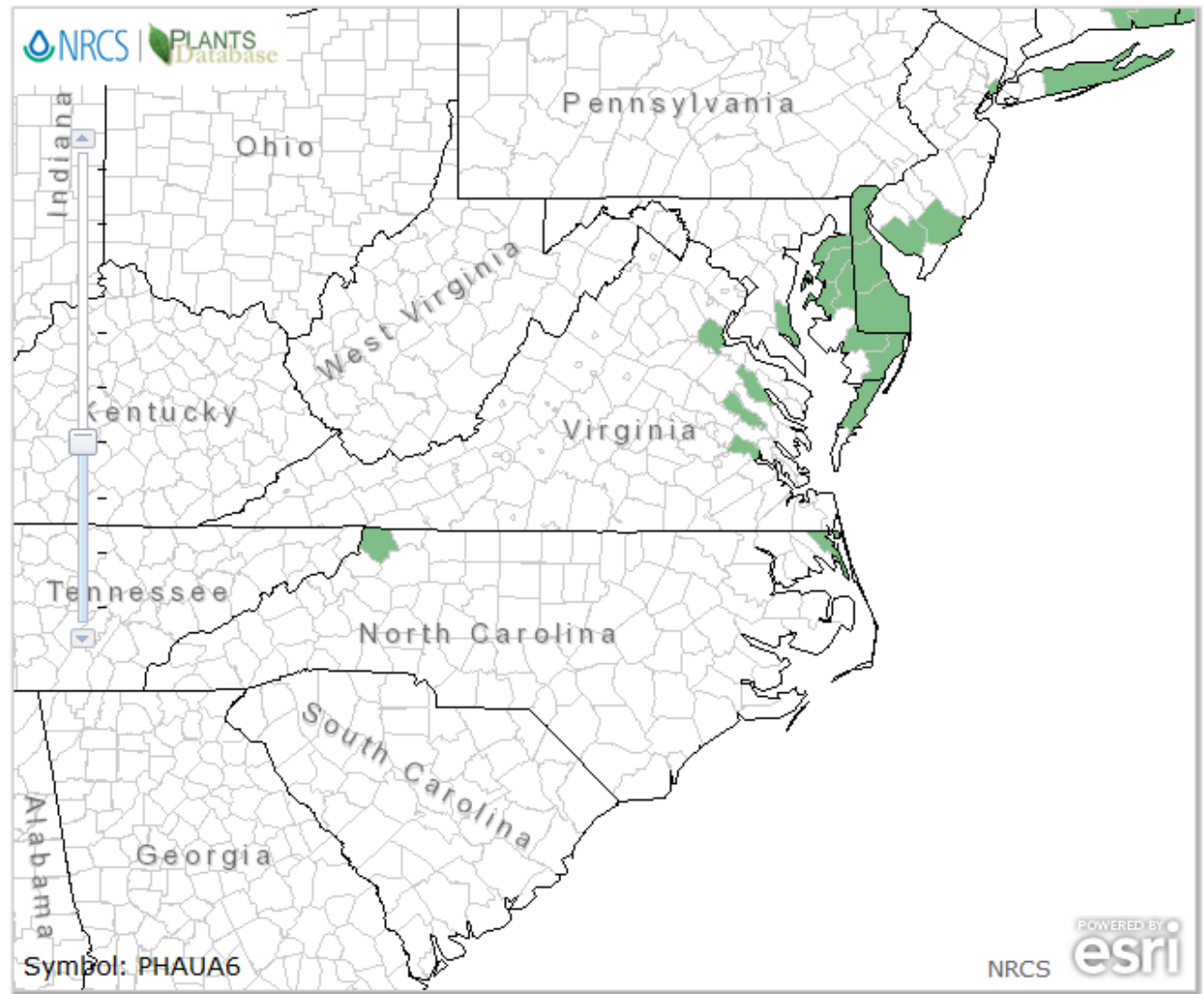
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Phragmites australis (Cav.) Trin. ex Steud. subsp. *americanus* Saltonst., P.M. Peterson & Soreng

American common reed



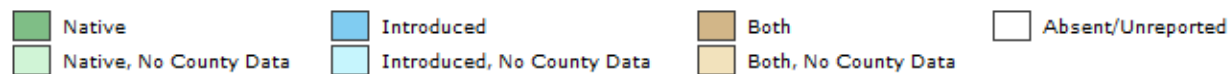
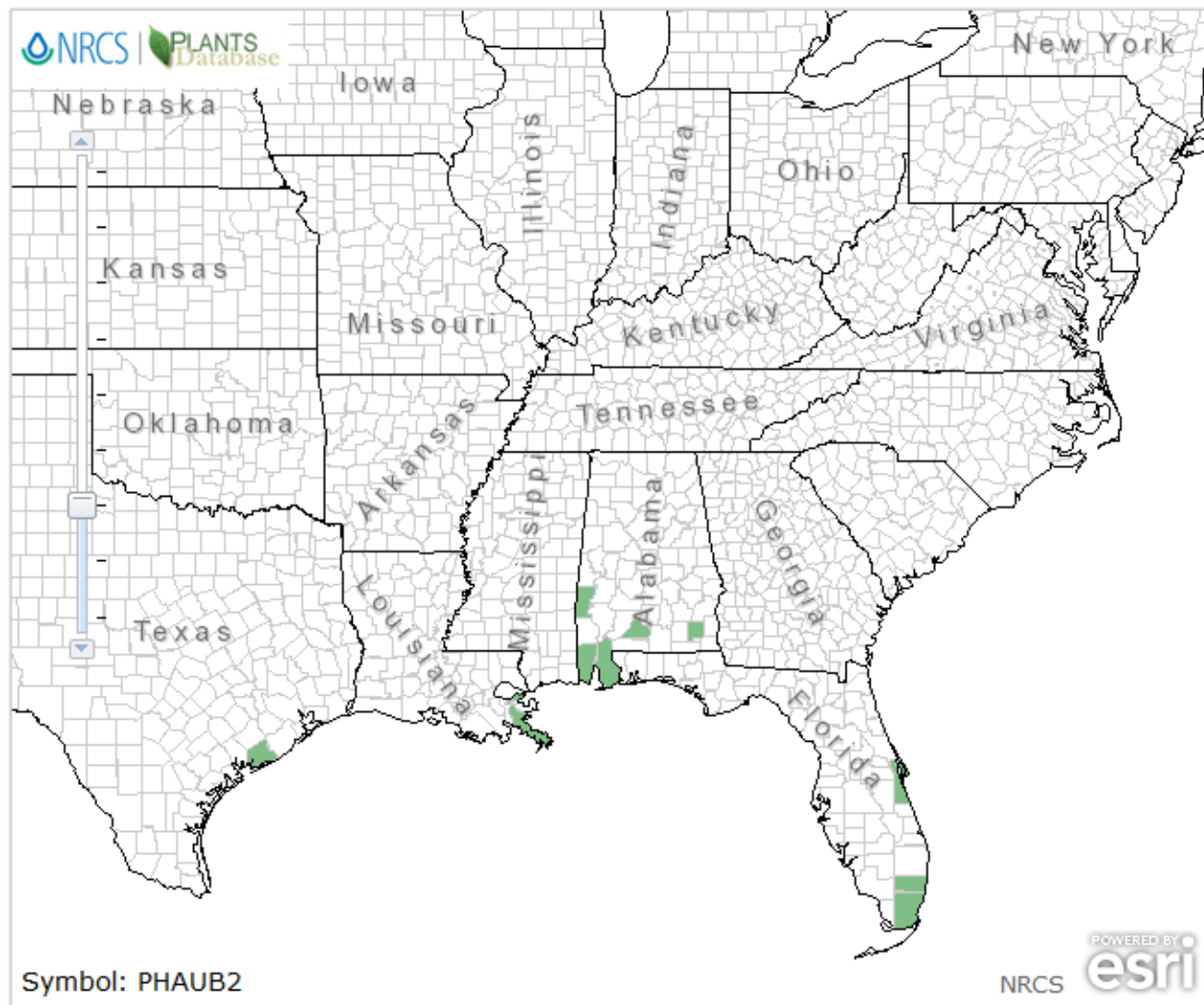
General Information	
Symbol:	PHUA6
Group:	Monocot
Family:	Poaceae
Duration:	Perennial
Growth Habit:	Graminoid
Native Status:	CAN N L48 N
Data Source and Documentation	



Phragmites australis (Cav.) Trin. ex Steud. subsp. *berlandieri* (E. Fourn.) Saltonst. & Hauber
subtropical common reed



General Information	
Symbol:	PHAUB2
Group:	Monocot
Family:	Poaceae
Duration:	Perennial
Growth Habit:	Graminoid
Native Status:	L48 N PR N?
Data Source and Documentation	



Phragmites australis ssp. australis



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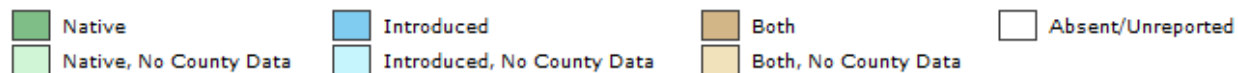
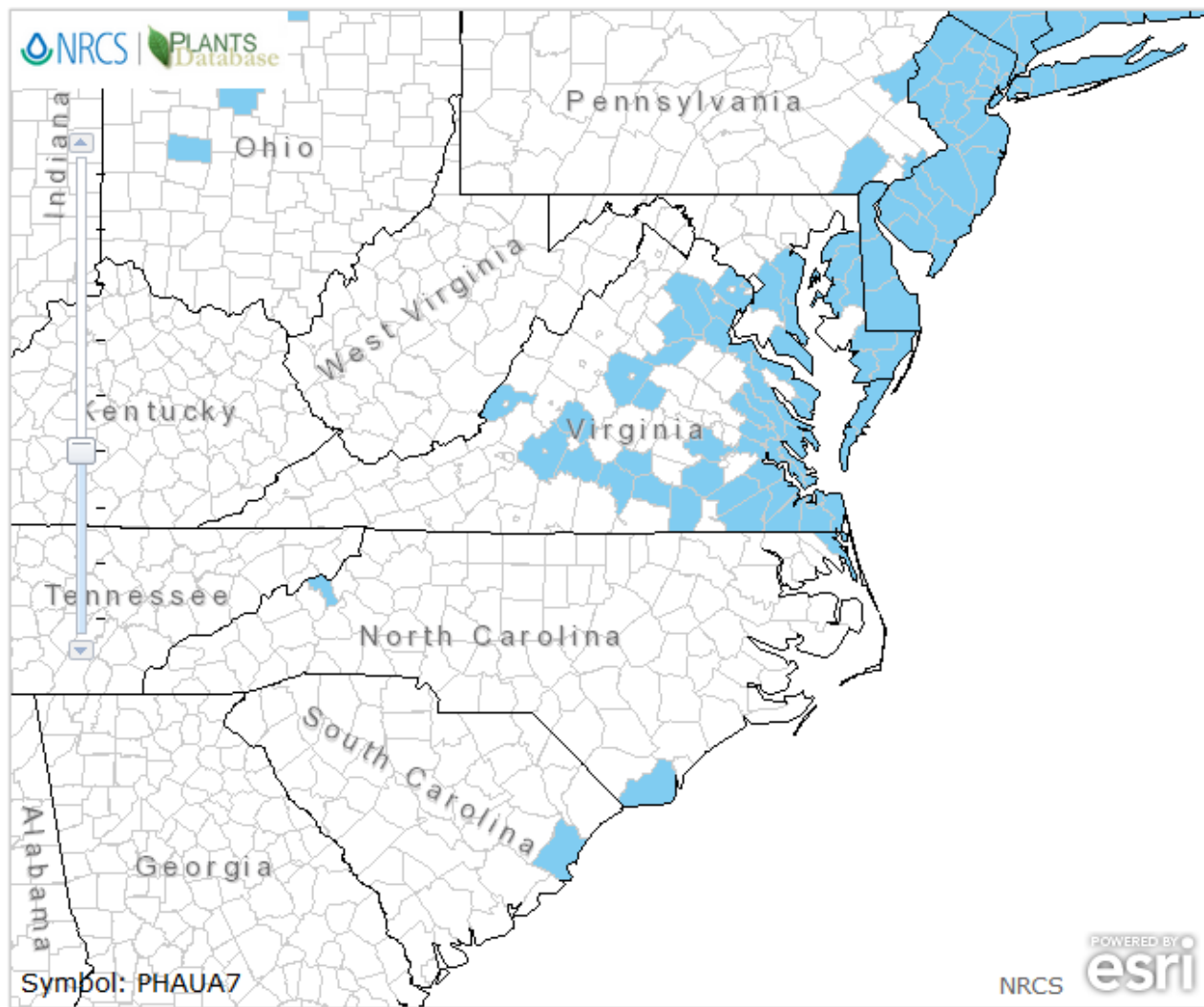
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Phragmites australis (Cav.) Trin. ex Steud. subsp. *australis*
European common reed



Blue = Introduced

General Information	
Symbol:	PHUA7
Group:	Monocot
Family:	Poaceae
Duration:	Perennial
Growth Habit:	Graminoid
Native Status:	CAN I L48 I
Data Source and Documentation	





*Annandale Plantation, South Carolina
(bright green is Phragmites)*



Management of Phragmites

- Methods:
 - Prevention?
 - Phrag loves disturbed areas!
 - Mowing / Clearing / Burning
 - Get those old culms out of the way
 - Herbicide
 - Use an “Aquatic” labeled product
 - Add a surfactant (MSO)
 - Repeat applications over multiple years
 - Biological control
 - None available

Management of Phragmites

- Rob's recommendations:
 1. Early Detection / Rapid Response
 2. Define objective and choose target area
 - a. Limit spread? Remove?
 - b. Can you mow the area?
 - c. Will herbicide be required?
 3. Winter-Spring
 - Mowing / Clearing / (Burning?)
 4. Spring-Summer
 - Aquatic-use Herbicide
 - Glyphosate (5%) or Imazapyr (1.5%)

History of Phragmites

- Known to occupy every continent except Antarctica
- Dated in North America 11,000 - 40,000 years ago based on fecal remains from extinct sloth in Grand Canyon cave
- Early naturalists and books noted it was a minor wetland plant usually at upper elevations of wetlands
- Plentiful in swamps behind NJ salt marshes in 1910

Biology of Phragmites

- Rhizomatous perennial grass – underground stems serve as a bud bank for new shoot growth
- Can tolerate a wide range of environments but typically found in wet areas
- Can live in saturated soils because of air channels that run from leaves to roots
- Invasive strain readily colonizes disturbed areas adjacent to our rivers and sounds

South Carolina Phragmites Management

Year	SC-DNR Program Acres	SC-DNR Program Costs	Private Cost-share Acres	Private Cost-share Acres
2005	2,083	\$349,174	-	-
2006	1,950	\$352,804	-	\$56,700
2007	1,147	\$194,335	-	\$33,810
2008	748	\$107,070	-	\$21,640
Totals	5,928	\$1,003,383	1,188	\$112,150