

# **How Management Strategies Have Affected Atlantic White-Cedar Forest Recovery After Massive Wind Damage in the Great Dismal Swamp**

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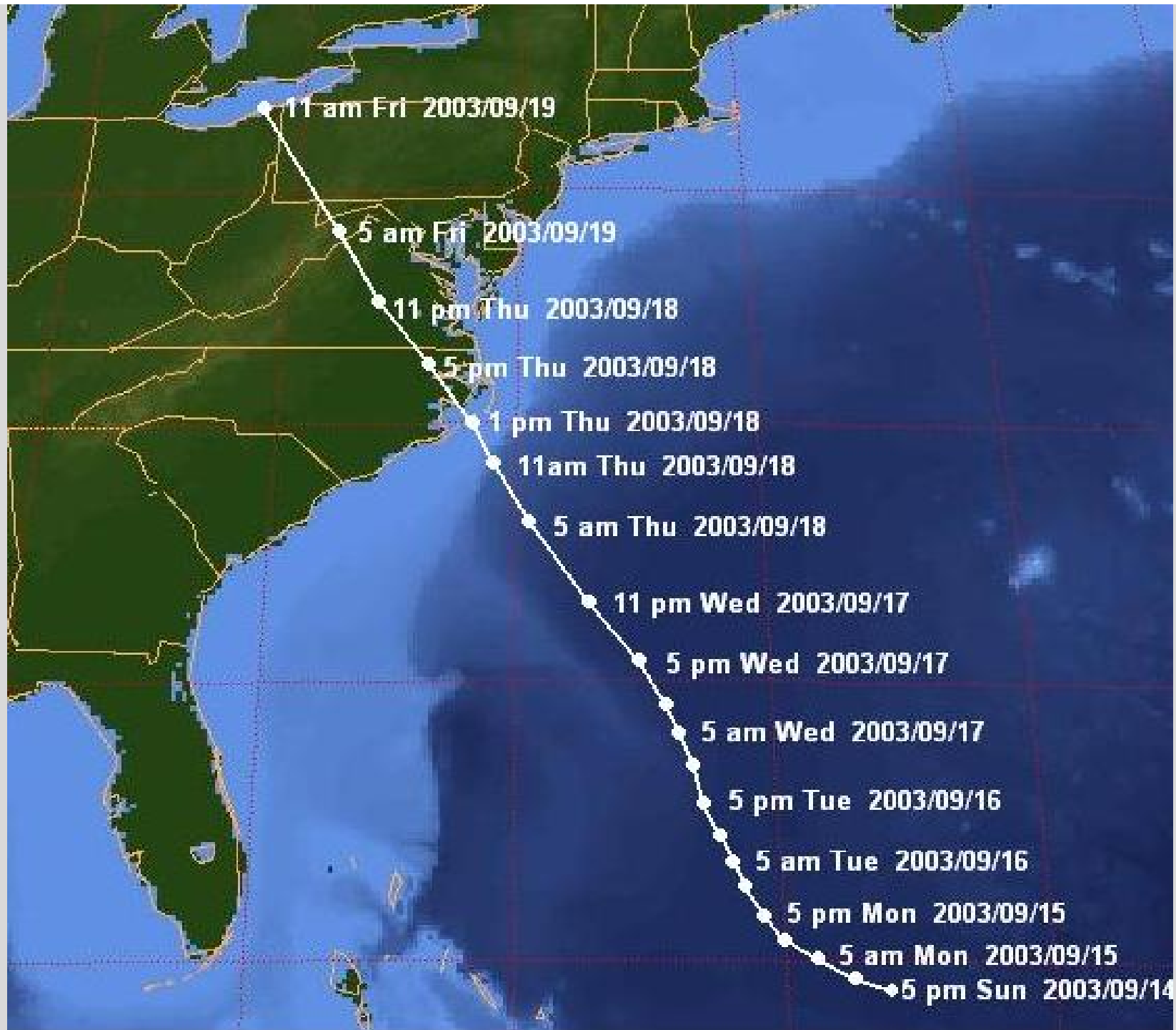
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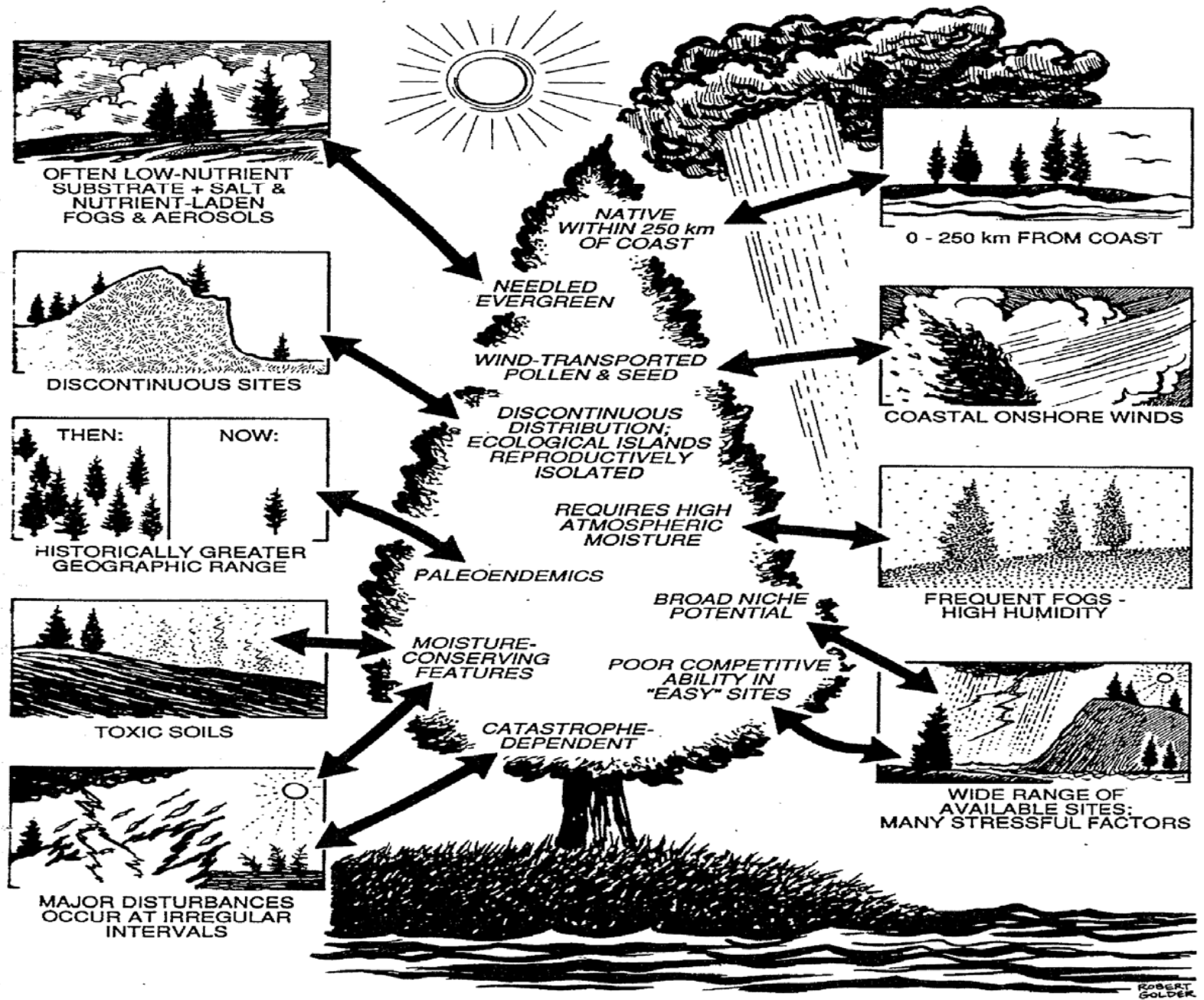






# Major Restoration Problems





courtesy of Aimlee Laderman 2000



Photo courtesy of Brian Poovey, Refuge Forester



Photo courtesy of Brian Poovey, Refuge Forester



# Major Study Questions

- Is a more hands-off management approach effective for promoting cedar regeneration after a storm?
- How much successful regeneration is taking place at Dismal Swamp State Park?
- What type of plant community is taking the place of cedar forest?
- Is a viable seedbank still available 5 years after the storm?

**Hurricane Isabel (HI)**



**Older Blowdown (OB)**



**Standing Cedar (SC)**







# Site Locations

O SC  
B

HI

O  
B

O  
B

HI = Hurricane Isabel

OB = Older Blowdown

SC = Standing Cedar Forest  
with some blowdown

# Creating Study Trails

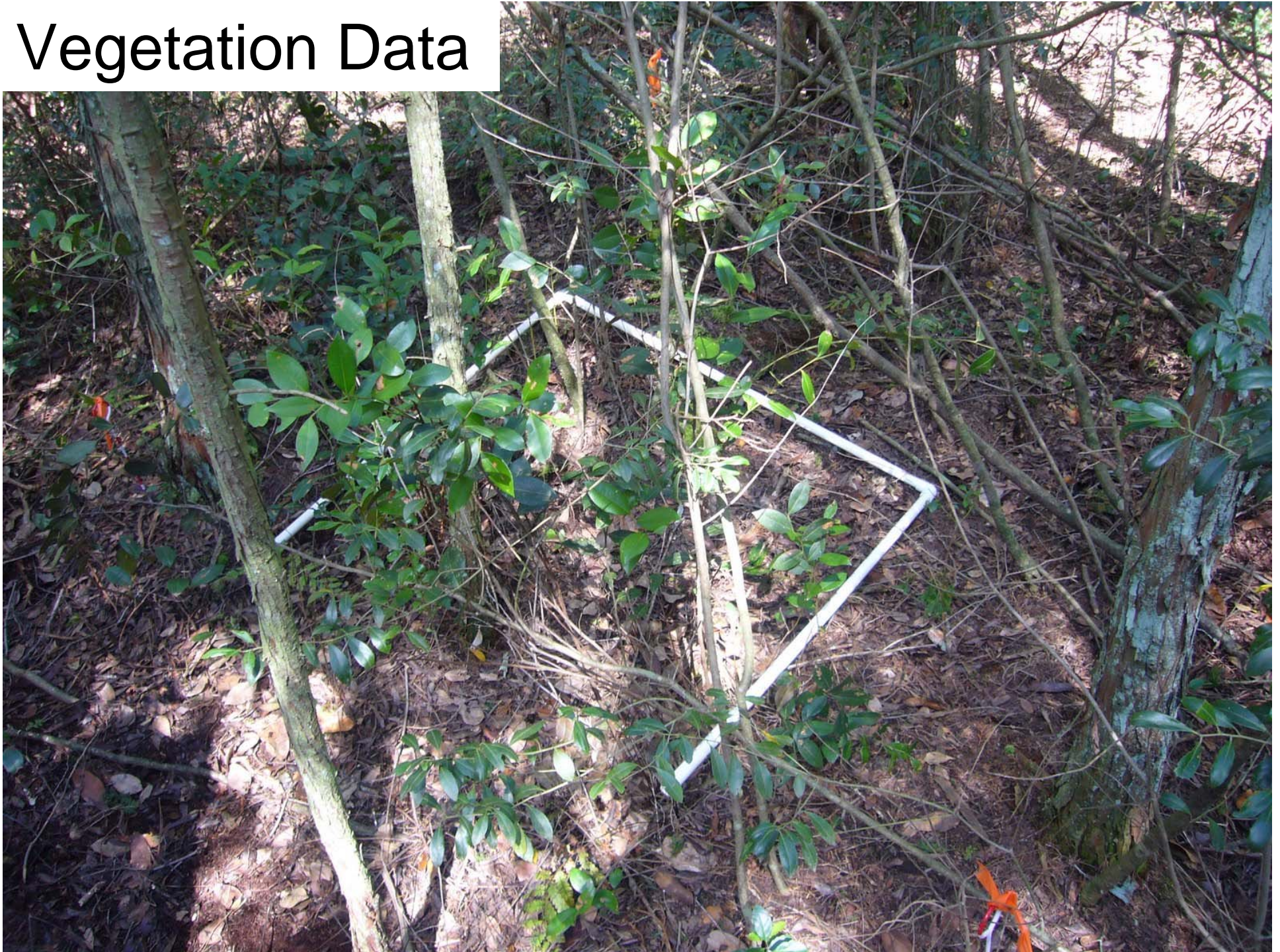




# Seedling Data Collection



# Vegetation Data



# Seedbank Study

90 day cold treatment at 5° C

Soil depth approximately 2cm

Soil was mixed twice during germination period



## Density of AWC Seedbank at Dismal Swamp State Park 2008

	<b>Viable AWC seed per square foot</b>	<b>Viable AWC seed per acre</b>
<b>All Stands</b>	7.7	336,447
<b>Standing Cedar Stand (SC)</b>	11.7	509,672
<b>Hurricane Isabel (HI)</b>	9.6	417,288
<b>Older Blowdown (OB)</b>	2.5	109,140

## Density of AWC Seedlings at Dismal Swamp State Park 2008

	Seedling Density per Acre	Density of Seedlings $\geq 12''$	Density of Seedlings $\geq 24''$
All Stands	74.2	26.7	7.4
Hurricane Isabel (HI)	39	19.5	9.8
Older Blowdown (OB)	24.4	18.3	8.1
Standing Cedar Stand (SC)	161.8	42.7	4.5



# Growing Conditions





# Comparing Regeneration Densities

Korstian & Brush (1931) studied cedar regeneration after logging in the Dismal Swamp



# Effect of timber slash on AWC reproduction at Dismal Swamp

(Adapted from Korstian & Brush 1931)

Years since Logging Event	Number of Seedlings Surviving Per Acre	
	Site Covered with Dense Slash	Site Cleared of Slash
1	135	12,414
2	157	4,513
8	145	11,500

# Post-Isabel Regeneration at Great Dismal Swamp National Wildlife Refuge (prior to 2008 fires)

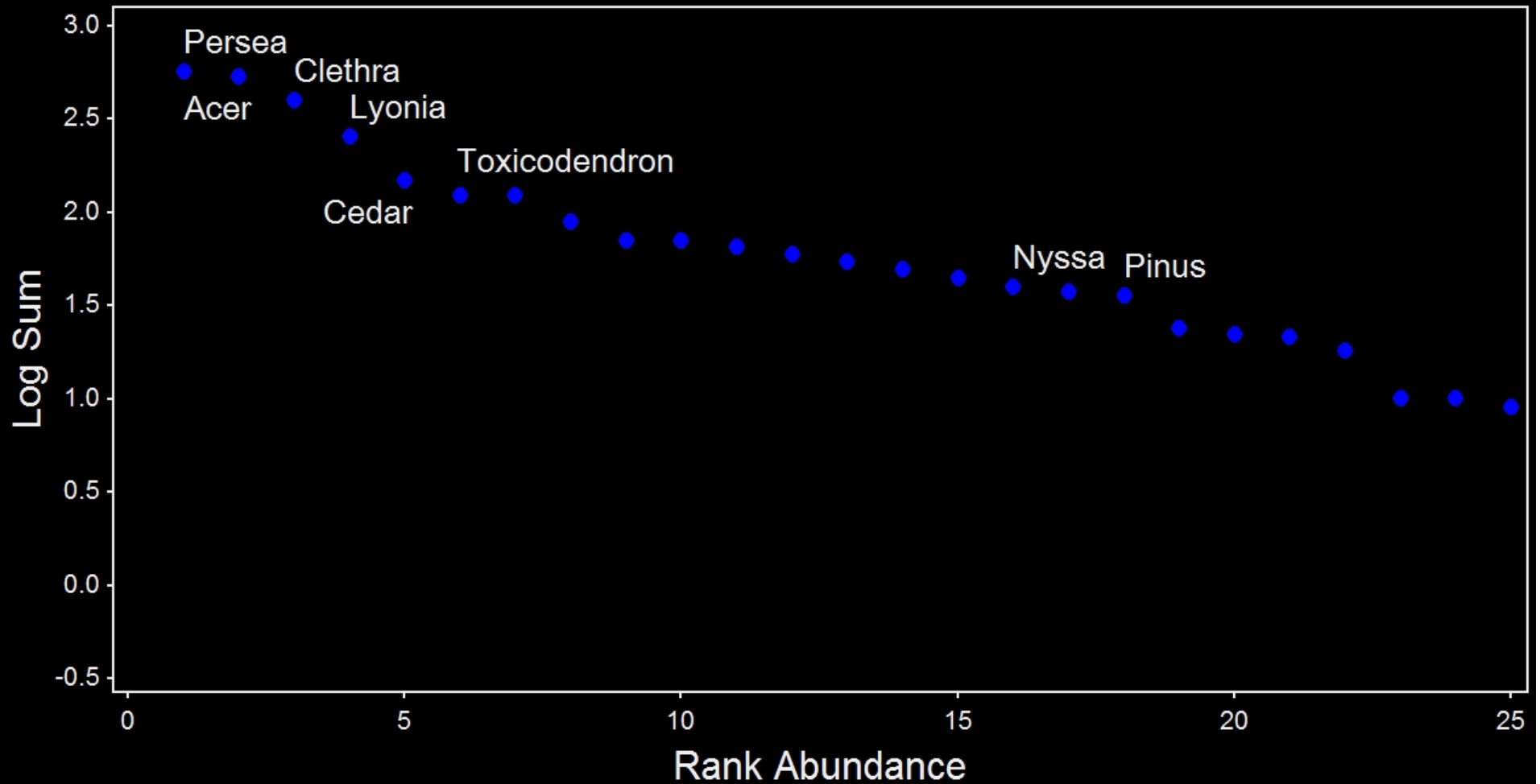
Location of Stand	Seedlings/acre
West of State Park	2,416
North of Corapeake Rd	3-4,000 (approx)
South of Corapeake Rd (Blackwater Cut)	5,884



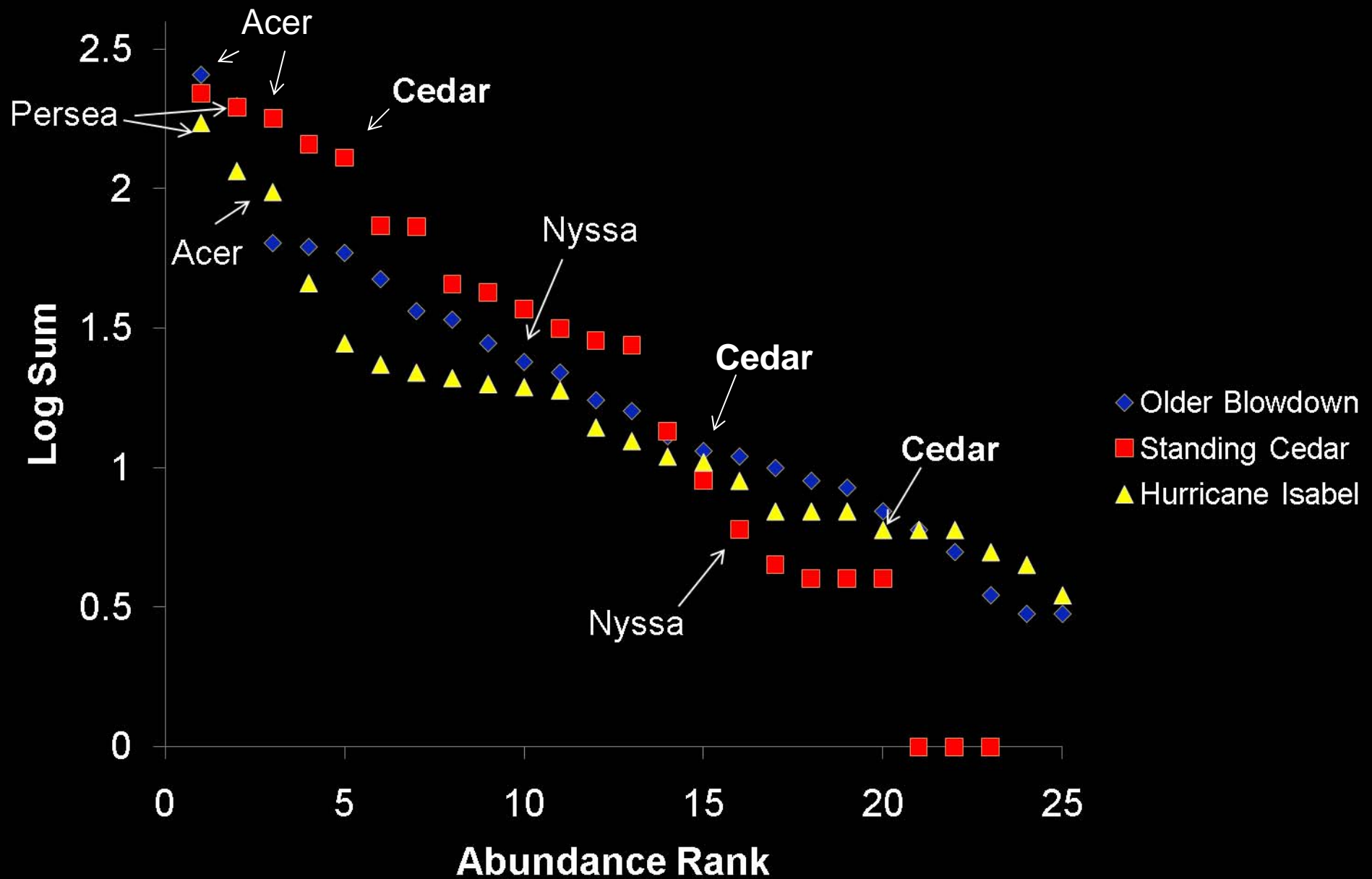


# What is replacing the cedar?

Species Abundance Rank for All Stands



# Species Abundance Ranks for Dismal Swamp State Park Plots







# Acknowledgements

- Committee members Ted Shear (chair), Tom Wentworth, and Frank Blazich for providing constant guidance throughout the study.
- Megan Malone, Yari Johnson, Matt O'Driscoll, Yang Lixin, Kim Shumate, Jasmine Shaw and Emily White for working long hours in the field.
- Dismal Swamp State Park staff for providing assistance throughout the study
- Dr. Jon Stucky and Dr. Alexander Krings for help with species identification.

A low-angle photograph of a dense forest. The trees are tall and thin, with their branches and leaves creating a complex, dark canopy. Sunlight filters through the leaves, creating a dappled light effect. The overall tone is somewhat dark and moody, with a focus on the textures and patterns of the forest. The text "Thank you!" is centered in the middle of the image in a simple, black, sans-serif font.

Thank you!