



*Planning the Urban Forest: Ecology, Economy  
and Community Development*

*Framing the Issues with Green Infrastructure*

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# Framing the Issues...

- Urban Decay- outdated and overwhelmed sanitary sewer-storm sewer systems- **How to revitalize cities?**
- Natural disasters-hurricanes, floods, ice, fire- **How to rebuild?**
- Urban Growth-Urban Sprawl- **How to grow more sustainably?**

# Reframing the Issues... with **Green** Infrastructure

From urban sprawl to **Smart Growth**

From traditional development to **conservation development**

From natural disaster clean-up to **building resiliency into the environment**

From engineered infrastructure to **non-engineered best management practices**

From compliance to **incentive recognition**

From single issue to **systems approach**

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# **Reframing the Issue With **Green** Infrastructure...**

**From Urban Sprawl to Smart Growth  
**City of Detroit Greenways****

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# City of Detroit



Detroit has 66,000 vacant lots  
=4600 acres of land as  
development shifts to suburbs

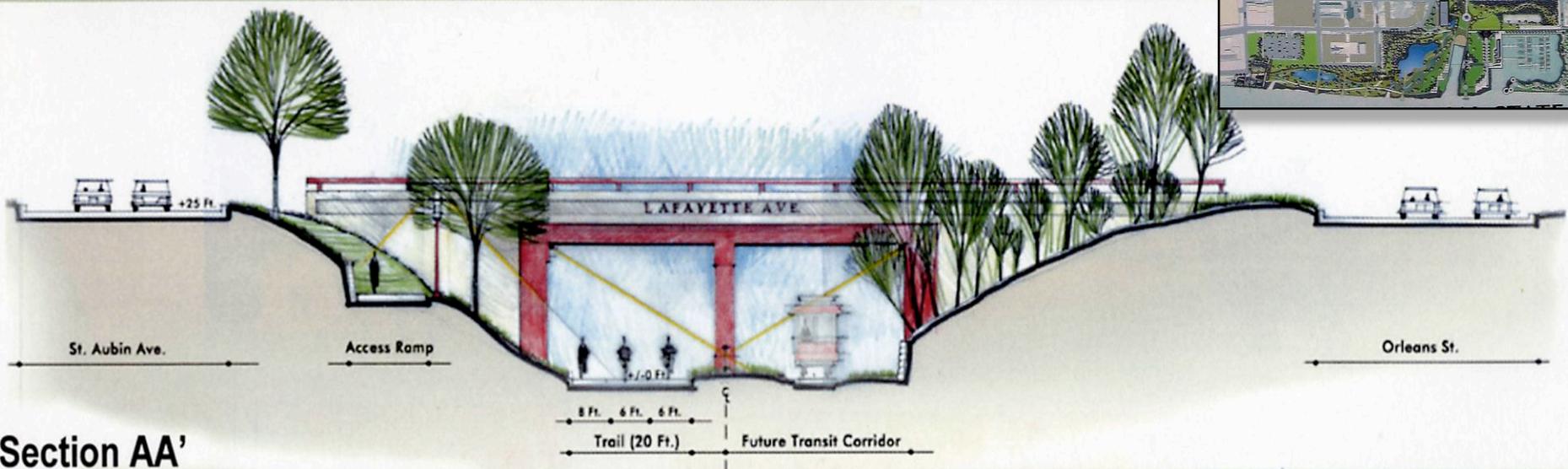
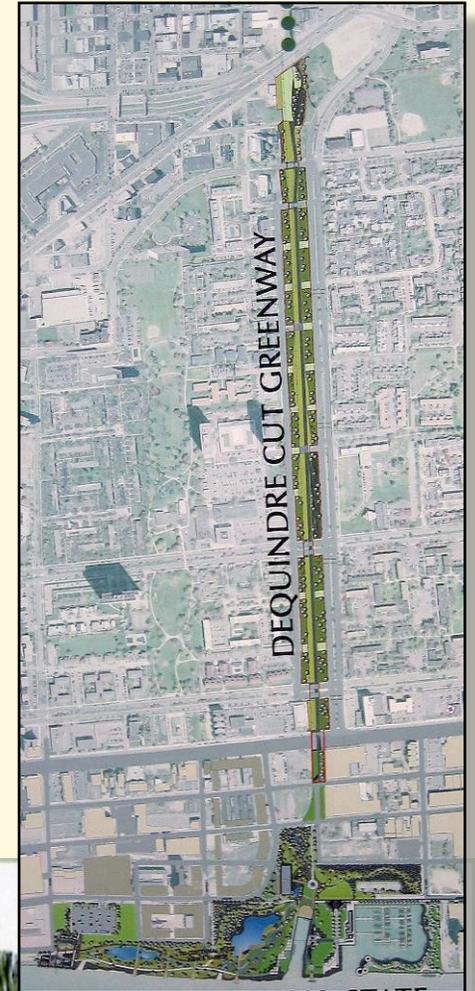
Between  
1950-1990 Detroit  
lost ½ tree  
canopy to Dutch  
Elm Disease.  
Currently lost 16  
million trees to  
Emerald ash  
borer.



# Dequindre Cut



Greenway  
Design



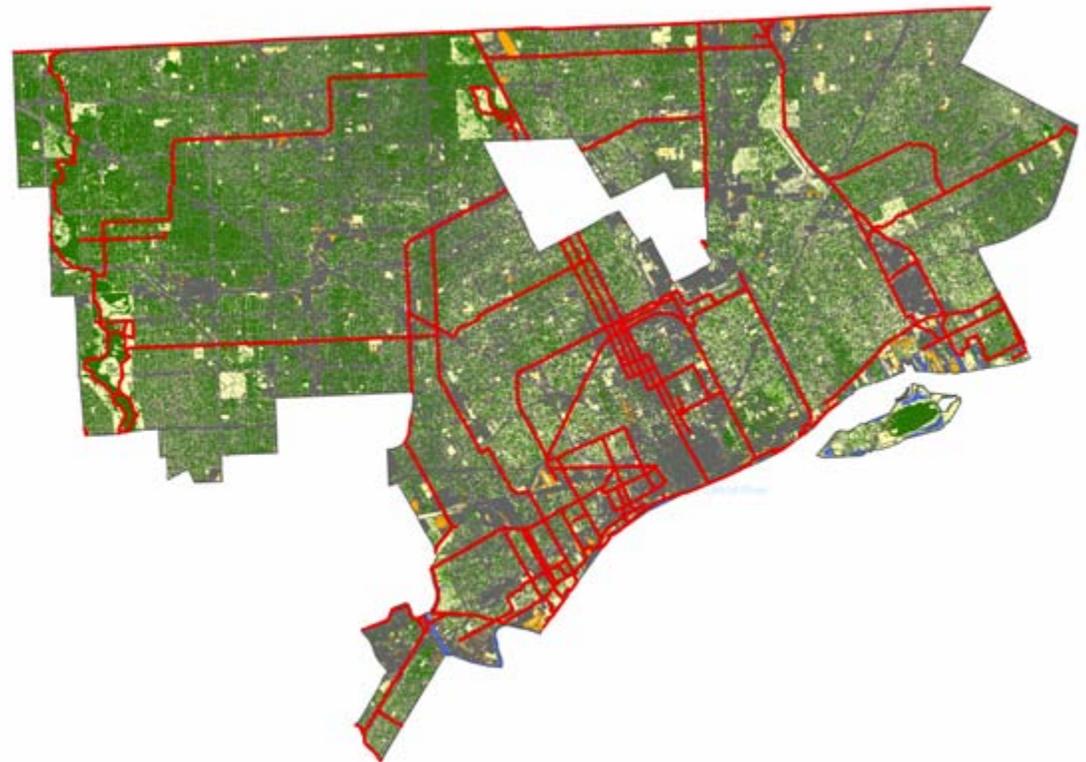
Section AA'

# If All Envisioned Greenways Were Built...

The greenway system's tree canopy currently provides:  
**\$7.6 million in stormwater mgt. value**

- 3,251 acres (150 ft. vegetation buffer)
- Currently has a 19% tree canopy

If tree canopy increased to 25%:  
**Would save an additional \$2 million in stormwater mgt. value**

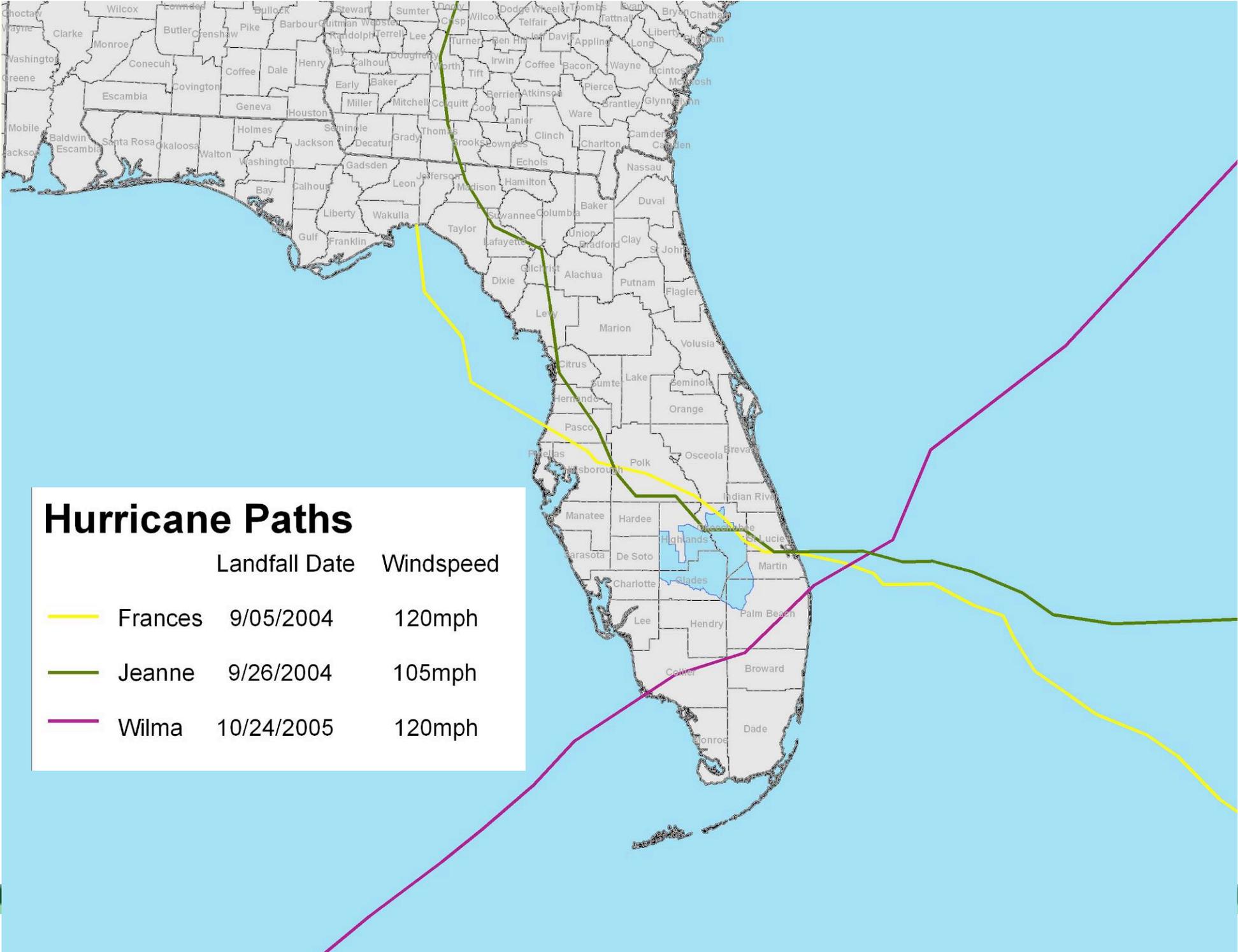


# Reframing the Issues With **Green** Infrastructure...

From natural disaster clean-up to building  
resiliency into the environment

**Palm Beach, Florida**



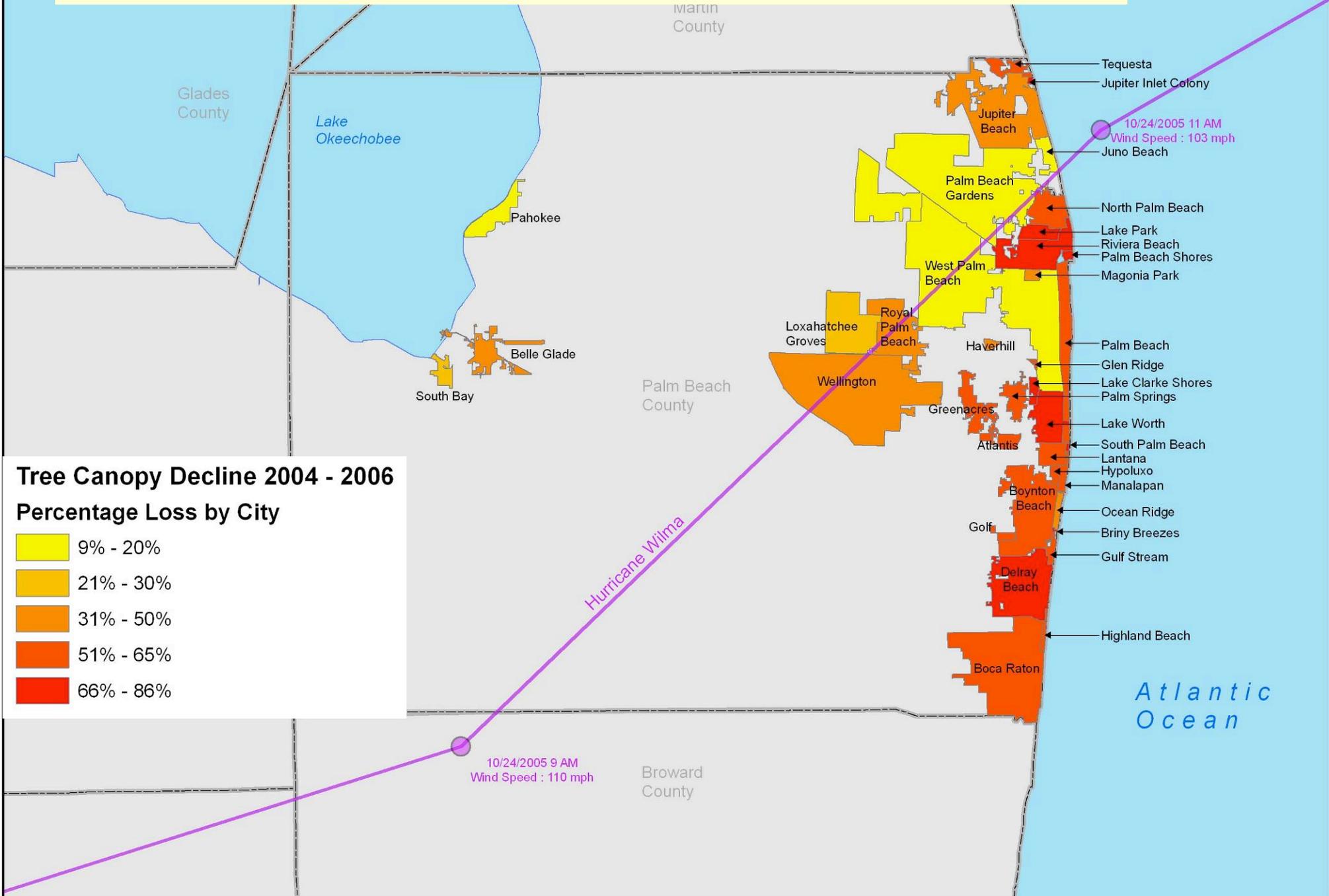


# Hurricane Paths

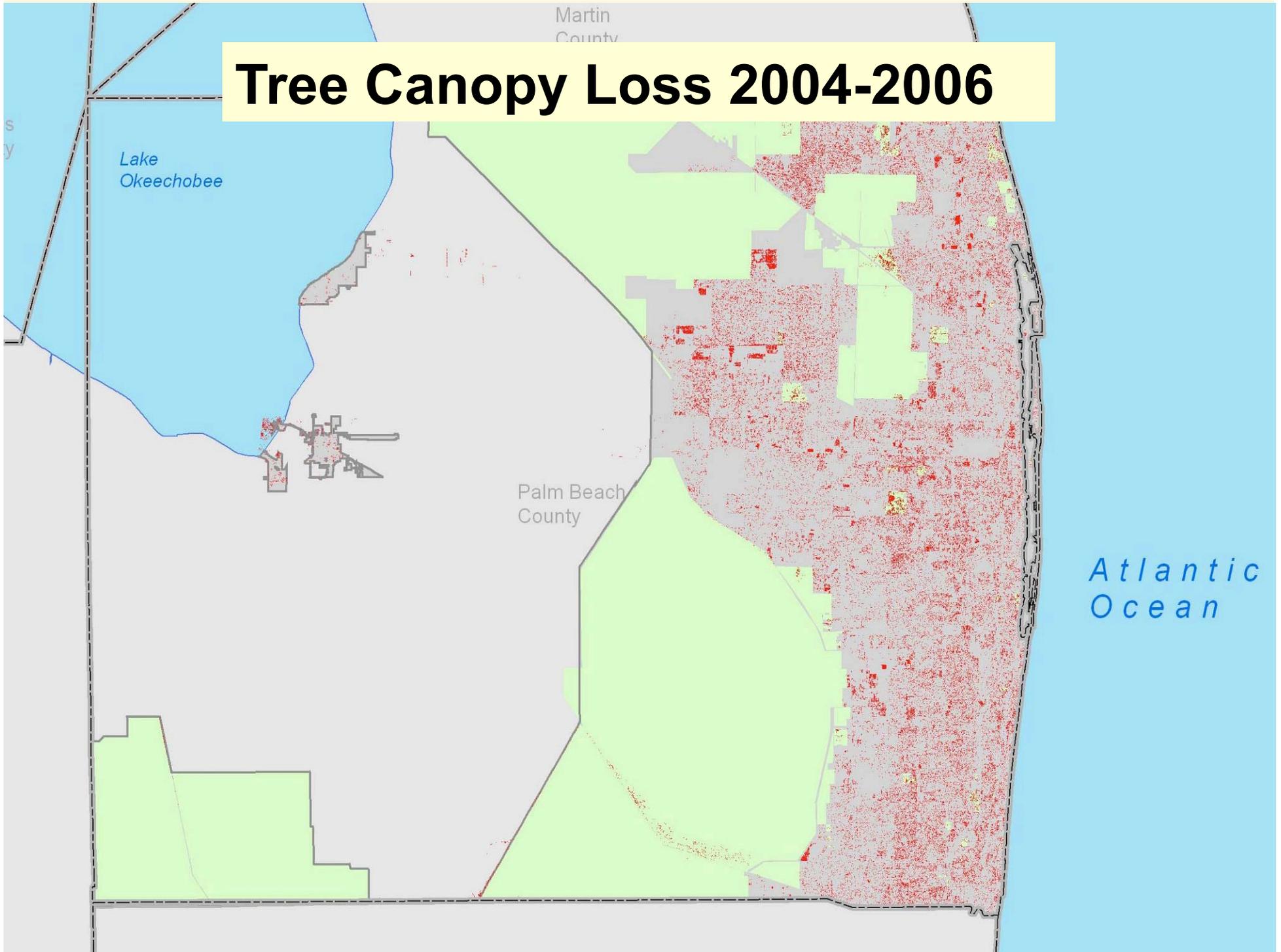
Landfall Date    Windspeed

	Frances	9/05/2004	120mph
	Jeanne	9/26/2004	105mph
	Wilma	10/24/2005	120mph

# Tree Canopy Loss 2004-2006



# Tree Canopy Loss 2004-2006



# Palm Beach County Landcover Changes 2004-2006

## **Landcover Changes:**

- 6% increase urban
- 17% decrease tree canopy
- 9% increase open space

## **Impacts:**

- Lost \$157 million stormwater retention capacity
- Lost \$12 million in air pollution removal/yr.
- Lost 1.8 million lbs. of carbon storage
- 8 measured water pollutants increased 2-4%

# Building Resiliency

- Tangible evidence for tree habitat
- Public education replaces fear
- Demonstrates best species selection
- Ties ecosystem benefits of county natural areas into regulatory mandates  
Native vegetation

# Reframing the Issue with Green Infrastructure...

From engineered infrastructure to non-engineered best management practices

**McDowell  
Creek  
Watershed,  
North  
Carolina**



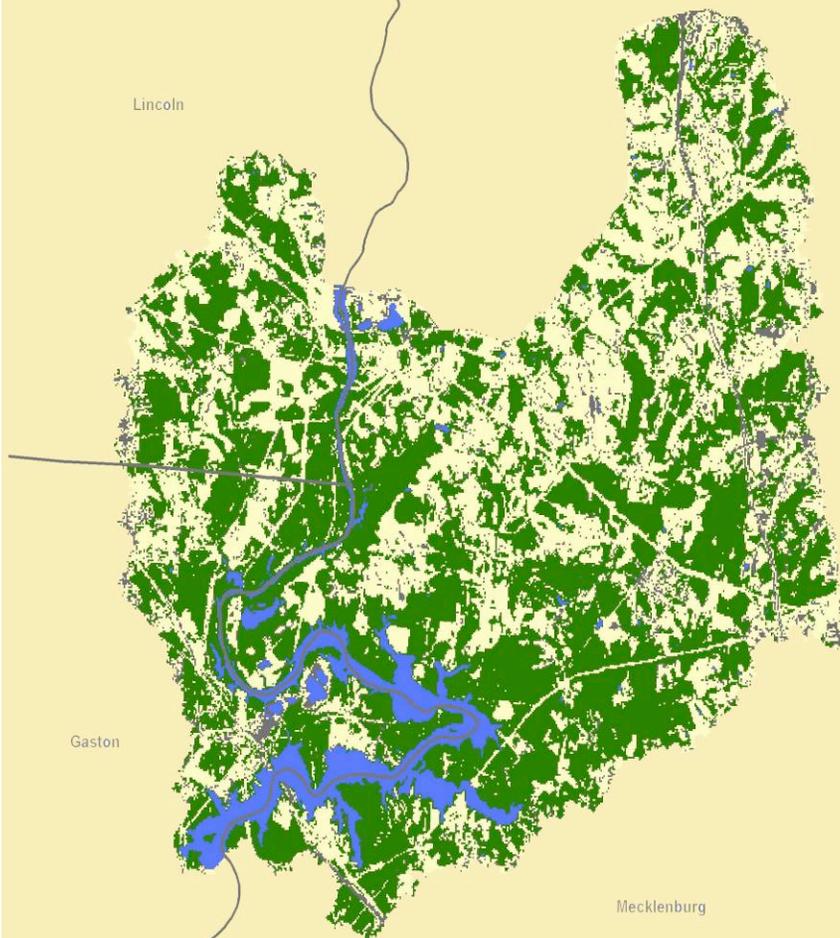
# McDowell Creek Watershed

30 square miles within  
Mecklenburg County

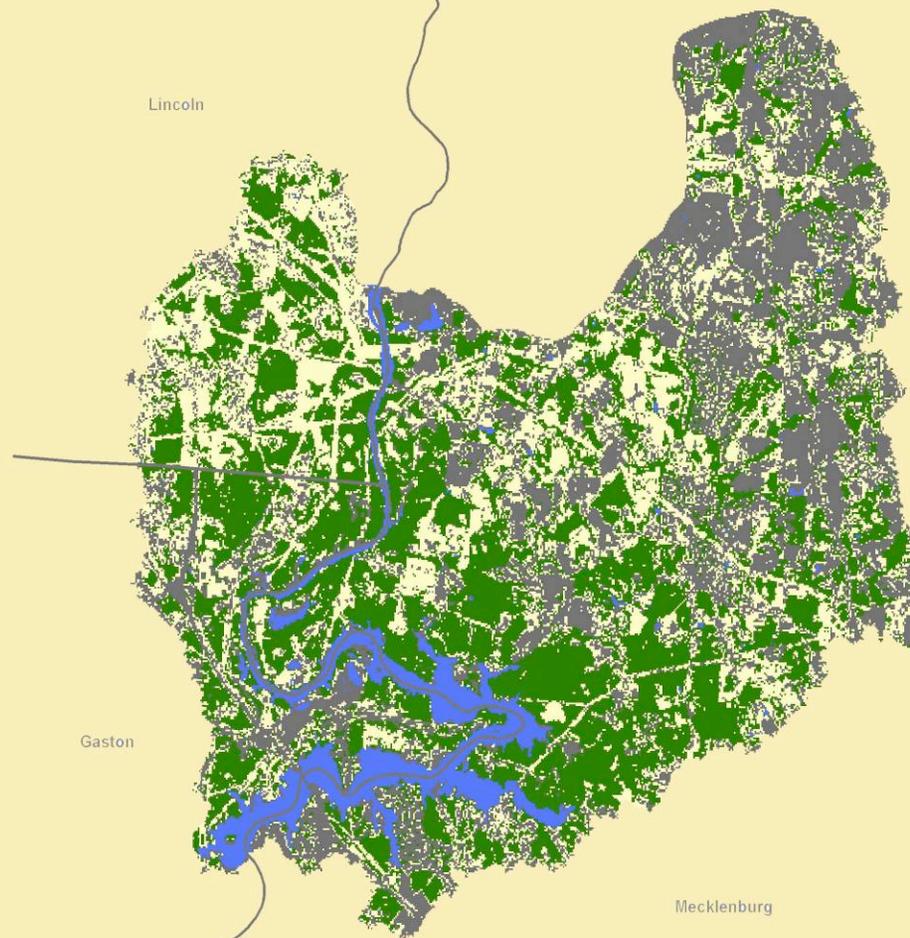
- Provides 80% of drinking water for 700,000 people
- Rapid development severely threatens water quality



# Mountain Island Lake Watershed



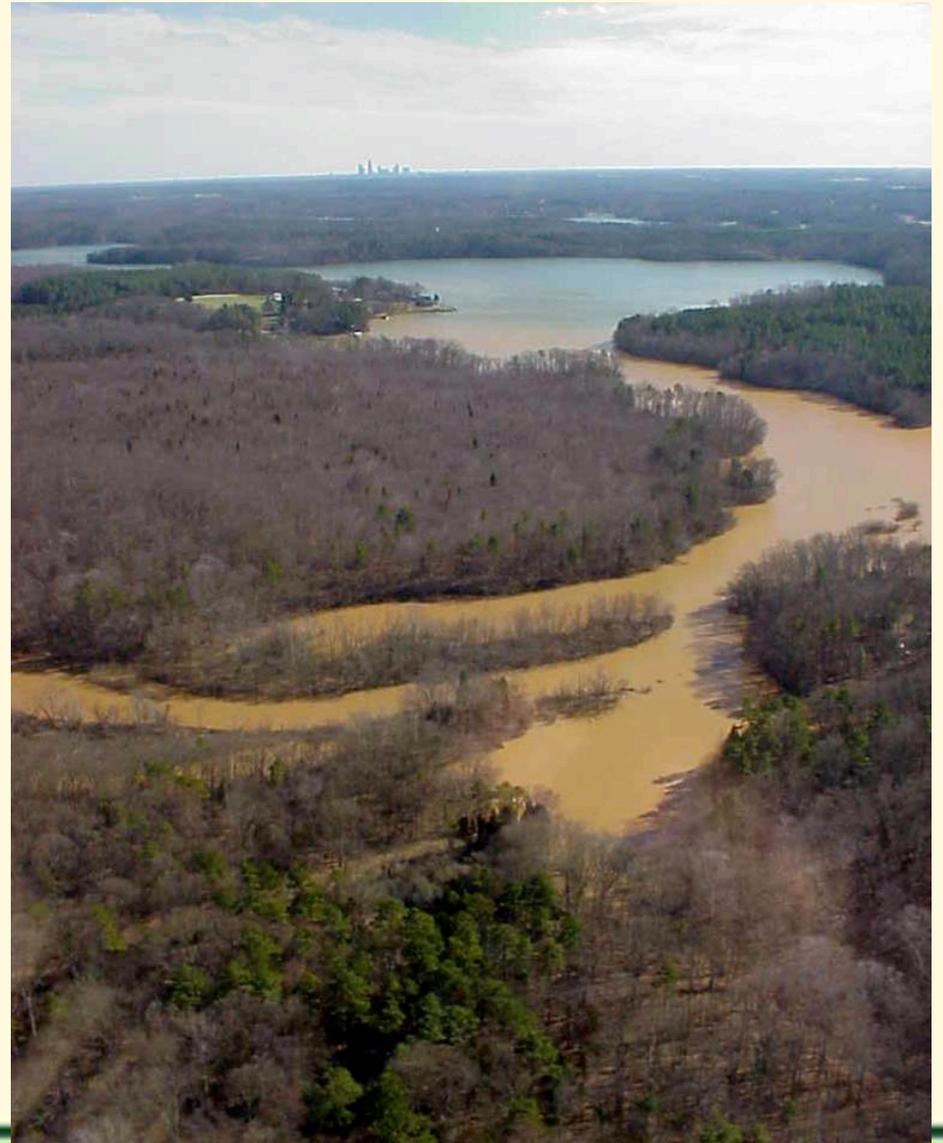
**1984 Landsat**



**2003 Landsat**

# 1984-2003 MIL Landcover and Ecosystem Changes

- 14% increase in flooding potential  
(meas. by the increase in flow depth)
- 17.3 million cu ft. stormwater mgt. required
- \$34.7 million value stormwater mgt



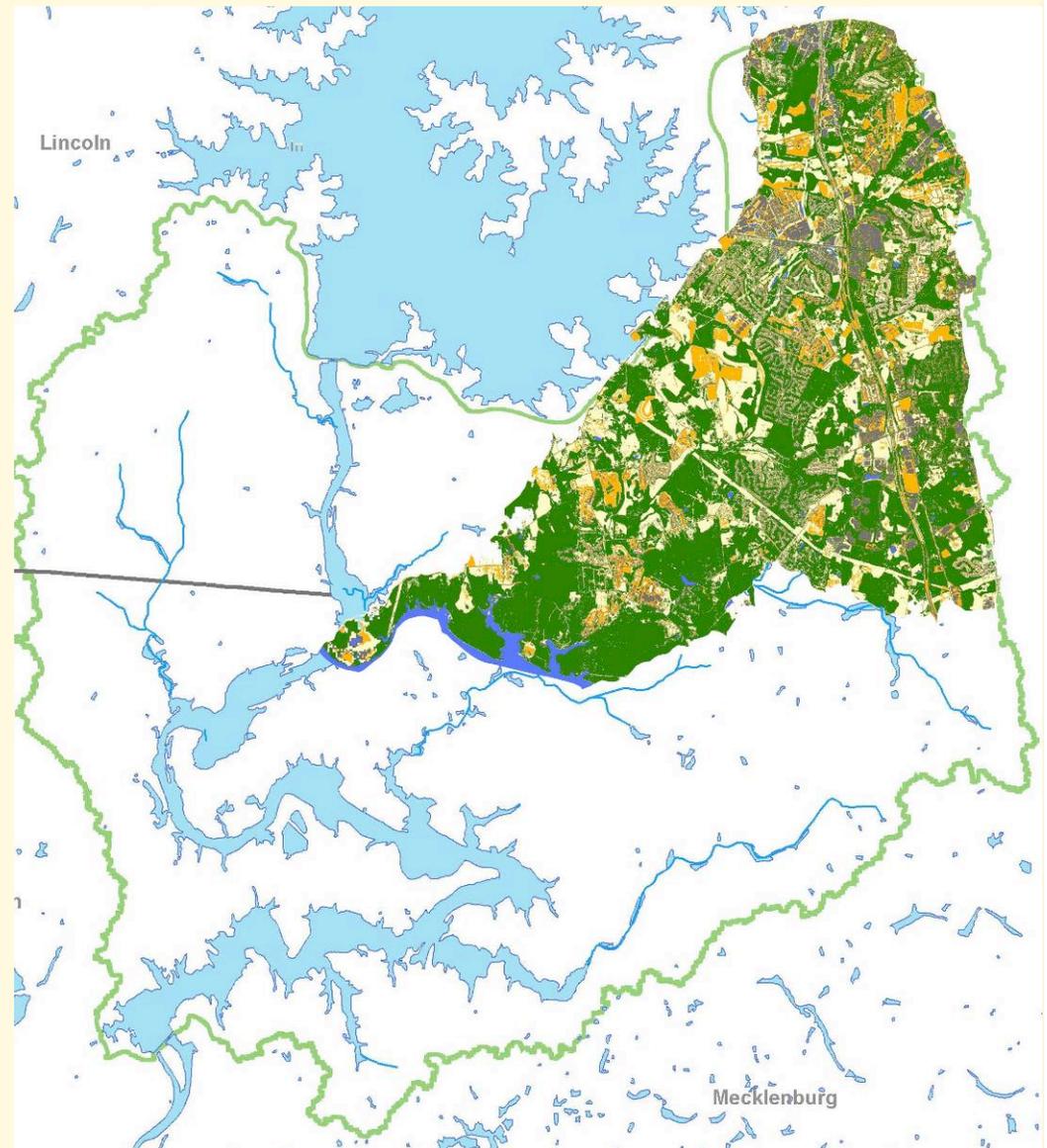
# McDowell Creek Watershed 2001 Ecosystem Services

Tree Canopy	51%
Open Space	24%
Impervious	12%
Bare Soil/Ag	11%
Water	2%

Baseline ecosystem services provided:

- 53 million cubic feet of stormwater
- Stormwater retention valued at \$105 million

2001 Landcover  
(from 1-meter multispectral data)

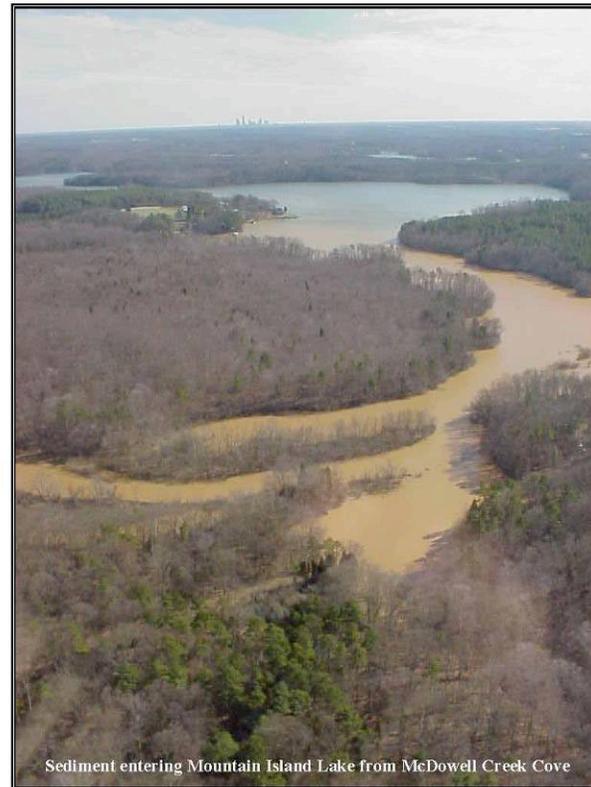


# Implementing Land Cover Solutions to Improve Water Quality

## Charlotte-Mecklenburg Stormwater Services staff implementation:

- Tree-save areas for stream bank restoration and stabilization
- Model water quality improvement
- Augments engineered techniques
- Building into zoning review

## McDowell Creek Watershed Management Plan



Sediment entering Mountain Island Lake from McDowell Creek Cove

Completed by: Charlotte-Mecklenburg Storm Water Services  
Version 3  
February 7, 2007

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