

# Partnering for Protection:



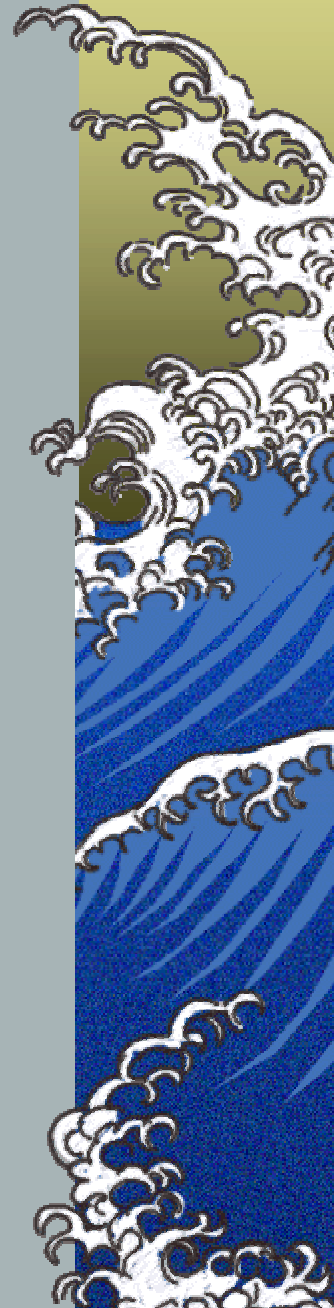
*Thoughts from  
New Jersey*

*Daniel J. Van Abs, PhD, AICP  
NJ Water Supply Authority*



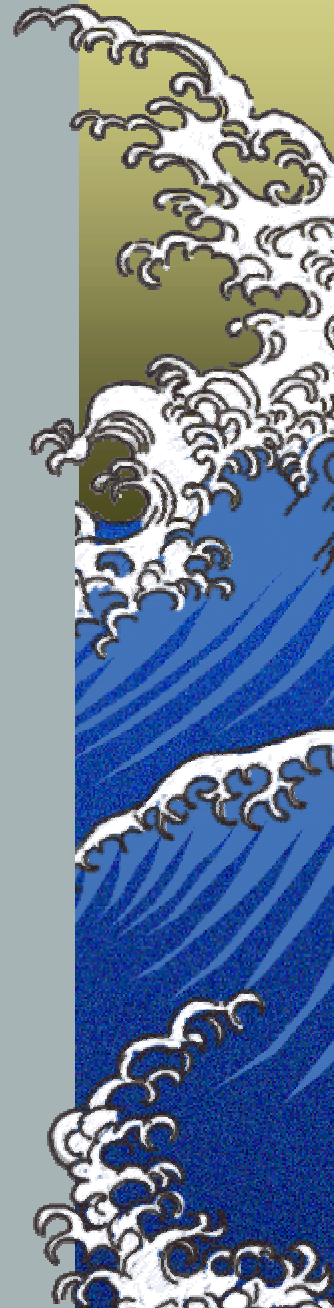
# Common perspectives

- ▶ *Water is worth fighting about*
- ▶ *Water is basic to societal functions*
- ▶ *Water is a primarily public resource*
- ▶ *States are responsible for water supply management*
- ▶ *Ecosystems also matter*
- ▶ *Watershed approach has value*



# Incentives for New Watershed Approaches

- ▲ Conflicting water supply uses
- ▲ Water supply limits
- ▲ Pollution
- ▲ Flooding
- ▲ Economic uses of water flows
- ▲ Ecosystem restoration & protection
- ▲ Regulatory mandates
- ▲ Regulatory incentives







Society's Lifeblood – Water Supply



# Droughts







Floods



# Impaired Streams

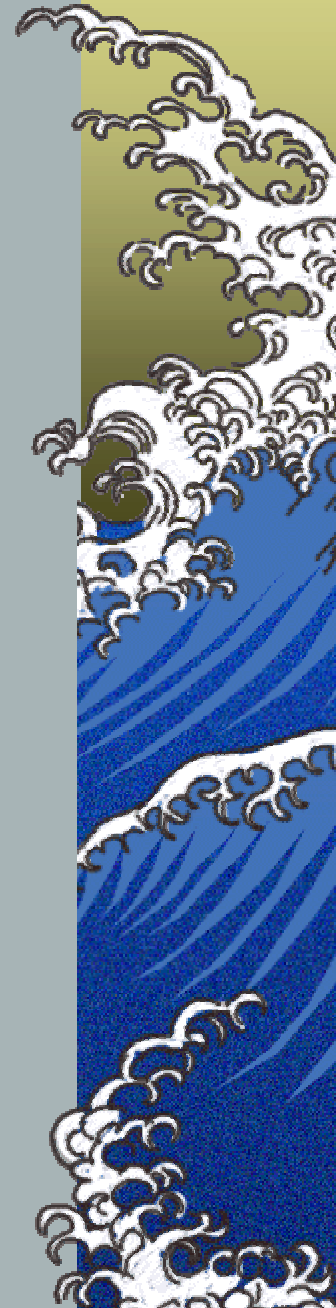


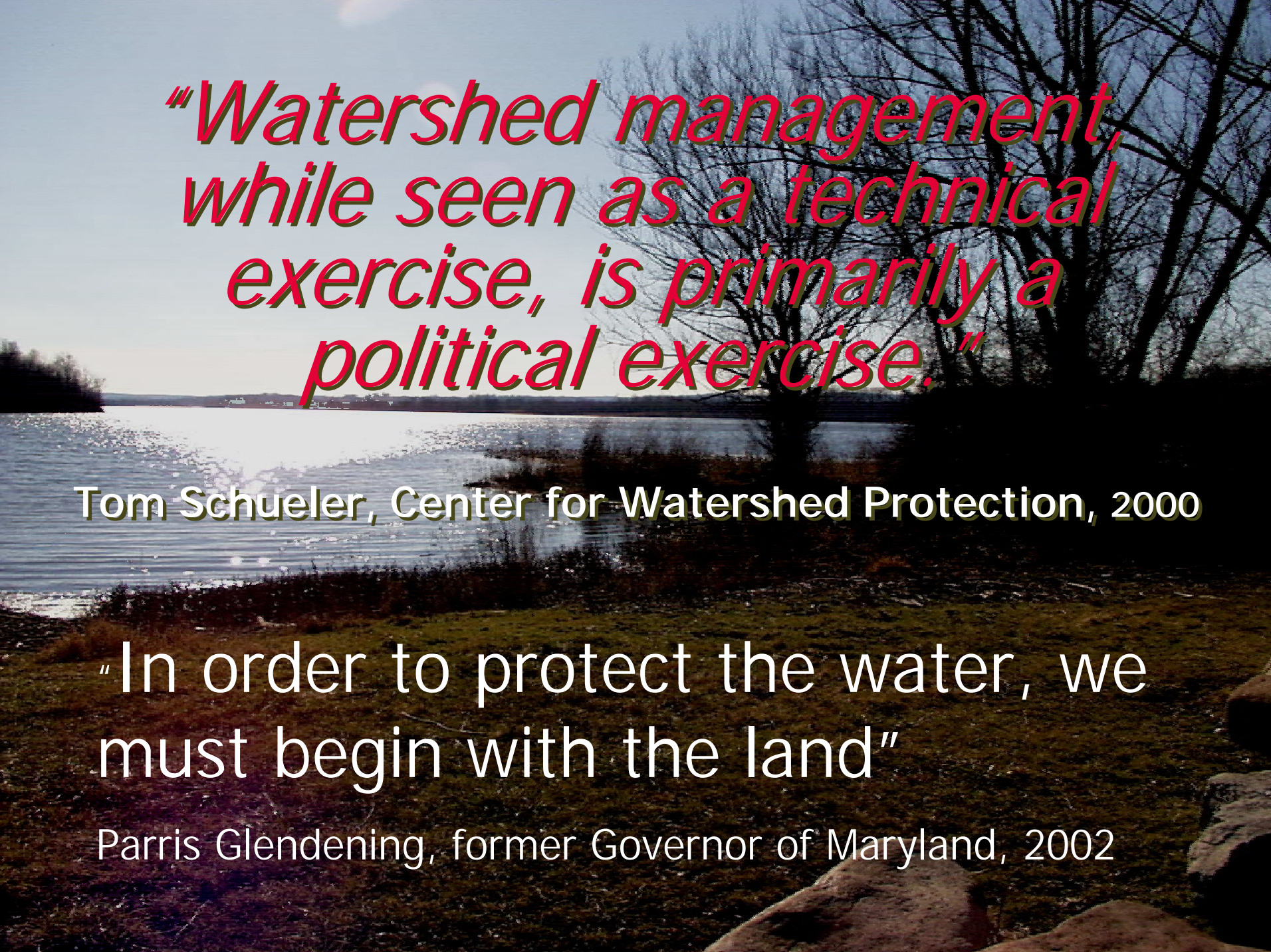
# Eutrophication





Most programs are reactions to a crisis or emergency (perceived, real or contrived)





*“Watershed management, while seen as a technical exercise, is primarily a political exercise.”*

Tom Schueler, Center for Watershed Protection, 2000

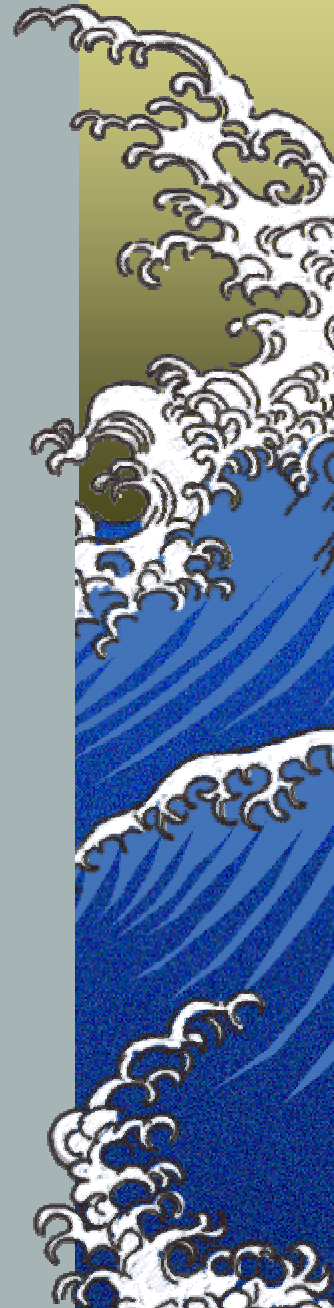
“In order to protect the water, we must begin with the land”

Parris Glendening, former Governor of Maryland, 2002



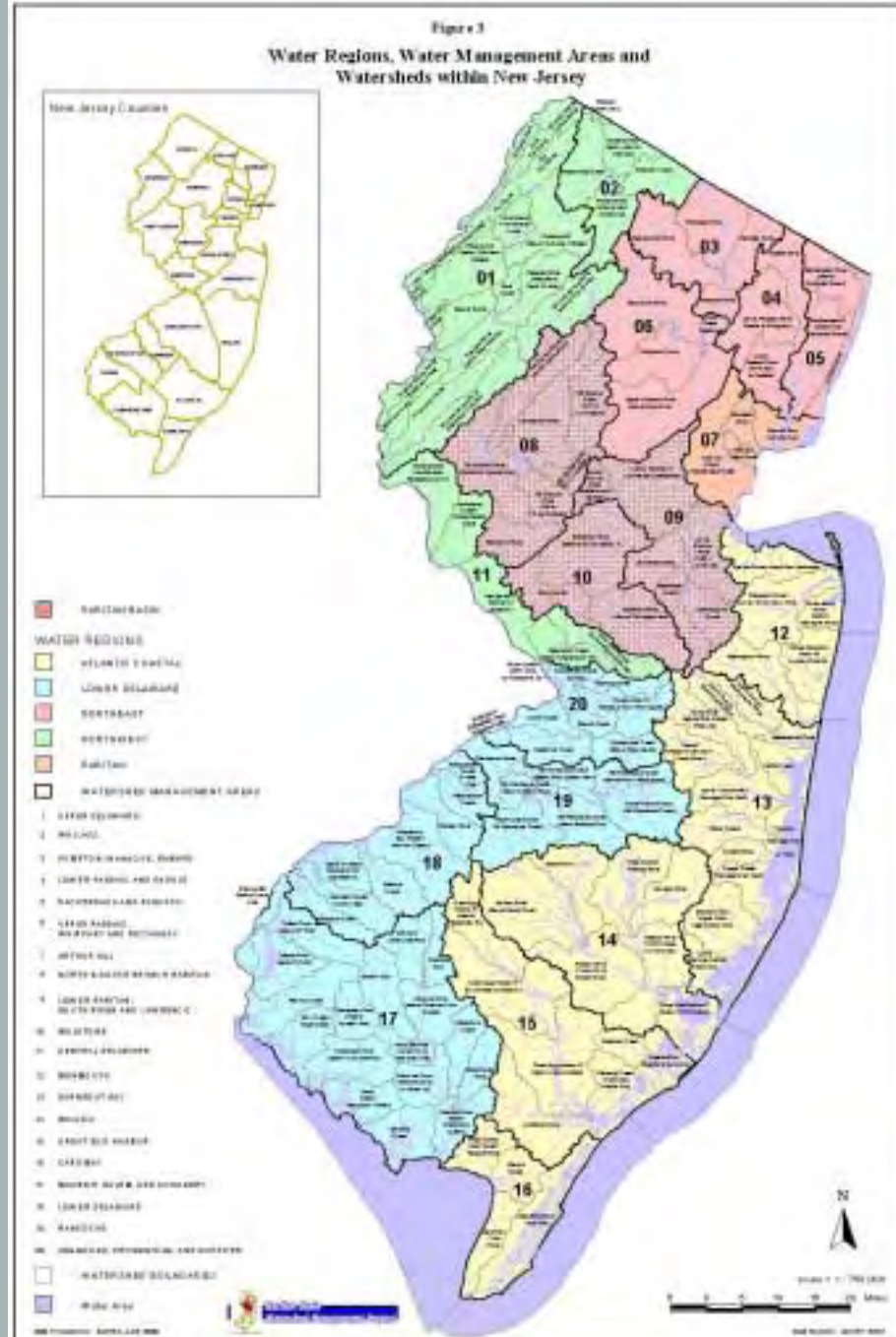
# Key Requirements for Successful Programs

- ▶ Issue accepted as “real” and “important”
- ▶ Those with “power” force the issue
- ▶ Issue and solutions understandable
- ▶ Solutions accepted as viable
- ▶ Entity(ies) capable of acting
- ▶ Sufficient resources to act
- ▶ Inaction has higher costs
- ▶ Issue will survive changing priorities



# New Jersey

- ▶ *Over 1100 people per square mile*
- ▶ *100 +/- major watersheds (HUC-11)*
- ▶ *40% urban*
- ▶ *20% preserved*
- ▶ *40% "battleground"*

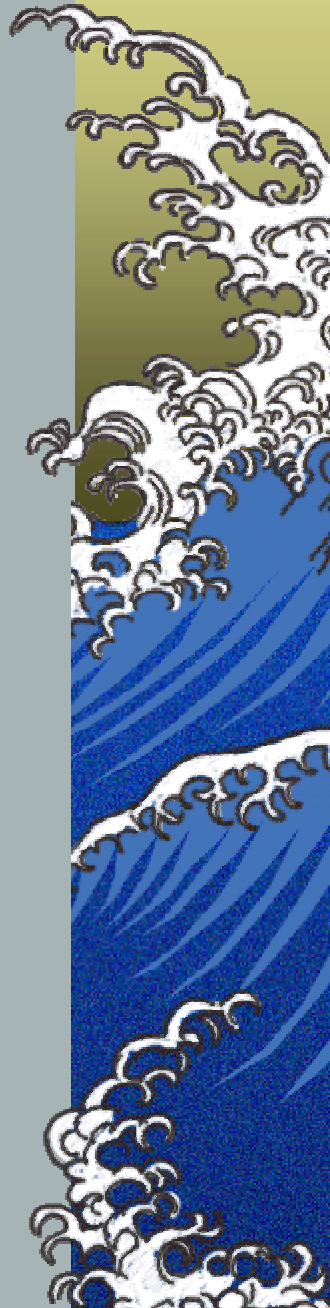




# Watershed Management

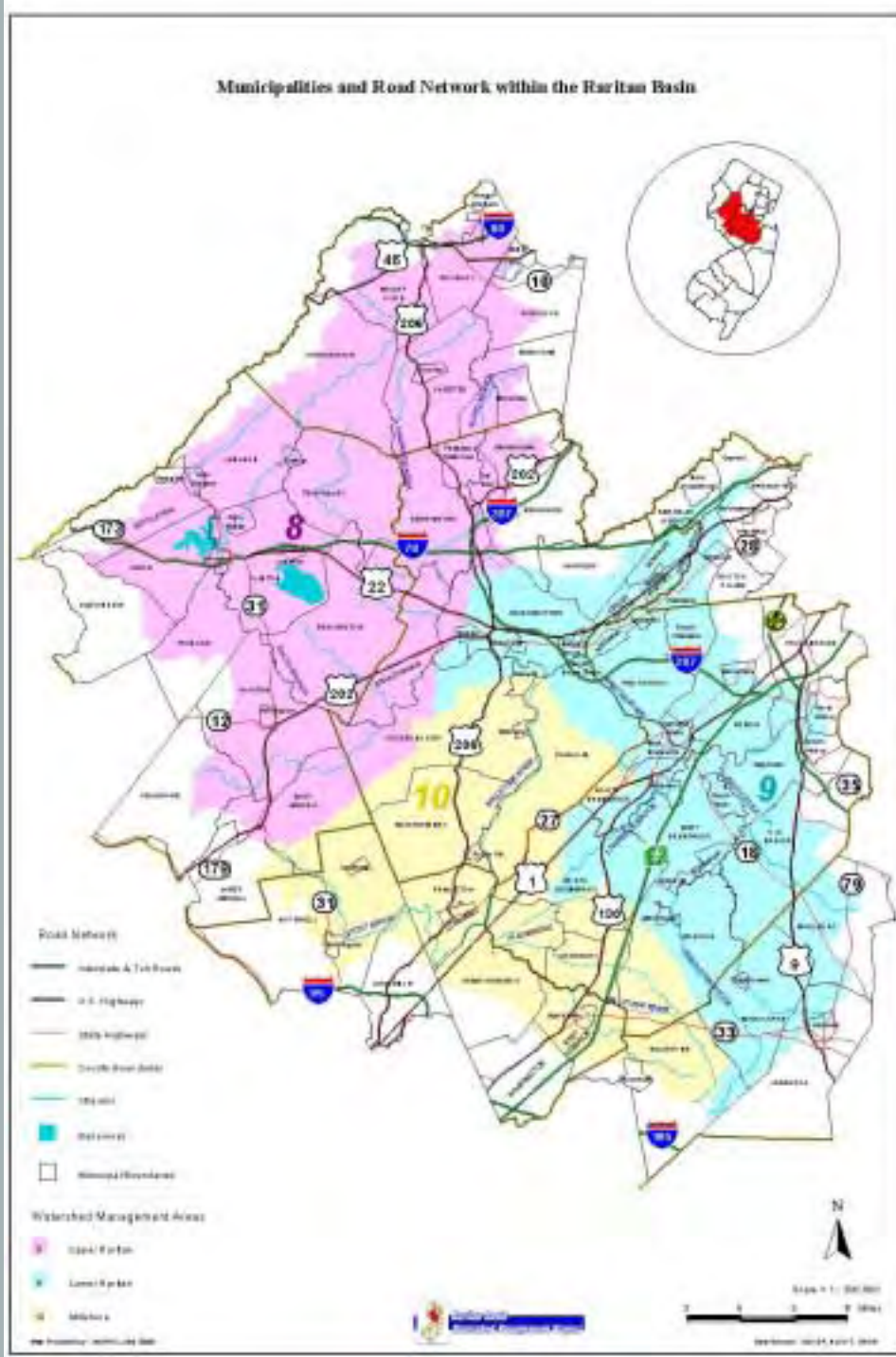


- ▶ *1988 moratorium on sale/transfer of water supply watershed lands*
- ▶ *Courts ruled moratorium still valid*
- ▶ *1997 – constitutionally dedicated \$\$ for watershed management*
- ▶ *2002 – open space preservation priorities for water protection*



# The Raritan Basin Watershed

- Largest river basin entirely within NJ
- 1,100 square miles, ~1.2 million people
- Includes parts of 7 Counties and 100 Municipalities
- Management Plan: December 2002

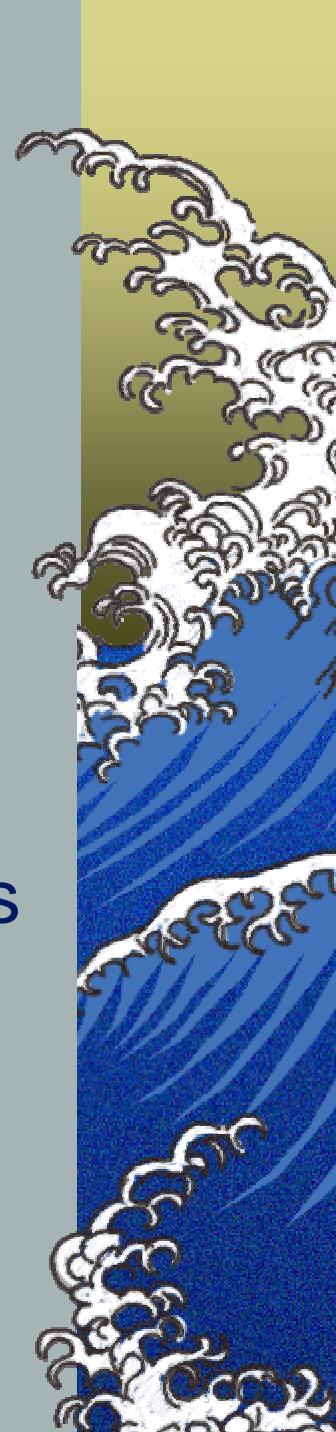




# What Are the Real Issues?

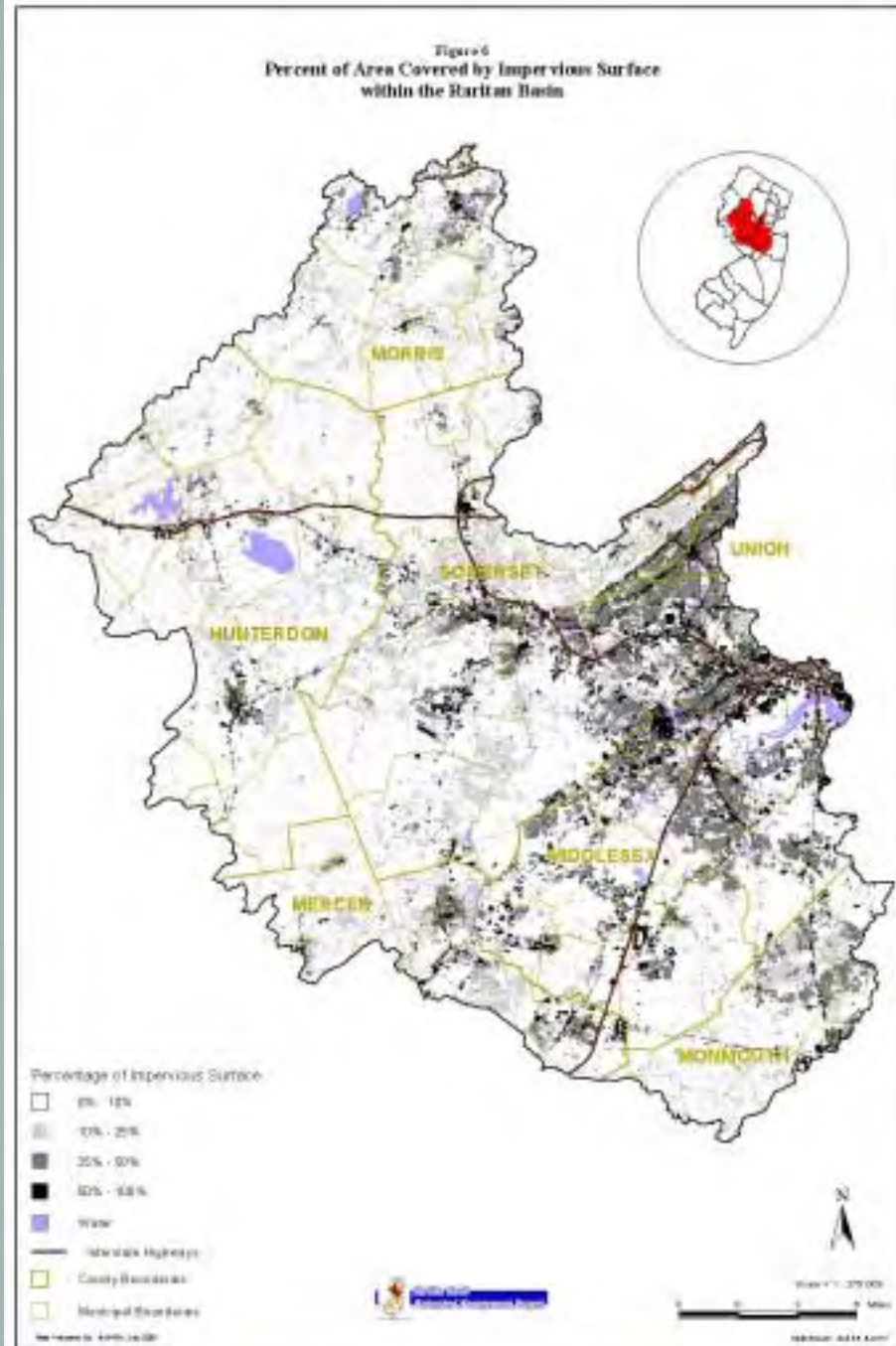


- ▲ Water pollution
- ▲ Loss of riparian areas
- ▲ Biological impairment of streams
- ▲ Development shifting into rural areas (scattered – sprawl pattern)
- ▲ Loss of ground water recharge
- ▲ Aquifer limitations
- ▲ Increased stream flows during storms
- ▲ Loss of agriculture
- ▲ Forest loss and fragmentation



# Impervious Surfaces

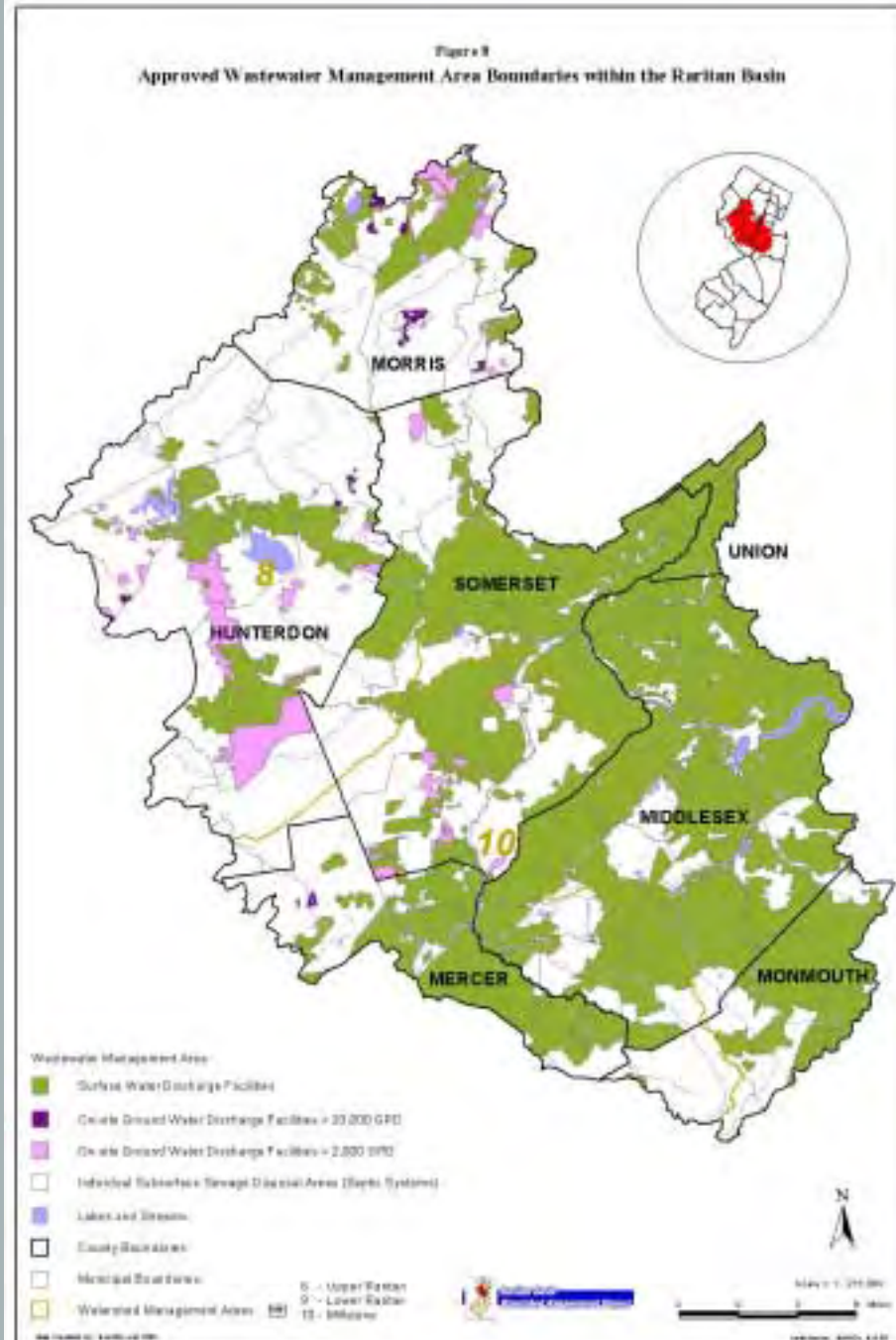
- Darker color = higher percentage of impervious surface
- Orientation of dense development to major highways
- Newer suburban development widely scattered





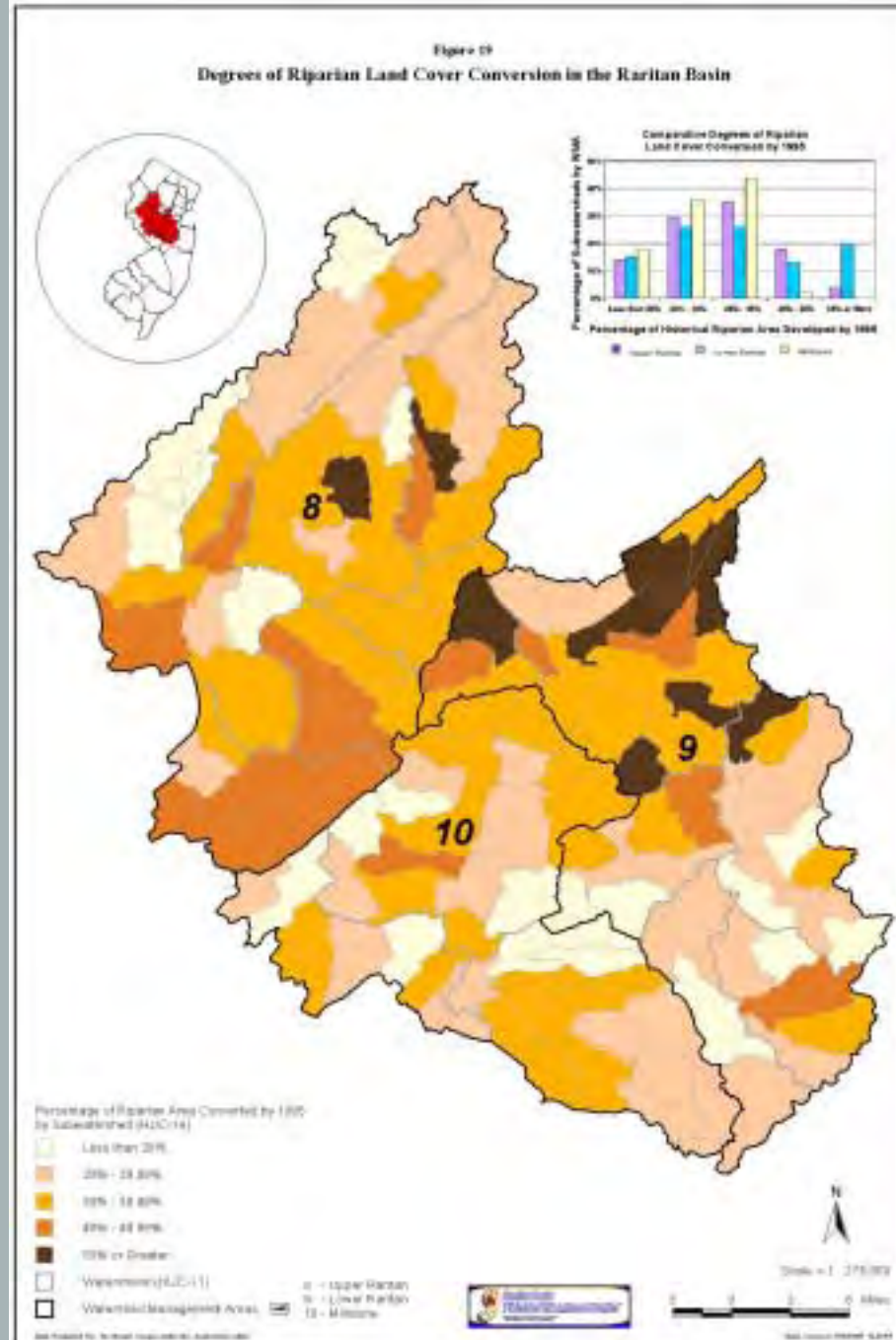
# Sewer Service Areas

- ▶ *Existing sewer service areas and areas approved for future sewer service*
- ▶ *Much of eastern Basin discharges to Raritan Bay – one-time water use*



# Riparian Area Conversions

- *Shows conversion to non-natural land cover by subwatershed*

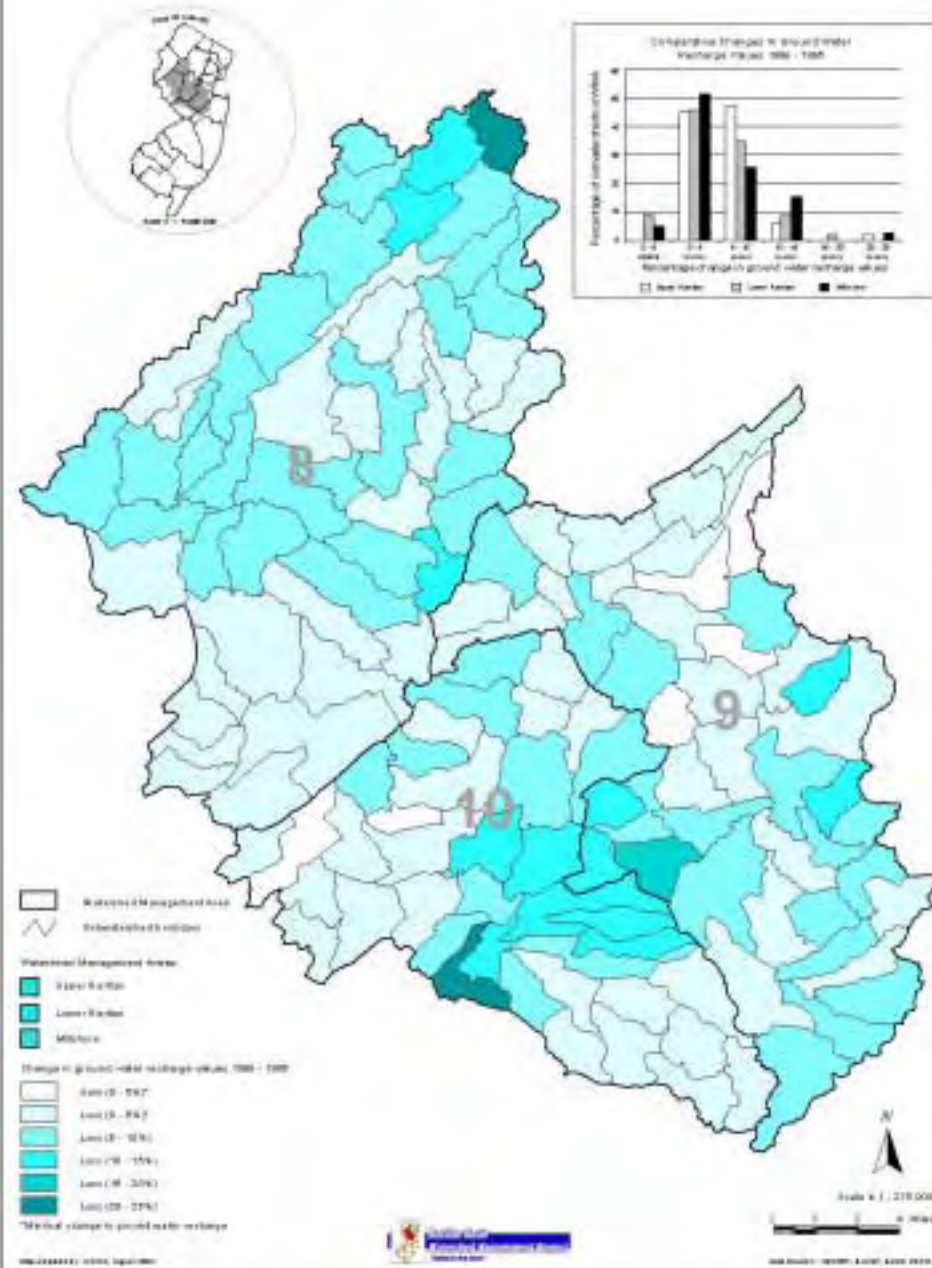




# Changes in Ground Water Recharge, 1986-1995

- *Most areas show recharge losses*
- *Majority of losses in 0-10% range*
- *Some losses in 15-25% range (darkest colors)*

Figure 5  
Difference In Average Ground Water Recharge Values In The Raritan Basin 1986-1995



# What to Expect in Looking Forward

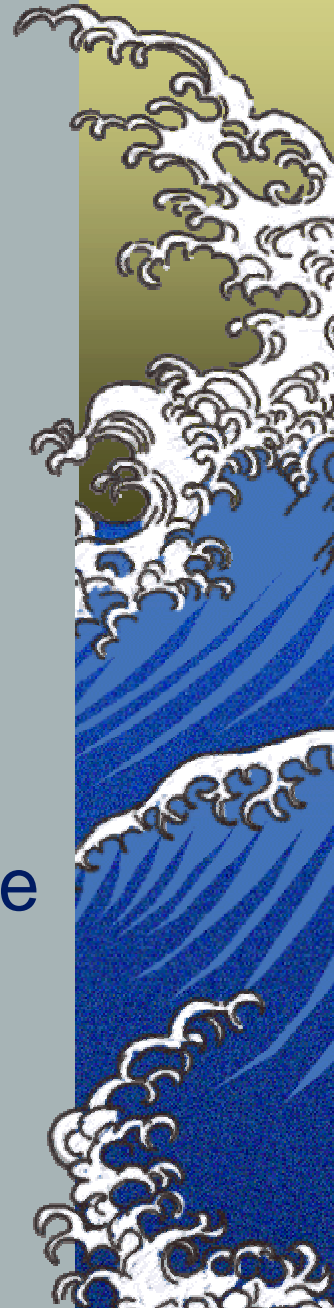
- ▲ Changing land use patterns
- ▲ Changing water use patterns
- ▲ Water supplies are at risk
- ▲ Putting plans into action
- ▲ Putting action into planning



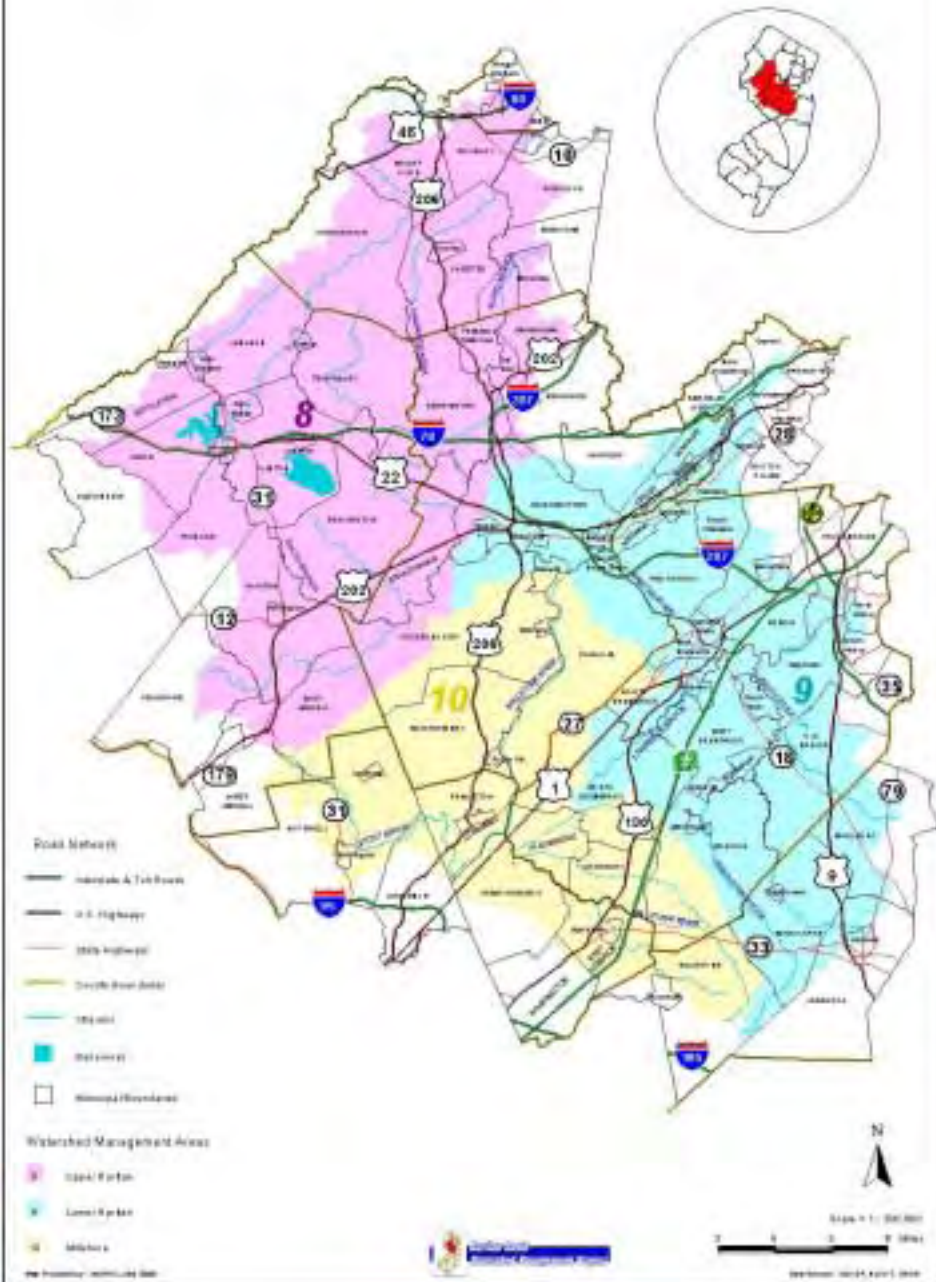


# Changing land use patterns

- ▶ Source water areas are suburbanizing
  - ▶ There is no “away” to put new reservoirs
- ▶ Ground water areas getting populated
  - ▶ Water quality is more than a reservoir issue

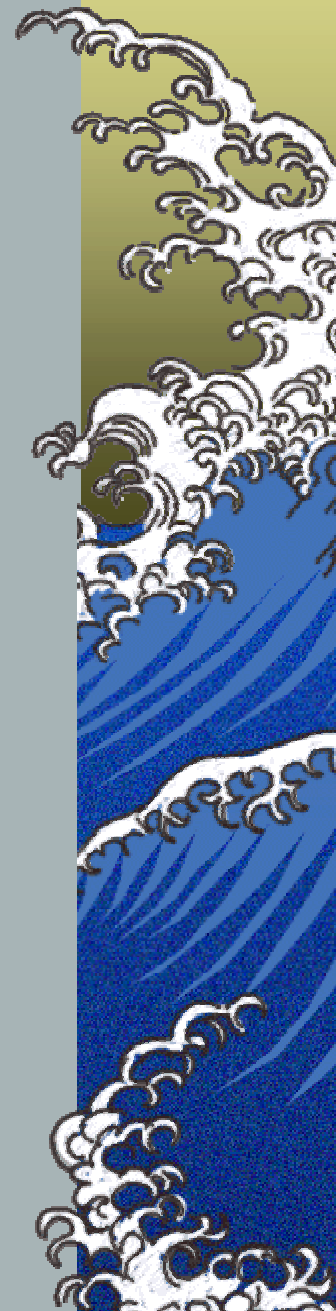


Municipalities and Road Network within the Raritan Basin



# Raritan Water Supplies

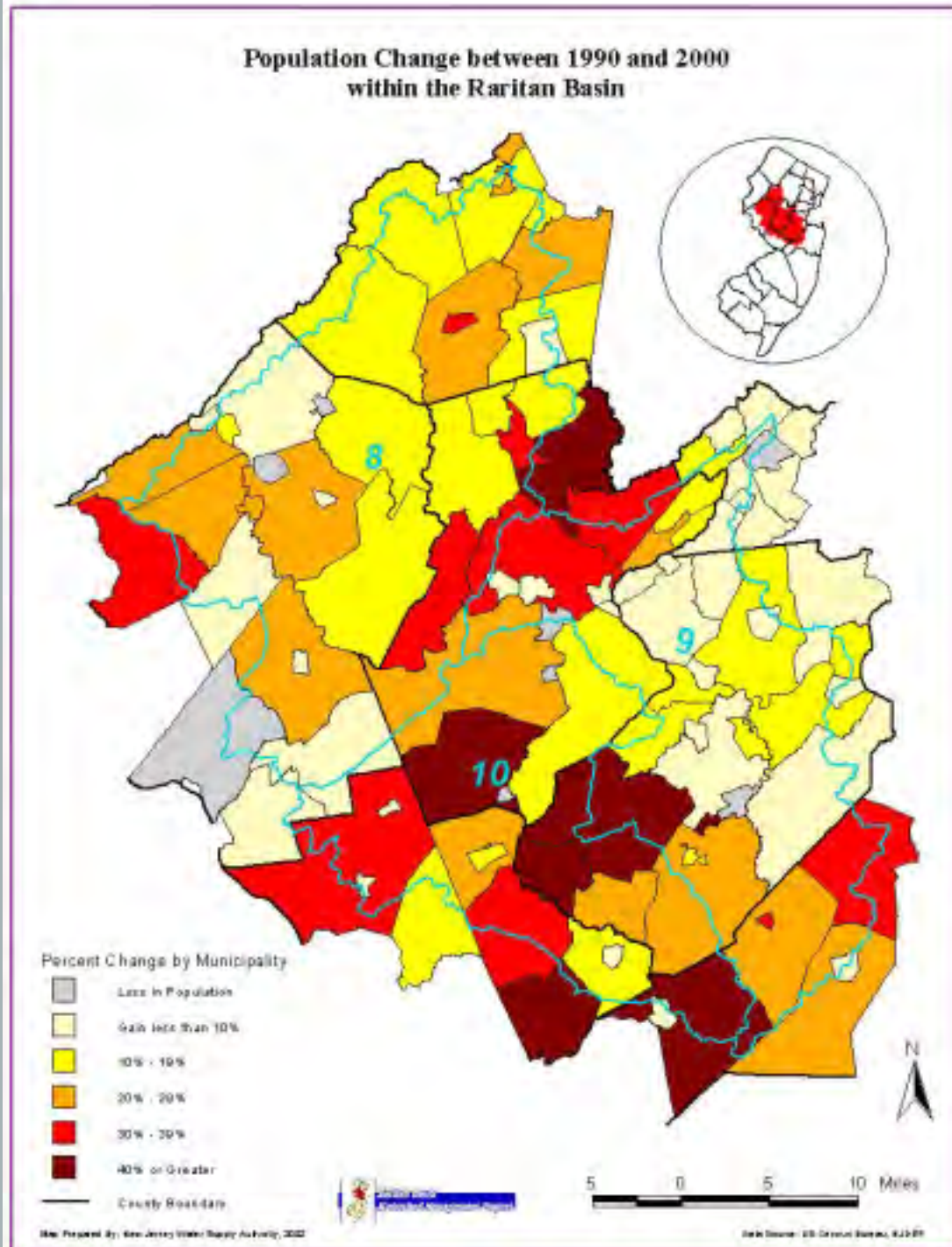
- ▶ *Spruce Run Reservoir*
- ▶ *Round Valley Reservoir*
- ▶ *Delaware & Raritan Canal*





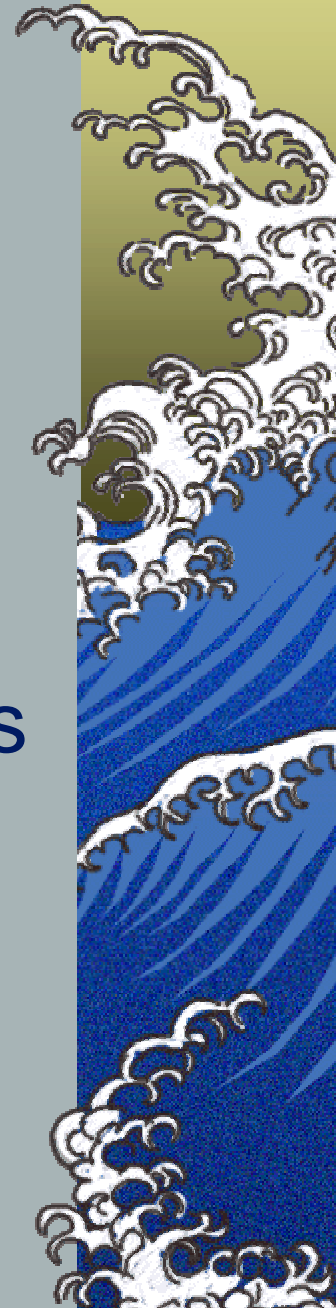
# Population Changes

- Development in the Raritan Basin moving into source water areas for surface water supplies



# Changing water use patterns

- ▶ More agricultural irrigation in NJ
  - ▶ Who says whether/when uses conflict?
  - ▶ And what happens then?
- ▶ More lawn irrigation using on-site wells
  - ▶ What impact on stream flows?
  - ▶ And what happens then?





# So what now?

## NJ Water Supply Authority focus:

- ▲ Improve management of new land uses
- ▲ Preservation of critical lands
- ▲ Improve management of existing LU
- ▲ Improve management of water uses





# Why a Spruce Run Initiative?

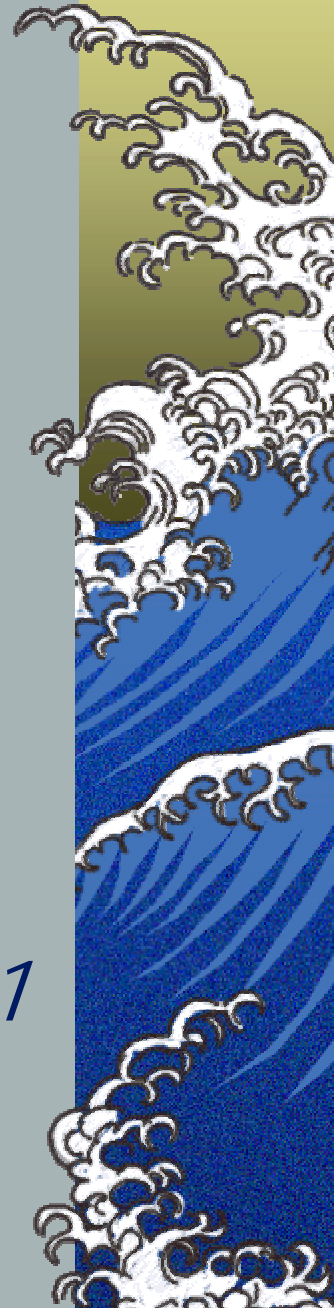
- ▶ *Spruce Run Reservoir showing impacts of excessive nutrients and sediments*
- ▶ *Tributary streams showing impacts of land uses and stormwater*





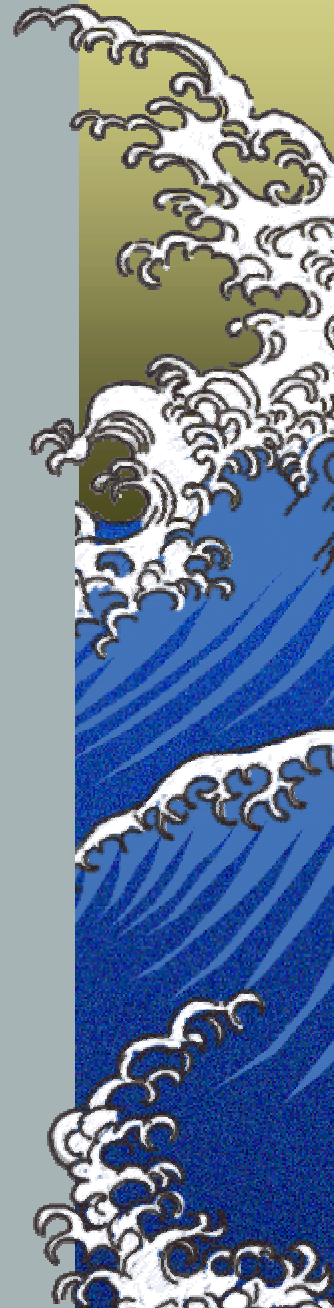
# Why NJWSA?

- *Owns and operates Reservoir*
- *Source water protection less costly than remedial actions*
- *Reservoir also used for recreation – algae growth an issue*
- *Area growing – Interstate 78/Route 31*



# Why Do Municipalities Cooperate?

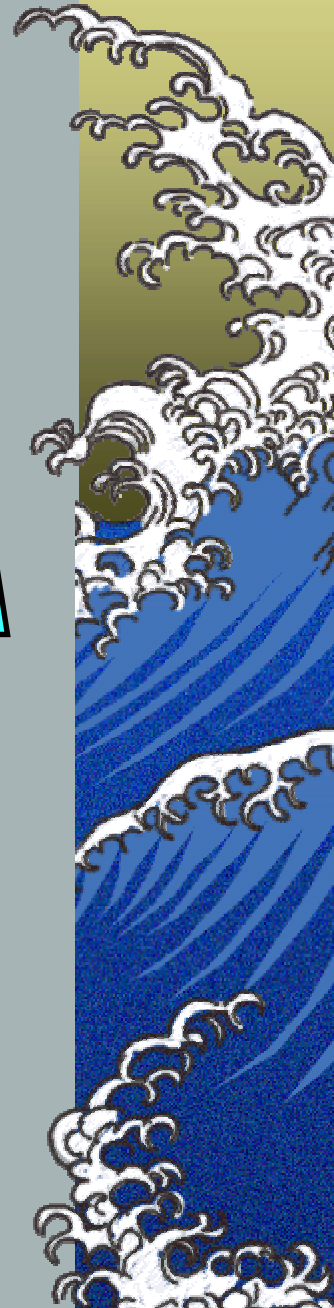
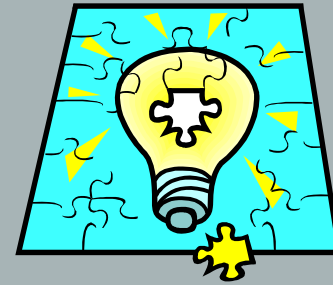
- ▶ *Mostly non-sewered, rural towns*
- ▶ *Suburban pressures mounting*
- ▶ *Oppose new infrastructure*
- ▶ *Stream damage increasing*
- ▶ *Want to limit growth*
- ▶ *NJWSA provides expertise, \$\$*





# Components of the Initiative

- ▶ Prevent increased water damages
- ▶ Remedy existing problems
- ▶ Acquire critical open spaces
- ▶ Formal Agreement with municipalities:  
all decisions to implement projects  
requires consensus & local approval



# Preventing Future Damage from New Land Uses



- *Master Plans*
- *Conservation Elements*
- *Ordinances*
- *BMPs*
- *Education*
- *Stormwater Management*



# Remedial Projects



- ▶ *Stream bank restoration*
- ▶ *Reforestation*
- ▶ *Agricultural BMPs*
- ▶ *Stormwater system retrofits and maintenance*
- ▶ *Septic system management*

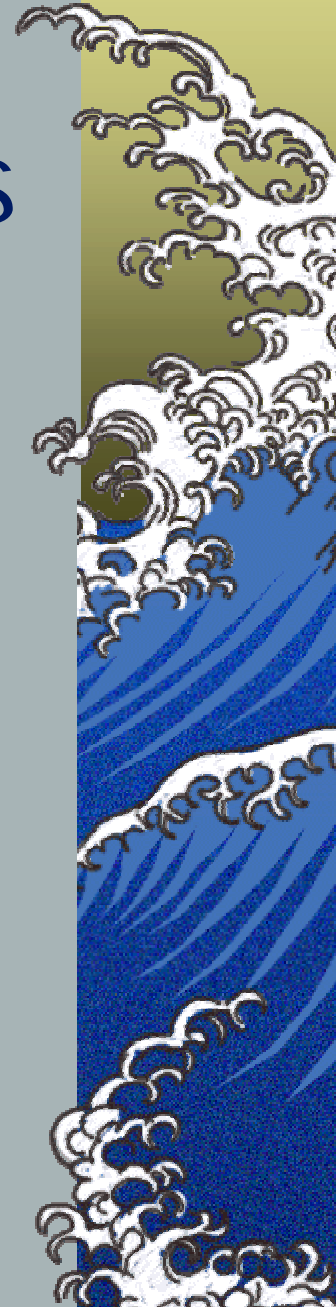






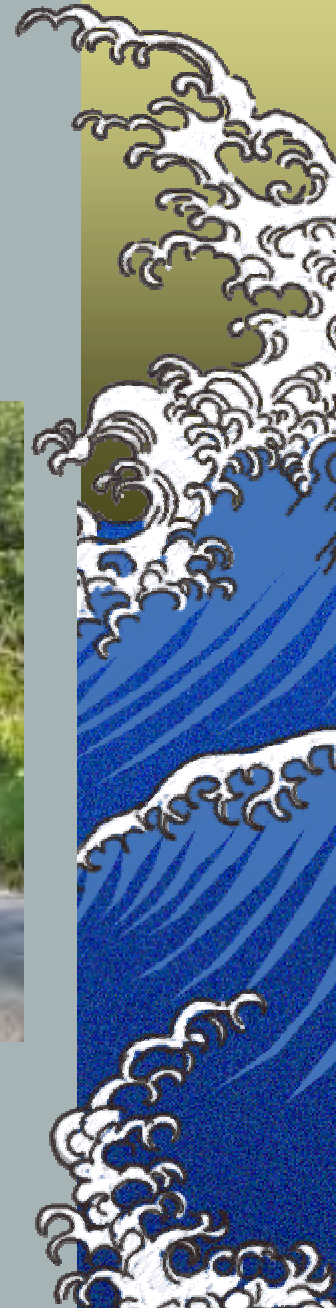
# Prevention/Restoration Funds

- ▶ EPA Watershed Initiative Grant – part of \$2 million dollar Raritan Basin project
- ▶ Smart Growth Grant – Managing highway corridor growth and redevelopment
- ▶ NJWSA – NPS loading model
- ▶ Section 319 grant – watershed-based stormwater management model and plan
- ▶ SRI Municipalities – public education for septic system maintenance, other topics



# Critical Areas Preservation

- ▶ *Focus – preservation of water resources*
- ▶ *Strategy – link land acquisition and land development ordinances*
- ▶ *Planning funds from US Forest Service and NJWSA*



# Land Preservation Criteria

➤ *Water Quality and Quantity*



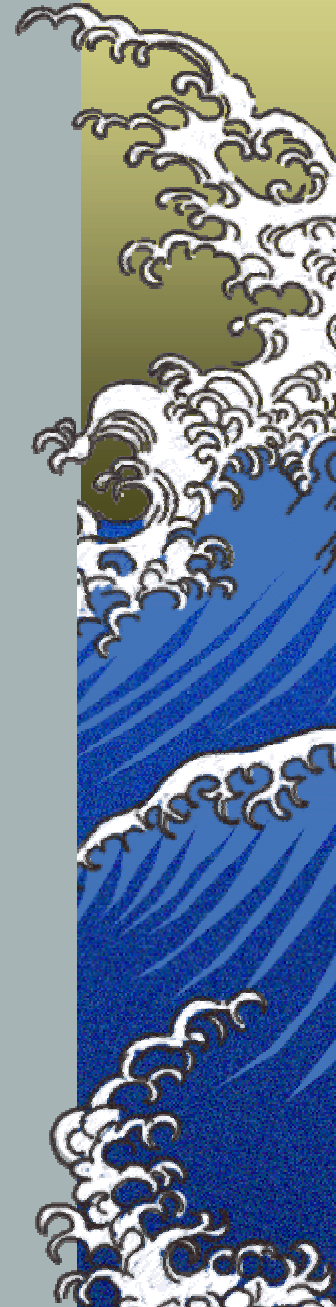
➤ *Endangered and Threatened Species*



➤ *Prime Ag Soils*

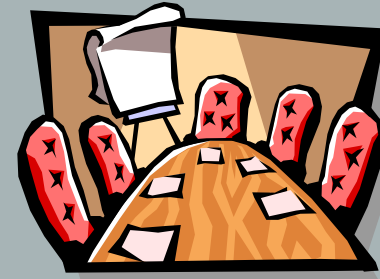


➤ *Large, contiguous areas*

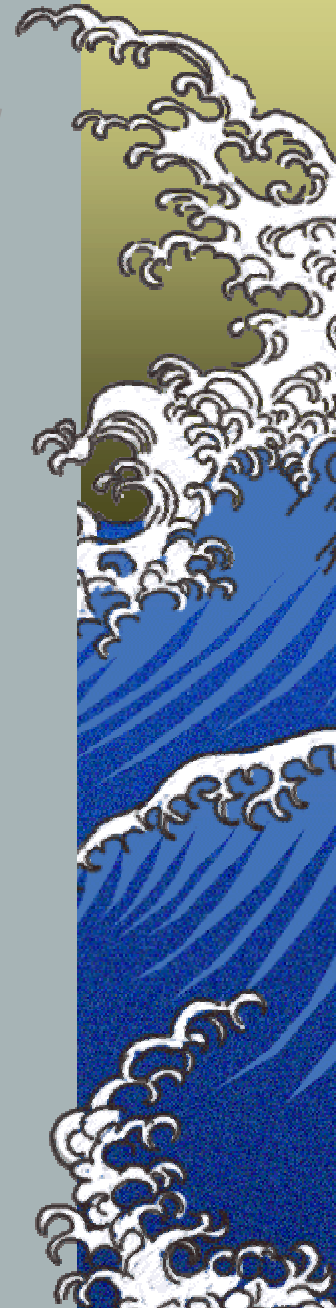
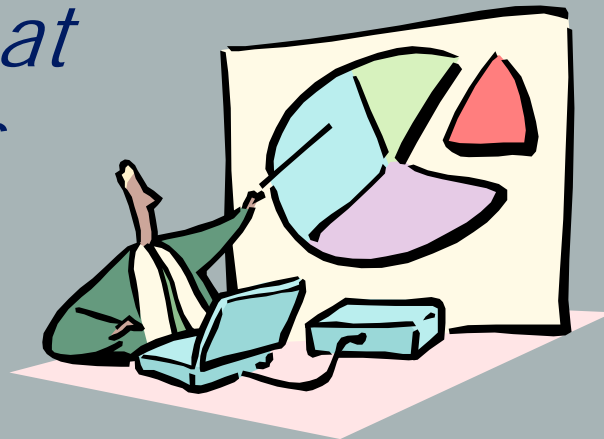




# Critical Areas Plan Development



- ▶ *NJWSA – GIS and general support*
- ▶ *Professional meeting facilitation*
- ▶ *GIS – “on the fly” at Initiative meetings*















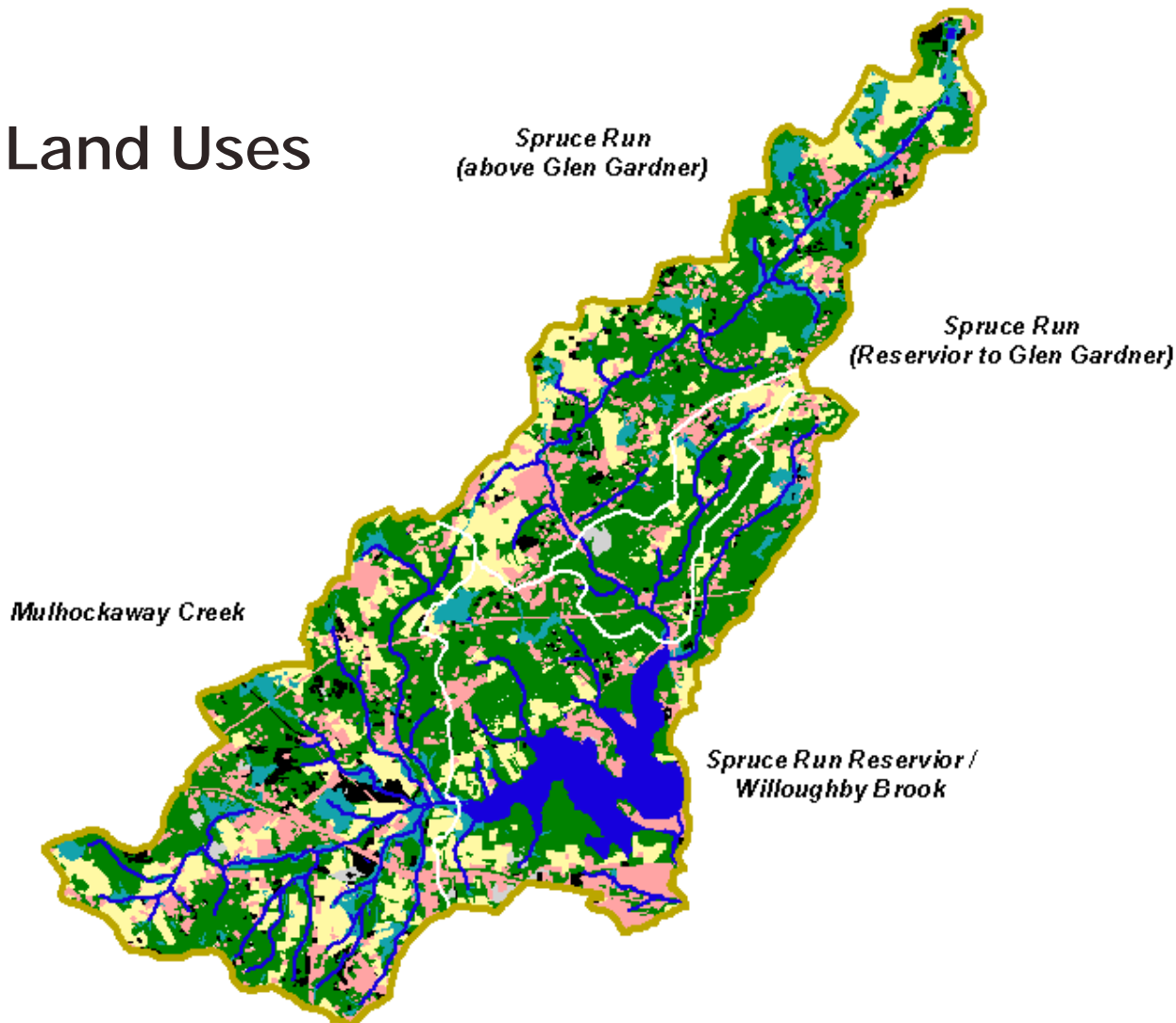
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1995 Land Use

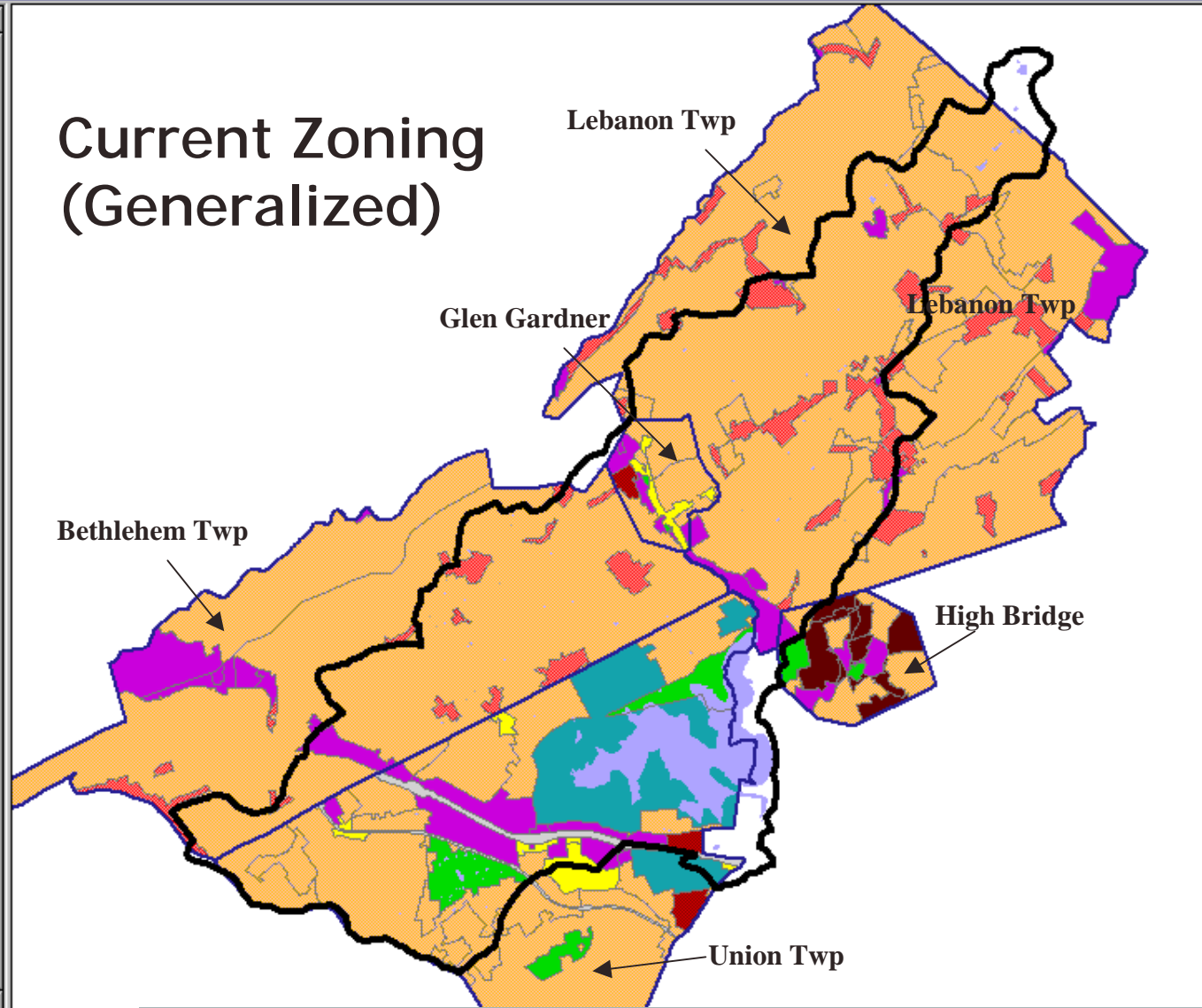
- Study Area  

- Subwatersheds  

- Streams  

- Change to Urban  

- 1995 Land Use
  -  AGRICULTURE
  -  BARREN LAND
  -  FOREST
  -  URBAN
  -  WATER
  -  WETLANDS

# 1995 Land Uses

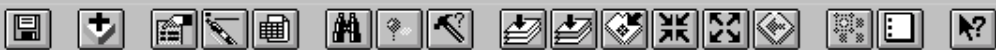




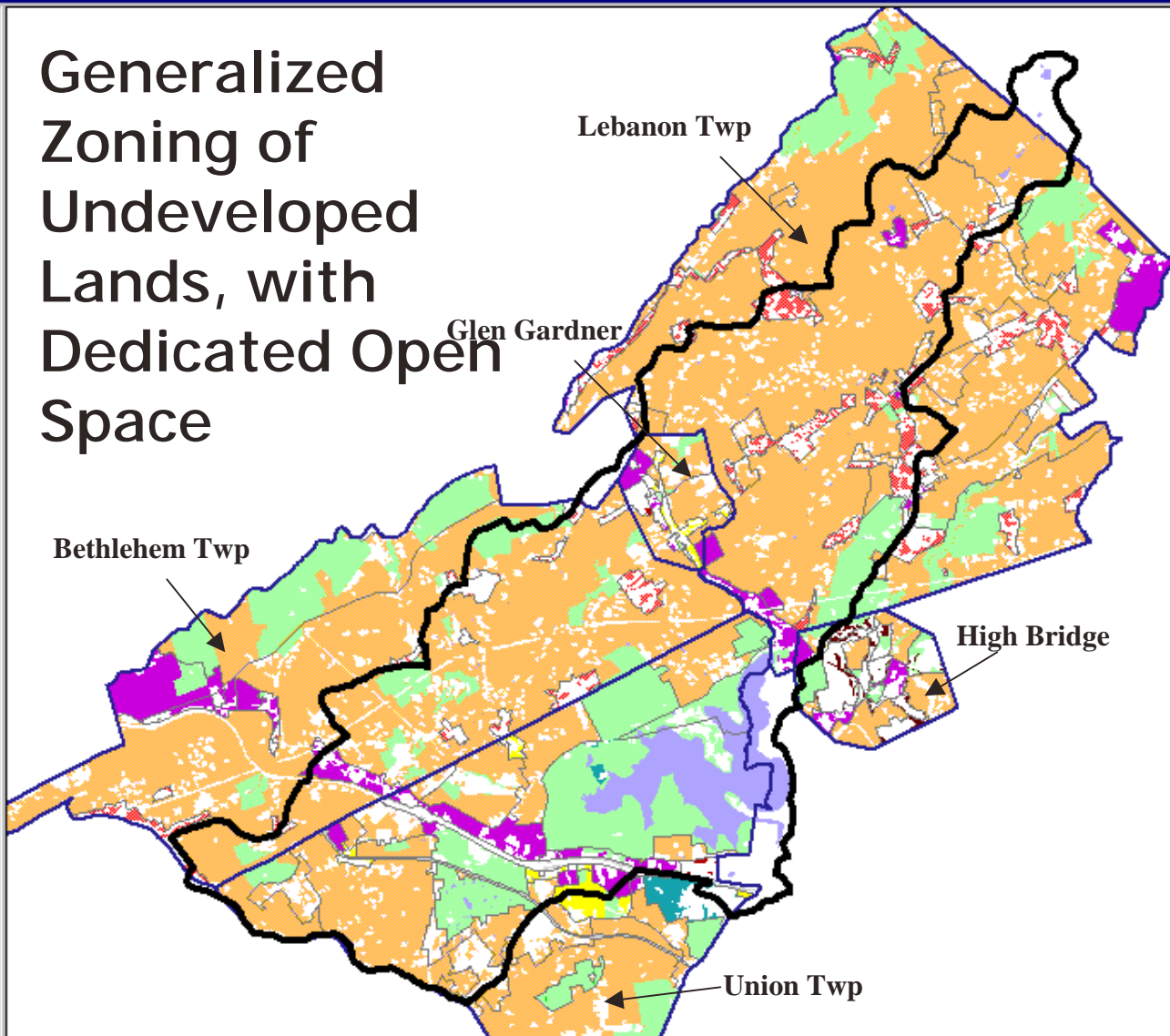
- Study Area
- Municipalities
- Zoning Type
- Lakes
- 1995 Land Use
  - URBAN
- Open Space
- Preserved Farms
- Zoning Name (Sample)
  - High Density Residential
  - Medium Density Residential
  - Moderate Density Residential
  - Multi-Family Residential
  - Multifamily Residential
  - Single Family Residential
  - Single-Family Residential
- Zoning Type
  - Commercial/Office/Industrial
  - Government
  - N/A
  - Park/Conservation
  - Residential
  - Village



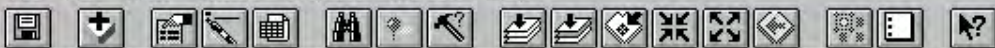




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


























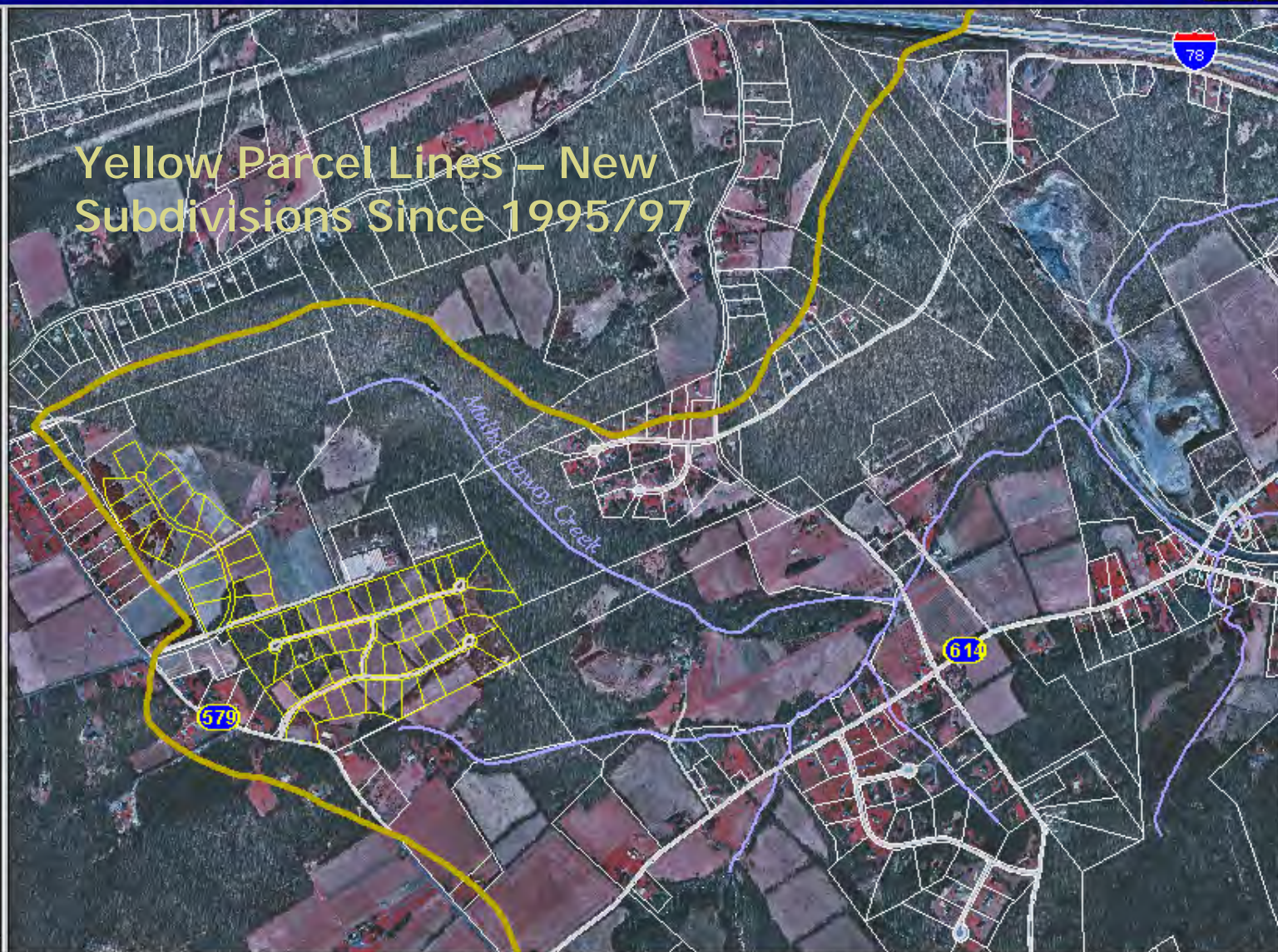


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## Land Use and Parcels

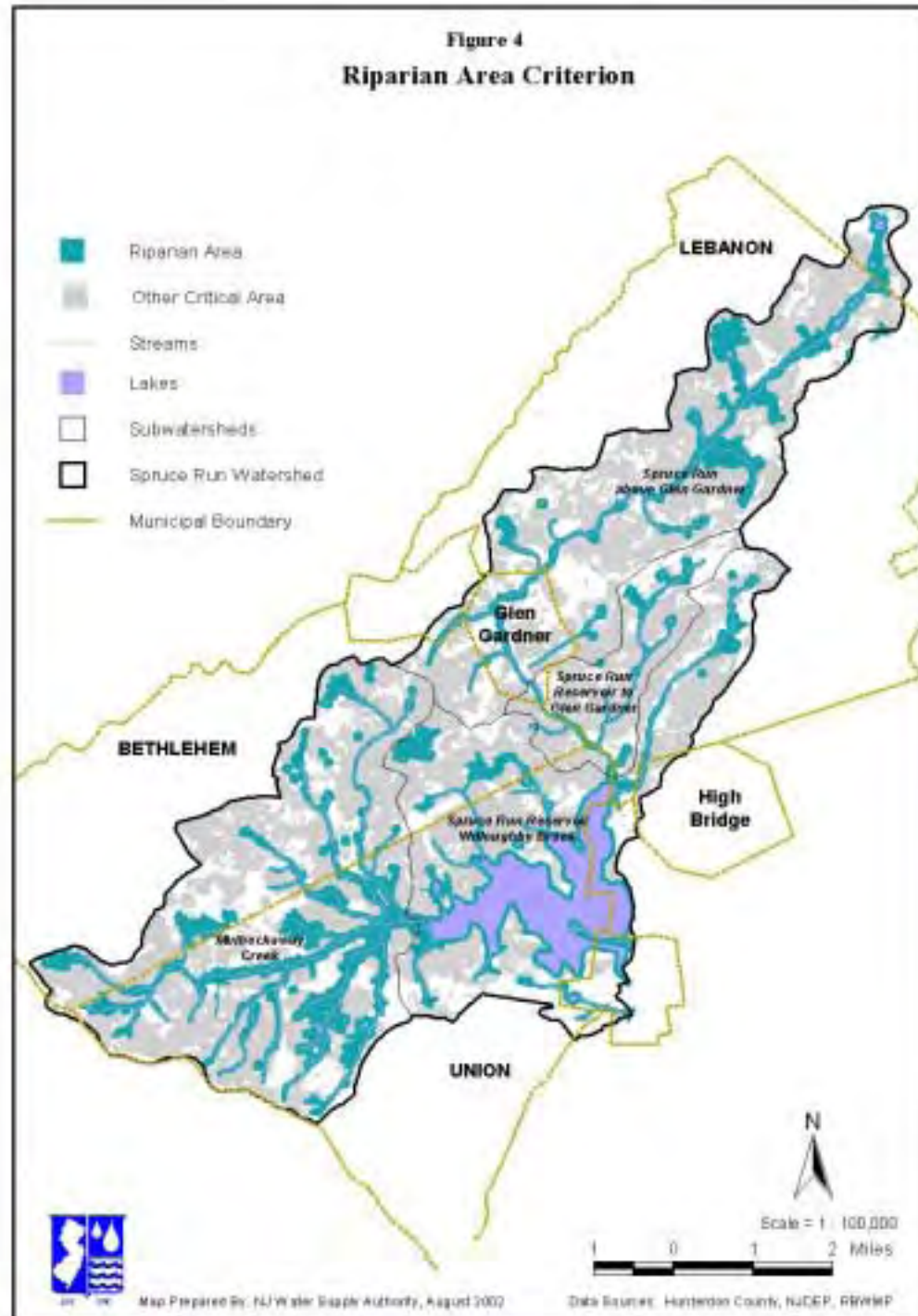
- Study Area  

- Roads  

- Streams  

- New Development  

- Parcels  

- Change to Urban  

- Impervious Surface
  -  0 - 9
  -  10 - 19
  -  20 - 24
  -  25 - 100
- 1995 Land Use
  -  AGRICULTURE
  -  BARREN LAND
  -  FOREST
  -  URBAN
  -  WATER
  -  WETLANDS
- 1986 Land Use
  -  AGRICULTURE
  -  BARREN LAND
  -  FOREST
  -  URBAN
  -  WATER
  -  WETLANDS
- 1997 Aerial Photo
- Watershed Mngmt Areas
  -  Upper Delaware
  -  N&S Branch Raritan
  -  Central Delaware





# Surface Waters with Riparian Areas

- *Green areas show streams and riparian areas*
- *Gray areas are remainder of critical areas*





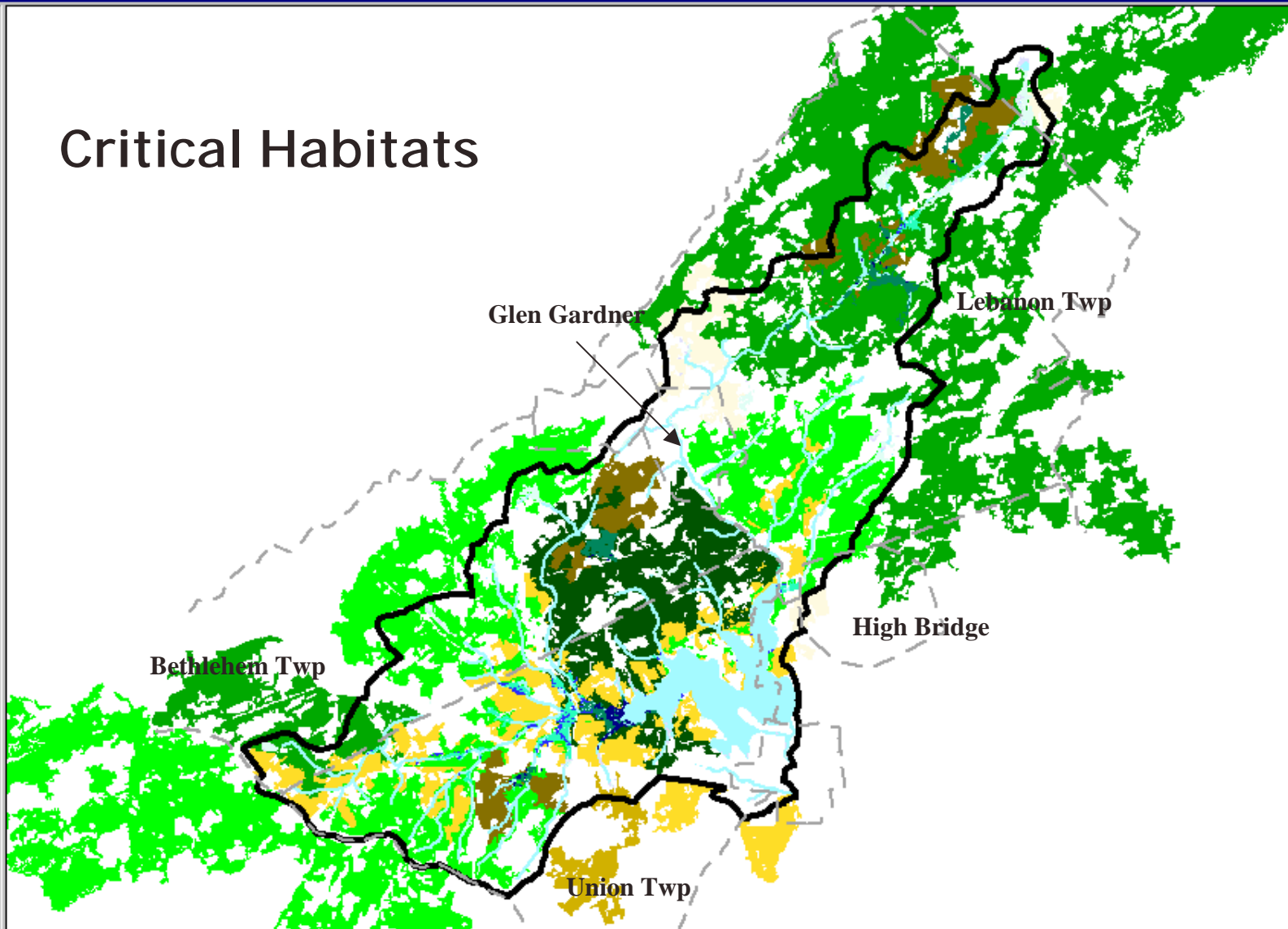


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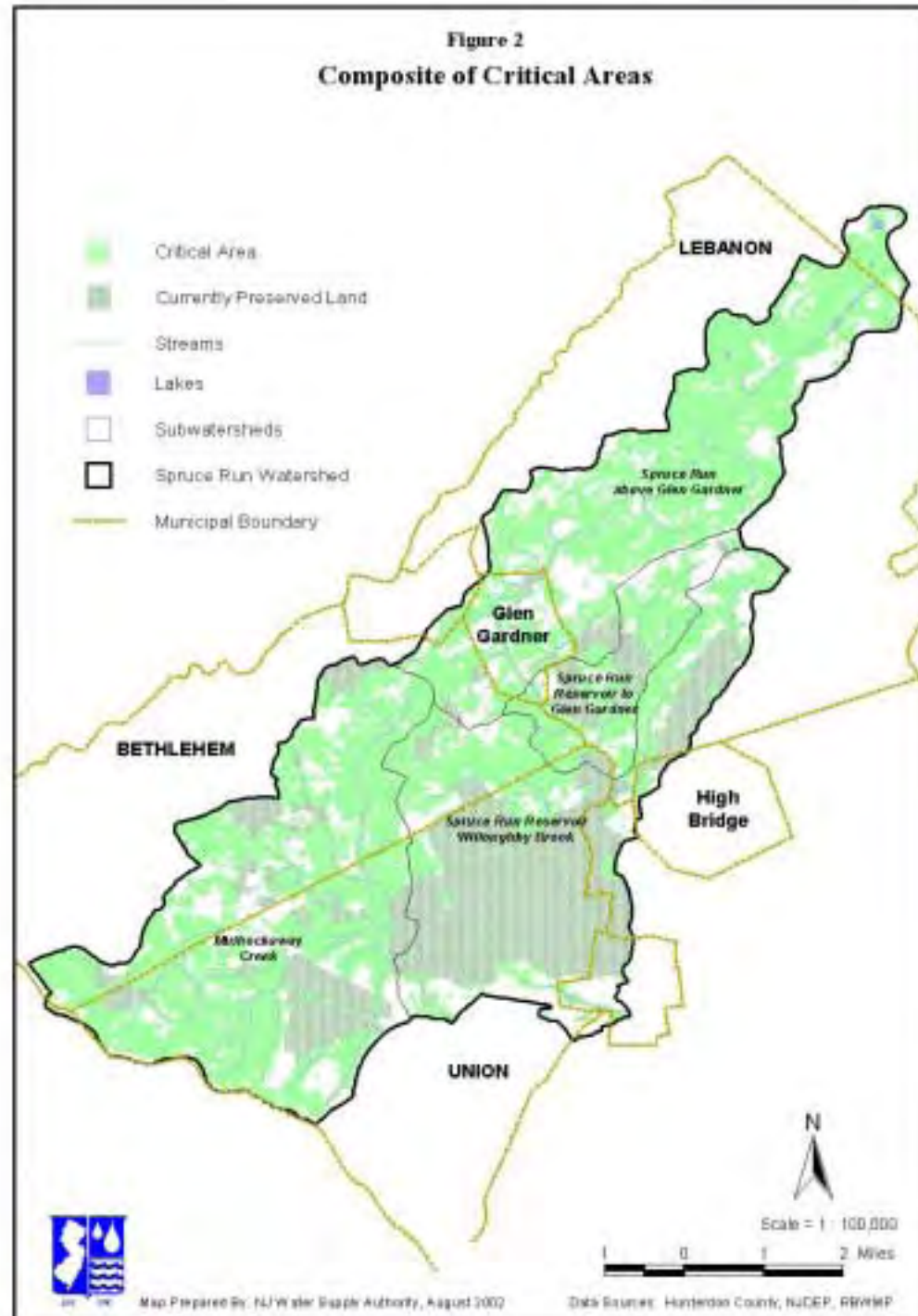
Landscape Project

- Mod\_line.shp
- Study Area
- Emergent Wetland
  - Suitable Habitat
  - Special Concern
  - State Threatened
  - State Endangered
  - Federal T & E
- Wetland Forest
  - Suitable Habitat
  - Special Concern
  - State Threatened
  - State Endangered
  - Federal T & E
- Streams
- Lakes
- Grassland
  - Suitable Habitat
  - Special Concern
  - State Threatened
  - State Endangered
  - Federal T & E
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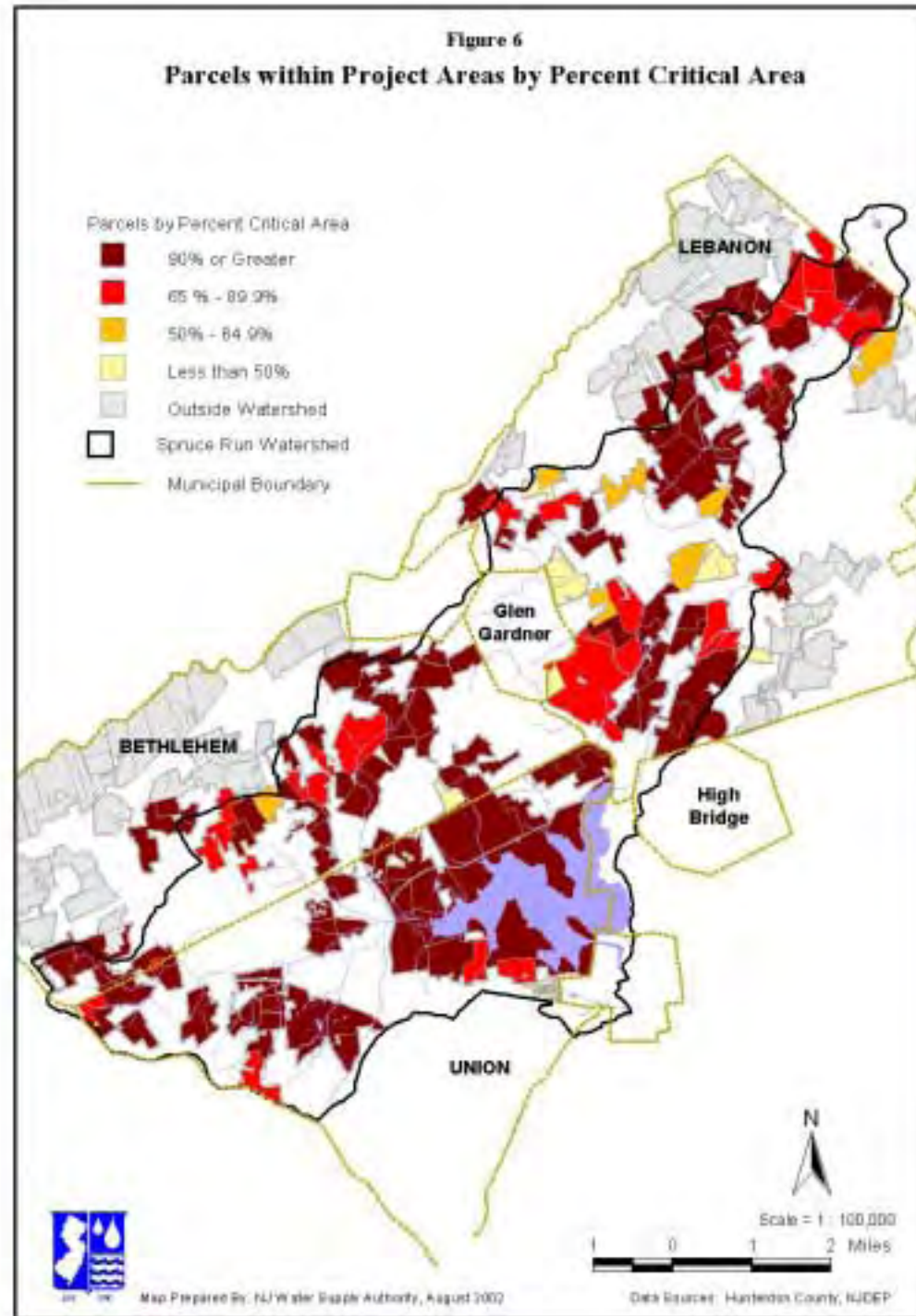
# Critical Areas

- Map shows all non-preserved critical areas, regardless of parcel size and land use
- Shows high natural resource values of the area



# Degrees of Criticality?

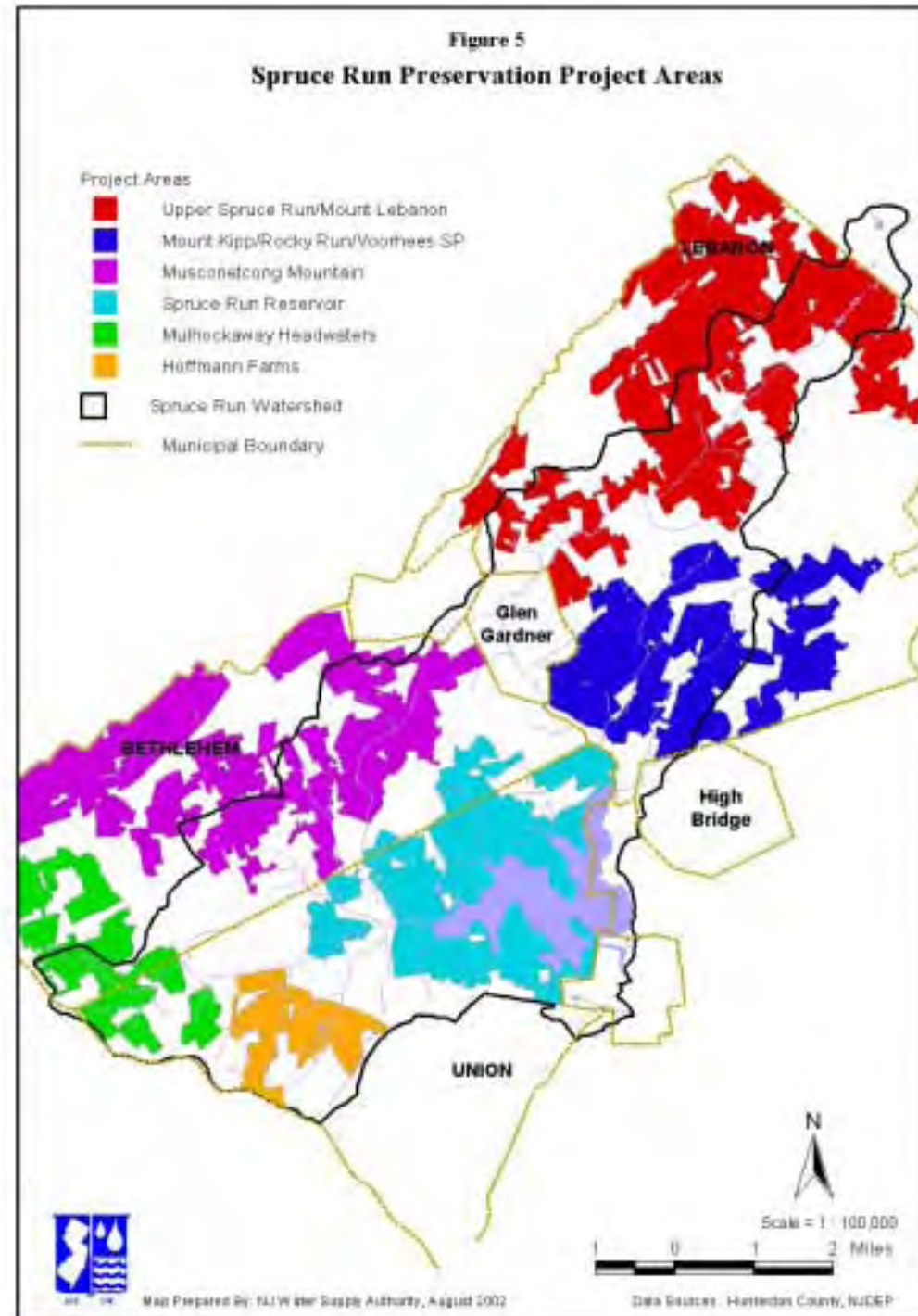
- *GIS can show the extent to which each parcel has critical areas (and where)*
- *Estimates, not site-specific findings*





# Project Areas

- *5365 acres in 2002 open space*
- *6 project areas: 6900 acres of new targeted lands*
- *240 parcels*
- *Over 640 acres preserved in 2003*
- *Ultimate target – 40% preserved*

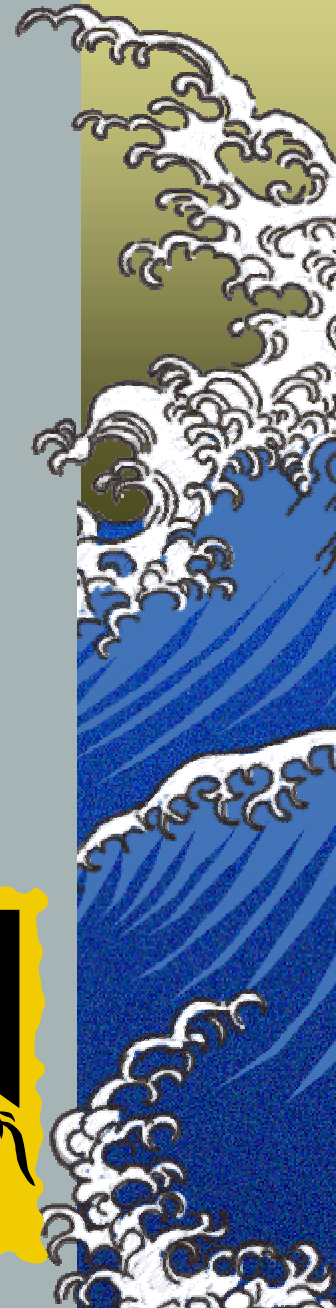


# Critical Area Plan Status

- ▶ *Completed October 2002*
- ▶ *Acquisition efforts in progress*



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# Uses of the Plan

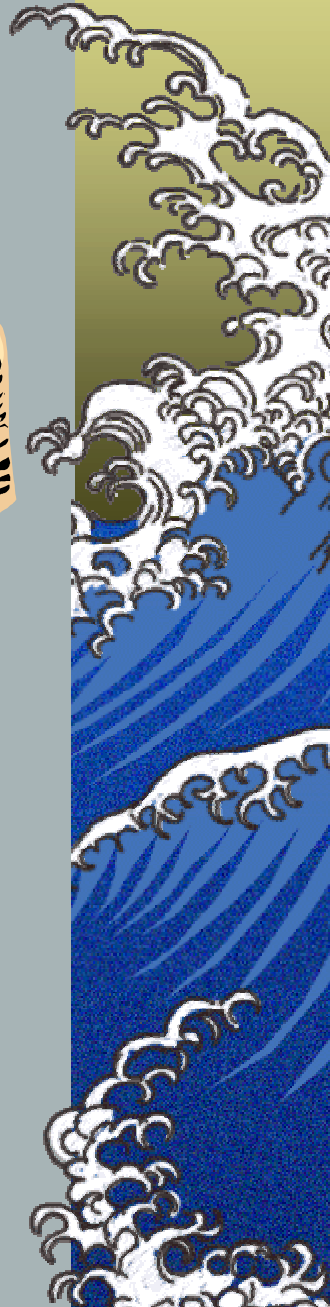
- *One component of local preservation programs*
- *Adopt as part of municipal open space/conservation plans, within master plan*
- *Basis for additional funding (SRF)*
- *Coordination of Green Acres, County, land trusts, NJWSA and other partners*





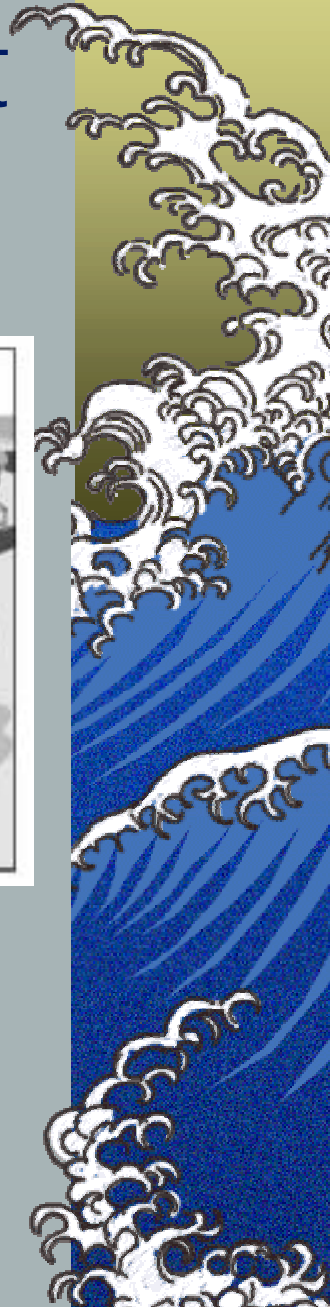
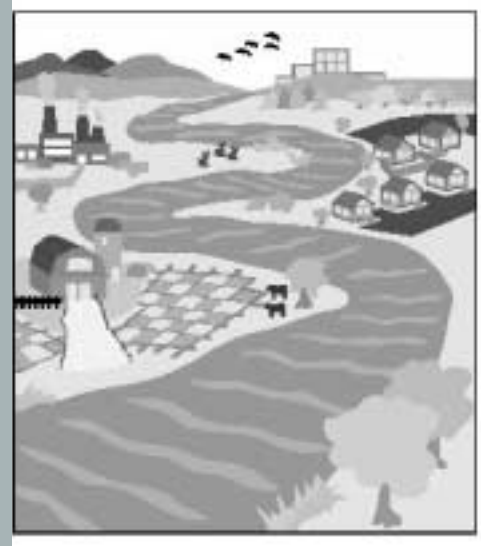
# Development Issues

- *Acquisition won't be totally successful*
- *Not all lands merit acquisition*
- *Site planning can protect some or all of critical areas*
- *Municipal land use ordinances allow for some of these approaches*



# What Do Water Suppliers Want From Watershed Approaches?

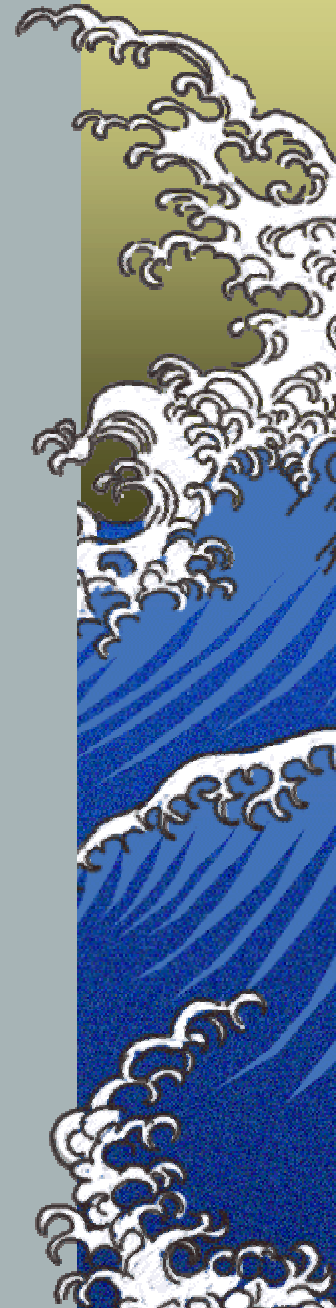
- Coordinated approaches to protect supplies from degradation and loss
- Watershed-based assessments that help with site-specific decisions
- Cost-effective approaches with multiple benefits
- *We want protection of our source waters!*





# Our Greatest Challenge – Developing Watersheds

- ▶ Dynamic – Limited time to act
- ▶ Controversial – Can affect profits
- ▶ Must prevent degradation, not just repair current damages
- ▶ Tax revenue implications
- ▶ Many landowners
- ▶ Constant influx of new players

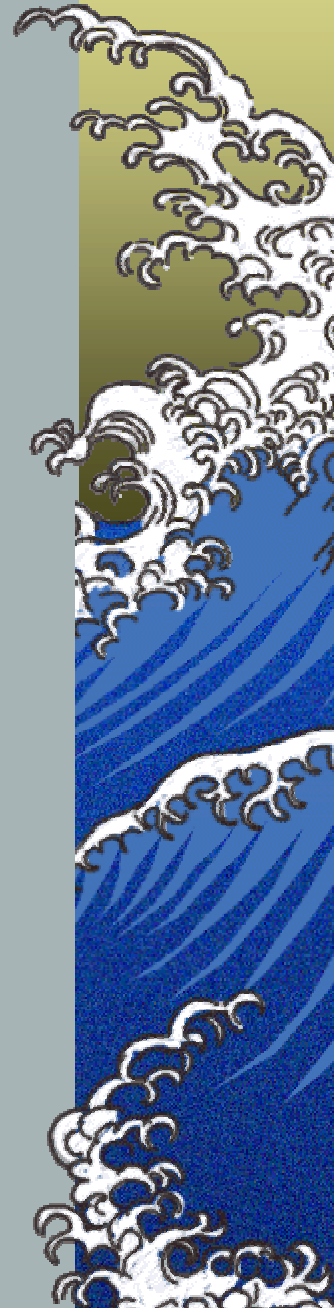






# Implications

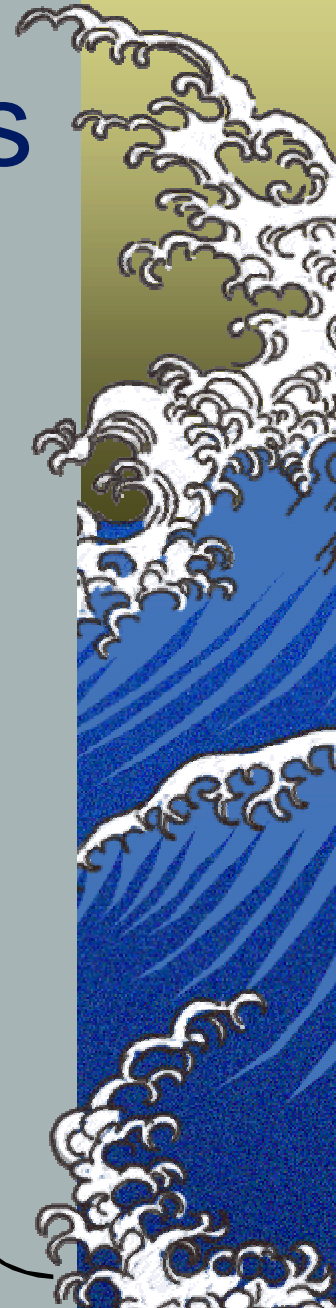
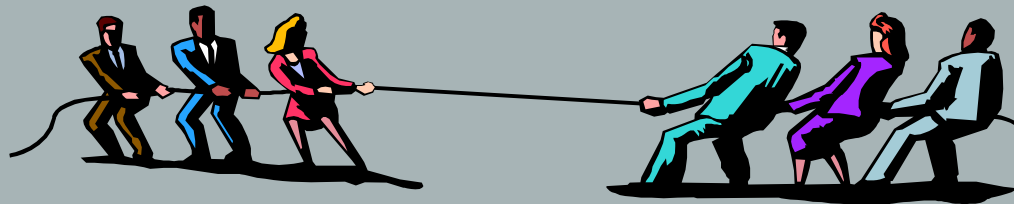
- ▶ Initiatives relying solely on non-regulatory or regulatory approaches become much more difficult
- ▶ Need coordinated use of police power and non-regulatory approaches





# Some Final Thoughts

- ▶ Source water protection – no guarantee of success
- ▶ Just complying with laws isn't enough – we should achieve much more than mere compliance
- ▶ If we aren't in the game, they play without us!





# New Jersey Water Supply Authority Watershed Protection Unit

**732-356-9344**

[www.raritanbasin.org](http://www.raritanbasin.org)