AWRA

Community, Conversation, Connections

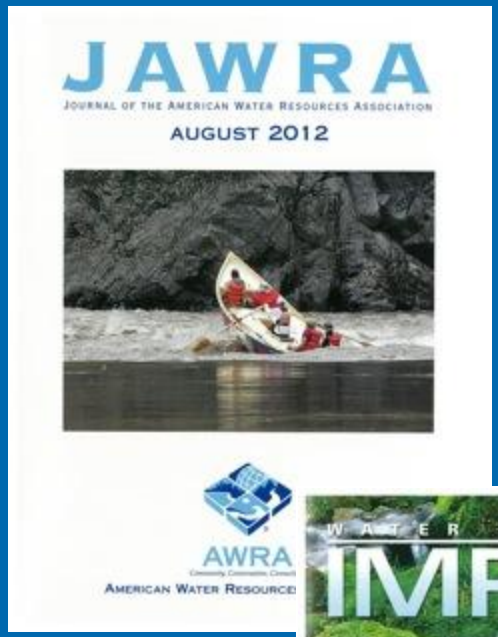
- **Mission:**
  - To advance multidisciplinary water resources education, management and research
    - www.AWRA.org

AWRA Meetings & Conferences

- Annual – November 3-7, 2013 – Portland, Oregon
- Technical Meetings - specific water resources themes
  - Environmental Flows
  - Healthy Forests = Healthy Waters
  - Water for Mega Cities - Beijing, China
- 2014 Technical Meetings
  - Spring - GIS and Water – Snow Bird, May
  - Summer – IWRM Application, Reno, Late June

2014 – 50th Anniversary Annual Conference – November Washington, DC

AWRA Publications



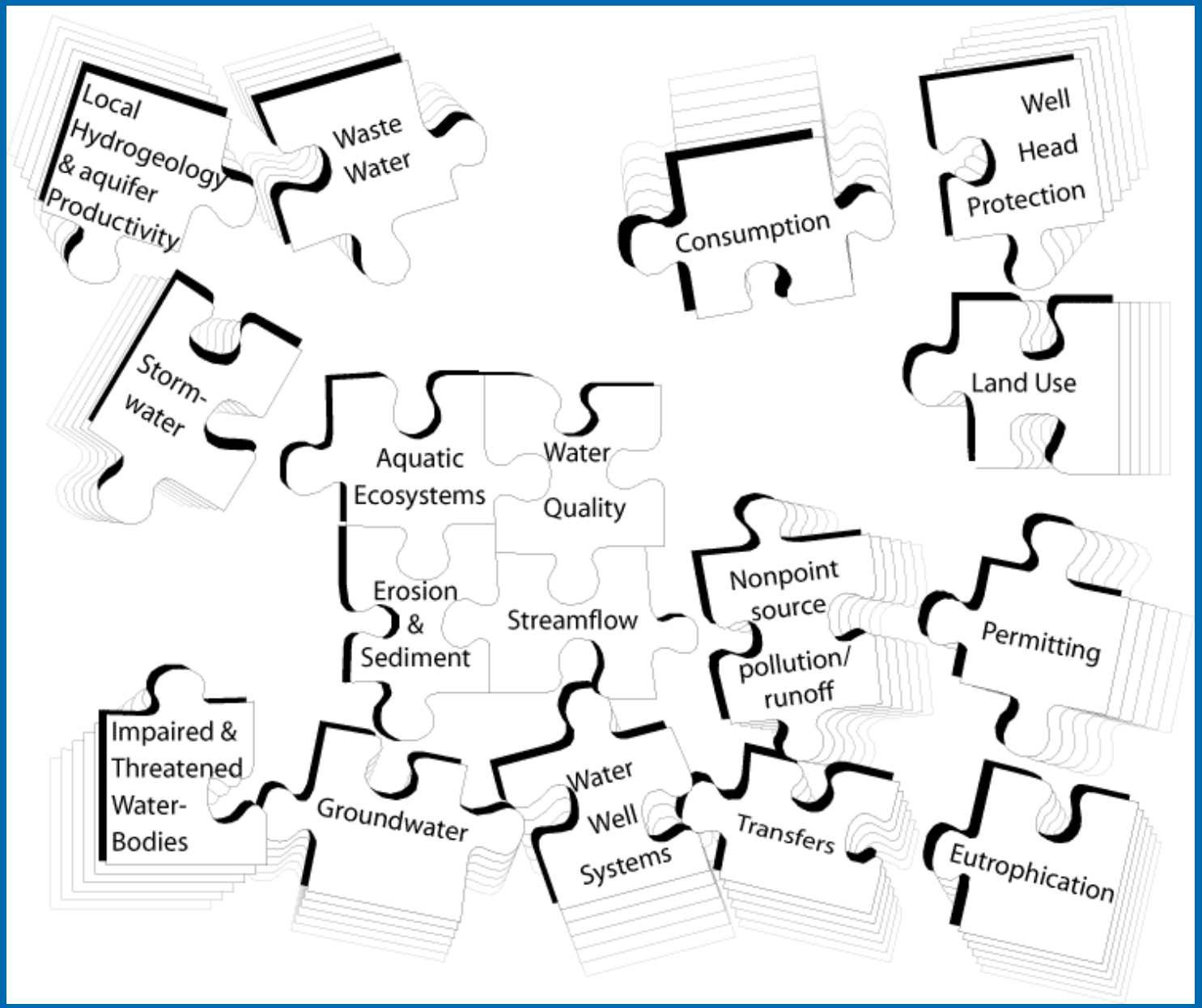
- ***Journal of the American Water Resources Association*** (JAWRA) - peer reviewed, refereed scientific journal
- ***Water Resources IMPACT*** - AWRA's bi-monthly magazine featuring practical solutions to current water resource issues.
- ***Connections*** - AWRA's monthly e-newsletter
- ***Catalyst*** – Specifically for State Sections and Student Chapters

Reports and Webinars

- IWRM – Local Stewardship to National Vision
- Proactive Flood and Drought Management
- Environmental Flows (in process)

Delaware River Basin Commission

AWRA = IWRM


Local Hydrogeology & aquifer Productivity
Waste Water
Consumption
Well Head Protection
Storm-water
Land Use
Aquatic Ecosystems
Water Quality
Erosion & Sediment
Streamflow
Nonpoint source pollution/ runoff
Permitting
Impaired & Threatened Water-Bodies
Groundwater
Water Well Systems
Transfers
Eutrophication

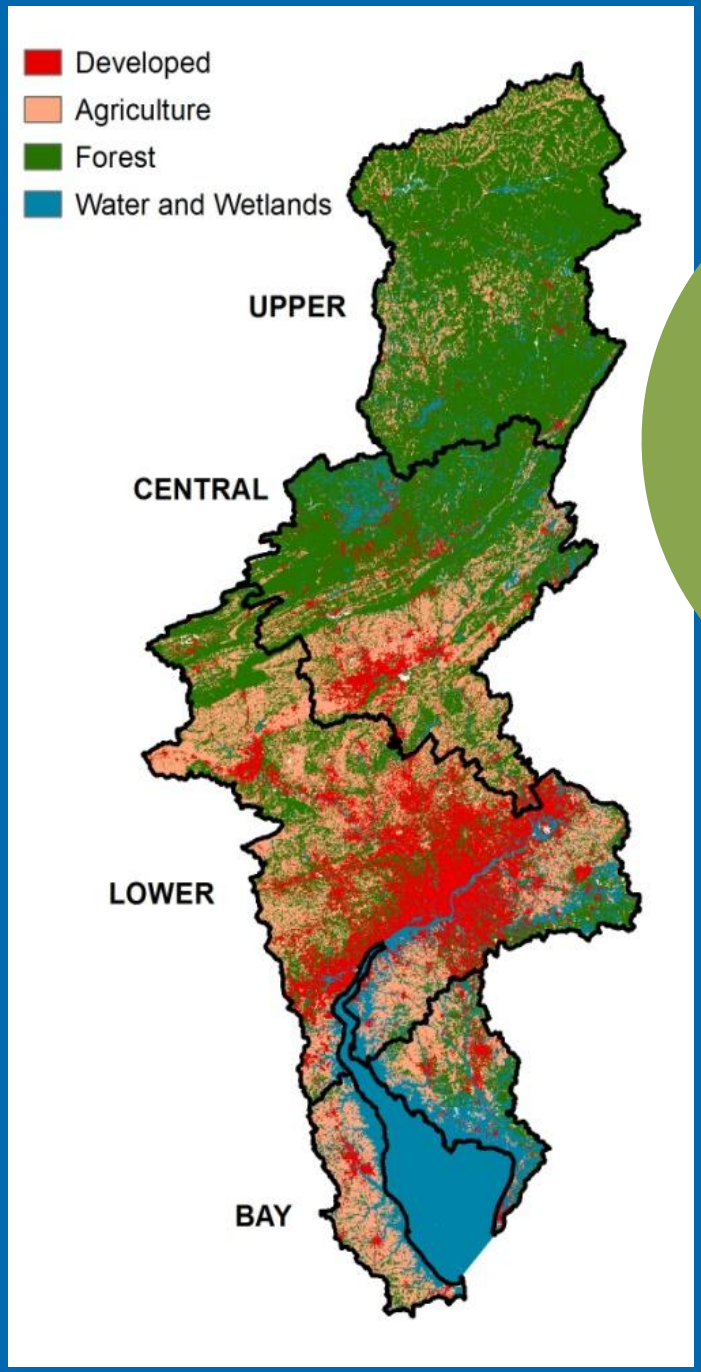
IWRM Focus

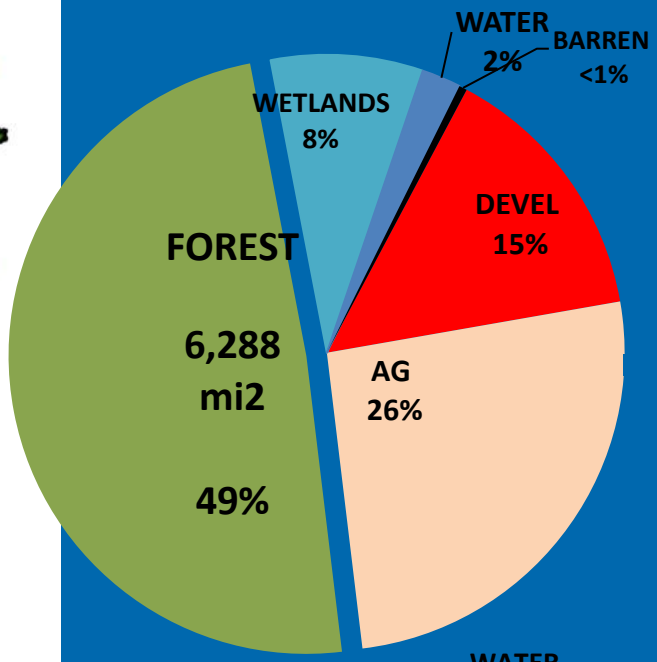
- USACE Contract:
  - 1) National IWRM Awards Program
  - 2) National IWRM Certification Program
- Please visit us at www.AWRA.org

Planning for the Future of the Delaware River Basin

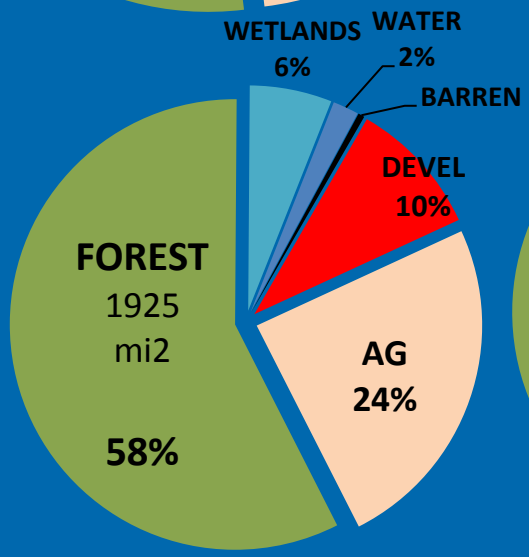
Carol R. Collier, AICP
Executive Director
Delaware River Basin Commission

50th Anniversary
Delaware River Basin Commission
1961–2011

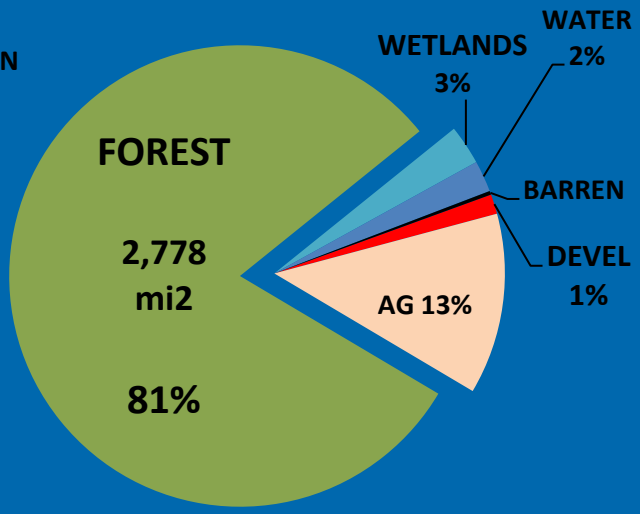




BASIN



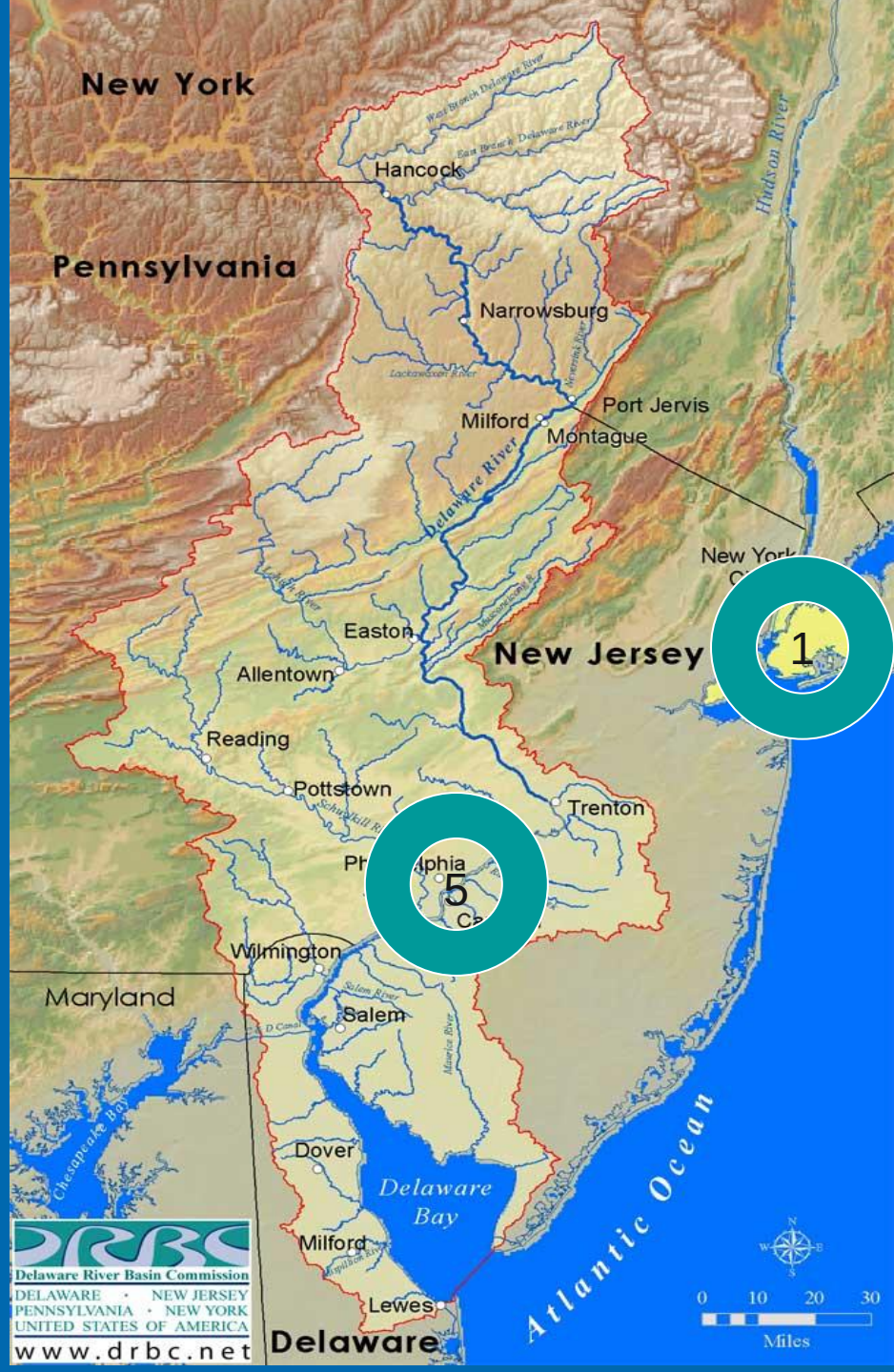
CENTRAL REGION



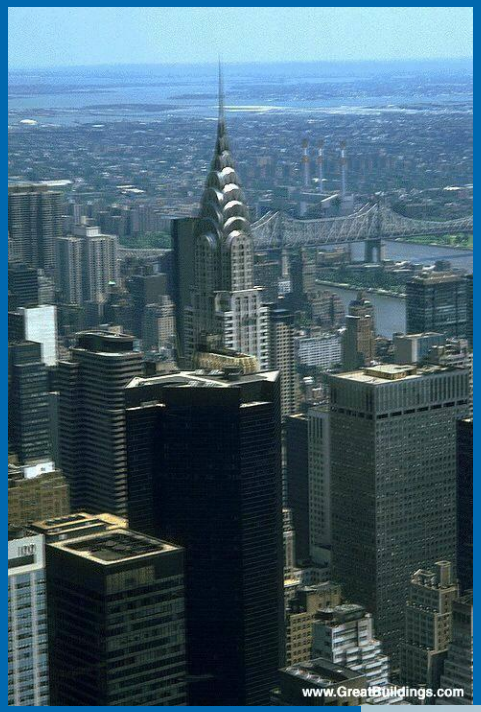
UPPER REGION

Delaware River Watershed Facts

- Over 15 million people (about 5% of the U.S. population) rely on the waters of the basin
- Drains 13,539 mi² , or 0.4 of 1% of the continental U.S. land area
- Longest undammed river east of the Mississippi
- Daily water withdrawal in the DRB = 8.7 BGD



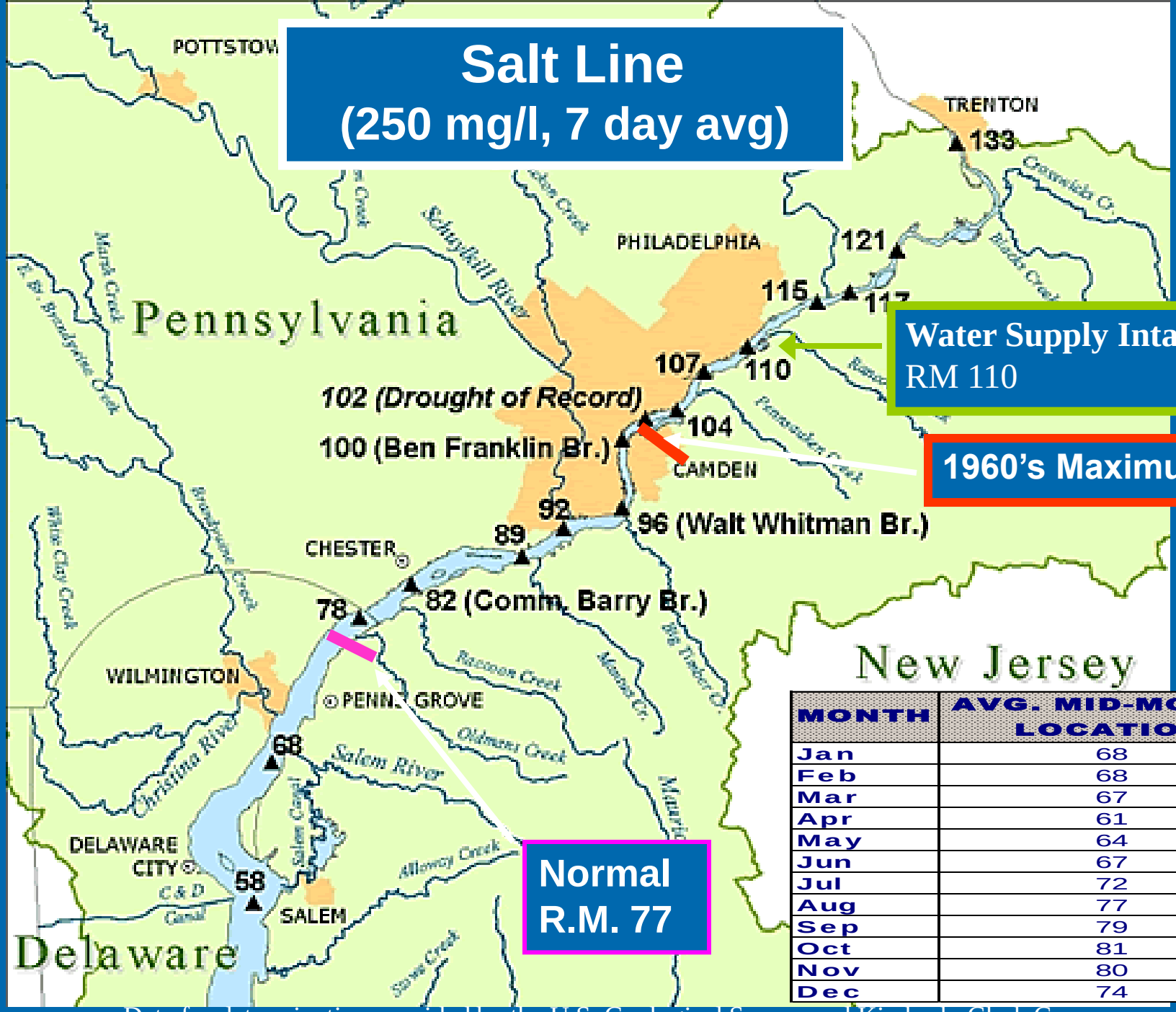
New York
Pennsylvania
Narrowsburg
Milford
Port Jervis
Montague
Delaware River
Hudson River
New York City
Easton
New Jersey
Allentown
Reading
Pottstown
Trenton
Philadelphia
Camden
Wilmington
Maryland
Salem
Dover
Delaware Bay
Atlantic Ocean
Milford
Cape May
Lewes
Delaware
0 10 20 30
Miles
Delaware River Basin Commission
DELAWARE • NEW JERSEY
PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA
www.drbc.net


www.GreatBuildings.com

Head of Tide

Delaware River Port Complex – Largest Fresh Water Port

Salt Line
(250 mg/l, 7 day avg)



MONTH	AVG. MID-MONTH LOCATION
Jan	68
Feb	68
Mar	67
Apr	61
May	64
Jun	67
Jul	72
Aug	77
Sep	79
Oct	81
Nov	80
Dec	74

Data for determination provided by the U.S. Geological Survey and Kimberly Clark Corp.

The DRB is a Critical Resource and An Economic Driver !!

- There is not enough water for all uses during drought conditions
- Water needed for other uses –
  - navigation, ecological flows, recreation, wastewater assimilative capacity
- More Complex – boundary of four states
- Holistic basin management is a necessity!

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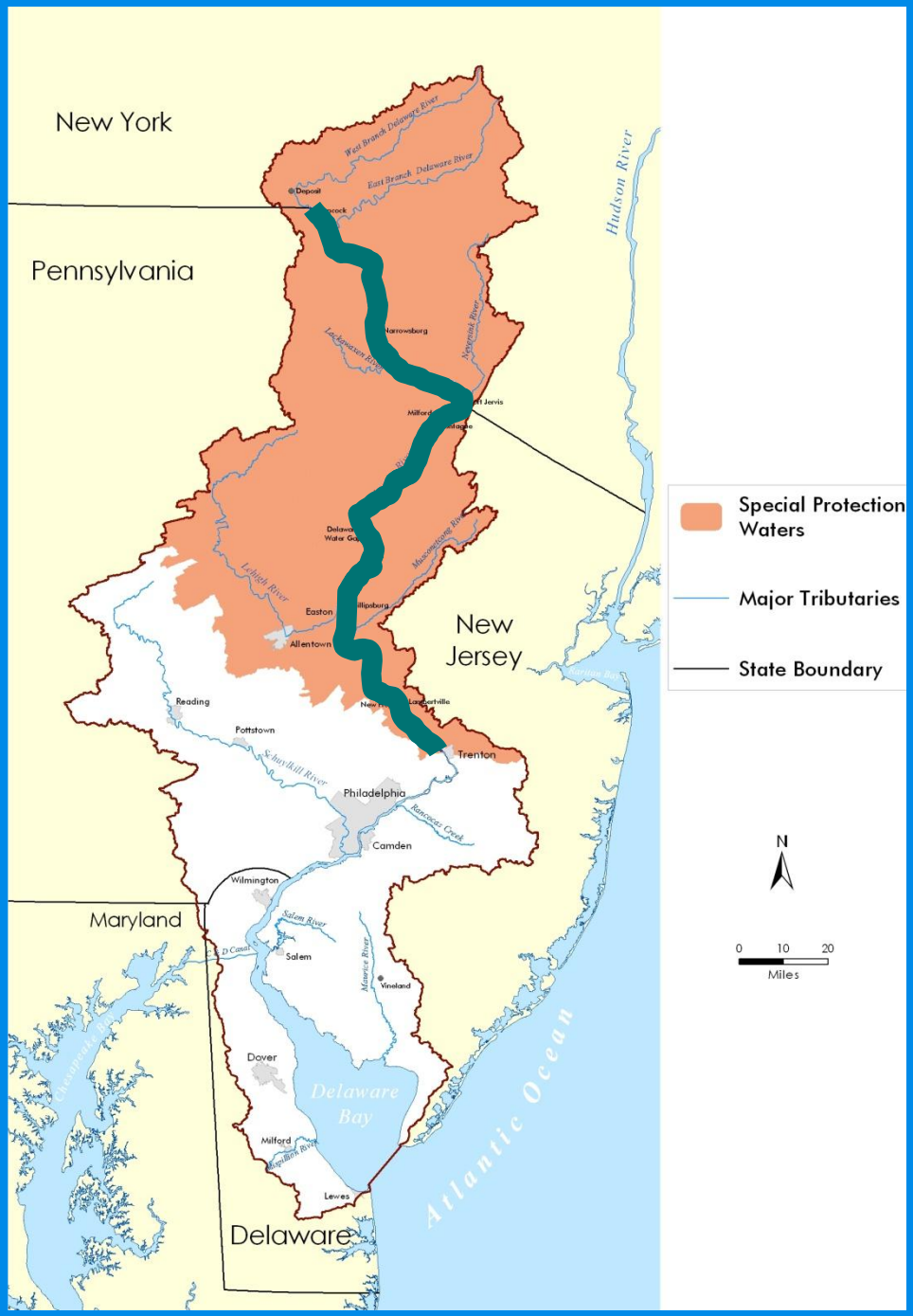
Water Quality

- Federal Wild and Scenic River Designation – ¾ of non-tidal river
- Total non-tidal river and its watershed designated DRBC Special Protection Waters
- Mainstem = longest stretch of anti-degradation waters in U.S.
- No measurable change in water quality



Fish Consumption Advisories

Issues Knocking On Our Door

- ✓ Natural Gas Drilling
- ✓ Population Shifts
- ✓ Energy Production – Water Use
- ✓ Ecological Flows / Human Use

- ✓ Sea Level Rise
- ✓ More Intense Storms
- ✓ Summer Droughts

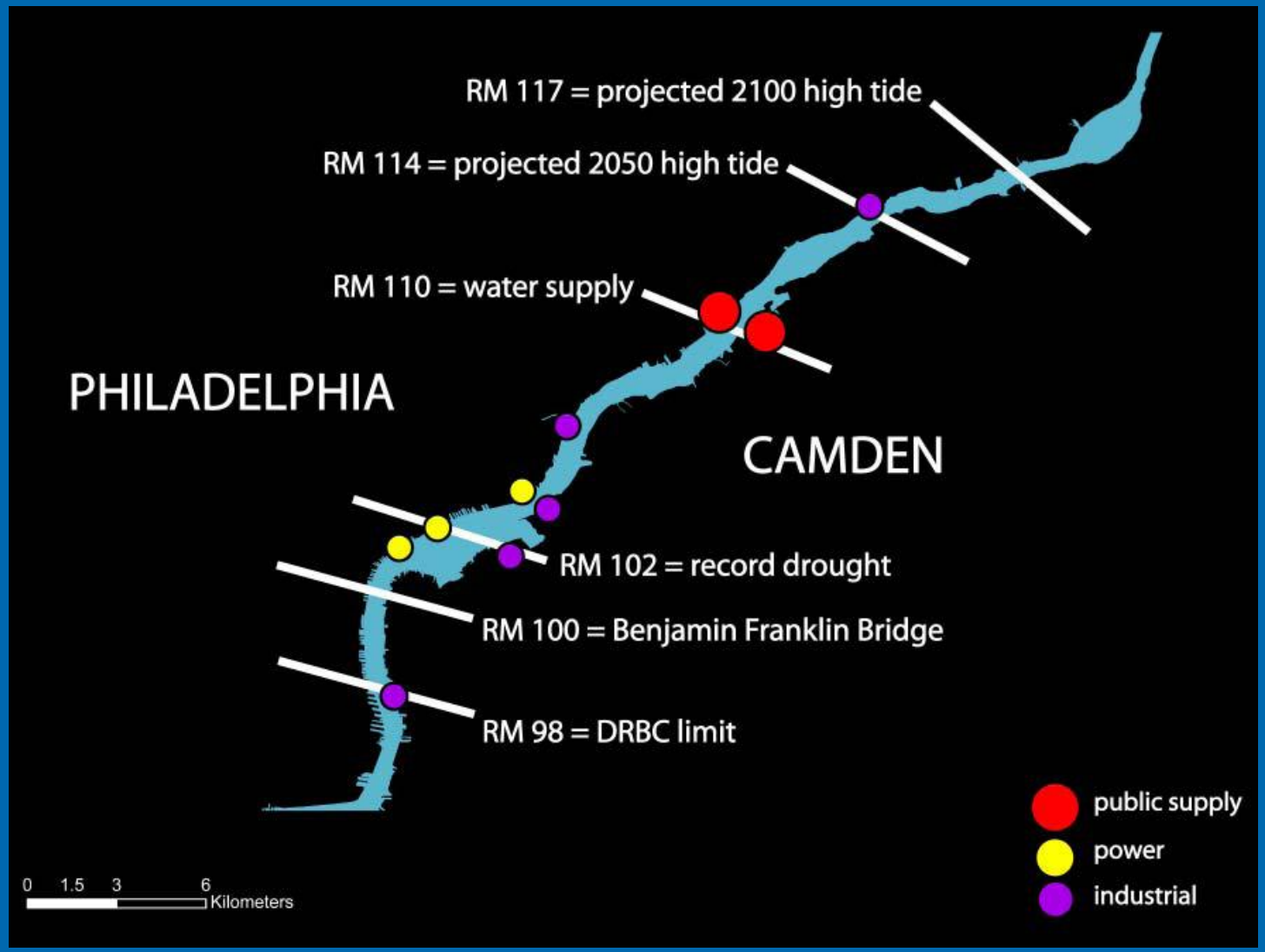
Aerial view of a Marcellus Shale well site near Waynesburg, Pa. (MICHAEL BRYANT / Phila. Inquirer Photographer)

Water Intakes at Risk from Drought and Sea Level Rise:
location of the salt line at high tide during drought

Power
- Exelon Delaware Generating Station
- Exelon Richmond Generating Station
- Philadelphia Gas Works Richmond

Industrial
- Koch Material Co.
- NGC Industries
- Rohm and Haas Philadelphia
- MacAndrew and Forbes Co.
- Pennwalt Corporation
- Sunoco

Public Supply
- Torresdale Water Intake (provides
- almost 60% of Philadelphia's water supply)
- New Jersey American Water Co. Tri-County Water Treatment Plant



Will We Have Enough Water?

- More water needed to control salt line
- Existing reservoirs will not be as effective with intense storms. Green and grey infrastructure solutions
- DRBC Strategy for Sustainable Water Resources – 2060
  - Develop resiliency
  - Shot-term; long-term

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Sustainable Water Resources - 2060

- Population – Change and Location
- Energy Generation – Water Footprint
- Ecological Flows
- Natural Gas Development?
- Water Quality – Toxics, nutrients, DO
- Climate Change
  - Sea level rise, intense storms, droughts

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POTENTIAL IMPACTS

- Salinity – Major Water Supplies – Trenton
- Flood Mitigation – Reservoir Storage
- Land Use Changes in Headwaters
  - Loss of forests, increased impervious
- Water Quality Degradation

- Big Changes in Water Management Needed
  - Place-based assessment and solutions
  - IWRM

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Needs

- Need to look holistically –
  - Water system
  - Geography
  - Stakeholders
- Upstream Impacts on Downstream
- Downstream needs driving upstream mgt.
- Basin-wide Solutions
- Plan Basin-wide; Implement locally

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How to Proceed With Minimal Funds

- Benefit of good data sets
- Federal Agencies & Foundations
  - GIS Tool – ID lands critical to water resources
  - USGS – Water Census Pilot
    - Ecological Flows
    - Water Use Updates – 2010 data, energy sector
    - WATERS Model – Scenario testing
  - NOAA – IWRSS
    - Mid-Atlantic Basins Pilot
  - USACE
    - Salinity – Flow Model
    - State Collaborative – Proof of Concept

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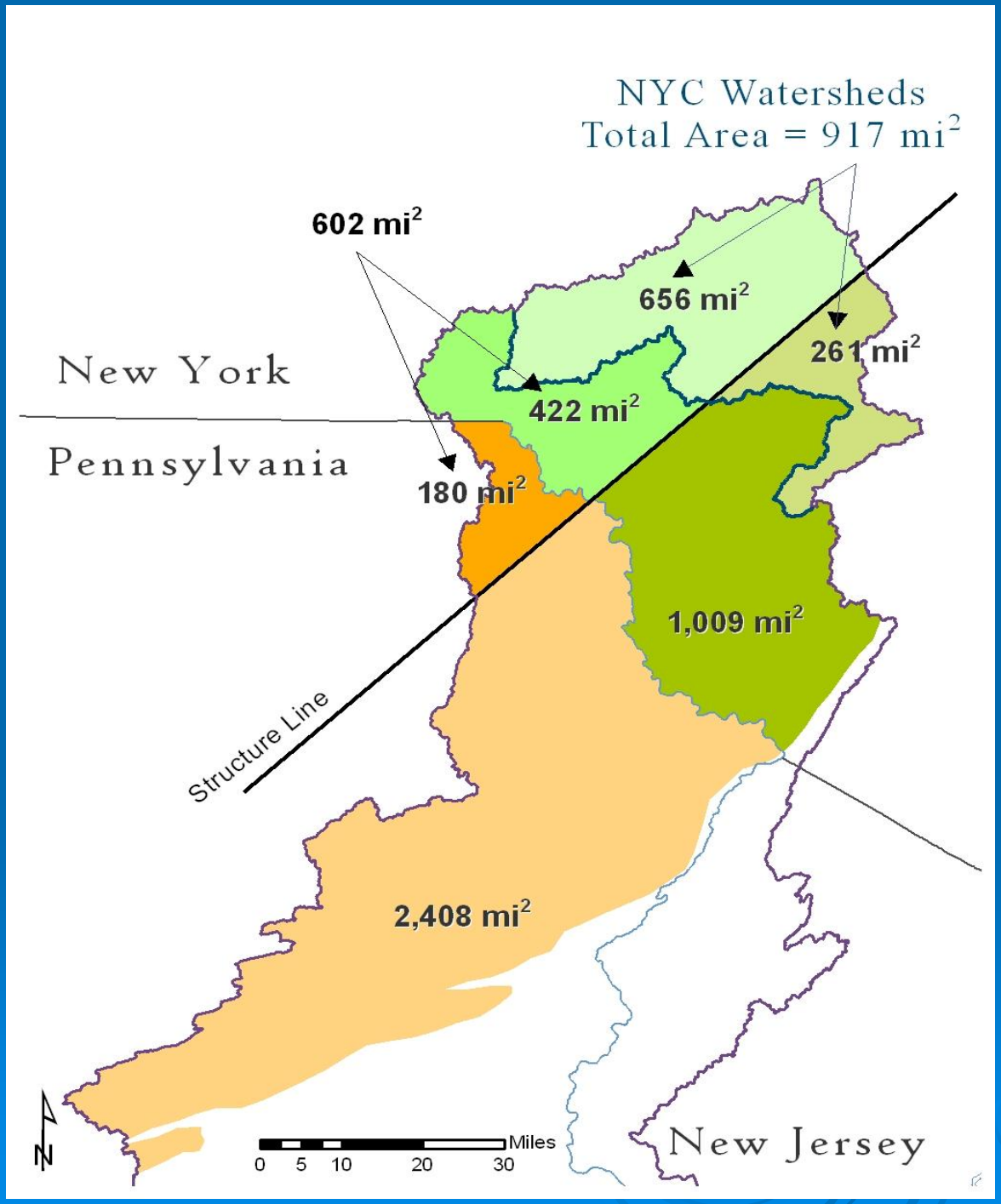
QUESTIONS?

ww.DRBC.net

AREA ESTIMATES



PA 2588 miles ^{2}

NY 2348 miles ^{2}

NYC Watershed 917 miles ^{2}

Structure Line

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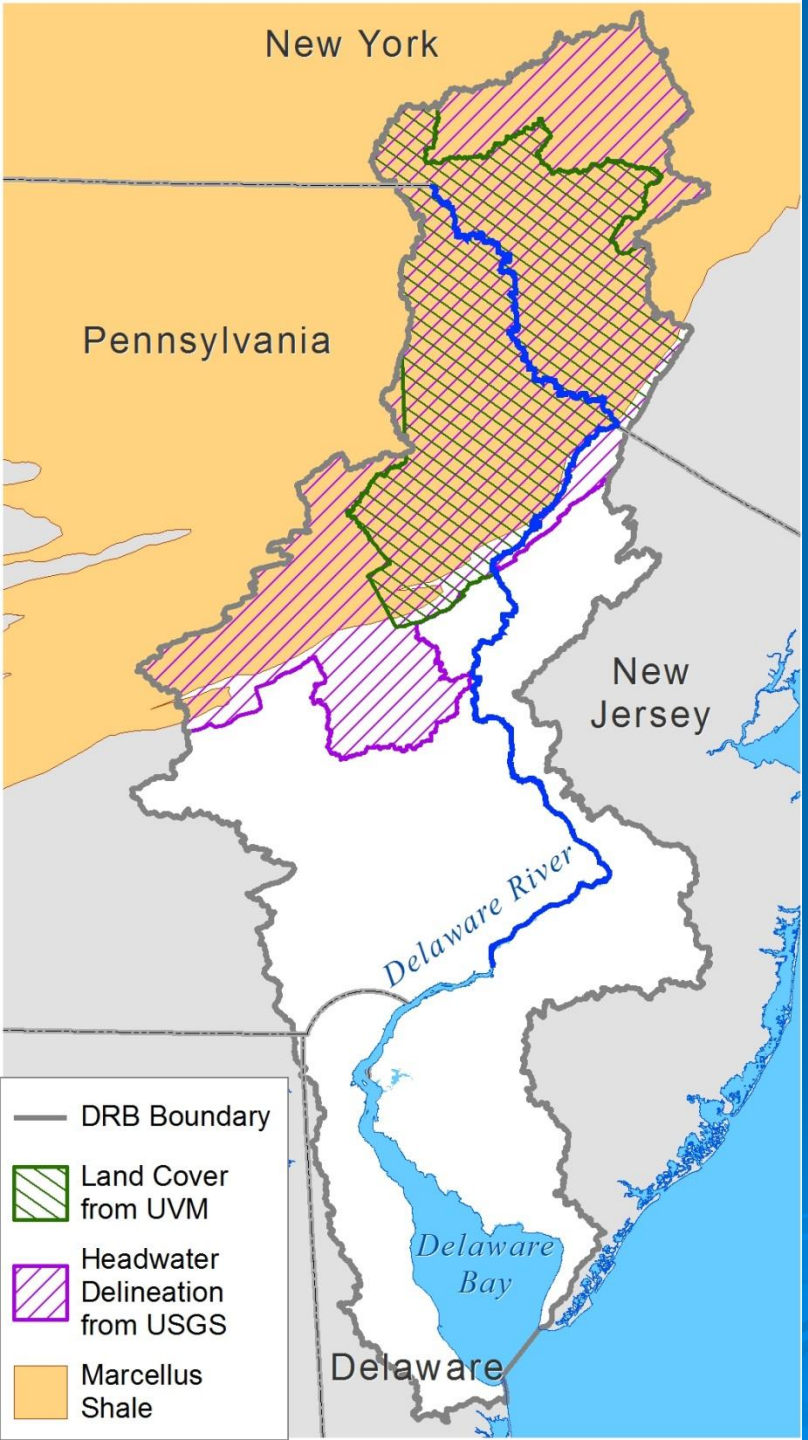

Mapping Areas:

- USGS (Headwaters)
- UVM (Landcover)*

*includes forest canopy, forest patch and forest species

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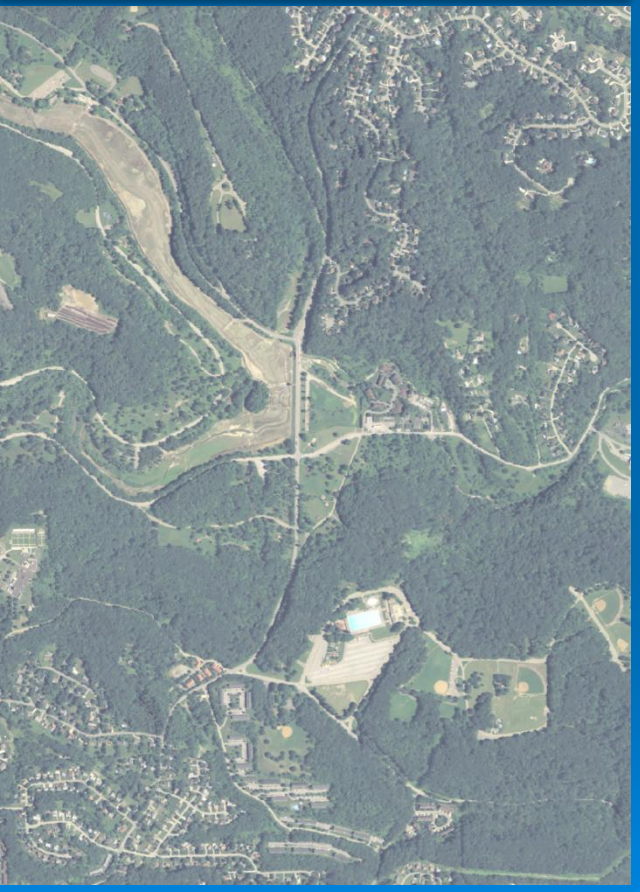
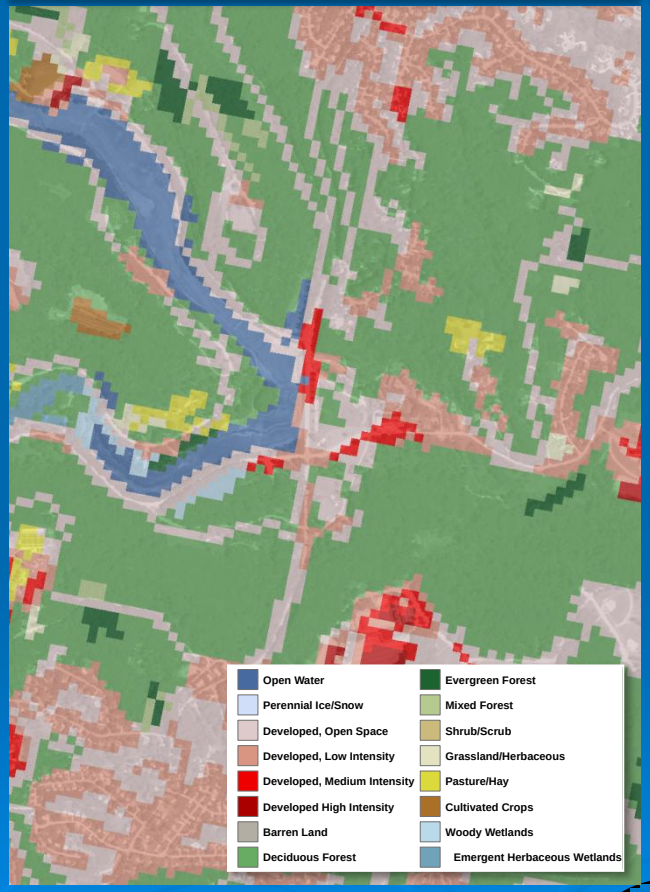
High-Resolution Aerial Imagery, 2010



National Land Cover Database, 2006, 30m



High-Resolution Land Cover, 2010, 1m

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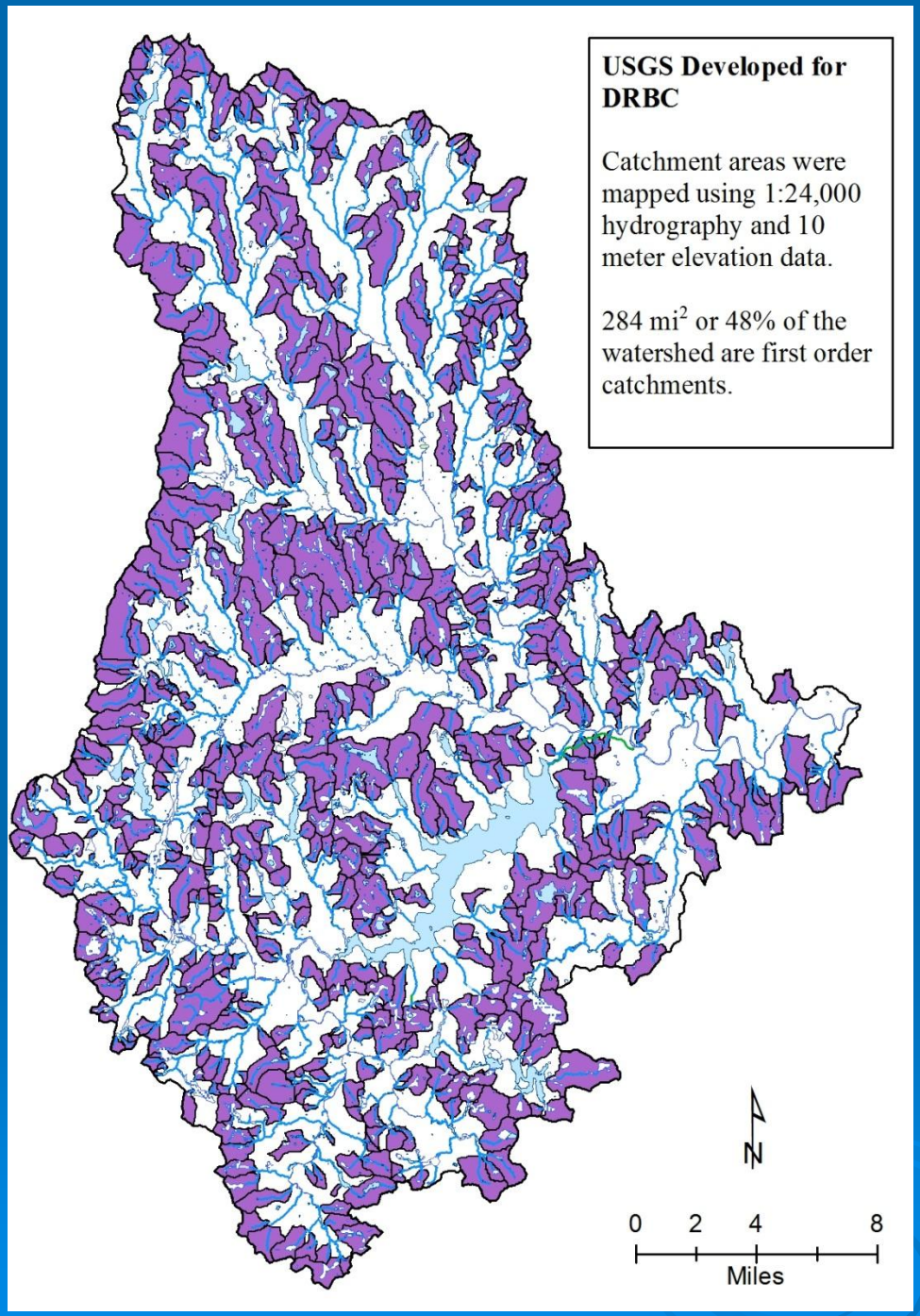

Lackawaxen Watershed First Order Catchments

48%

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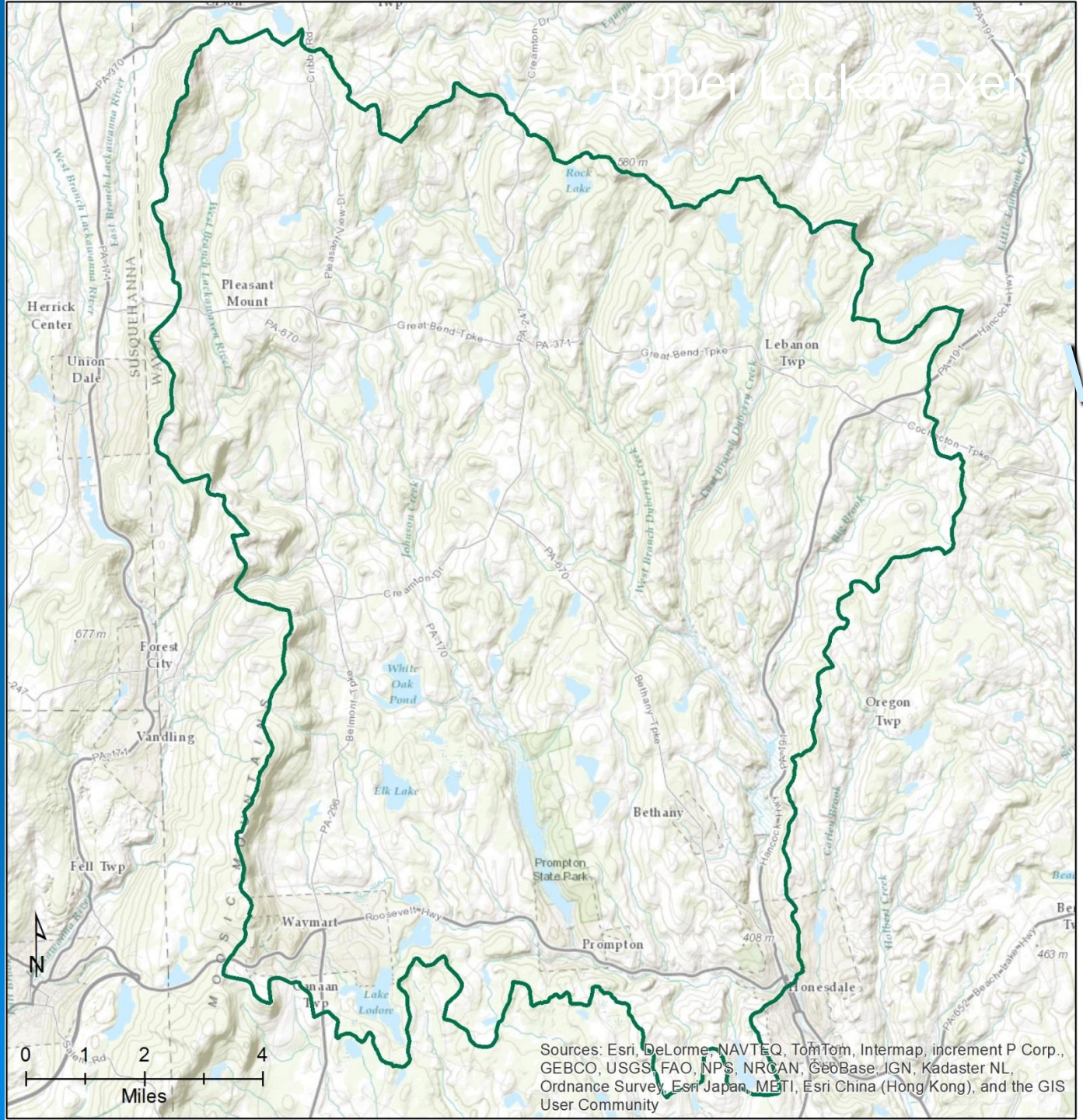


Legend

Upper Lackawaxen Watershed

Example Watershed

162 mi²

Hydrology

1: 24,000

Legend

Upper Lackawaxen Watershed

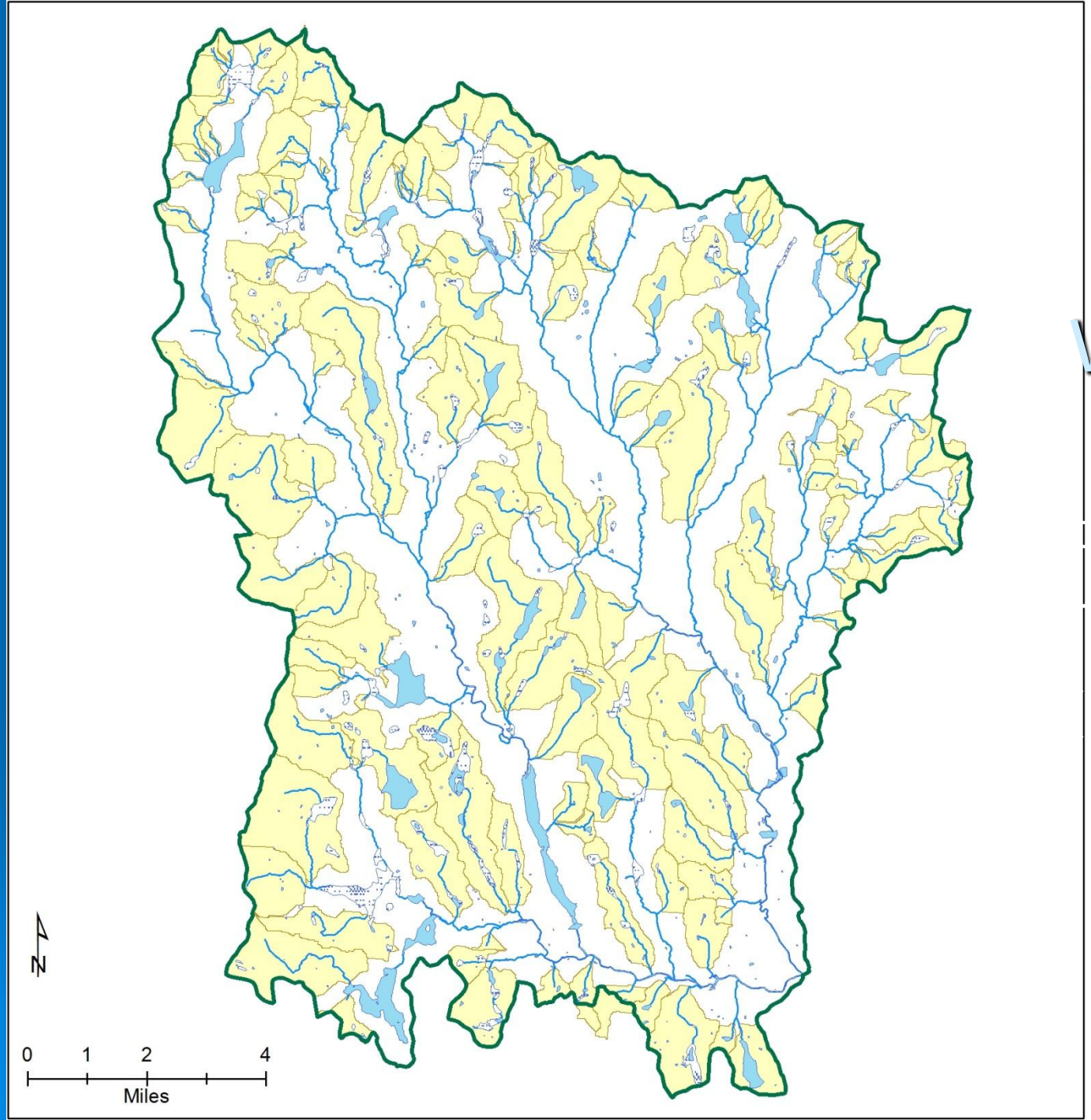
River

N

0 1 2 4

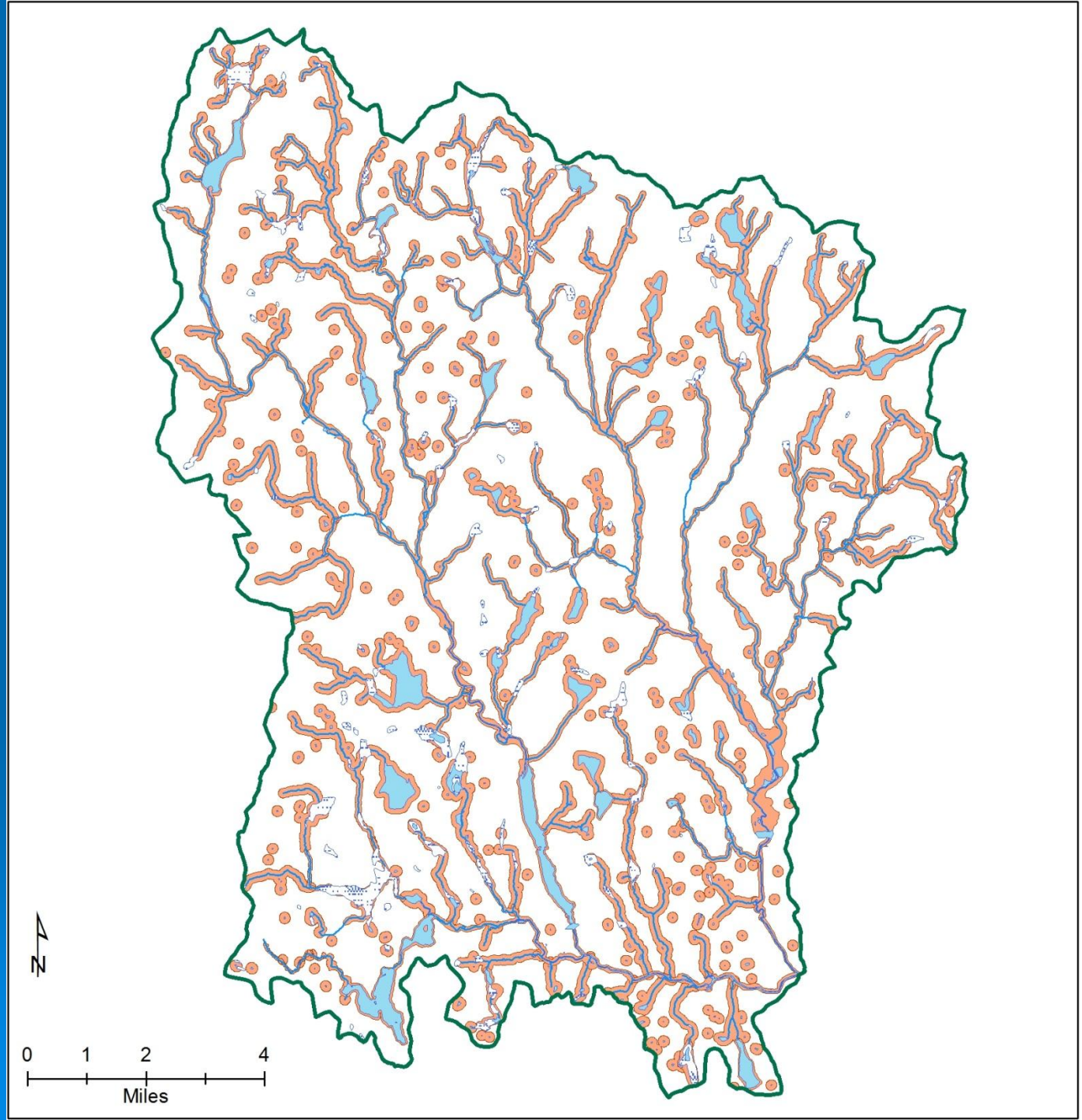
Miles

Headwater Watersheds



Legend

- Upper Lackawaxen Watershed
- River
- Headwater Watershed

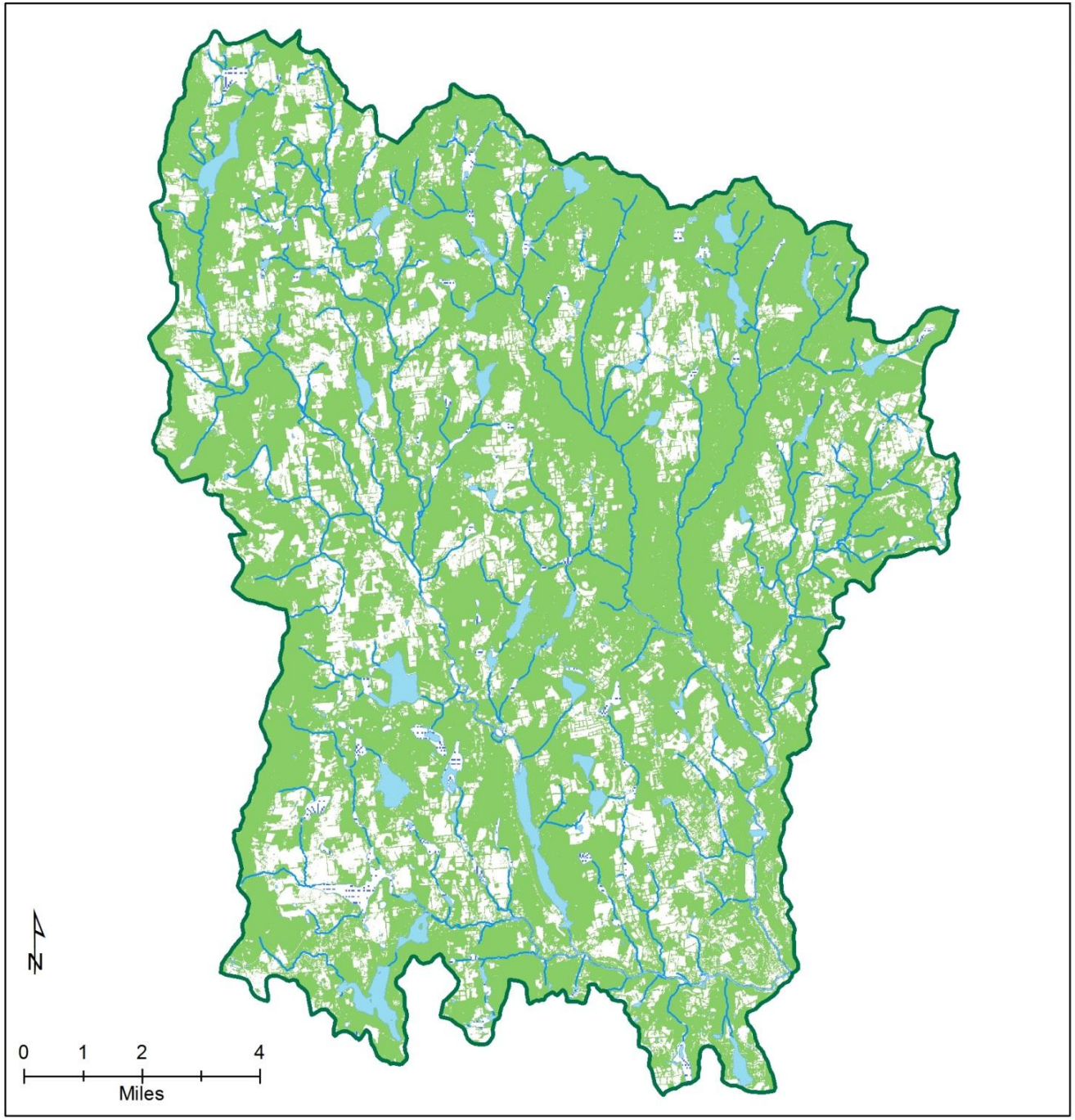


Legend

- Upper Lackawaxen Watershed
- River
- Riparian Zone

Riparian Corridors

23 %

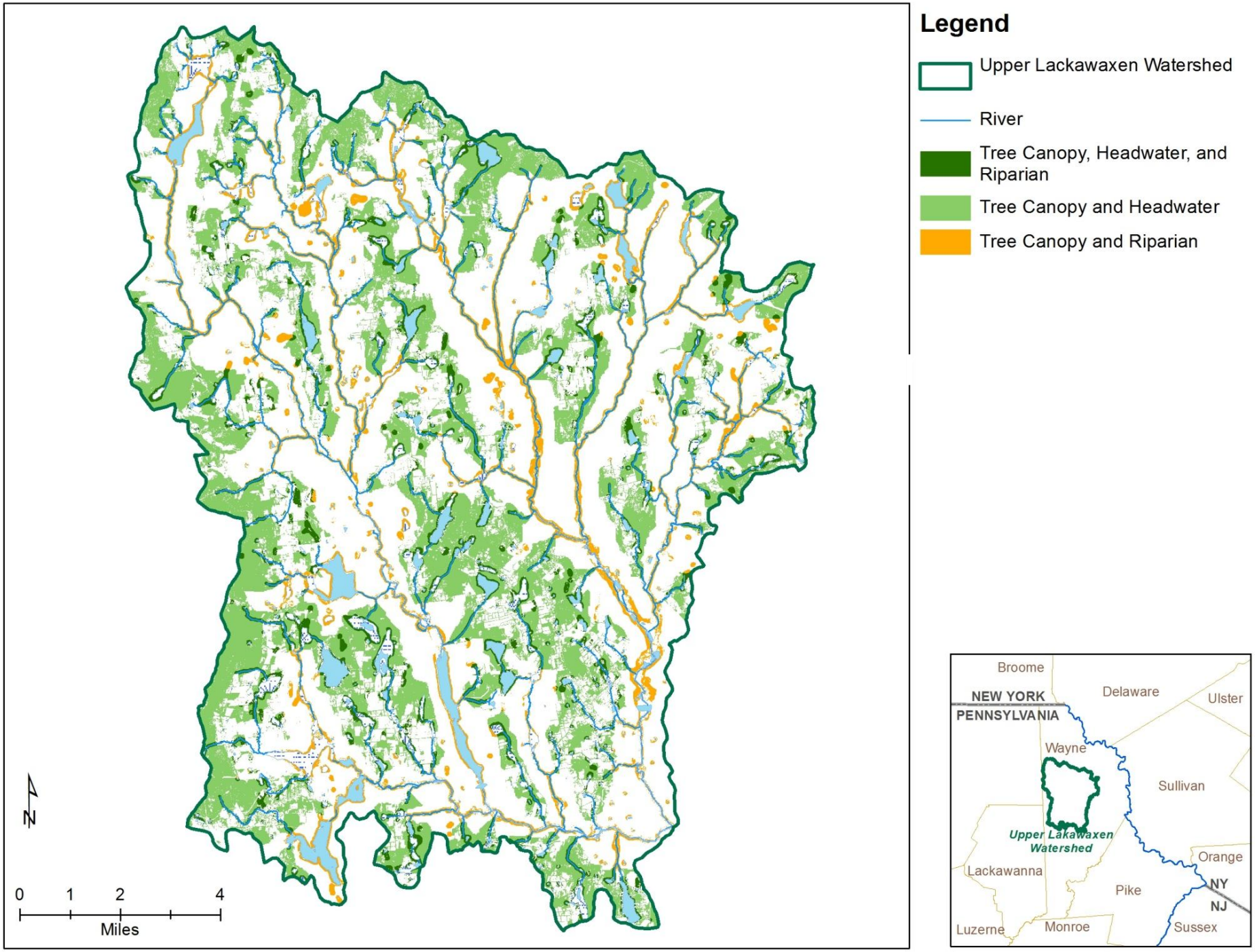


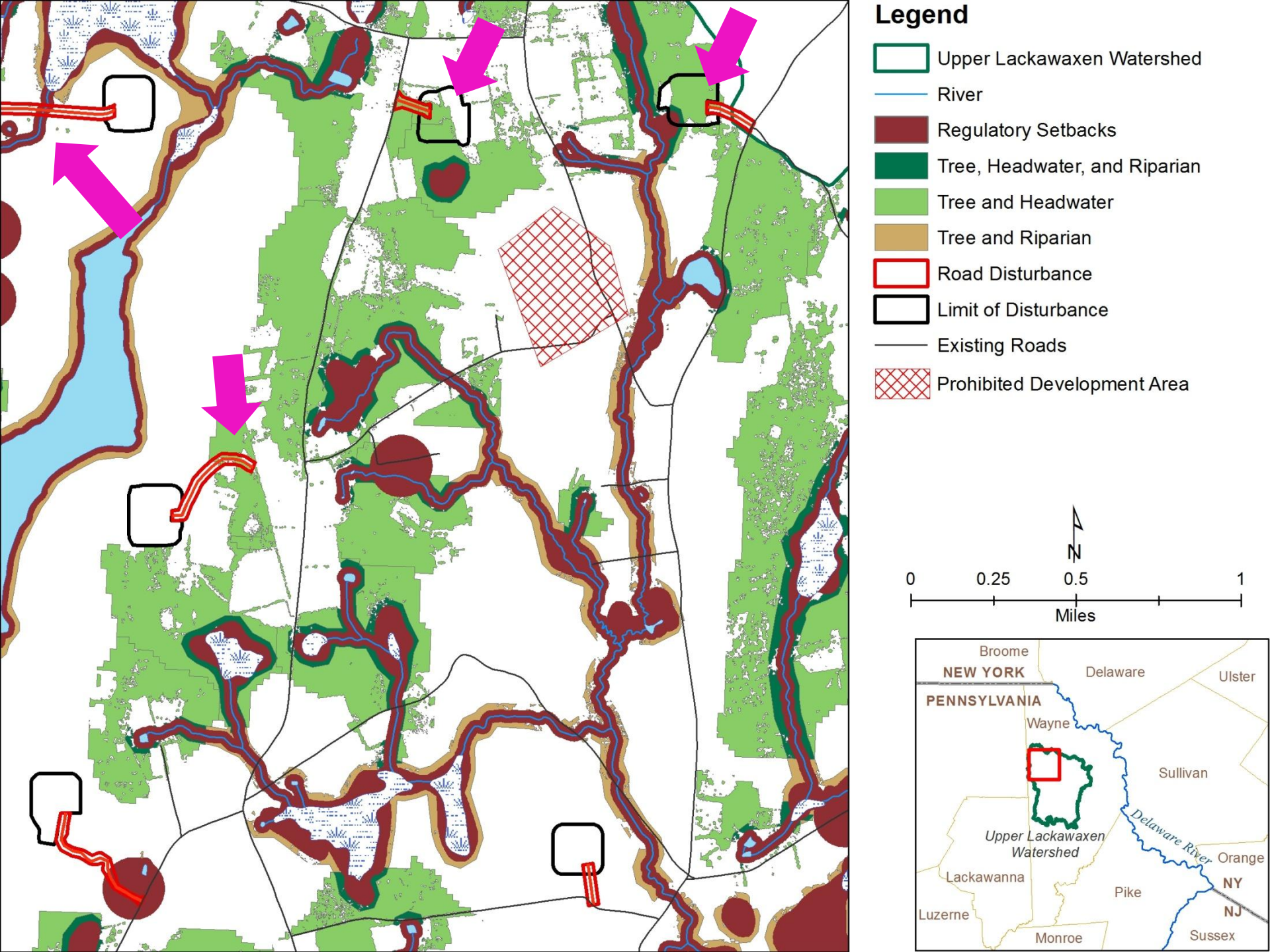
Legend

- Upper Lackawaxen Watershed
- River
- Tree Canopy

Tree Canopy

65%


Legend
Upper Lackawaxen Watershed
River
Tree Canopy, Headwater, and Riparian
Tree Canopy and Headwater
Tree Canopy and Riparian
N
0
1
2
4
Miles
Broome
NEW YORK
PENNSYLVANIA
Delaware
Ulster
Wayne
Sullivan
Upper Lakawaxen Watershed
Orange
Lackawanna
Pike
NY
NJ
Luzerne
Monroe
Sussex


Legend
Upper Lackawaxen Watershed
River
Regulatory Setbacks
Tree, Headwater, and Riparian
Tree and Headwater
Tree and Riparian
Road Disturbance
Limit of Disturbance
Existing Roads
Prohibited Development Area
N
0
0.25
0.5
1
Miles
Broome
NEW YORK
Delaware
Ulster
PENNSYLVANIA
Wayne
Sullivan
Delaware River
Upper Lackawaxen Watershed
Orange
Lackawanna
NY
Pike
Luzerne
NJ
Monroe
Sussex