RUTGERS COOPERATIVE EXTENSION
New Jersey Agricultural Experiment Station

Building on the Past – Providing Solutions for the Future

The Restoration of Robinsons Branch: An Example of Integrating Research, Education and Extension in Watershed Management

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THE STATE UNIVERSITY OF NEW JERSEY RUTGERS

COOK COLLEGE

NJ AES New Jersey Agricultural Experiment Station

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Definition

"Integrated" means to bring the three components of the agricultural knowledge system (research, education, and extension) together around a problem area or activity.

Ref: FY2007 Request for Applications Integrated Research, Education, and ExtensionCompetitive Grants Program – National Water Quality Program

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Integration

Through integrated programming, the Land Grant Universities can deliver solutions to today's problems and yield quick measurable outcomes.

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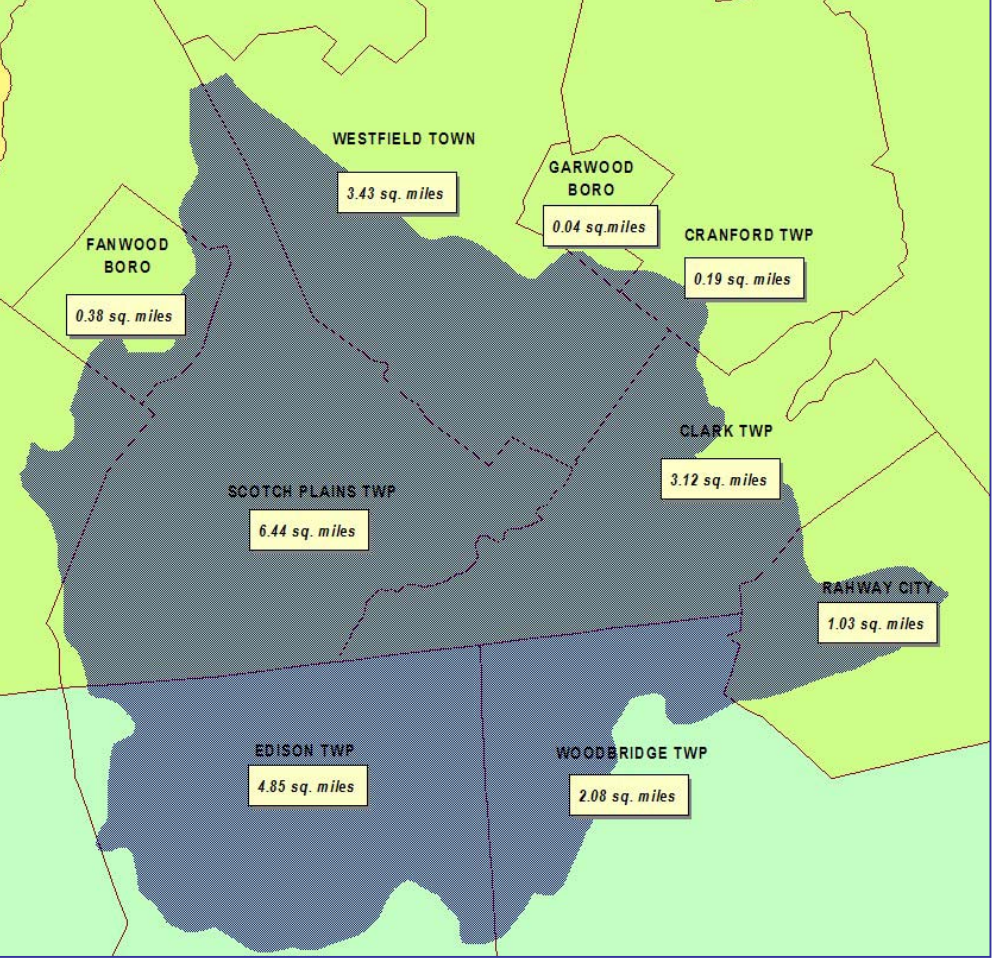
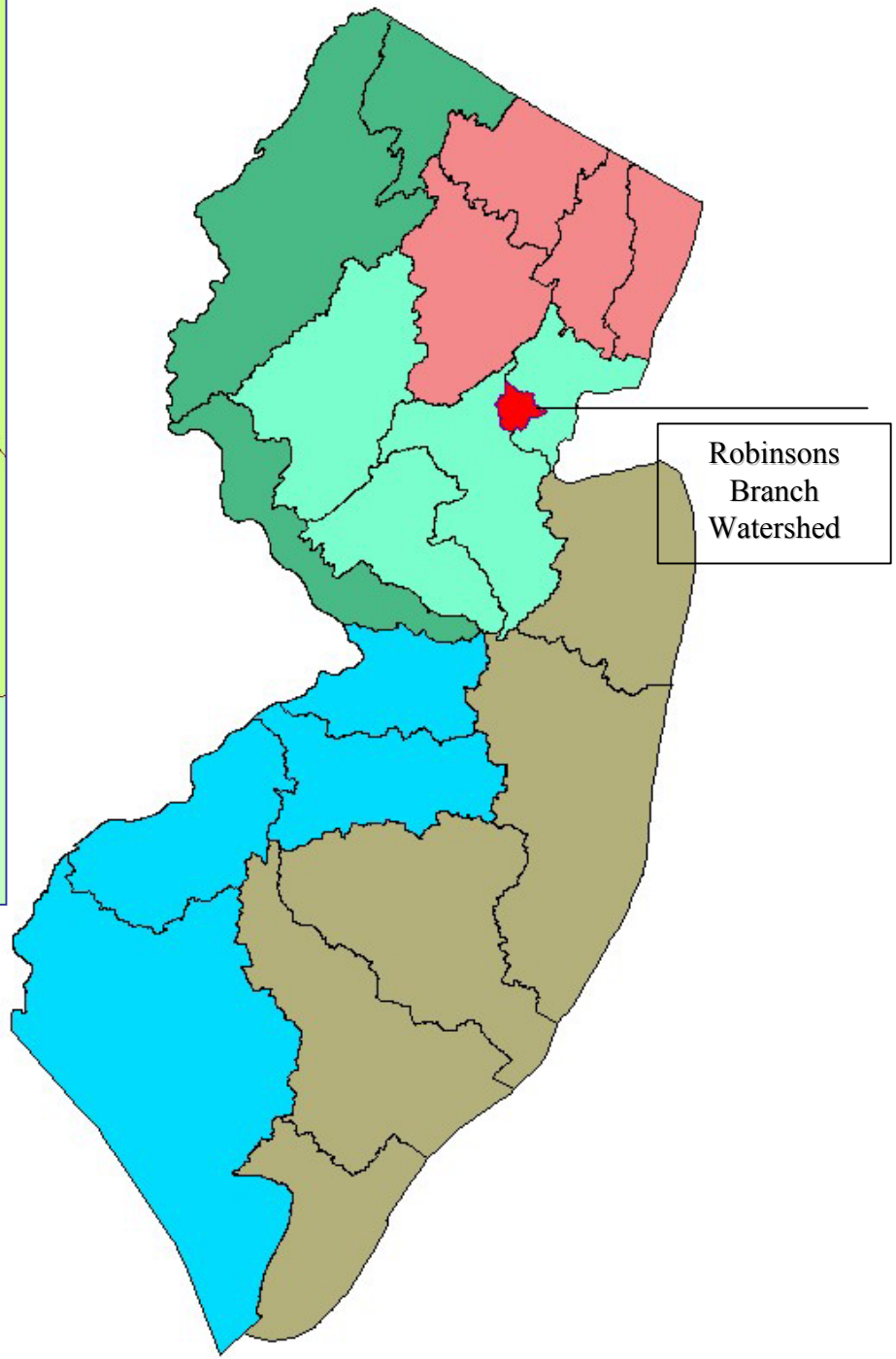
How does Integration Work?

- ***Secure base funding to conduct a research project in a watershed***
- ***Direct extension programming into the same watershed to compliment research effort***
- ***Get the students involved – this is the education***


WESTFIELD TOWN
3.43 sq. miles
GARWOOD BORO
0.04 sq.miles
CRANFORD TWP
0.19 sq. miles
FANWOOD BORO
0.38 sq. miles
CLARK TWP
3.12 sq. miles
SCOTCH PLAINS TWP
6.44 sq. miles
RAHWAY CITY
1.03 sq. miles
EDISON TWP
4.85 sq. miles
WOODBRIDGE TWP
2.08 sq. miles


Robinsons Branch Watershed

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Regional Stormwater Management Plan

1. Form Regional Stormwater Management Planning Committee
2. Complete Characterization and Assessment of Watershed
3. Develop Drainage Area Specific Water Quality, Quantity & Recharge Objectives
4. Identify Stormwater Management measures and Performance Standards
5. Write and adopt plan
6. Implement plan

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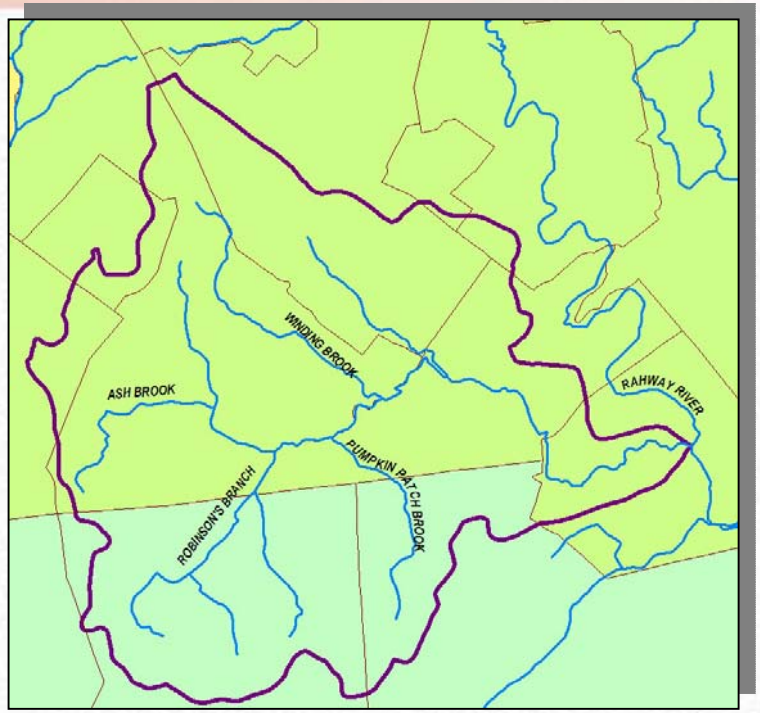
Data Collection for C & A

- Build GIS with available data
- Incorporate existing chemical, physical and biological stream data
- Collect new data
  - Stream cross-sections
  - Geomorphology data
  - Infrastructure data

Conduct Modeling to Address:

- Flooding issues
  - HEC HMS model
  - HEC RAS model
- Water Quality Issues
  - Aerial loading spreadsheet model
  - GWLF, SWMM, HSPF, or SWAT



- ***2, 10 and 100 year design storms***
- ***Runoff volumes and peak flows***
- ***Stream elevation***
- ***Pollutant loads***

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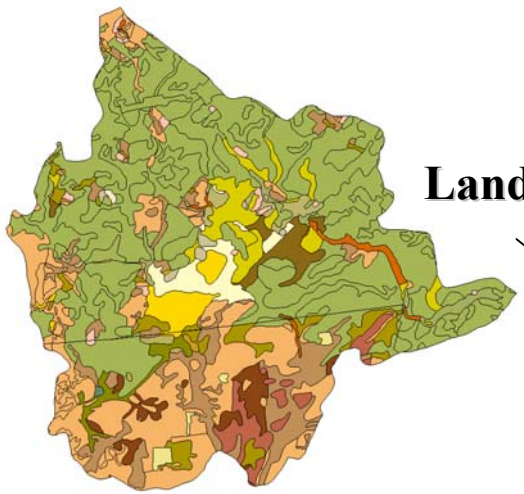
Curve Number Generation



Land Use

Soils

Merge

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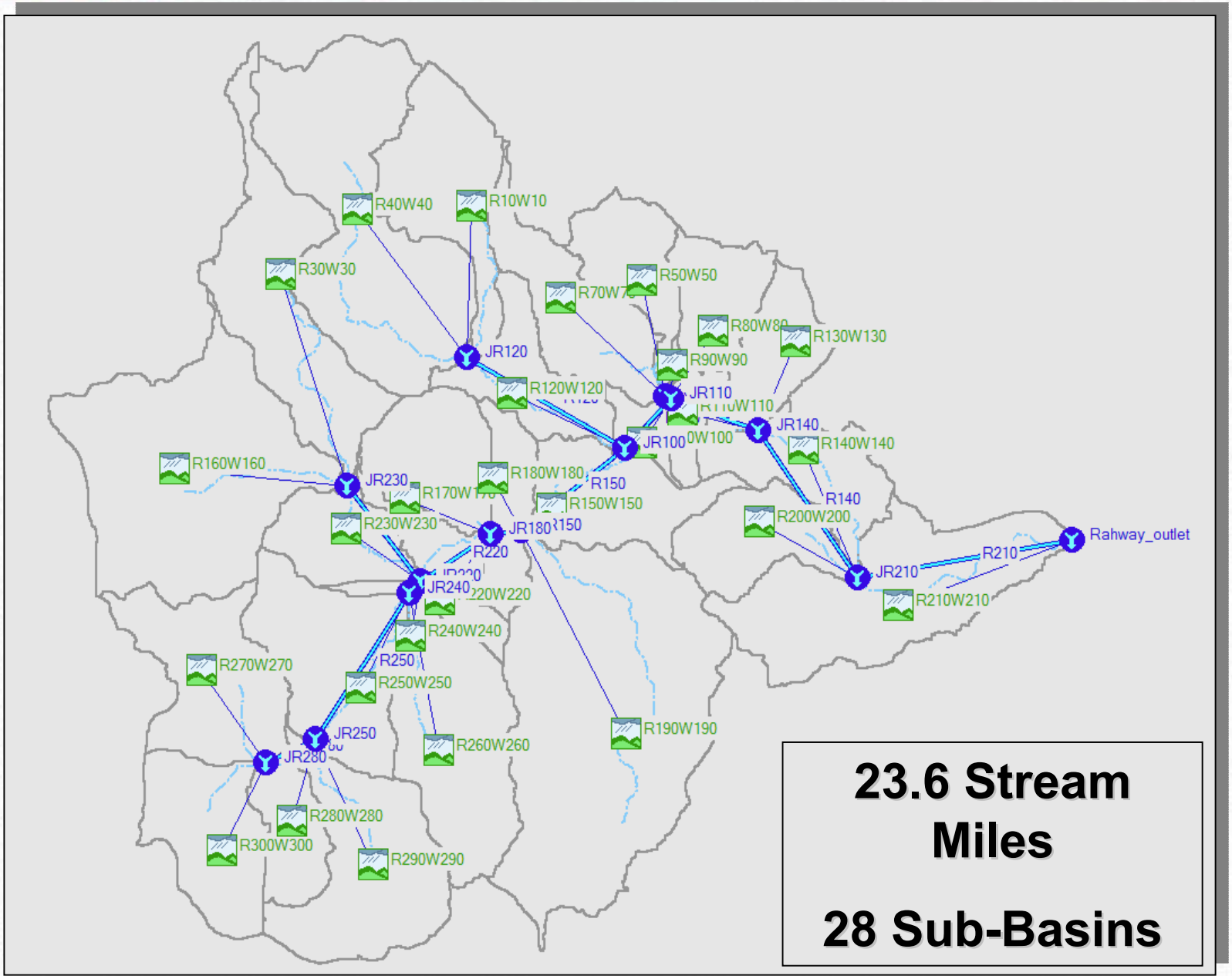
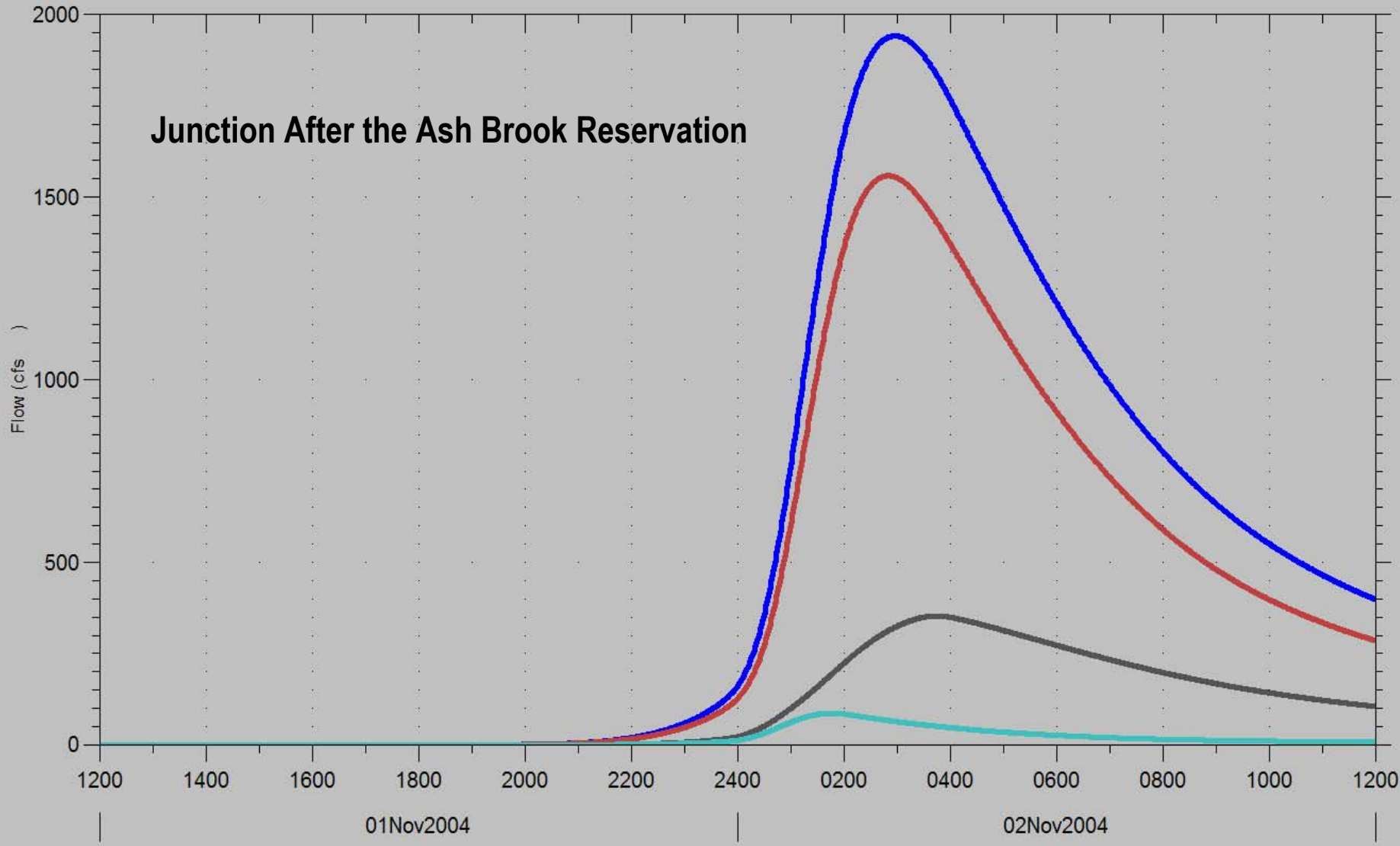
HEC-HMS Model



JR150



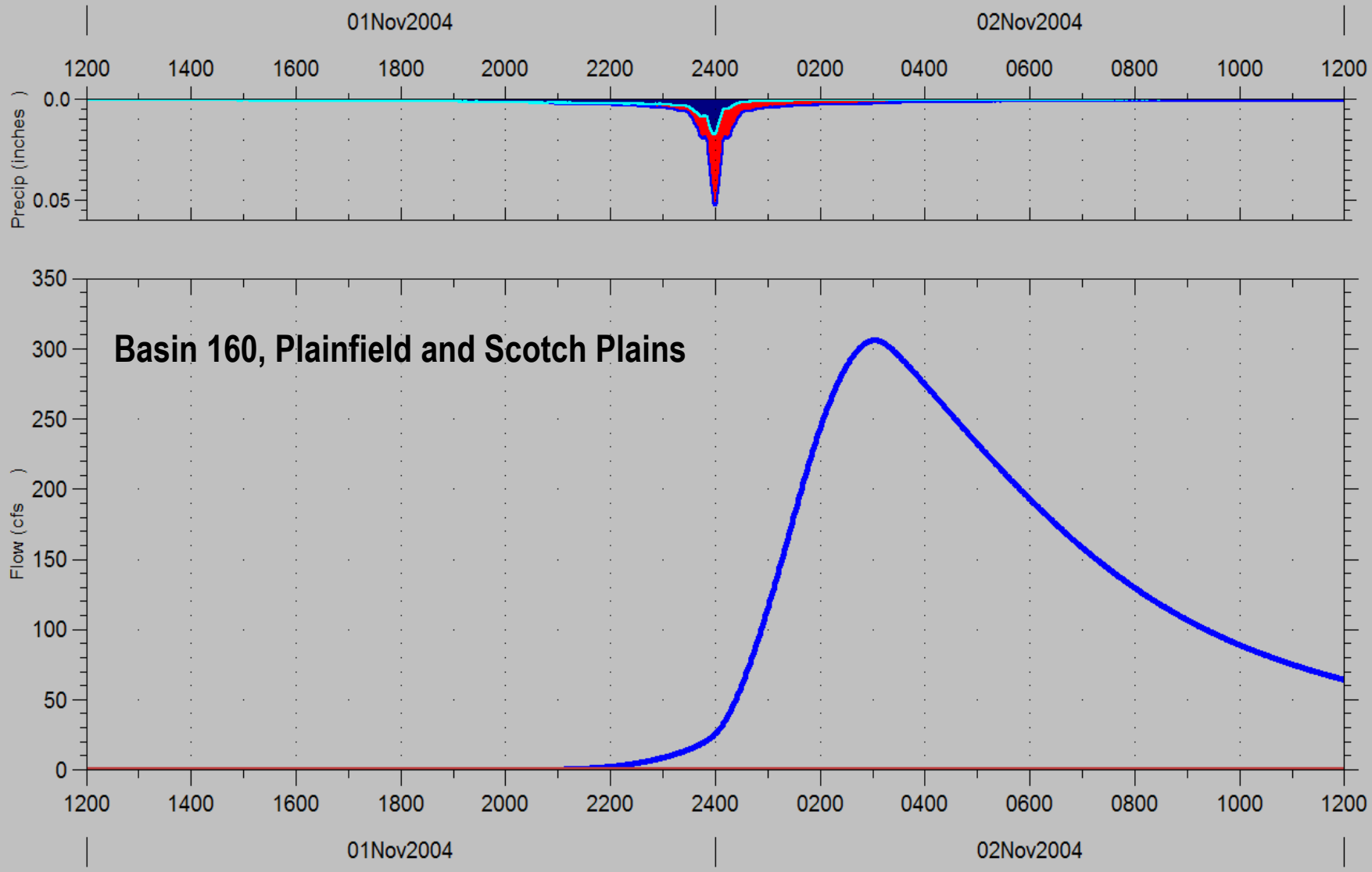
HEC HMS

JR150
R180
R190W190
R180W180

Basin: RB011905
Run: Run 3
Time: 25Jan05, 12:32

Print Close

R160W160



HEC HMS

Total Precipitation
Loss
R160W160
Baseflow

Basin: RB011905
Run: Run 3
Time: 25Jan05, 12:42

Print
Close

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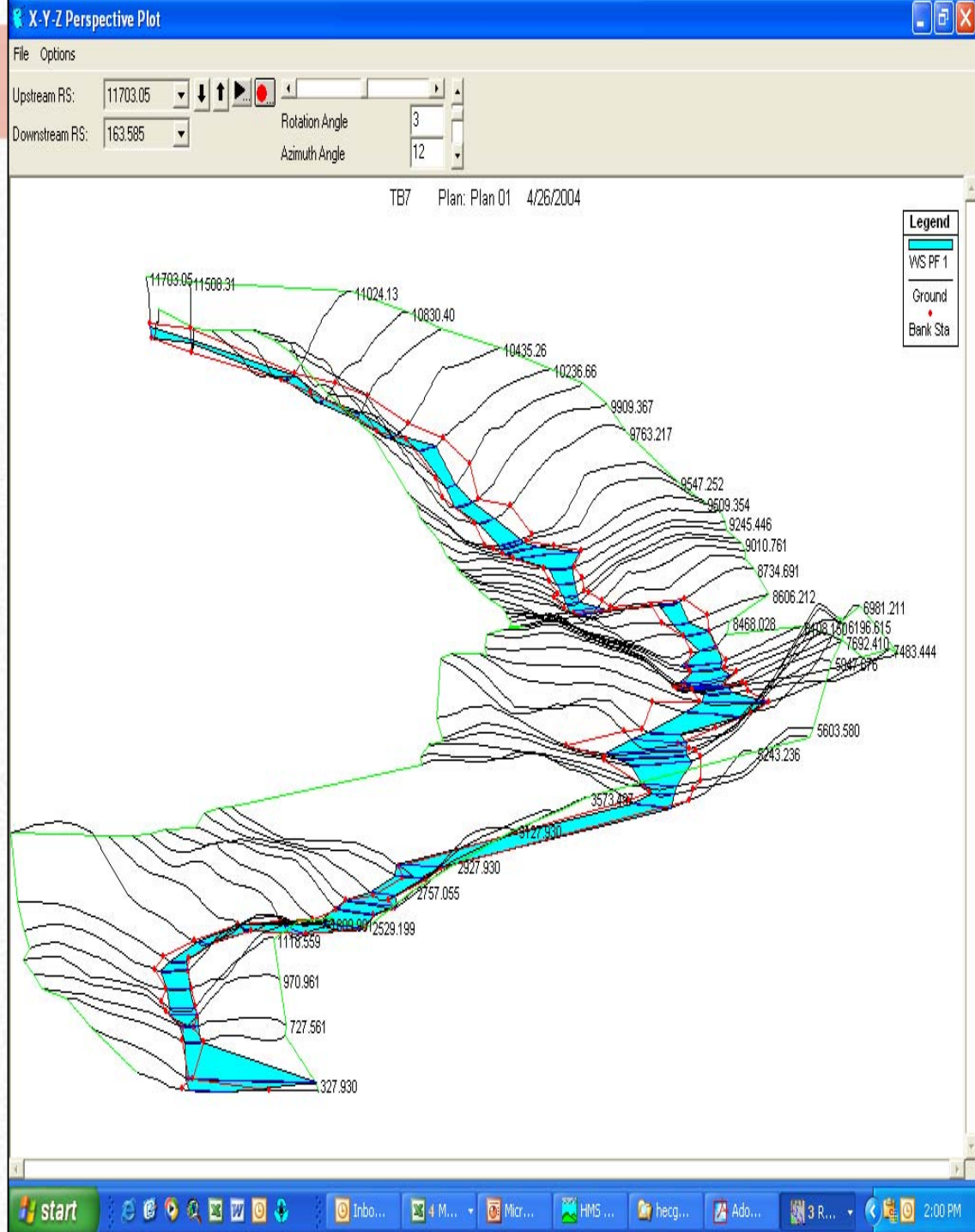
HEC-RAS Model

- HEC-HMS output as input
- Input on-line structures
- Predicts water surface elevation
- Delineate floodplain



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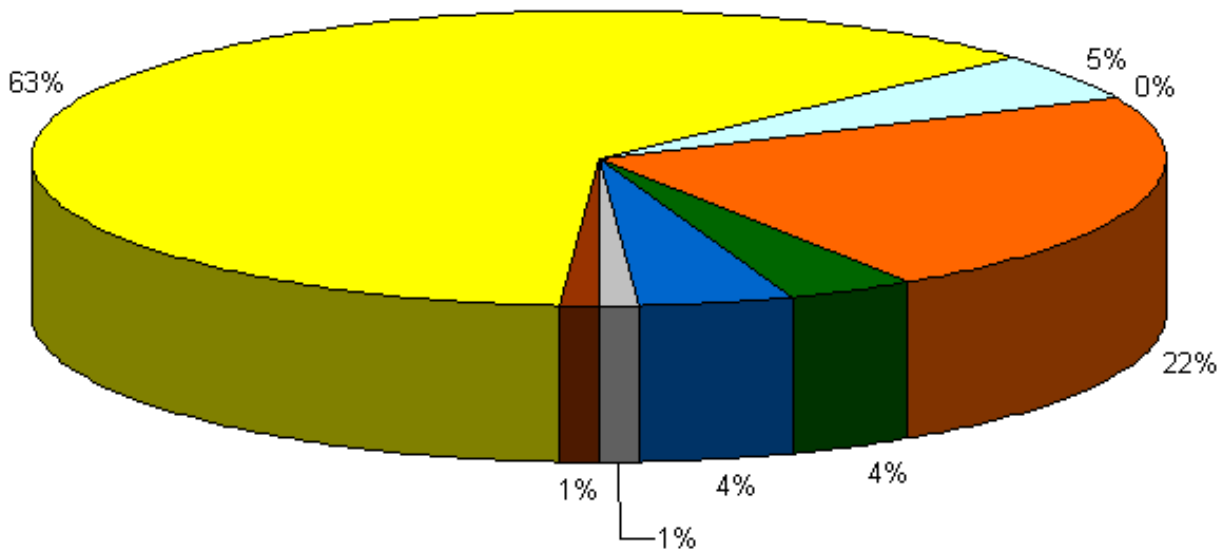
NPS Analysis Sample

This example shows the load per land use for a parameter within one of the Robinson's subwatersheds.

Land Use Specific to Subwatershed R160W160

Land Use	Acres	Percent
High/Med Residential	615.68	28.5%
Low/Rural Residential	917.34	42.4%
Commercial	21.658	1.0%
Industrial	0	0.0%
Mixed Urban	220.282	10.2%
Agriculture	9.673	0.4%
Forest, Water, Wetlands	352.852	16.3%
Barren Land	25.817	1.2%
Total	2163.302	100.0%

SUBWATERSHED R160W160
TOTAL SUSPENDED SOILDS LOAD
lbs/yr expressed as a %



These land uses have been further broken down according to the Anderson Model.

- High/Med Residential
- Low/Rural Residential
- Commercial
- Industrial
- Mixed Urban
- Agriculture
- Forest, Water, Wetlands
- Barren Land

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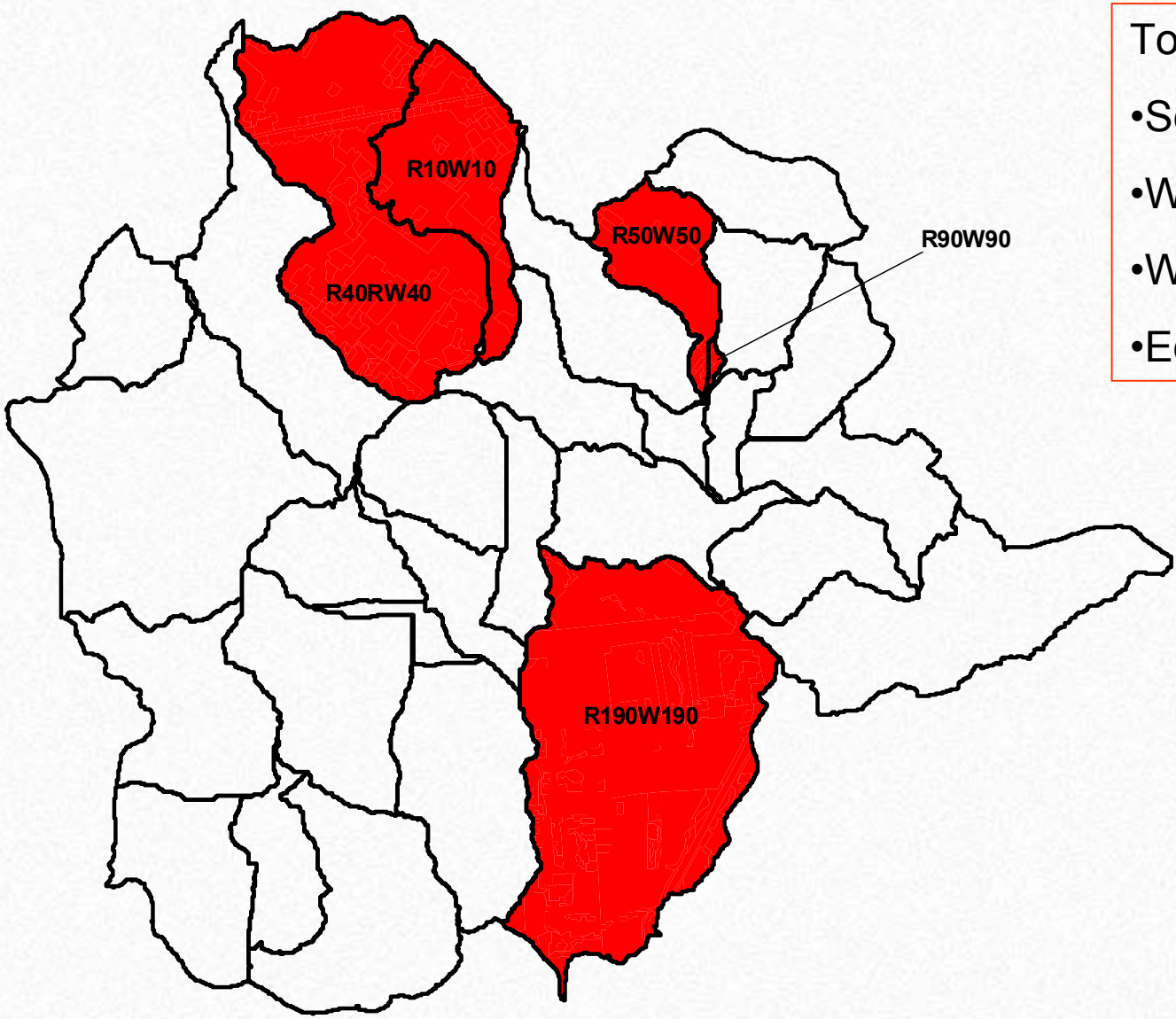
Top 5 – Total Phosphorus



Towns include:

- Scotch Plains
- Westfield
- Woodbridge
- Edison

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Finally …

- Define watershed objectives
- Identify management measures
- Write it all up in a plan
- Start implementing

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Education

- Design projects for bioresource engineering senior design
- Undergraduate independent studies
- Graduate research

Extension Activities

- Stakeholder committee
- Stormwater management in your backyard program
- How to Build a Rain Garden Adult Program
- “Messy Town” Children’s Program
- Restore-a-Waterway Program

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Outcomes and Impacts

- 31 Master Gardeners trained on stormwater management
- Five demonstration rain gardens built
- 125,000 gallons of stormwater captured, treated and infiltrated annually
- One undergraduate student trained on how to be an extension agent
- Two new programs were created: “how to build a rain garden” and “messy town”
- New powerpoints presentations and educational posters were created

QUESTIONS?