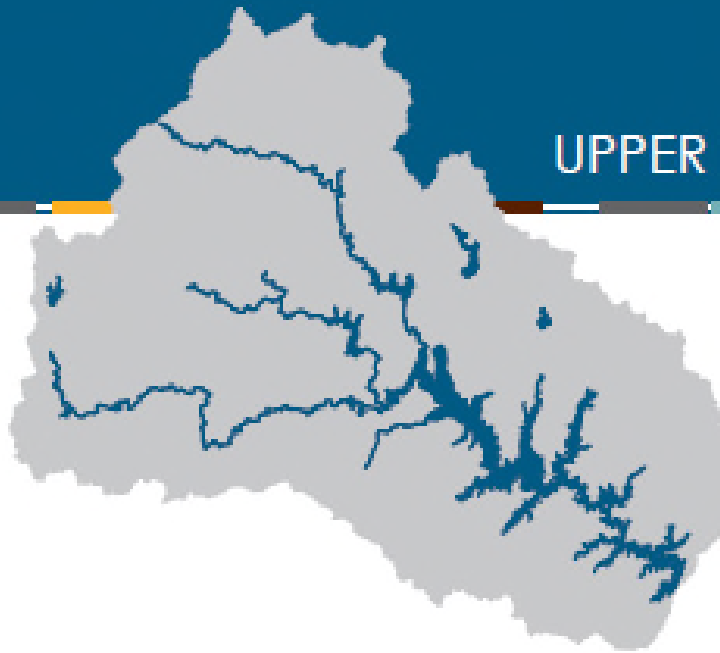




UPPER NEUSE CLEAN WATER INITIATIVE



A Partnership between
Local Governments and
Land Trusts to Protect
and Provide Clean
Water

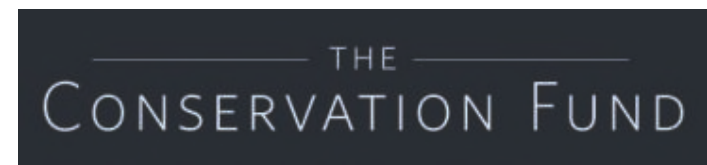
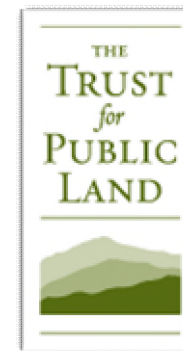
Agenda



- Program overview
- Conservation plan update
 - *Land cover data*
 - *Model core Goals & objectives*
 - *2015-2045 Conservation strategy*
 - *Water quality impacts*
- Quantifying nutrient avoidance
Project proposal
- Questions/Next Steps

Partnership to protect clean water

- Conservation Trust for North Carolina and 6 local land trusts
- Local governments
- Natural resource professionals

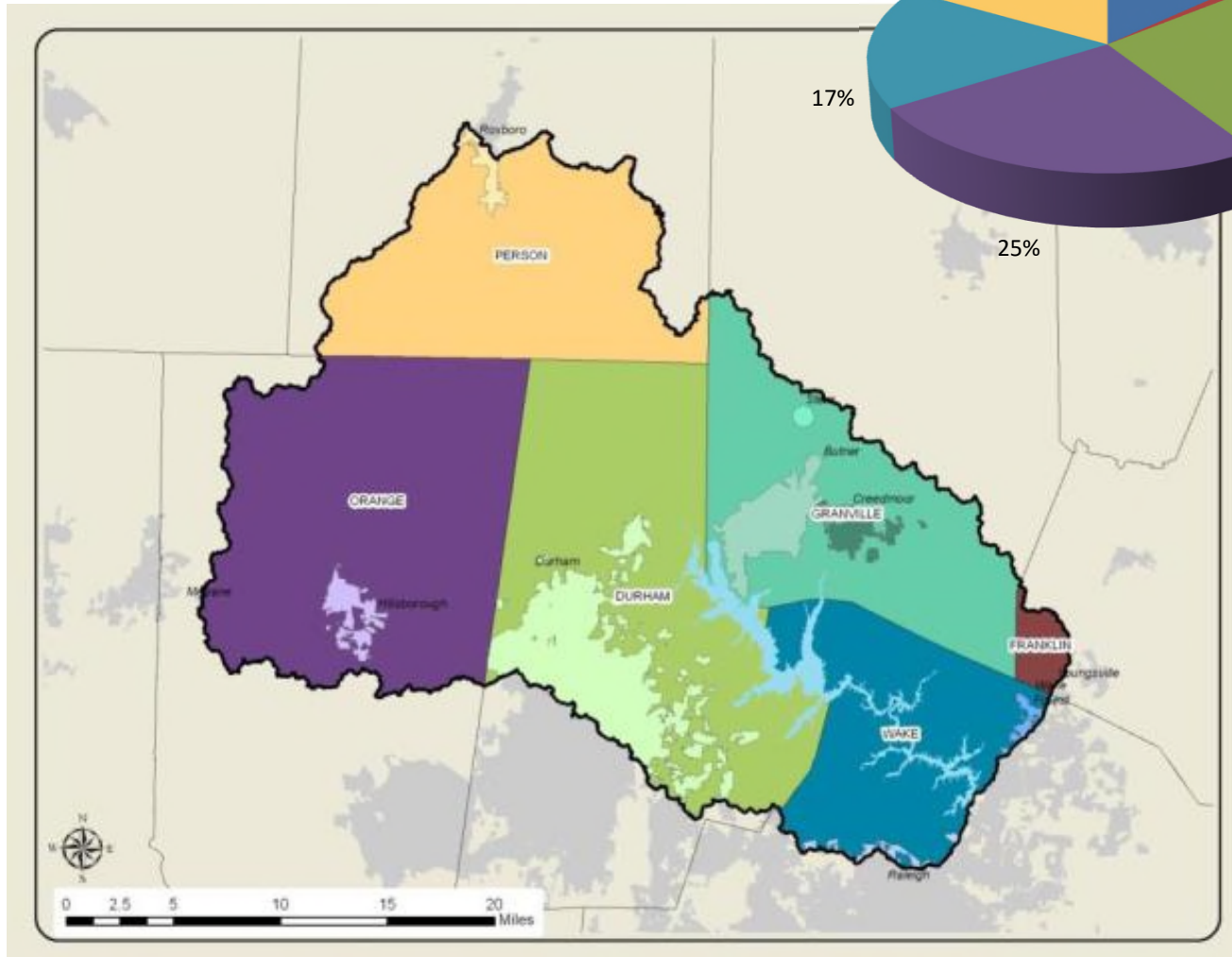


Mission

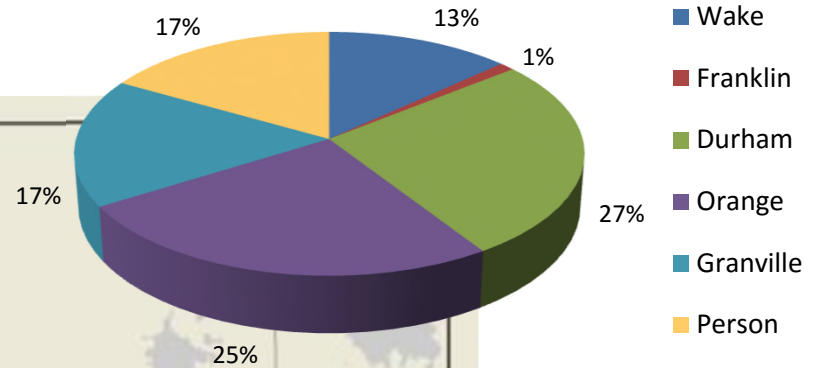
Protect and enhance drinking water resources through land acquisitions, planning, and innovative water quality improvement activities which:

- Have long term, lasting, measurable, and beneficial impacts
- Are non-regulatory and voluntary
- Address impacts from a variety of sources including agricultural and forestry activities
- Leverage additional partners and funding resources
- Are located in an active drinking water supply watershed including the Upper Neuse River Basin and the Upper Swift Creek Watershed

The Upper Neuse

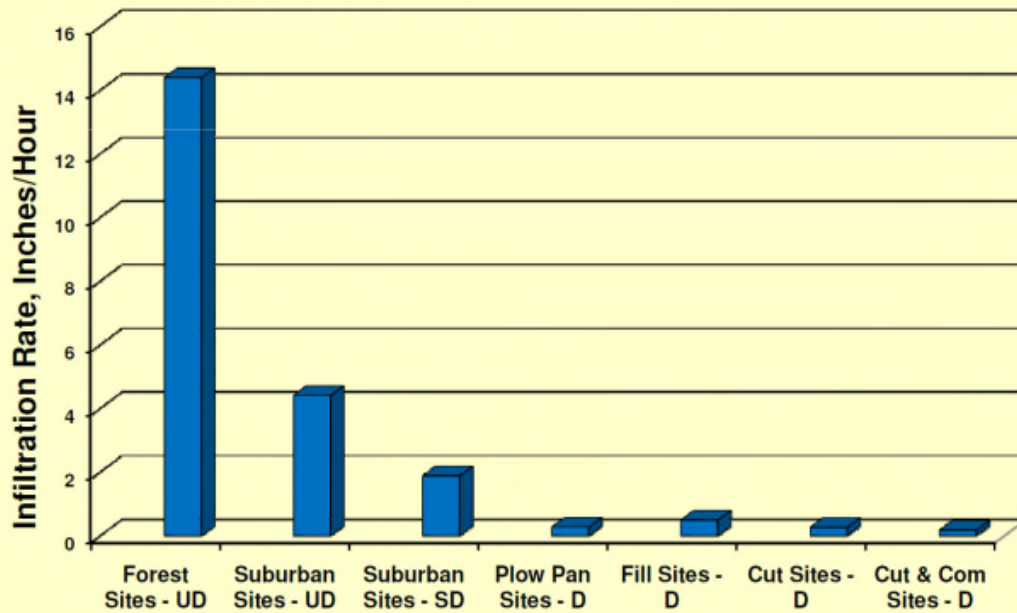


Percent of watershed



- 770 square miles
- 6 counties
- 8 municipalities
- 6 public drinking water systems
- 9 water supply reservoirs
- Raleigh has 1100 acres (less than 1% of the area) in the Basin

Infiltration Rates for Suburban Land Types in Sugar Creek Watershed, Charlotte, NC



Cost of Stormwater Strategies

	<u>Design Construction Cost/Gallon</u>
□ Preserving natural areas	\$0.03 to 0.05
□ Enhanced infiltration	\$0.05 to 0.10
□ Stormwater wetland ponds	\$0.25 to 1.25
□ Sand/peat infiltration swales	\$0.50 to 0.75
□ Sand based infiltration systems	\$0.25 to 2.75
□ Rainwater harvesting	\$0.50 to 2.50
□ Sand/peat filtration	\$2.50 to 3.50
□ Recirculating sand/peat filtration	\$4.50 to 7.50
□ Renovation of urban streets	\$5.00 to \$12.50

Source: Barrett Kays, PHD, Landis PLLC
5th Annual Water Symposium
2015

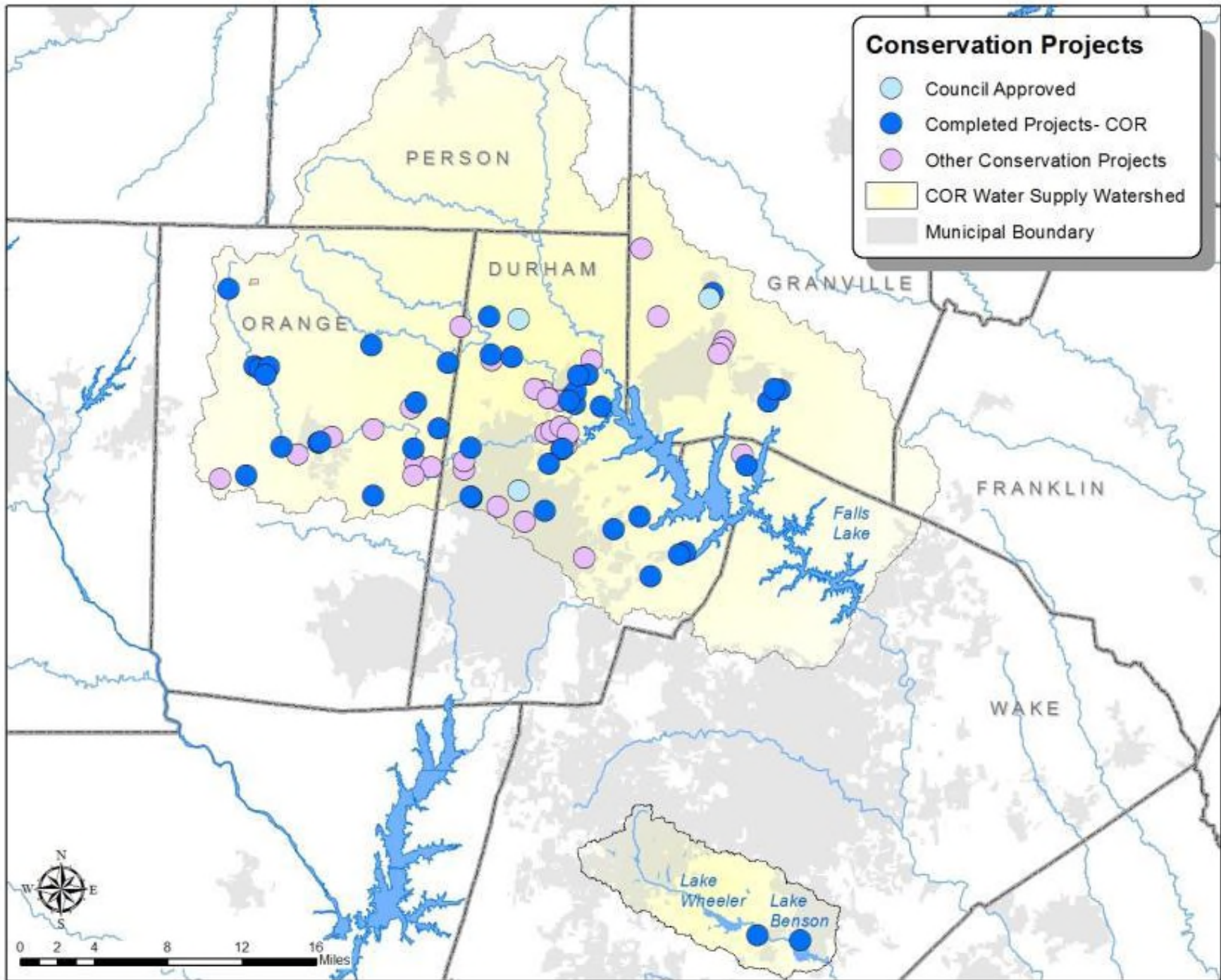
Funding

- Raleigh watershed protection fee
 - *\$0.15 per 1000 gallons, volumetric fee*
 - *Generates ~\$2.25 million a year*
 - *Adopted as part of rate ordinance in 2011*
 - *Supports outreach, project negotiation, transaction and project costs, monitoring, and administration*
- Upstream local governments
 - *Durham, Granville, Orange and Wake counties*
 - *Cities of Creedmoor, Durham*
 - *Towns of Butner, Hillsborough*
 - *Durham Soil and Water Conservation District*
- Clean Water Management Trust Fund, Environmental Enhancement Grants
- US Endowment For Forestry And Communities
- Landowners



Program Accomplishments

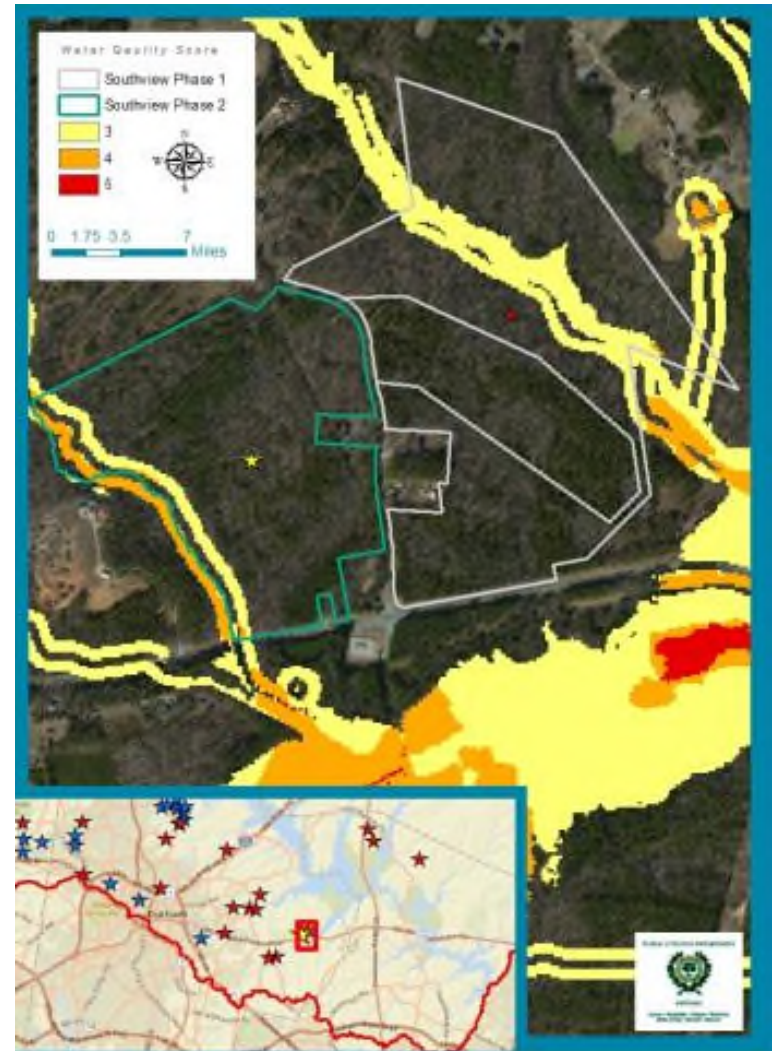
Properties conserved	90
Acres protected	7,698
Miles of stream buffered	85
Value of property protected	~\$72,720,000
Value donated by landowners	~\$21,276,000
Invested by Raleigh	~\$5,800,000
Raleigh leverage ratio	\$13 : \$1



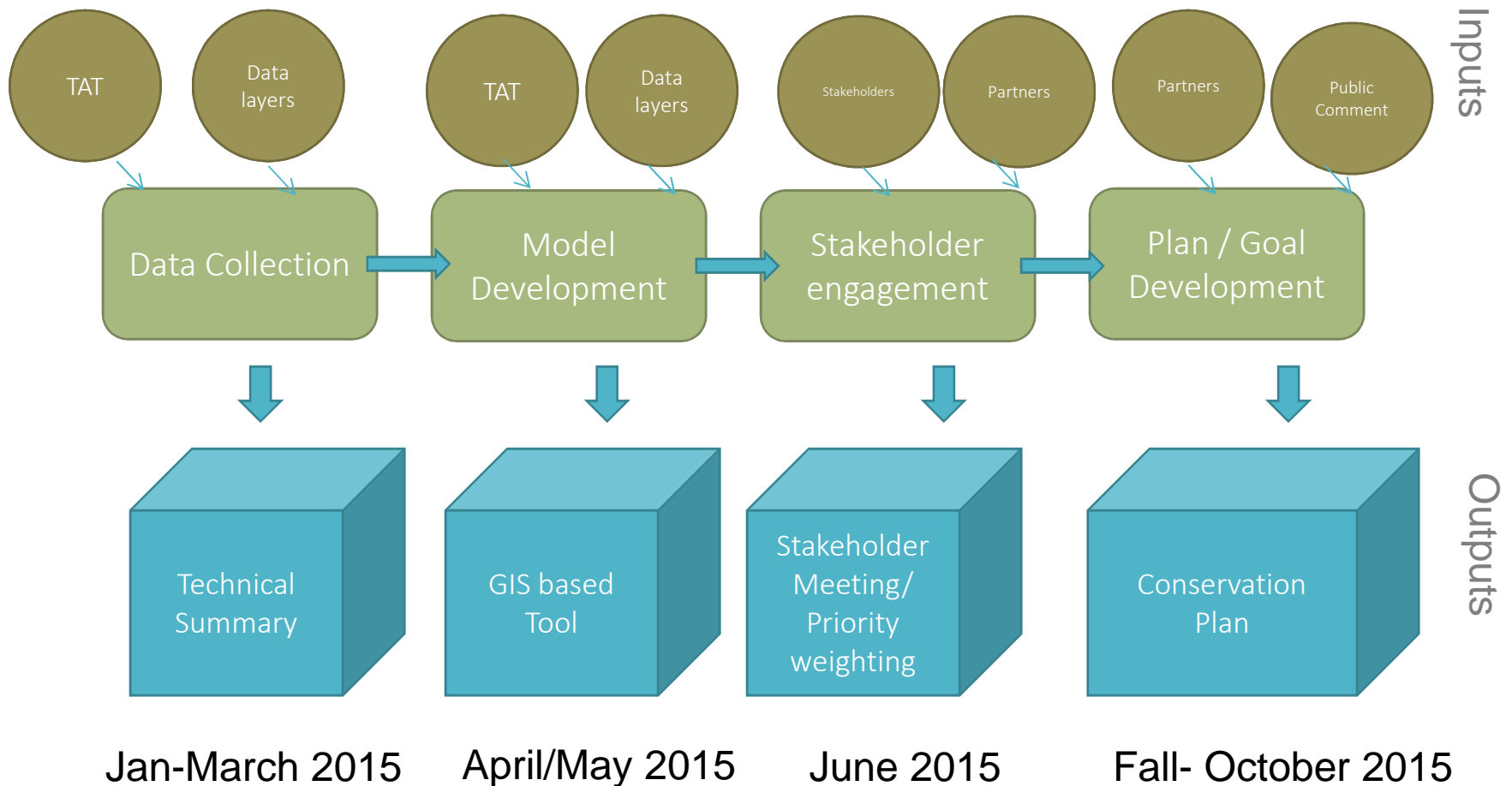
Conservation Plan Update

Original Model:

- Developed by Trust for Public Land with support from Triangle J Council of Governments
- Water Quality Focused
- Raster Based
- Only ranked water features
- Weighted Average Score



Process

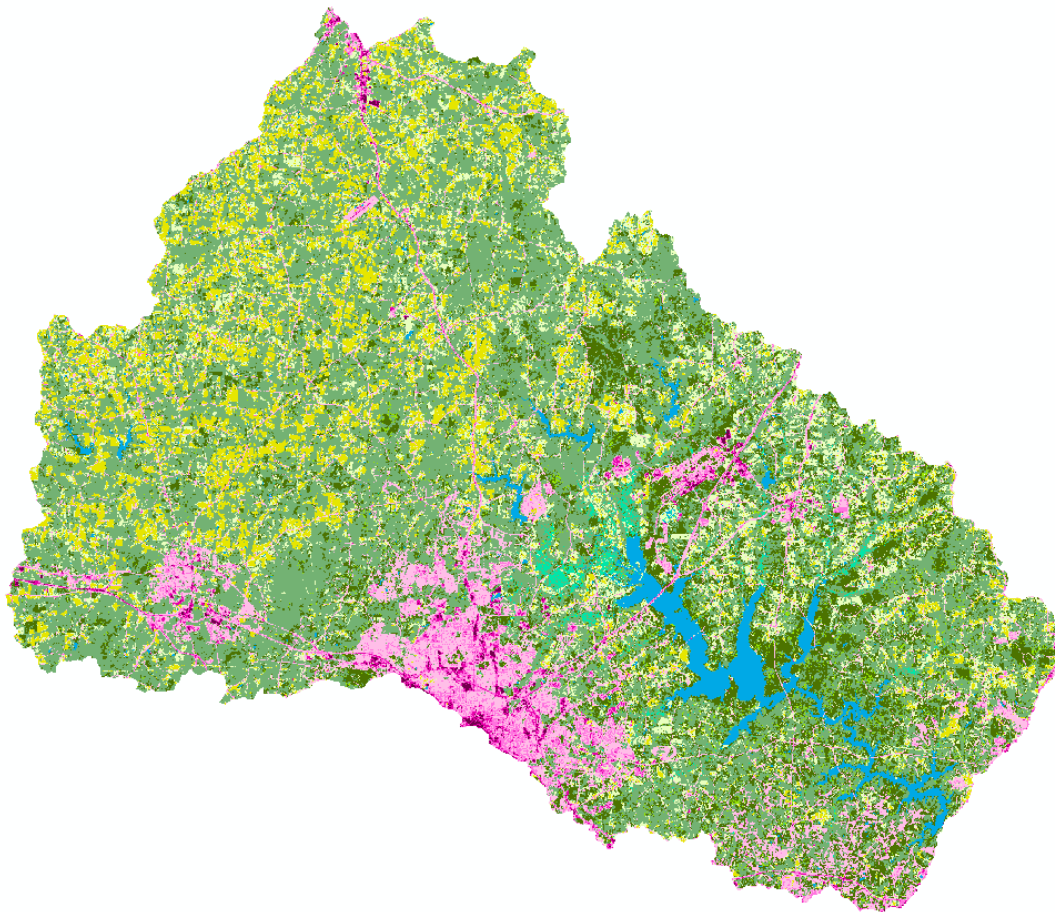




Technical Advisory Team

- Ed Buchan, Raleigh Public Utilities
- Carl Stearns, Raleigh Public Utilities GIS
- Corey White, Raleigh Public Utilities GIS
- David Jones, Geospatial Services Branch Head at N.C. Forest Service
- Silvia Terziotti, GIS Specialist, USGS, South Atlantic Water Science Center
- Leigh Ann Hammerbacher, Raleigh Public Utilities
- Caitlin Burke, Conservation Trust for North Carolina
- Will Allen, The Conservation Fund
- Andrew Birch, NC State University

Land Use Layer



- Crops
- Deciduous Forest
- Evergreen Forest
- Grassland/Pasture
- Mixed Forest
- Open Water
- Wetlands
- Developed/ High intensity (80-100% impervious)
- Developed/ Medium Intensity (50-79% impervious)
- Developed/ Low Intensity (20-49% impervious)
- Developed/Open Space (<20% impervious)

Land Use Accuracy Assessment



Model Update Goals

Develop a model that identifies priorities for water quality and quantity protection in the Upper Neuse and Swift Creek Drinking Water Supply Watersheds

- Consider both riparian areas and uplands
- Develop a model for both watersheds
- Develop a model that could be used by various partners across the watershed
- Look at future scenarios and water quality impacts
- Set clear goals
- Incorporate stakeholders and partners in the development
- Create a model that can be updated with new data resources

Core Objectives



Protect Water Sources and Conveyances



Conserve Upland Areas



Promote Infiltration and Retention



Protect Vulnerable Areas

Parameters for Core Objectives

Water Sources and Conveyances

- Protect Headwater Streams
- Support connected high quality water features
- Protect Riparian areas



Uplands

- Protect uplands and pervious areas
- Protect areas with minimal impervious surface
- Protect uplands with forest cover



Infiltration and Retention

- Promote infiltration and retention through wetland protection
- Promote filtration through floodplain protection
- Protect groundwater recharge areas



Vulnerable Areas

- Protect wet/hydric areas
- Protect steep slopes
- Protect highly erodible soils



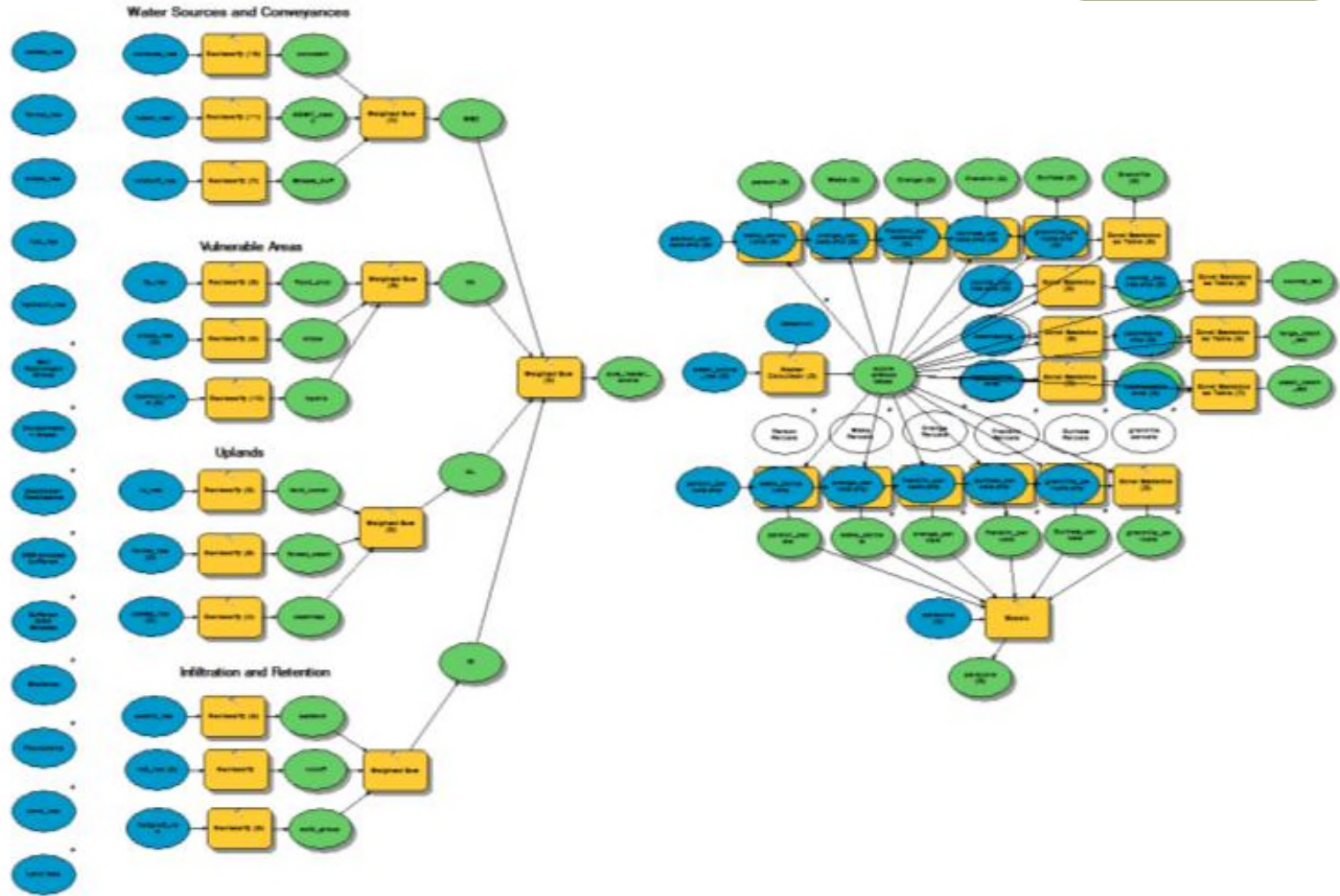
Parameter Characteristics

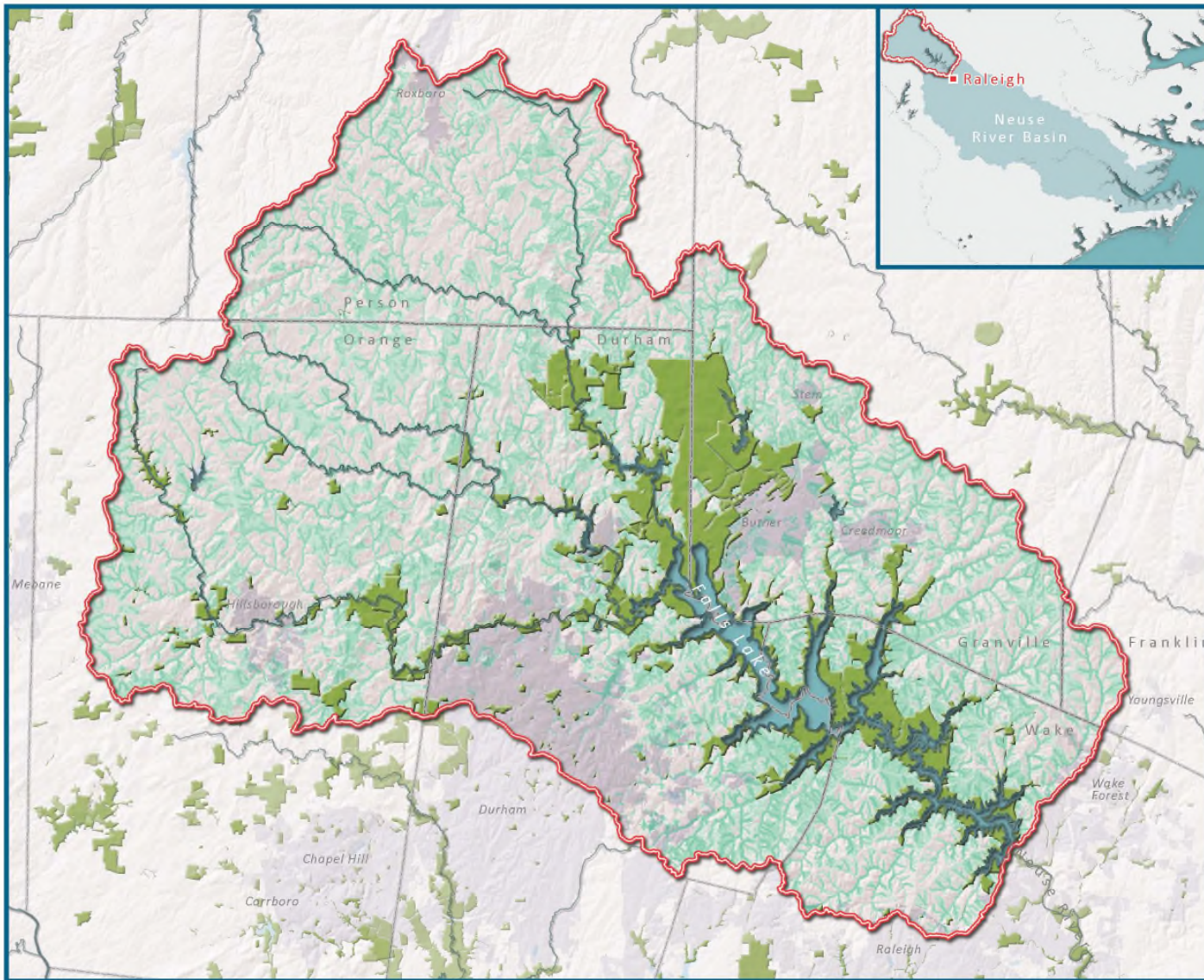
- Meets primary goal of water quality and quantity
- Comes from a reliable source
- Has continuous coverage for entire watershed area
- Can be updated
- Has scientific basis for scale
- Was screened by the Technical Advisory Team



The Model

Model Development





THE CONSERVATION FUND



TAR RIVER LAND CONSERVANCY

FIGURE 1.2: Land Conservation Strategy Map

UPPER NEUSE CLEAN WATER INITIATIVE:
CONSERVATION STRATEGY

2015 MODEL RESULTS

LEGEND

-  Major Hydrology
-  Upper Neuse River Basin
-  County Boundaries
-  Managed Open Space
-  Watershed Protection Model Score

Priority parcels = Score 4.2 (mean) or above, within 50' of waterbody
Priority area = 17,000 parcels (15% of total), 260,000 acres (56% of total)
Goal = Protect 30,000 acres over the next 30 years

Water Quality Impacts

Properties conserved	90
Acres protected	7,698
Miles of stream buffered	85
Nitrogen avoided	~7,970 lb/yr
Phosphorous avoided	~1,415 lb/yr

INITIATIVE RESULTS – 2007-2015



FIGURE 3.2: Initiative Impact on the Land



FIGURE 3.3: Initiative Impact on Pollutants



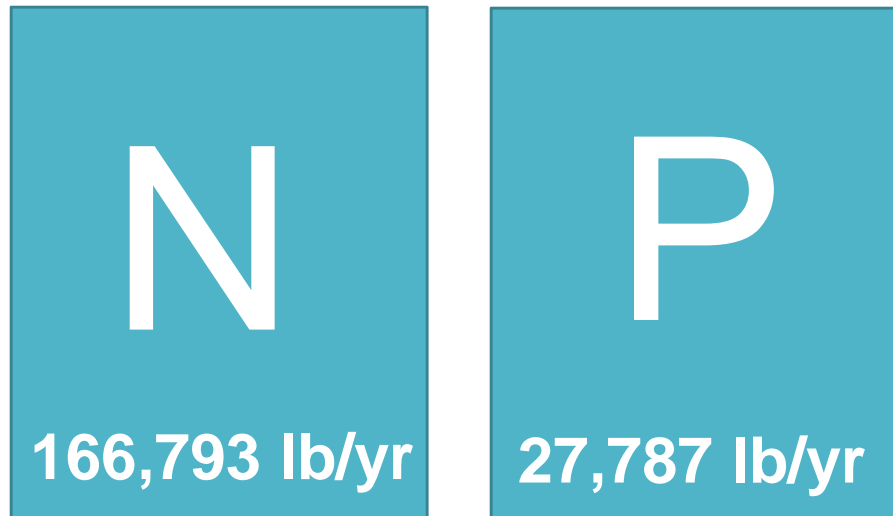
FIGURE 3.4: Raleigh Investment in Initiative



FIGURE 3.5: Funds Leveraged for Initiative

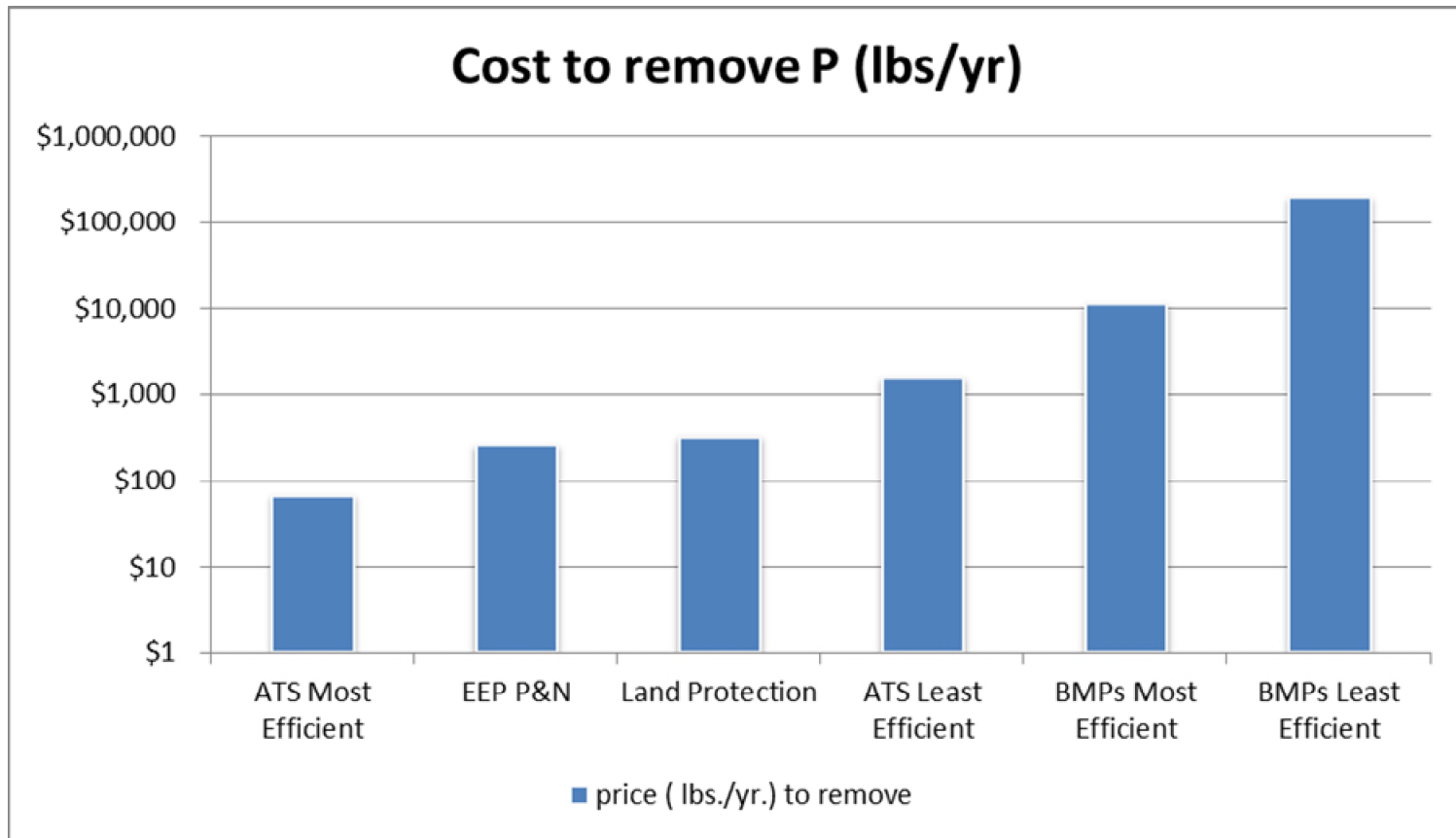
Potential Avoidance

Sum acres total	262,102
Sum acres eligible	232,270



30,000 acres ~13%

Water Quality Benefits



Proposed Project

Quantifying Nutrient Avoidance

- Project Goal: Develop additional methods to quantify the water quality impact of conservation projects
- Potential types of analysis
 - Statistical analysis of existing data and paper
 - Automated sampling during high flow events (2-4 sites, 4 events annually)
 - Grab samples (instantaneous values) 2-4 sites, 4-8 events
- Letter of support



Next steps/ questions?