

Using Integrated Watershed Modeling to Support Collaborative Source Water Protection

Michele Eddy, RTI

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**CATAWBA
WATER REUSE**
WATER MANAGEMENT GROUP

delivering the **promise of science**
for global good



RTI International is an independent, scientific research institute dedicated to improving the human condition. We combine scientific rigor and technical expertise in social, statistical, data, and laboratory sciences, engineering, and other technical disciplines to deliver solutions to the critical needs of clients worldwide.

Catawba-Wateree Water Management Group (CWWMG)

Eligible Member Organizations

Mainstem Members

Duke Energy and water utilities with intakes on lakes/river

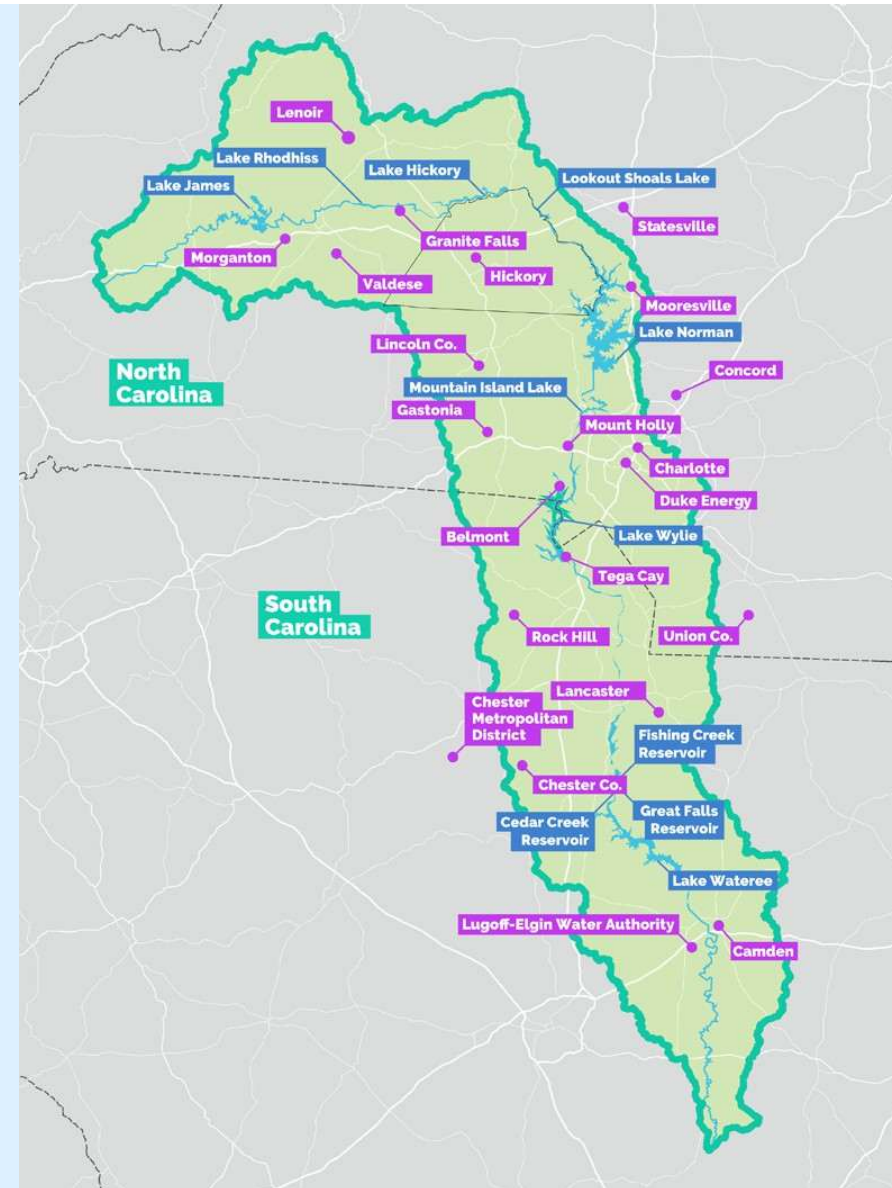
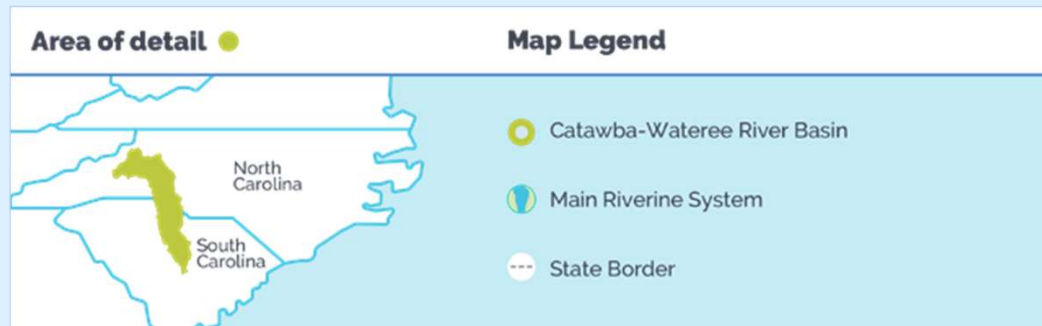
Utility Members

Water utilities serving customers within the Basin, or use Basin water to serve customers in other Basins

Associate Members

Commercial entities that own a water intake within the Basin

CWWMG is not a political or regulatory body, it is a non-profit of users and dependents on the Catawba-Wateree Basin



RTI Contributions to CWWMG's Integrated Water Resources Plan (IWRP)



**Watershed Modeling
(WaterFALL®) of Current and
Projected Future Conditions**



**Reservoir Inflow and Subbasin
Quantity and Quality**



**Groundwater-Surface
Water Assessment**



**Monitoring Data Compilation
and Recommendations**



**Basin-Wide Management
Scenario Design and
Evaluation**



**Detailed Case Studies of
Individual Projects**

Corporations

Secure water supply
and achieve
replenishment
targets

Utilities

Meet regulatory
requirements and
protect source
water

Land Conservancies

Achieve conservation
goals and protect
natural resources

Communities

Protect from flooding
and maintain water
access and quality

Government

Address regulatory
impairments and
support infrastructure

Multiple Actors with Different Needs in Shared Watersheds

- Each actor brings different motivations from corporate risk mitigation to environmental protection to regulatory compliance
- Capacities vary widely from corporate financial resources to local community knowledge and government regulatory authority
- Collaborative frameworks maximize benefits by addressing complementary objectives with available funding and expertise

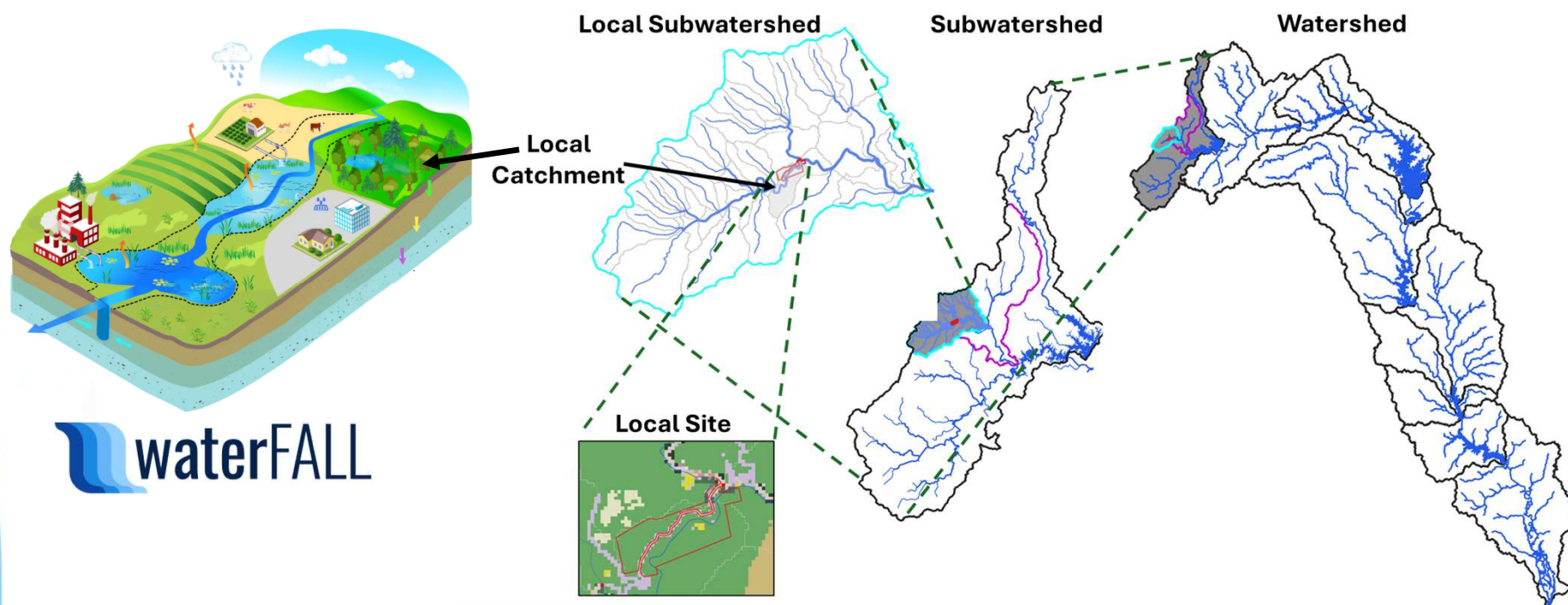


Catawba-Wateree Water
Management Group

**INTEGRATED WATER
RESOURCES PLAN**



Translation of Local Actions to Watershed Outcomes



Project Assessment

- What are the benefits of this project locally?
- Do the benefits extend downstream?

Basin-Wide Assessment

- Where are the “best” locations to restore or conserve land?
- How much land do I need to act on to mitigate the current issues and/or risks?

Source Water Protection Framework Components

Project
Application



Intake Form
Initial Proposal Document for Source Water Protection

Date: *Click or tap gray boxes to enter information*

Name of Applicant:

Type of Entity:

Name of Project:

Brief Overview of Project:

Total Cost of Project: (also identify anticipated funding sources with related amounts)

Funding Amount Requested from CWWMG: \$

Project Location: (provide maps)

Please indicate:

- Watershed position (i.e., headwater, tributary, along mainstem):
- Drainage area:
- Site area:
- Catchment(s) identifier:
- Catchment area:

For selection of land cover/use categories, please see the [Descriptions of Land Cover/Uses](#) for details on each category.

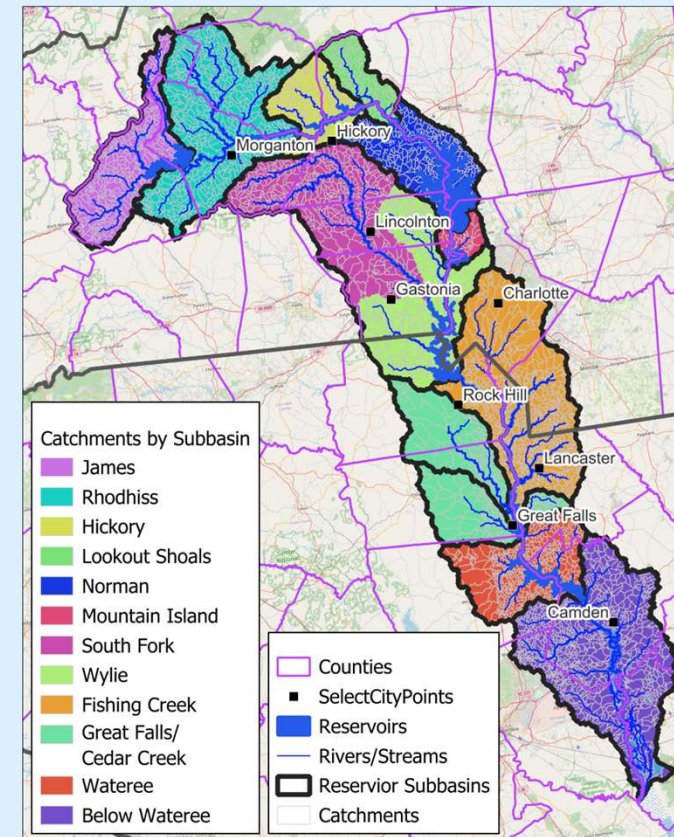
- Current land cover/use (list dominant use/cover(s)): Choose an item.

Source Water Protection Framework Components

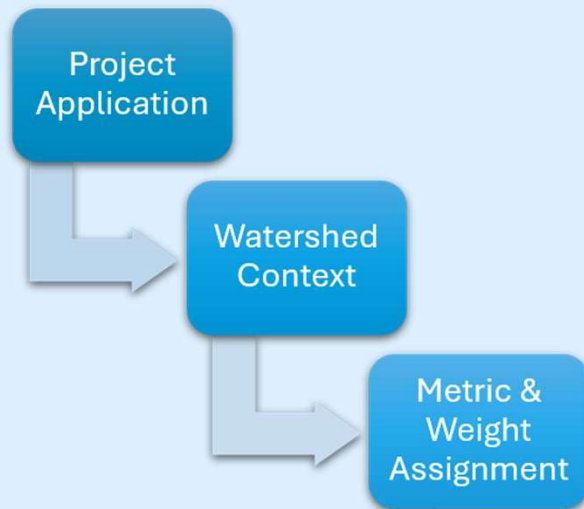
Project
Application



Watershed
Context



Source Water Protection Framework Components



Metrics Determined by Objective

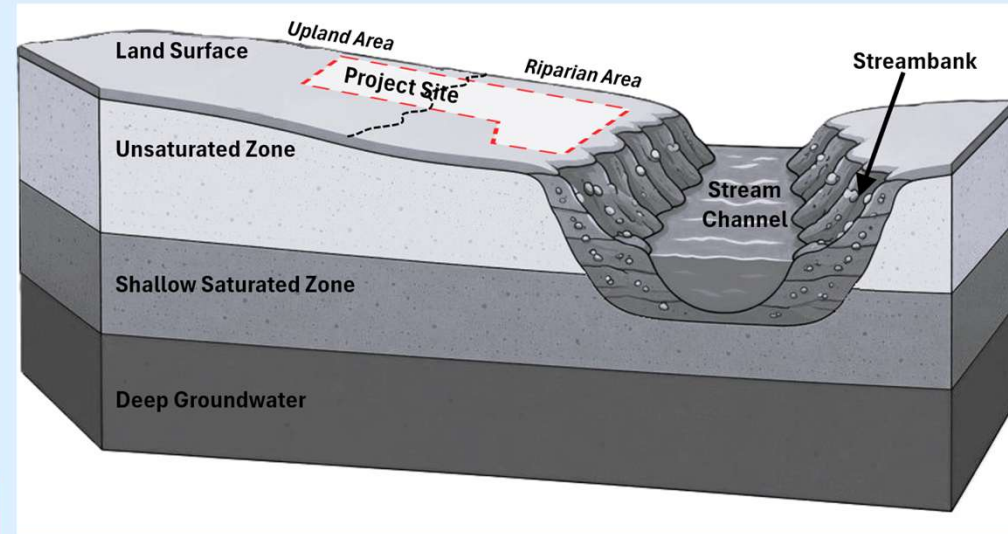
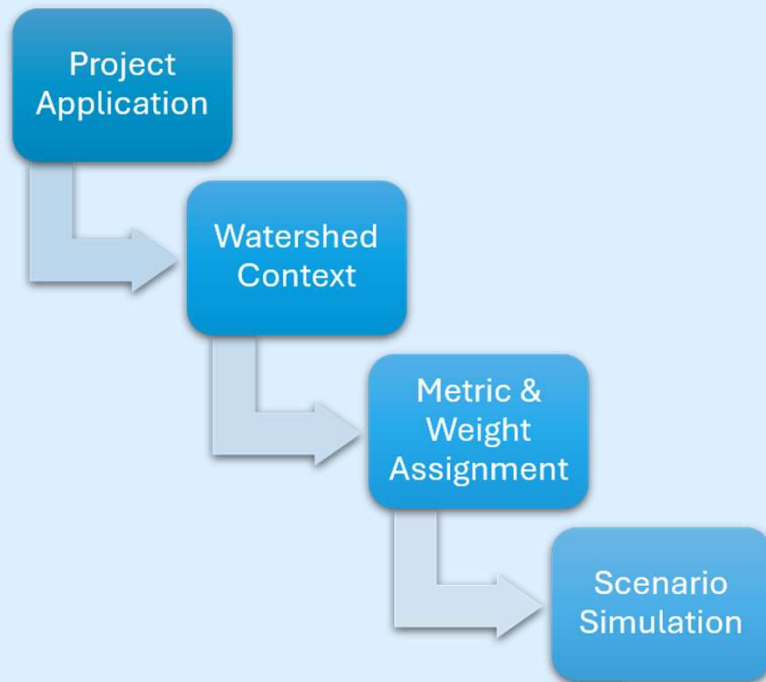
Hydrology

✓ Primary
e.g., Maximum
Daily Streamflow

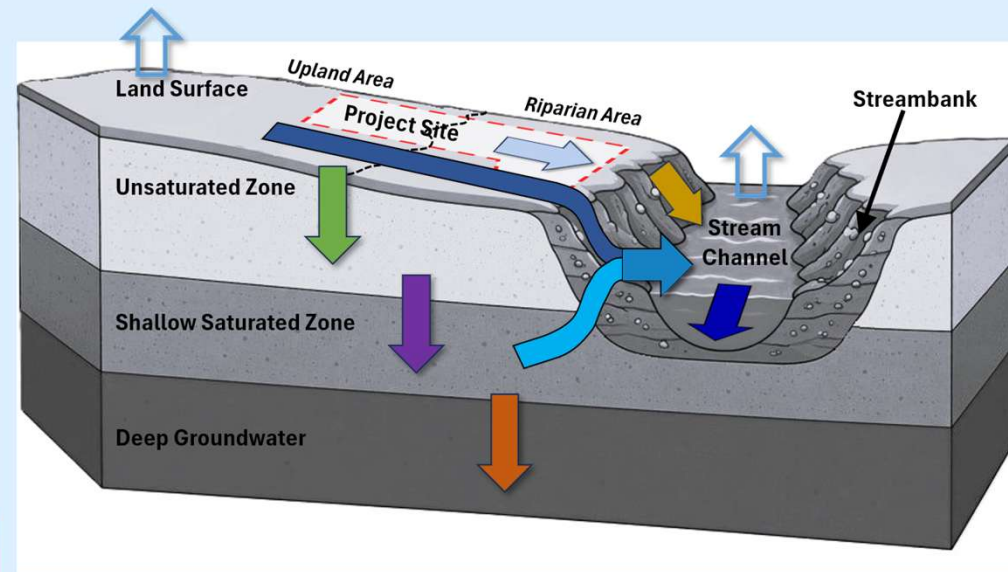
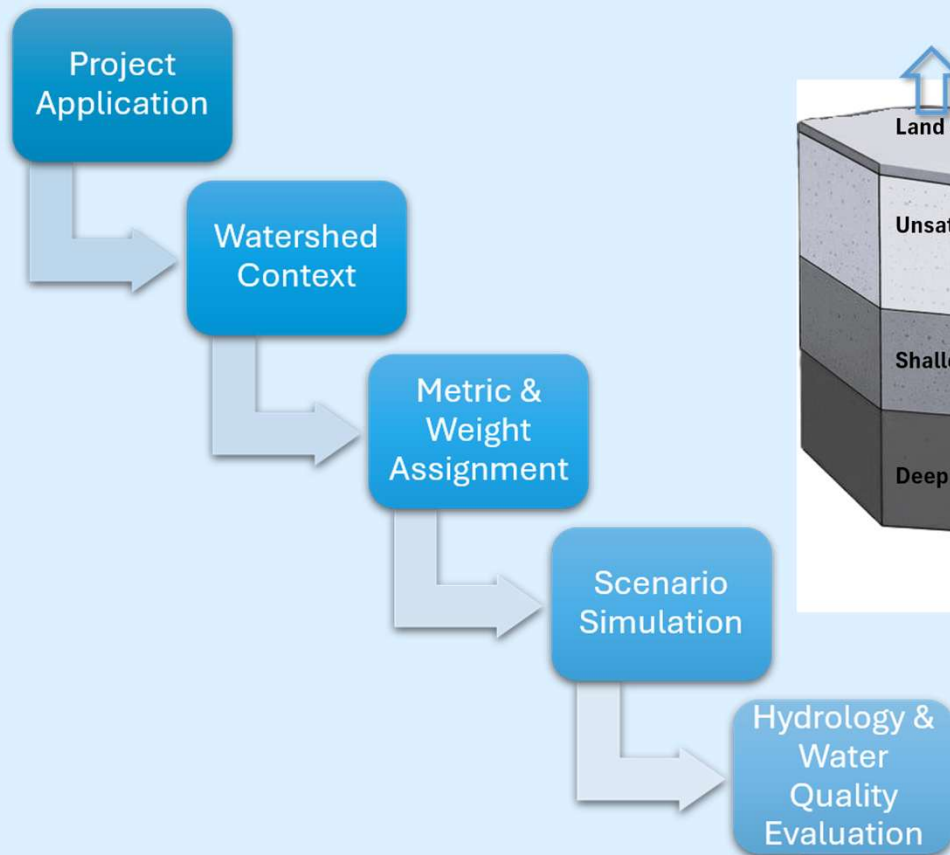
Water Quality

X Primary
e.g., Sediment
Load from
Streambank

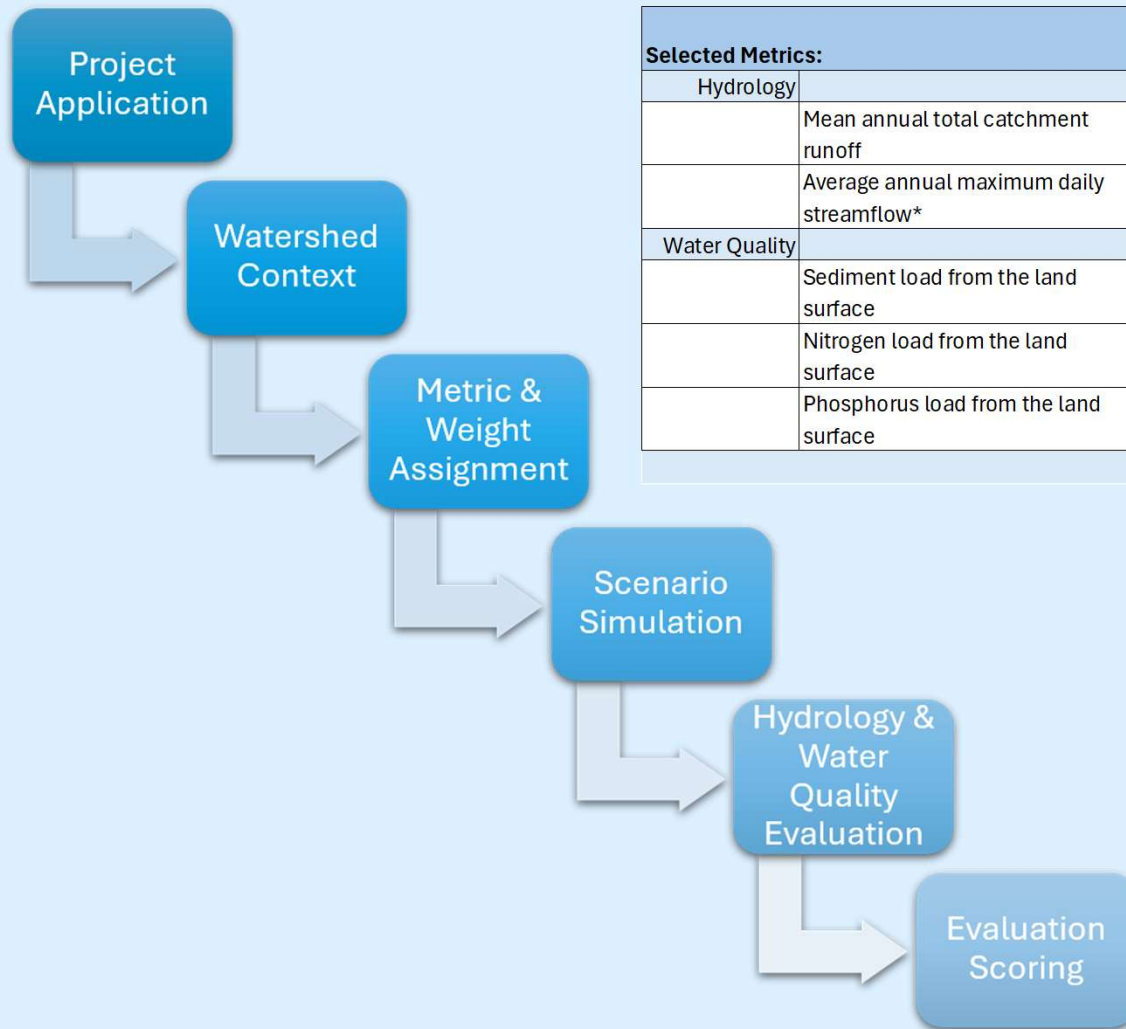
Source Water Protection Framework Components



Source Water Protection Framework Components



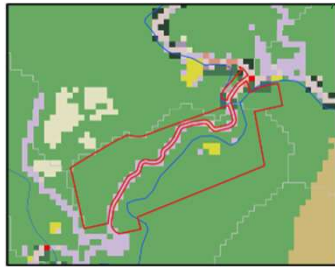
Source Water Protection Framework Components



Selected Metrics:		Weights:	% Reduction Value	Metric Score*	Weighted Value	Final Score
Hydrology		0.3				0.0
	Mean annual total catchment runoff	0.7	2.3%	0	0.0	
	Average annual maximum daily streamflow*	0.3	0.00%	0	0.0	
Water Quality		0.7				0.7
	Sediment load from the land surface	0.4	76.9%	1	0.4	
	Nitrogen load from the land surface	0.3	88.5%	1	0.3	
	Phosphorus load from the land surface	0.3	86.2%	1	0.3	
Evaluation Score:						0.7

Informing Decision Support for Partners

Land Preservation Project



At Site

Volumetric Water Benefit

Avoided Runoff

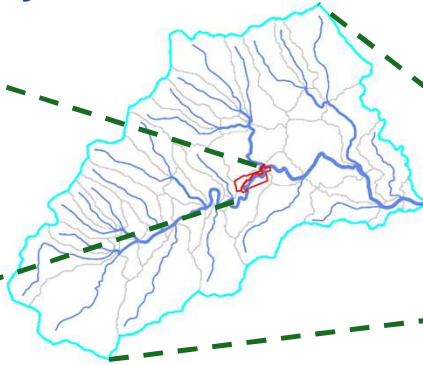
11.5 MGY

Water Quality Benefit

Avoided Load in Runoff

Nitrogen	23	lb/yr
Phosphorus	6.7	lb/yr
Sediment	185,000	lb/yr

Avoid 5 MGY in Baseflow Reduction



Instream

Volumetric Water Benefit

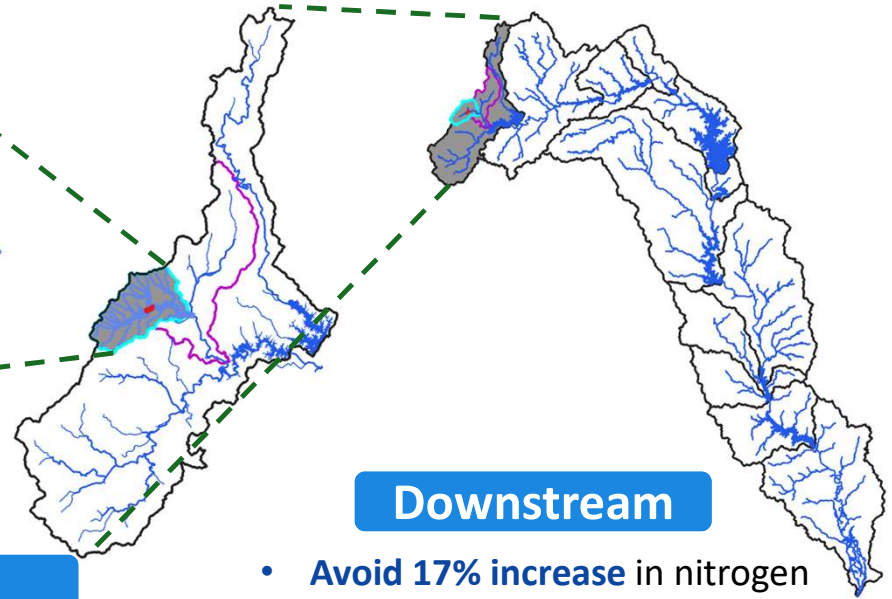
Avoided Streamflow

1.7 MGY

Water Quality Benefit

Avoided Instream Load

Nitrogen	14,150	lb/yr
Phosphorus	3,670	lb/yr
Sediment	534,900	lb/yr



Downstream

- **Avoid 17% increase** in nitrogen concentration on average leaving Armstrong Creek
- **Avoid 1,900 lbs** of sediment delivered to reservoir during a peak flow day
- On average **avoid 700 lbs** of sediment to reservoir per day

Next Steps for Catawba and RTI

Catawba-Wateree River Basin

- IWRP finalization and collection of **resolutions of support**
- CWWMG **annual funding** for source water protection (SWP) projects
- Additional **corporate partners** engaging
- RTI support for SWP committee **project evaluation** on as-needed basis
- RTI developing **data viewer** for IWRP results dissemination

RTI Support of Water Stewardship

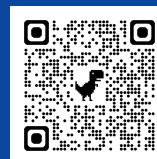
- Continued refinement of **project evaluation framework**
- Publishing **white paper** on collective action support through modeling
- Linkage of water benefits to **cross-sector co-benefits**
- Presentation of the **NBS Explorer web application** for hands-on decision support

Thank You!

Michele Eddy
mceddy@rti.org

Questions?

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