

Source Water Protection: A National Perspective

Water for All Summit

Wednesday, March 29, 2023



Agenda

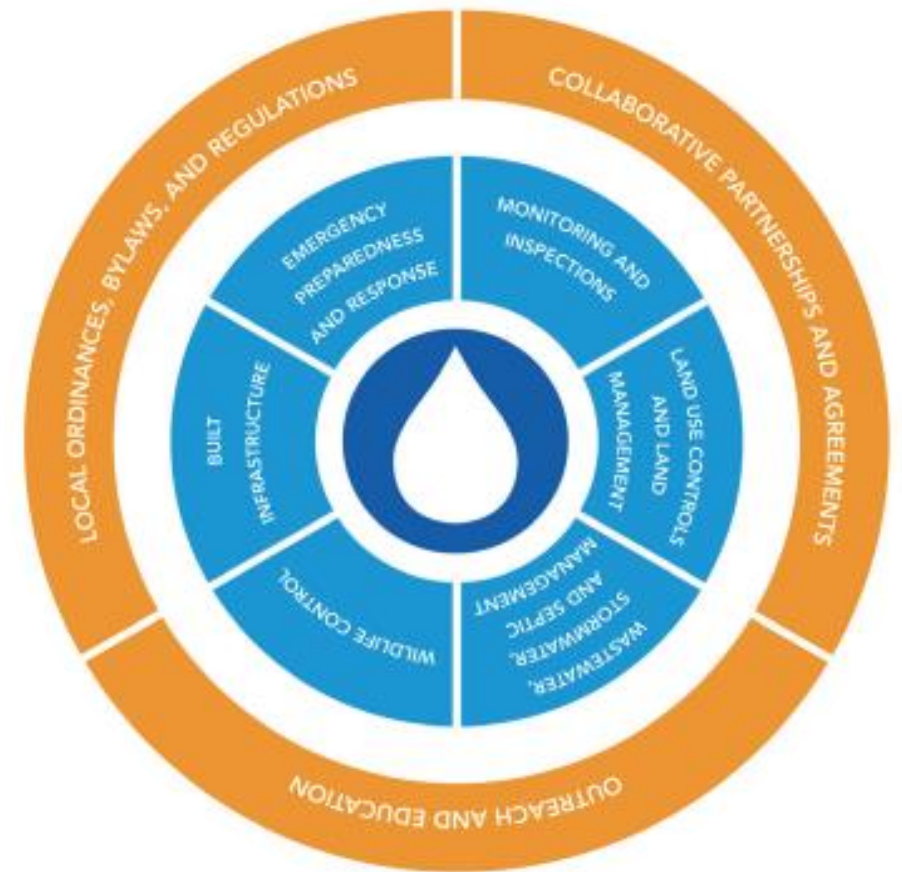
- Key concepts
- Challenges
- National trends
- Case studies
- Call to action



Protect the
SOURCE

Source water protection

Source water protection is a proactive approach to safeguard, maintain, or improve the quality and/or quantity of **drinking water sources and their contributing areas** (AWWA G300-22).



Integrated water and land use planning

*Integrated water resource management is a process which promotes the coordinated development and management of **water, land and related resources**, to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (Global Water Partnership).*

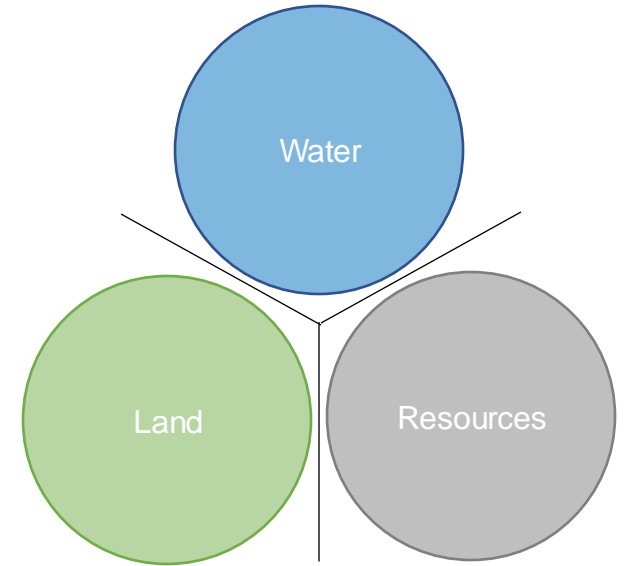
Benefits associated with integrated water and land use planning

- Enhanced water supply and storage
- Improved water quality
- Reduced flooding
- Improved reliability and long-term water management
- Greater cost efficiency for municipalities and consumers
- Greater resilience in a time of climate change

Challenges in water and land management

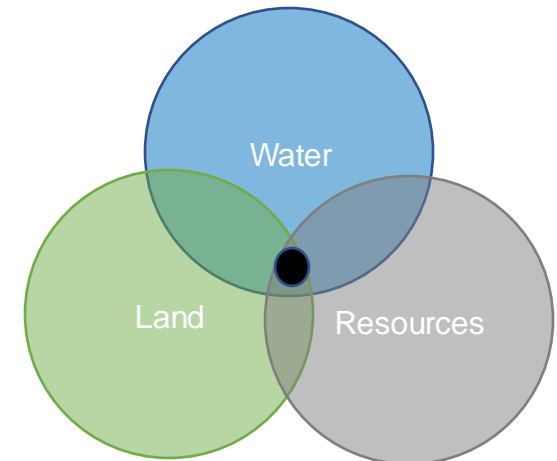
Common approaches:

- Water management → safe, clean, affordable water
- Land use management → enable and attract development, balance community needs & interests



Questions to consider:

- How do water resources <impact> development?
- How could a more integrated approach meet common goals? Stakeholders, processes, outcomes
- What role does each group have in planning?



Tailwinds at the national level



Building capacity

- Federal funding programs – explore [FITS](#) for details
- Focus on more holistic management - One Water
- Raising awareness through education and outreach – SWP Week



Regulations

- Farm Bill designates 10% carve out for source water protection
- Revision to WOTUS defines scope of water protected under Clean Water Act
- America's Water Infrastructure Act (2018)

Case study examples



Savannah River

- Collaboration across state lines in SC and GA
- Utilities (5) and partners to improve land management of 2.8m acre watershed
- Focus on land conservation to protect water quality



Austin Water Forward

- Developed water plan for the next *100 years*
- Task Force, Commission, and City Council approved
- Adaptive management strategies to address population, drought, climate



Upper Neuse River

- 9 reservoirs serving 0.5M+ people in 8 municipalities
- Facing population growth and > impervious surface
- Protections funded through City of Raleigh Watershed Protection Fund + others

Additional resources

- [AWWA Source Water Protection](#)
- [IWRM Action Hub and Toolbox](#)
- [Integrated Land Use and Water Management Planning & Practice](#)
- [Source Water Collaborative & Guide for Land Use Planners](#)

Other successful examples

- Philadelphia, PA
- Hillsborough County, FL
- Salt Lake City, UT

Table 2.1: Tools, Practices, and Processes for Integrating Land and Water*

Tools, Practices, and Processes	Tool Usefulness for Addressing Certain Water Issues			
	Water Adequacy	Flooding and CSOs	Aging Infrastructure	Water Quality
Collaborative Processes				
Remove Existing Barriers	●	●	●	●
Ongoing Communication	●	●	●	●
Coordinated Data and Information	●	●	●	●
Education Programs	●	○	N/A	●
Public Engagement and Participation	●	○	N/A	●
Scenario Planning	●	●	●	N/A
Pilots, Demonstrations, and Models	○	●	N/A	●
Coordinated Pre-Application Meetings	●	○	N/A	●
Closed Approval Loop Between Land/Water	●	●	N/A	○
Monitoring and Program Evaluation	●	●	●	●
Planning				
Comprehensive and Master Plans	●	●	●	●
Water Resources Plans	●	●	●	●
Capital Improvement Plans	●	●	●	●
Sustainability and Climate-Related Plans	●	●	●	●
Hazard Mitigation, Response, Recovery Plans	●	●	●	●
Regulations: Codes and Ordinances				
Building Codes	●	●	N/A	●
Plumbing Codes	●	●	N/A	●
Landscape and Irrigation Codes	●	●	○	●
Zoning and Land Use Codes	●	●	●	●
Subdivision Regulations	●	●	●	○
Annexation or Growth Policies	●	●	●	●
Water Restriction/Other Water Use Codes	●	N/A	N/A	N/A
Water Budget, Allocation, and Dedication	●	●	N/A	N/A
Assured Water Supply	●	N/A	N/A	N/A
Water Demand Offsets/Water Neutral Code	●	N/A	●	N/A
Consistency Requirements and Formalized Collaboration	●	●	N/A	●
Development Review				
Development Agreements/PUDs	●	●	●	●
Site Planning	●	●	○	●
Connection Charges	●	●	●	N/A
Developer Incentives	●	●	○	●
Water and Infrastructure				
Water Supply Infrastructure	●	●	●	●
Wastewater Collection and Treatment	N/A	●	●	●
Stormwater Management	●	●	●	●
Water Quality and Source Water Protection	●	●	N/A	●
Water Reuse and Use of Impaired Supplies	●	○	●	●
Water Recharge and Storage	●	●	●	●
Post-Occupancy Water Demand Management				
Rate Structure/Conservation Rate Structure	●	●	N/A	N/A
Fixture, Appliance, or Landscaping Retrofits	●	○	N/A	○
Water Audits and Leak Detection	●	N/A	●	○

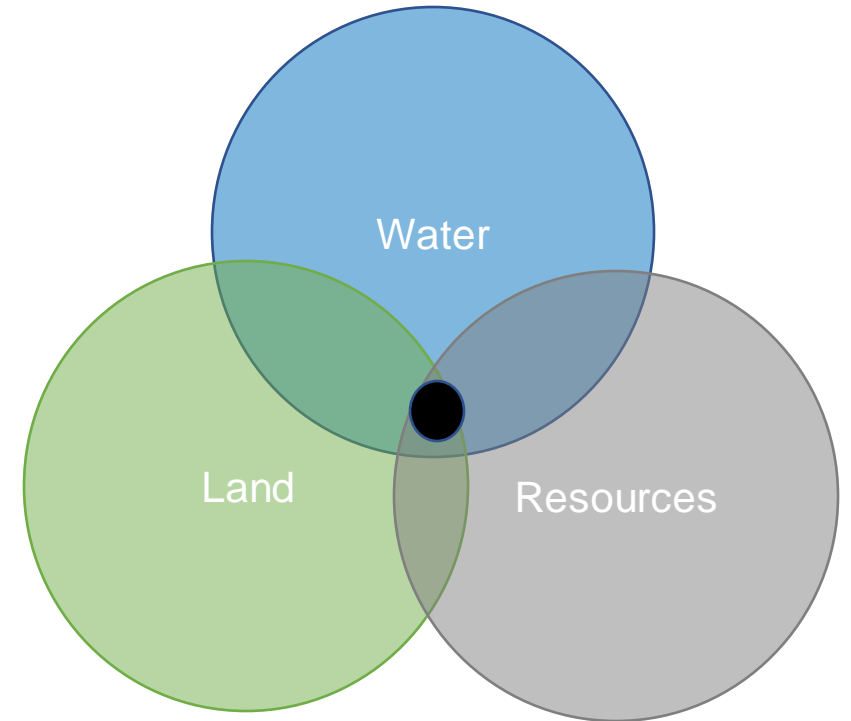
* Complete descriptions for each row and column of this toolbox are described in Rugland 2021b, *Integrating Land and Water: Tools, Practices, Processes, and Evaluation Criteria*.

KEY ● Highly useful for addressing this water issue
 ● Useful for addressing this water issue
 ● Somewhat useful for addressing this water issue
 ○ Marginally useful for addressing this water issue

Call to action

Stakeholder engagement

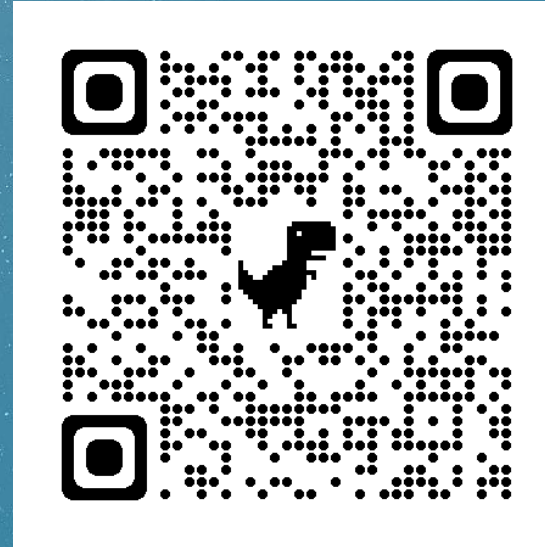
- **Vision:** What is the desired future state?
- **Assessment:** What are the risks and opportunities? What has/not worked before?
- **Program Goals:** What are the specific outcomes you hope to achieve?
- **Plan:** What activities will achieve the goals? How are they prioritized and resourced?
- **Act:** Implementation is key!
- **Evaluate:** Is it working? What needs to change?



It takes a village! Build relationships, explore perspectives, and challenge each other...

Thank you!

Jennifer Heymann, P.G.
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Connect on LinkedIn



NC Drinking Water Protection Program

March 29, 2023

Department of Environmental Quality

Brad Whitman & Danny Edwards



Outline

- Mandatory Source Water Protection Planning (Rule .1305)
- Voluntary Source Water Protection Planning
- Source Water Assessment Program (SWAP)
- Wellhead Protection Program
- Source Water Protection Success Stories



Mandatory Source Water Protection Planning (Rule .1305)



*15A NCAC 18C .1305 SOURCE WATER PROTECTION PLANNING (a) In compliance with G.S. 130A-320, every supplier of water operating a public water system treating and furnishing water from a surface water source shall create and implement a Source Water Protection Plan. For purposes of this Rule, the Source Water Protection Plan required by G.S. 130A-320 shall be referred to as a **Source Water Resiliency and Response Plan (SWRRP)**.*

15A NCAC 18C .1305 SOURCE WATER PROTECTION PLANNING (d) For community water systems that are subject to this Rule and also required to complete a Risk and Resilience Assessment and an Emergency Response Plan under Section 2013 of America's Water Infrastructure Act of 2018 (AWIA), the system's Risk and Resilience Assessment and Emergency Response Plan created to comply with AWIA may be referred to as a SWRRP and used to satisfy the requirements of this Rule, if the PCS list was compiled in accordance with Paragraph (b) of this Rule.

.1305 Regulated Community Comparison

~15%

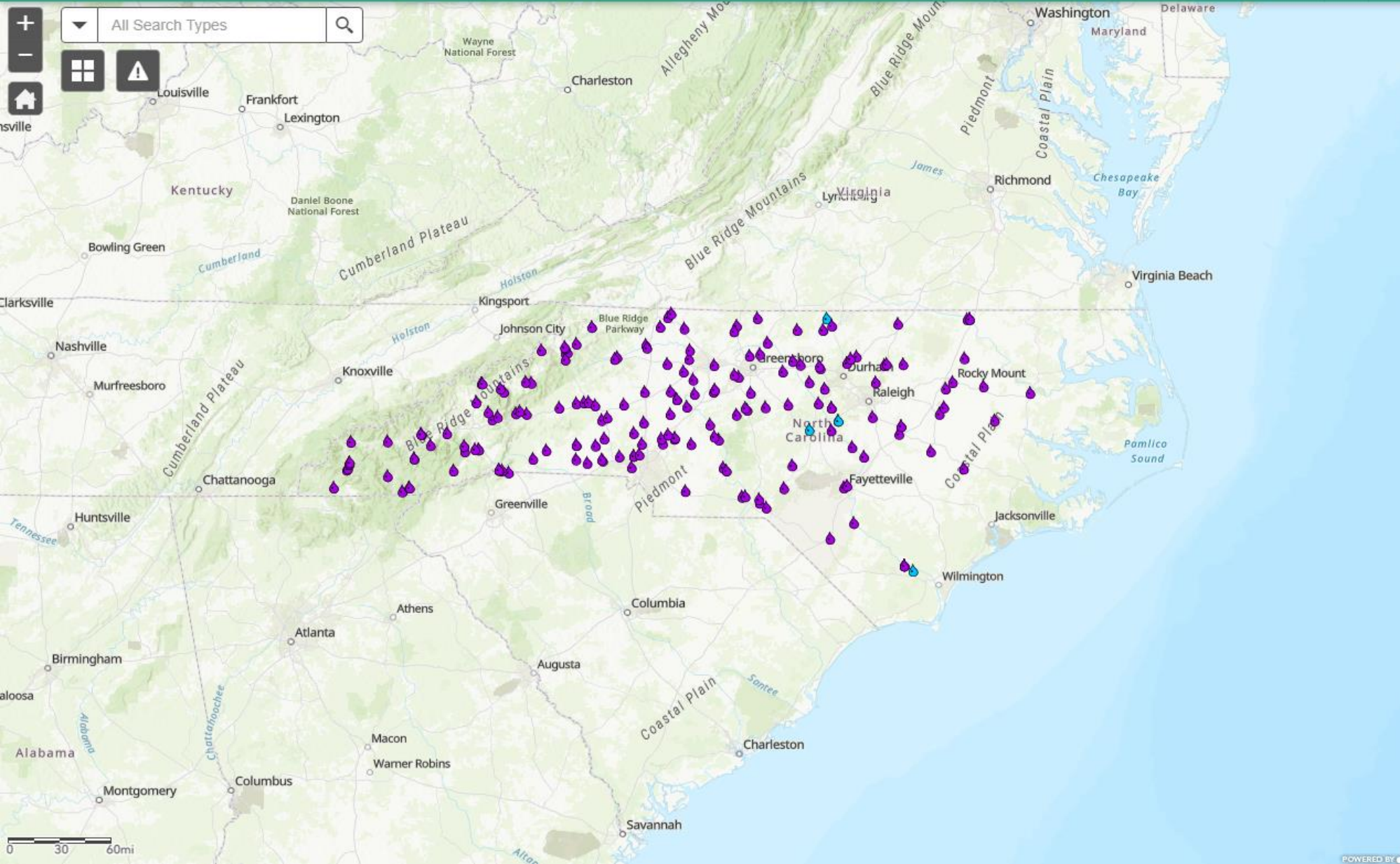
Community
Surface
Systems
serving
 $\leq 3,300$

NTNC
Surface
Systems

~ 85% Surface Water Systems that have to create a SWRRP, and also have to conduct a Risk and Resilience Assessment and create an Emergency Response Plan.

Community Surface Water Systems serving $>3,300$

Surface Sources



.1305 Required Plan Elements

- All Surface Systems
 - Water System, Local, State, and Federal emergency management personnel contact information
 - List of Potential Contaminant Sources (PCSs) provided by Department, + other *known* PCSs with the potential to reach surface waters upon release
 - Evaluation of the system's ability to:
 - close water intake(s),
 - isolate or divert contaminated water from the intake(s),
 - reduce demand by implementing conservation measures, and
 - meet demand via alternate sources of supply

.1305 Required Plan Elements

- Community Systems only:
 - Identification of foreseeable natural and human-caused emergency events including water shortages and outages
 - Description of the emergency response strategies for each identified event and each potential contaminant event associated with the identified PCSs
 - Description of public notification procedures
 - Identification and evaluation of all facilities and equipment that could result in a water outage or violation

.1305 Plan Location and Certification

- The plan and any associated documentation used in its creation and implementation shall be available for review by Department staff upon request.
- The supplier of water shall certify that a SWRRP has been created and implemented and that the water system's governing body has been advised of the plan's creation and implementation

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.1305 Plan Certification and Updates

State of North Carolina Department of Environmental Quality

Source Water Resiliency and Response Plan (SWRRP) Certification Form

In accordance with 15A NCAC 18C .1305 (a): in compliance with G.S. 130A-320, every supplier of water operating a public water system treating and furnishing water from a surface water source shall create and implement a Source Water Protection Plan. For the purposes of this Rule, the Source Water Protection Plan required by G.S. 130A-320 shall be referred to as a Source Water Resiliency and Response Plan (SWRRP). Additionally, as per 15A NCAC 18C .1305 (i), the supplier of water shall certify that a SWRRP has been created and implemented, and that the water system's governing body has been advised of the SWRRP creation and implementation. The certification shall be submitted to the Department by the deadlines specified in Paragraphs (c), (d), (e), or (f) of this Rule.

By my signature below, I certify on behalf of the public water system named below, that:

- In accordance with all requirements of 15A NCAC 18C .1305, a SWRRP has been created and implemented, and that the water system's governing body has been advised of the SWRRP creation and implementation.

Signature: _____

Name: _____

Title: _____

Date: _____

System Name: _____

System ID: _____

Certifications can be sent by mail to Source Water Protection Program, 1634 Mail Service Center, Raleigh, NC 27699
or attachment to an email message to SWAP@ncdenr.gov

Plan Updates

- Federal (AWIA) and State Plans must be reviewed and updated every 5 years.

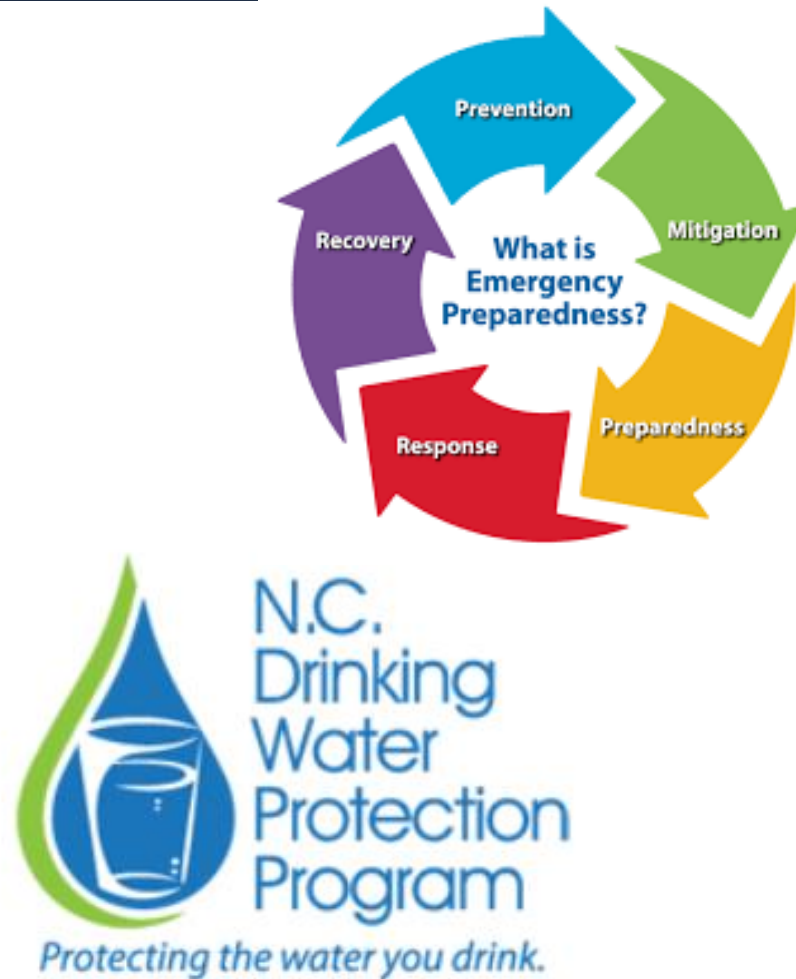


Source Water Protection Rule

- What the rule does **not** do:
 - Strengthen regulations against PCS owners
 - Share regulatory oversight of PCS facilities
 - Mandate implementation of proactive strategies
 - Require a local stakeholder team to develop plan
 - Require submittal of the plan to DEQ as a public record

Source Water Protection Rule

- What the rule does do:
 - Strengthen awareness of risks and threats
 - Emphasize emergency preparedness as highest priority
 - Use the agency's SWP resources



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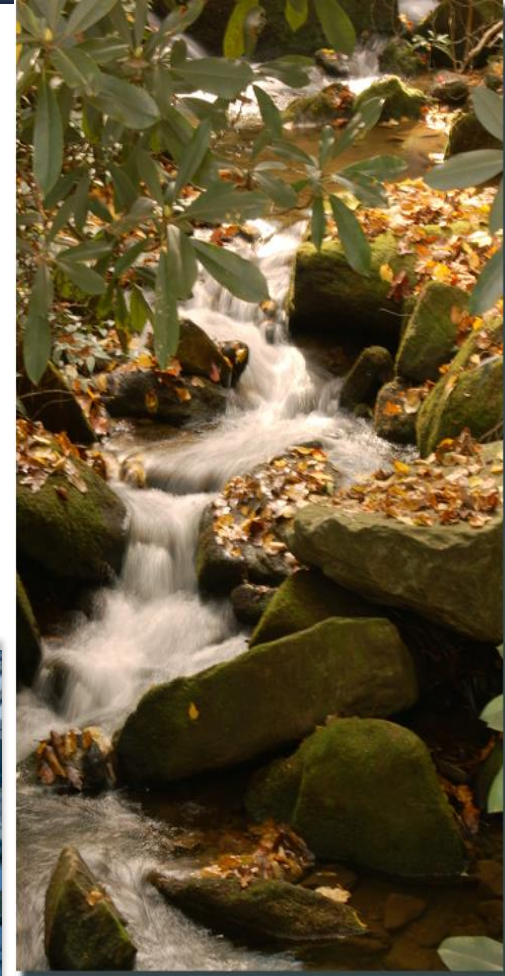


Voluntary Source Water Protection Planning



Voluntary Source Water Protection Planning

- Recognized by EPA as a top strategy
- Procedures already exist
- Supporting data is available
- Economic incentives are available
- Politically correct



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Voluntary SWP Plan Development

[Home](#) [Divisions](#) [Permits & Rules](#) [Outreach & Education](#) [Energy & Climate](#) [News](#) [About](#)

Surface Water Protection Program

Surface water refers to the streams, rivers and lakes that are used as sources of public drinking water. In NC, more than 4 million citizens rely on surface water for safe and reliable drinking water. Our state's surface waters face a variety of threats, including agriculture pressures, stormwater runoff, development and emerging contaminants. The NC Surface Water Protection Program serves the state by initiating proactive protection strategies to identify and mitigate these threats. We work in partnership with a variety of other agencies and programs to promote local drinking water protection in local communities all across NC.

- [View the SWP Planning Brochure](#)
- [SWP Guidance Document](#)
- Approved SWP Plans
 - [City of Marion](#)
 - [Davidson Water](#)
 - [Elkin and Jonesville](#)
 - [Ivy River](#)
 - [Kerr Lake Regional Water](#)
 - [Lincoln County](#)
 - [Lower Creek](#)
 - [Mills River Integrated Watershed Management Plan and Source Water Protection Plan](#)
 - [Pilot Mountain](#)
 - [Western Piedmont](#)

Source Water Assessment Program (SWAP)

Funding & Incentives

Success Stories

Tools & Resources

Sample Wellhead Protection (WHP) Plans

Wellhead Protection

Drinking Water Watch

Emergency Planning

Forms, Reports and Publications

Loans & Grants

Local Water Supply Plans

NC Water Treatment Facility Operator Certification Board

Plan Review

PWS Reports (Sampling Status Report)

Rules Governing Public Water Systems

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Steps to Prepare a Voluntary SWP Plan

1. Obtain a copy of SWAP Report
2. Form local SWP Team
3. Conduct a Potential Contaminant Source (PCS) Inventory
4. **Develop Management Strategies**
5. Develop Contingency Plan
6. Develop Schedule for Implementation and Plan Updates
7. Submit Plan for Approval

Steps to Prepare a Voluntary SWP Plan

- Conduct PCS Inventory
 - Collect physical information, search existing information, databases and records, engage community members, visually survey watershed, go investigate and seek out!
 - Map PCSs
 - PCS Inventory Data Sheets
 - Summary of PCS Inventory
 - Estimate risks and rank PCSs
 - Involve Public

Develop Management Strategies

Management Strategies

- Regulatory approaches
 - Targeted inspections and training
 - Growth controls or zoning
 - Land use prohibitions
 - Construction and operating standards
 - Permitting program
- Land use/land acquisition
- Education

Tool 2: Land Conservation



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Management Strategies

Best Management Practices/Standard Operating Procedures that can reduce threats that activities at homes, businesses, farms, and industries can pose to water supplies.

- Structural
 - Imposed or voluntary
- Good Housekeeping
 - Equipment O&M
 - Product storage and handling
 - Waste storage and disposal



NC Voluntary Source Water Protection Plans

- 10 approved plans
- 13 systems covered by plans
- 440,577 - population served by systems covered by plans



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Barriers

- Voluntary effort
- Length of process
- Staff turnover
- \$ for implementation



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Getting Started:

- Contact Drinking Water Protection Program for more information
- Assistance with SWP Plan development available from NC Rural Water Association
- Review/Reference SWP Guidance Document
- Review SWAP Report

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Source Water Assessment Program (SWAP)

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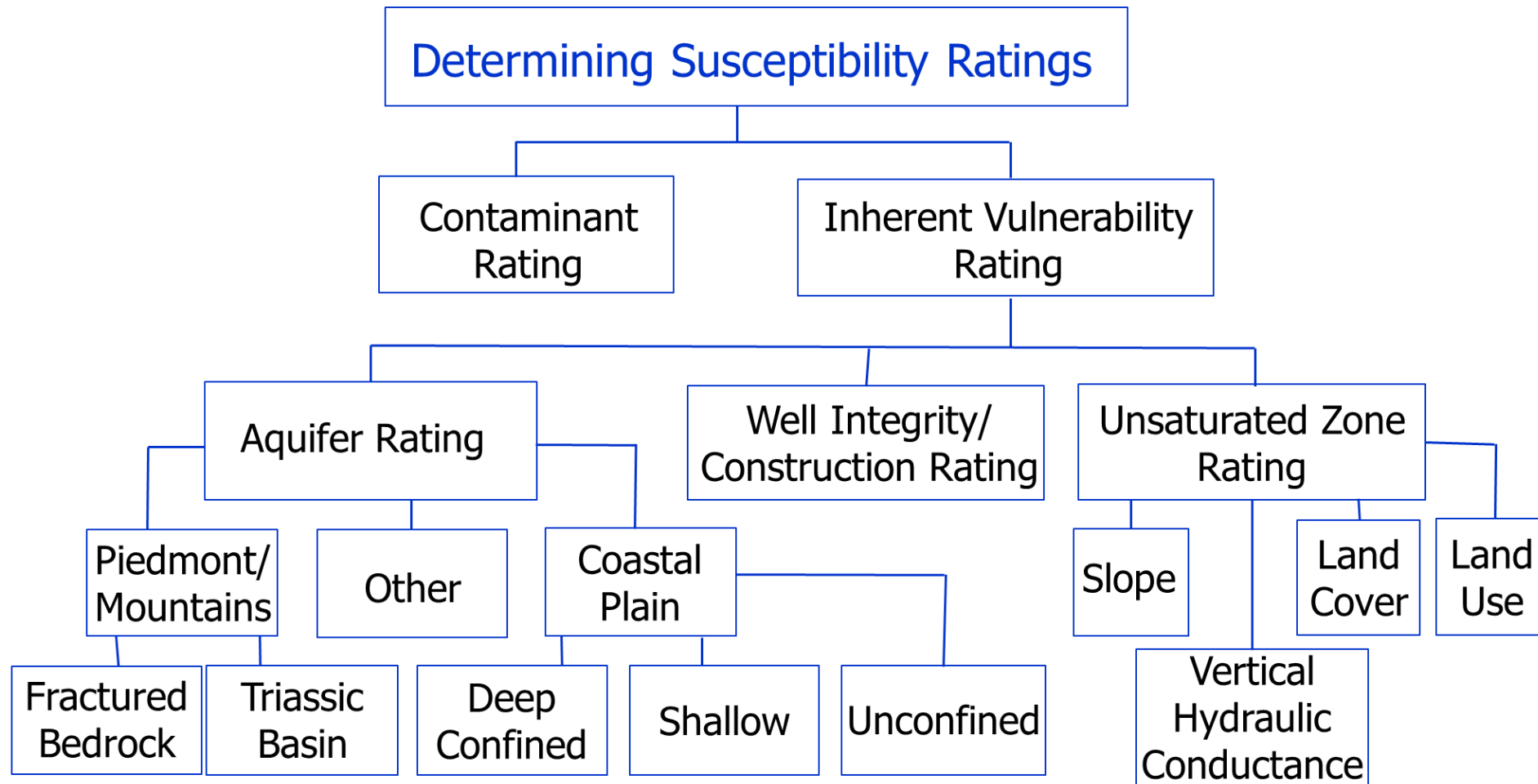


NC Source Water Assessment Program

- Safe Drinking Water Act Amendments of 1996 required all states to establish Source Water Assessment Programs
- Pollution prevention is most effective for ensuring reliable and safe public drinking water at reasonable cost
- Technical advisory committee provided recommendations in the development of NC's SWAP
- Approved by EPA in 1999






- SWAP Components
 - Assessment Area Delineation
 - Defines the land area contributing water to a public water supply source
 - Potential Contaminant Source Inventory
 - Contamination Susceptibility Rating
 - Distribution of Assessment Results

SWAP Rating Method – Groundwater Sources



Source Water Assessment Program (SWAP)

North Carolina's Source Water Assessment Program (SWAP) provides detailed assessments of all public drinking water intakes in the state. These assessments include a Susceptibility Rating to indicate the relative risk of source contamination. Our SWAP data is readily available to help define environmental priorities and projects that may prevent pollution. We have concise and current reports downloadable from this web page. Any local effort to protect drinking water should begin here.

- [Learn more about NC's SWAP](#)
- [View the SWAP Brochure](#) 
- [Source Water Assessment Reports](#) 
- [Source Water Assessment Mapping Tool](#) 
- [Original USGS Methodology](#) 
- [USGS Methodology Update - 2009](#) 

Wellhead Protection (WHP) Program

The NC Wellhead Protection (WHP) Program functions to protect groundwater sources of drinking water from contamination. Wellhead protection is simply the protection of all or part of an area surrounding a well from which the groundwater is drawn. The size of this area will vary and depends on a variety of factors, including local geologic and hydrogeologic features. Most communities begin by creating a voluntary Wellhead Protection Plan. These proactive plans identify strategies and concerns unique to each individual location. Our WHP Program staff is prepared to assist your groundwater protection efforts.

- [Learn more about NC's WHP Program](#)

[Rules Governing Public Water Systems](#)

[Water System Management Plan](#)

SWAP Report

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Public Water Supply - Source Water Assessment Reports

Start typing a system name or a system identification number

(a minimum of 3 characters is required to start the search)

Liberty, Town of 1 Report Found

Start a New Search

Click on the System ID to view the report

System ID	System Name
NC0276025	LIBERTY, TOWN OF

SWAP Report

Source Water Assessment Program Report for LIBERTY, TOWN OF Community Water System

Introduction: What is a Source Water Assessment?

The North Carolina Division of Water Resources, Public Water Supply (PWS) Section is responsible for implementing the Source Water Assessment Program (SWAP) and completing assessments for all public drinking water supplies in the state. The 1996 amendments to the Safe Drinking Water Act provided federal support and required states to conduct assessments of all public water systems. A source water assessment is a qualitative evaluation of the potential of a drinking water source to become contaminated by the identified potential contaminant sources (PCS) within the delineated area. In North Carolina there are approximately 8,000 public water supply sources that were assessed by the state. The PWS Section has gathered information for each water supply and developed a process for completing the assessments. This process is summarized in the next few pages and detailed in Section 6 of this report.

This report provides a summary of the results for the **Source Water Assessment** for your drinking water source(s).

What is the Source of Your Drinking Water?

Everyone wants clean, safe drinking water and we assume this natural resource will always be available to us. However, drinking water sources can be threatened by many potential contaminant sources, including underground storage tanks for gasoline, permitted wastewater discharges and other waste disposal sites, improper handling of hazardous materials, urban storm water runoff, or other types of non-point source contamination such as runoff produced by agricultural activities and land clearing for development. Your drinking water source(s) is listed in Table 1. Protecting your drinking water from becoming contaminated is a wise investment in public health and your community's future.

Table 1. Public Water Supply System Information

System Name	LIBERTY, TOWN OF
City	LIBERTY
PWS ID	NC0276025
Source Name	WELL #1
Source Name	WELL #10
Source Name	WELL #11
Source Name	WELL #12
Source Name	WELL #2
Source Name	WELL #4
Source Name	WELL #5
Source Name	WELL #6
Source Name	WELL #8

Assessment Report Contents

This assessment report includes the following sections:

- Section 1: Assessment Area Delineation
- Section 2: Potential Contaminant Source Inventory and Map
- Section 3: What is a Susceptibility Rating?

Inherent Vulnerability Rating

The inherent vulnerability rating of your well(s) refers to the geologic characteristics or existing conditions of the well and its delineated assessment area. These characteristics include aquifer rating, unsaturated zone rating and well integrity/well construction rating. The aquifer rating is an assessment of the water transmitting characteristics of the aquifer. The unsaturated zone rating is an assessment of the likelihood that contaminants from surface and shallow sources will follow the path of aquifer recharge and reach the water table. The well integrity/construction rating is an assessment of the quality of the construction of the well. An inherent vulnerability rating of higher, moderate or lower was assigned to your well(s).

Table 2. SWAP Results Summary

Source Name	Inherent Vulnerability Rating	Contaminant Rating	Susceptibility Rating
WELL #1	Higher	Higher	Higher
WELL #10	Moderate	Lower	Moderate
WELL #11	Moderate	Lower	Moderate
WELL #12	Moderate	Lower	Moderate
WELL #2	Higher	Higher	Higher
WELL #4	Higher	Moderate	Higher
WELL #5	Higher	Lower	Moderate
WELL #6	Higher	Moderate	Higher
WELL #8	Higher	Moderate	Higher

It is important to understand that a susceptibility rating of higher does not imply poor water quality. Susceptibility is an indication of a water supply's potential to become contaminated by the identified PCSs within the assessment area.

Table 3. Well Information

Source Name	Well Yield (Gallons/Min)	Well Depth (Feet)
WELL #1	75	230
WELL #10	56	930
WELL #11	51	700
WELL #12	200	345
WELL #2	86	260
WELL #4	100	573
WELL #5	53	400
WELL #6	68	250
WELL #8	55	350

Section 4: Reviewing Your SWAP Results

Please review the information on your drinking water source(s) provided in this report. If you believe any of this information is incorrect please contact the Public Water Supply Section by e-mail at the following address: SWAP@ncdenr.gov or you may submit comments to us at:

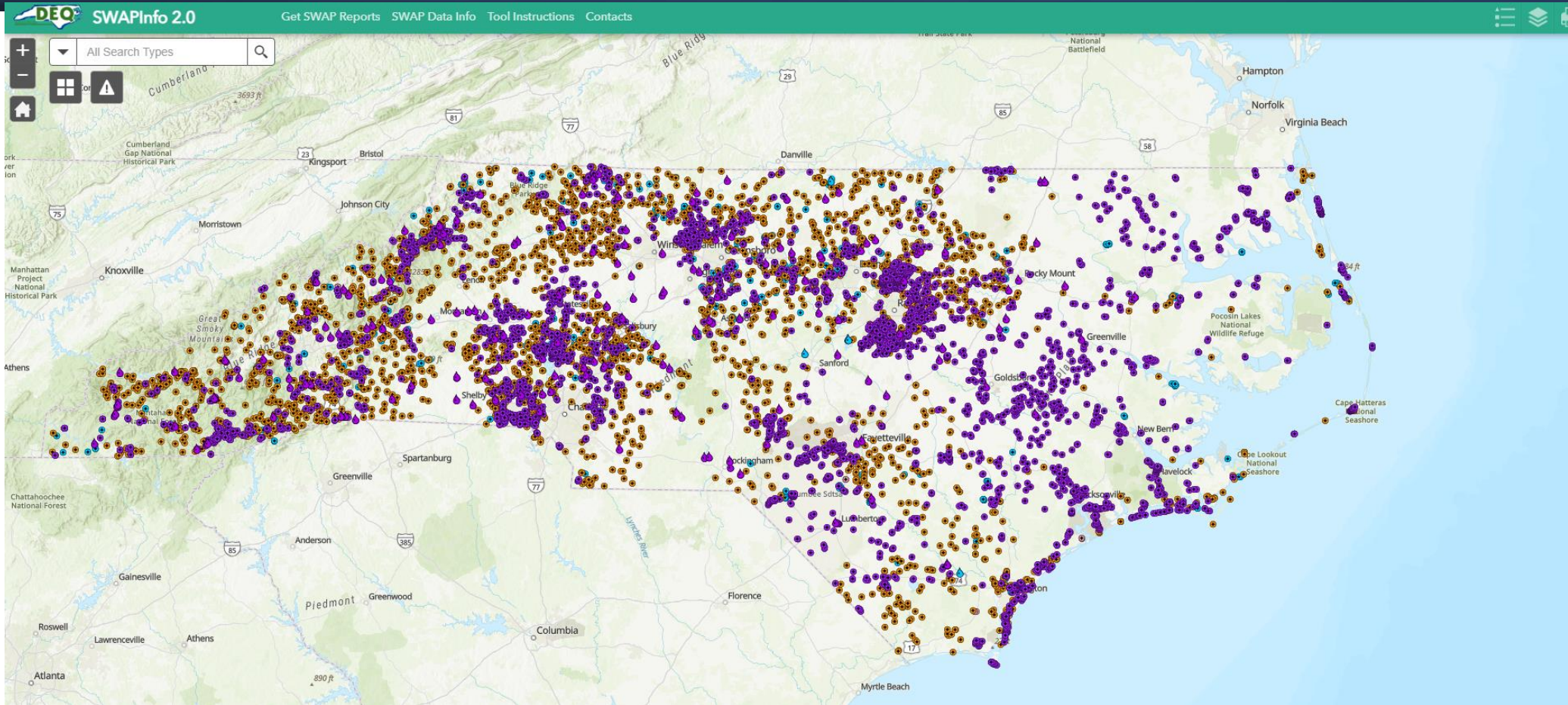
SWAP

SWAP Mapping Application

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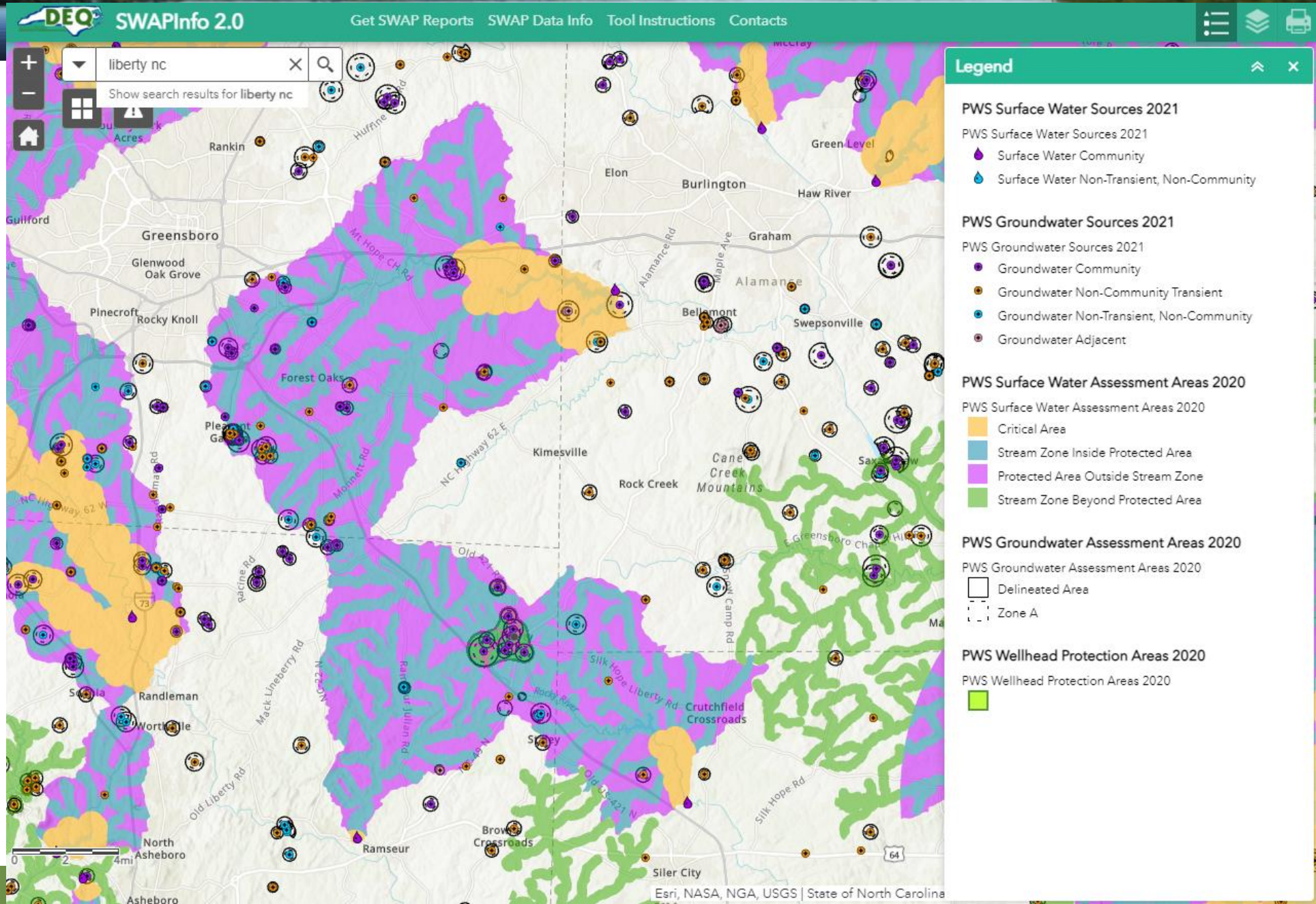
SWAP Mapping Application



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SWAP Mapping Application



SWAP Mapping Application

DEQ SWAPInfo 2.0 Get SWAP Reports SWAP Data Info Tool Instructions Contacts

All Search Types

Legend

- PWS Groundwater Sources 2021**
 - Groundwater Community
 - Groundwater Non-Community Transient
 - Groundwater Non-Transient, Non-Community
 - Groundwater Adjacent
- PWS Surface Water Assessment Areas 2020**
 - Critical Area
 - Stream Zone Inside Protected Area
 - Protected Area Outside Stream Zone
 - Stream Zone Beyond Protected Area
- PWS Groundwater Assessment Areas 2020**
 - Delineated Area
 - Zone A
- All PCS Combined 2019**
 - Animal Operations
 - CERCLA-Fed. Remediation
 - Hazardous Waste Sites
 - Inactive Hazardous Waste Sites
 - NPDES Permits
 - Non Discharge Permits
 - Old Landfill Sites
 - PCB Sites
 - Pollution Incidents

Locate Incident Search Distance (Feet)

Incident Surface Water Sources Groundwater Sources PCS Wellhead Protection Areas

SWAP Mapping Application

DEQ SWAPInfo 2.0 Get SWAP Reports SWAP Data Info Tool Instructions Contacts

LIBERTY, TOWN OF

Show search results for LIBERT...

Legend

- PWS Surface Water Sources 2021**
 - Surface Water Community
 - Surface Water Non-Transient, Non-Community
- PWS Groundwater Sources 2021**
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 - NPDES Permits
 - Non Discharge Permits
 - Old Landfill Sites
 - PCB Sites
 - Pollution Incidents
 - Septage Disposal Sites

4046 Bunton Swaim Rd

Search Distance (Feet): 3000

Closest address: 4046 Bunton Swaim RdLibe...

Incident Surface Water Sources Groundwater Sources PCS Wellhead Protection Areas

SWAP Mapping Application

DEQ SWAPInfo 2.0 Get SWAP Reports SWAP Data Info Tool Instructions Contacts

LIBERTY, TOWN OF

Show search results for LIBERT...

Legend

- PWS Surface Water Sources 2021**
 - Surface Water Community
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 - Septage Disposal Sites

1 Feet: 2534.84
DOLLAR GENERAL #3942
00-0-0000037686
UST Permits

2 Feet: 2750.51
Lowe & Routh
6408349
Tier II Sites

3 Feet: 2759.05
LOWE & ROUTH OIL - HOME ...
13214
Pollution Incidents

DOWNLOAD CSV

Incident Surface Water Sources Groundwater Sources PCS Wellhead Protection Areas

SWAP Mapping Application

SWAPInfo 2.0

[Get SWAP Reports](#)
[SWAP Data Info](#)
[Tool Instructions](#)
[Contacts](#)

× 🔍

Show search results for LIBERTY...

DOWNLOAD CSV

1 Feet: 2534.84
DOLLAR GENERAL #3942
00-0-0000037686
UST Permits

2 Feet: 2750.51
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Tier II Sites

3 Feet: 2759.05
LOWE & ROUTH OIL - HOME ...
13214
Pollution Incidents

Incident
Surface Water Sources
Groundwater Sources
PCS
Wellhead Protection Areas

Legend

PWS Surface Water Sources 2021

PWS Surface Water Sources 2021

- Surface Water Community
- Surface Water Non-Transient, Non-Community

PWS Groundwater Sources 2021

PWS Groundwater Sources 2021

- Groundwater Community
- Groundwater Non-Community Transient
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PWS Groundwater Assessment Areas 2020

PWS Groundwater Assessment Areas 2020

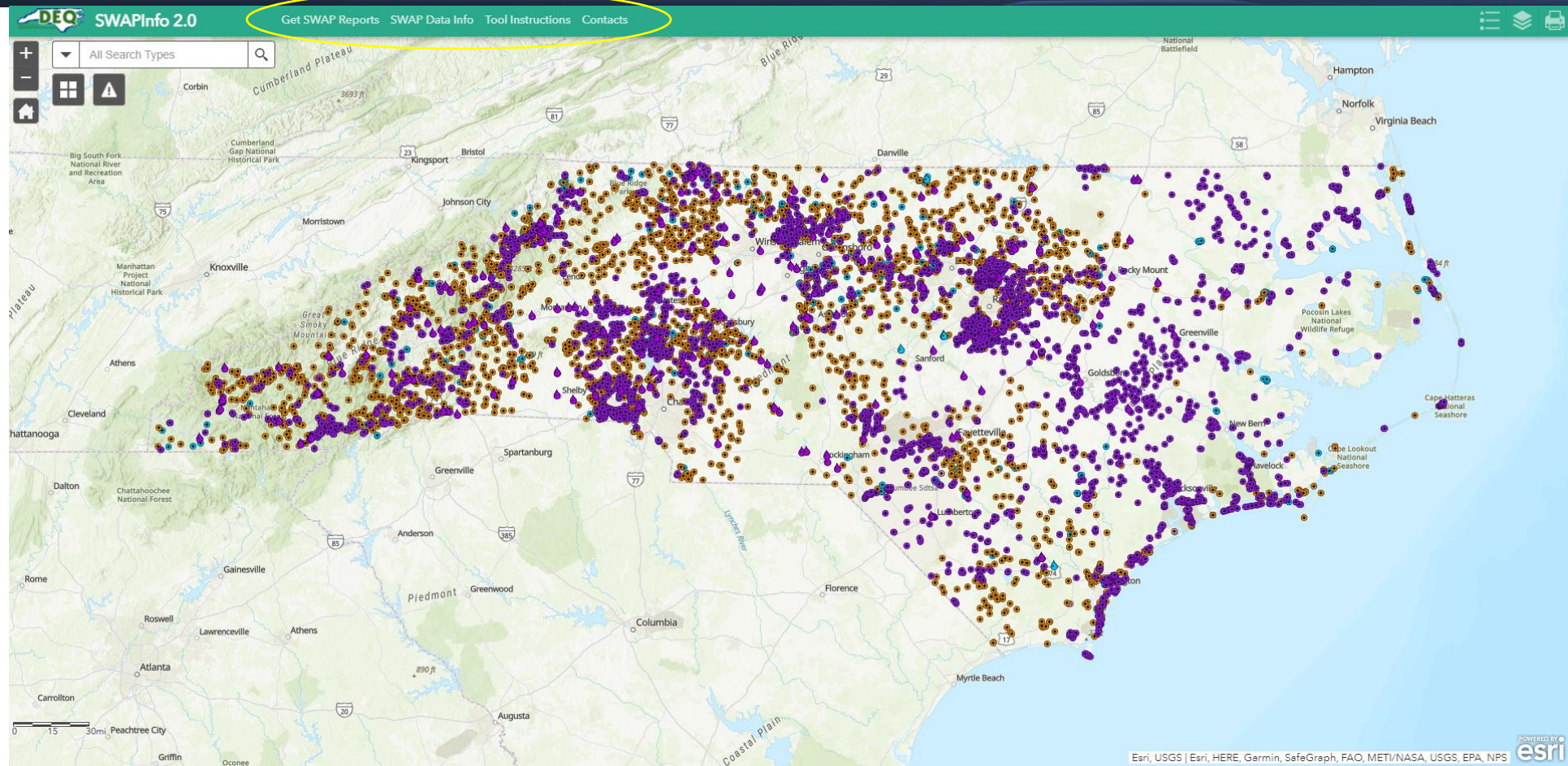
- Delineated Area
- Zone A

All PCS Combined 2019

All PCS Combined 2019

- Animal Operations
- ▲ CERCLA-Fed. Remediation
- Hazardous Waste Sites
- ⊙ Inactive Hazardous Waste Sites
- ▲ NPDES Permits
- Non Discharge Permits
- ⊙ Old Landfill Sites
- + PCB Sites
- Pollution Incidents
- Septage Disposal Sites

SWAP Mapping Application



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Wellhead Protection Program

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- Authorized by SDWA Section 1428 of the 1986 amendments
- NC's Wellhead Protection (WHP) Program received EPA approval on March 28, 1995
- In NC WHP is voluntary and enhances the protections provided by state regulatory programs
- Economic incentives are available

- Public water systems, usually with the assistance of the NC Rural Water Association (NCRWA) or a private consultant, develop their own WHP plan
- The Public Water Supply (PWS) Section contracts with NCRWA to provide assistance with the development of local WHP plans
- NCRWA specialists provide on-site technical assistance to water system owners and operators in the development of local WHP Plans

- The PWS Section established the WHP criteria that local WHP Plans must meet for approval
- The local WHP Plan is submitted to the PWS Section for review and approval
- The PWS Section also provides delineations of Wellhead Protection Areas

Steps to Develop a Wellhead Protection Plan


1. Obtain a copy of SWAP Report
2. Form local Wellhead Protection Planning Team
3. Identify the Wellhead Protection Area for each well or well field
4. Conduct a Potential Contaminant Source (PCS) Inventory
5. Develop Management strategies for each PCS type
6. Develop Contingency plan
7. Plan for the Future – Update WHP Plan at least every 5 years
8. Submit Plan for Approval

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Wellhead Protection Plan Development



- [View the SWAP Brochure](#) 
- [Source Water Assessment Reports](#) 
- [Source Water Assessment Mapping Tool](#) 
- [Original USGS Methodology](#) 
- [USGS Methodology Update - 2009](#) 

Wellhead Protection (WHP) Program

The NC Wellhead Protection (WHP) Program functions to protect groundwater sources of drinking water from contamination. Wellhead protection is simply the protection of all or part of an area surrounding a well from which the groundwater is drawn. The size of this area will vary and depends on a variety of factors, including local geologic and hydrogeologic features. Most communities begin by creating a voluntary Wellhead Protection Plan. These proactive plans identify strategies and concerns unique to each individual location. Our WHP Program staff is prepared to assist your groundwater protection efforts.

- [Learn more about NC's WHP Program](#)
- [Sample WHP Plans](#)

NC Wellhead Protection Plans

- 160 approved plans
- 177 systems covered by plans
- 1,107,248 - population served by systems covered by plans



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Source Water Protection Success Stories



Septic System Repair Programs

Corrective Action
Use a local *septic tank pump hauler* to periodically pump the tank and clean the effluent filter. Check the Yellow Pages or contact the Environmental Health Department for a certified contractor list. For more septic repair, free consultation is available from the Health Department.

Estimated Septic Tank Inspection and Pumping Frequency in Years

Tank Size (gals)	Number of People Using the System				
	1	2	4	6	8
900	11	5	2	1	<1
1,000	12	6	3	2	1
1,250	16	8	3	2	1
1,500	19	9	4	3	2

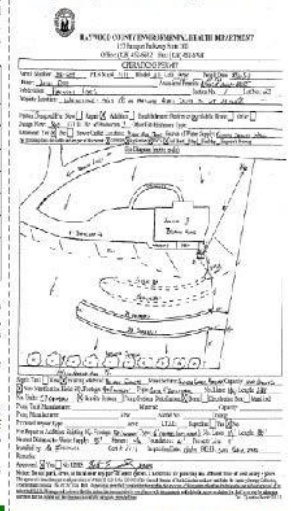
Source: Adapted from "Estimated Septic Tank Pumping Frequencies," by Karen Mabel, 1984 *Journal of Environmental Engineering*, Volume 110

Contacts
Haywood County Environmental Health Department assesses and identifies the system, diagnosing issues, and providing any permits required at NO COST.
157 Parkway Parkway, Suite 300, Clark, NC 28724; 870-452-6582

Haywood Waterways Association encourages protection of the surface waters of Haywood County and provides financial support to repair failing septic systems.
PO Box 389, Waynesville, NC 28786; 828-479-4567; hwa@haywoodwaterways.org

Working to Protect and Improve Our Water Resources for Everyone

Example Permit: Identify and Protect Septic System and Repair Areas



It's Crystal Clear and Starts Right Here... Our Water.
JOIN US...
BE A WATER QUALITY STEWARD.

Septic System Pocket Guide

Many homeowners rely on a septic system for treatment of household wastewater from baths, kitchens and laundry rooms. This wastewater may contain disease-causing germs and other pollutants that must be treated and disposed of underground to protect human health and the environment.

With proper use and periodic maintenance the septic system will safely treat and dispose of waste for many years. This guide provides strategies for long-term use, tips for proper care and what routine maintenance is needed.

Don't Flush
Solids: coffee grounds, dental floss, kitty litter, tampons, cigarette butts, condoms, paper towels, disposable diapers, sanitary napkins


Scum: grease, fats, oils, and limit use of the garbage disposal

Chemicals: paints, varnishes, cleaners, pesticides, drain openers, oils

These items destroy beneficial bacteria




Is Your Septic System Failing You?



Signs of a failing septic system:

1. Pooling water or muddy soil around your septic system or basement.
2. Toilet or sinks backup when you flush or do laundry.
3. Bright green strips over drain field.
4. Odor.

If you think your system is failing, call a professional immediately! Failing septic systems can release harmful bacteria and viruses. If not fixed untreated sewage could find its way into well water or rivers, lakes, and streams.



HAYWOOD WATERWAYS ASSOCIATION
P. O. Box 389
Waynesville, NC 28786
www.haywoodwaterways.org

Don't Ignore Your Septic System



FACT:
One fourth of US homes have septic systems. Each day these septic systems process over 4 billion gallons of waste into the ground.



Tips for keeping your septic system in tip top shape:

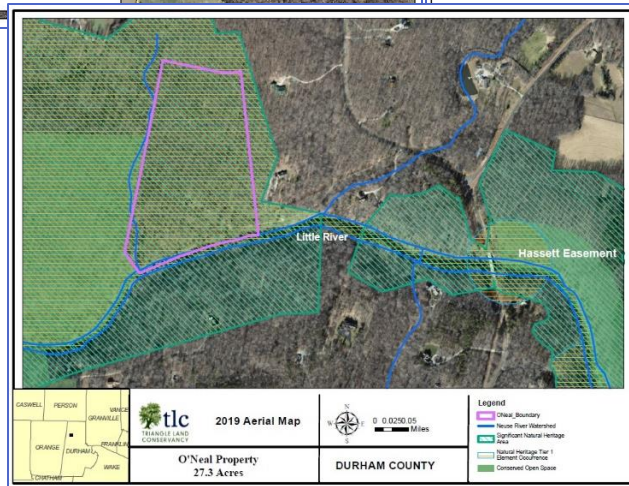
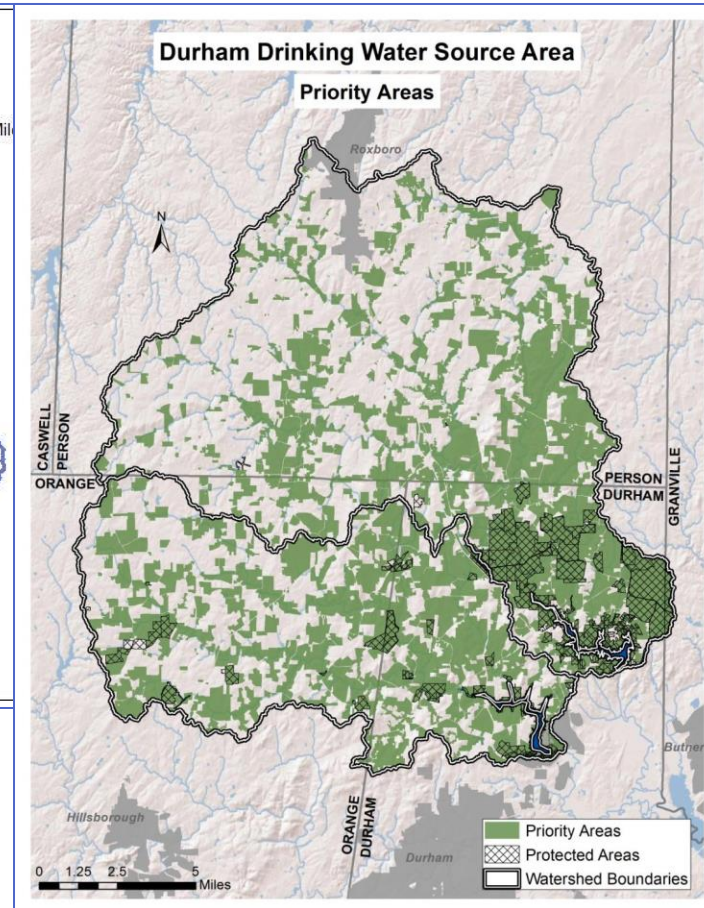
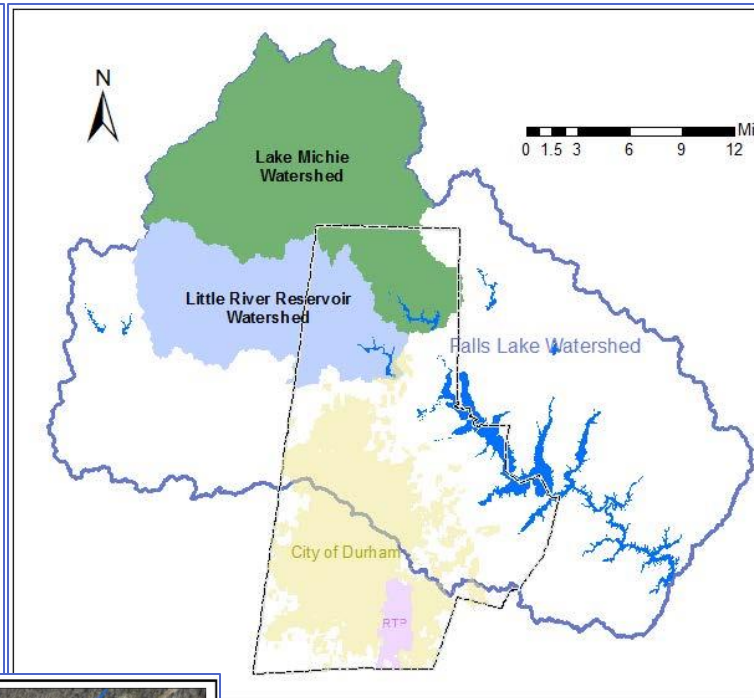
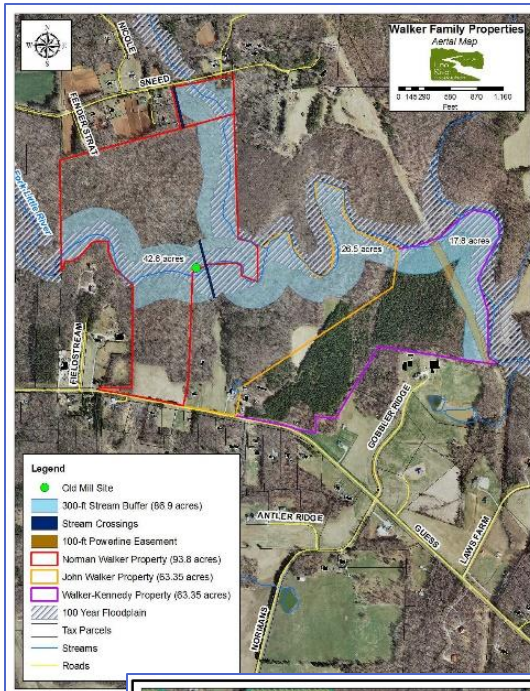
1. **Pump**—Septic systems should be pumped every three years.
2. **Limit Water**— reduce the amount of water use in the home.
3. **Don't Dump**—keep the following items out of the sink: gasoline, oil, pesticides, antifreeze, paint, cooking oil, cooking grease, coffee grounds, or other toxic chemicals that could harm the biological process taking place in the septic tank.
4. **Don't Flush**—keep these items out of the toilet: feminine hygiene products, diapers, cotton swabs, cigarette butts, condoms, cat litter, paper towels or any other items which could clog the septic system.



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Watershed Protection Parcel Prioritization Models



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Mills River Source Water Protection RCPP Project



This project is on the mainstem of the Mills River and on Foster Creek, a direct tributary in Henderson County

- Proposed NRCS Investment: \$730,000
- Lead Partner: Mills River Partnership
- Initial Partners: 11

The project seeks to:

- Protect the source water for 85,000 people in the cities of Hendersonville, Asheville, and surrounding counties
- Restore streambanks
- Reduce sediment and nutrients
- Create a safe system for mixing agrichemicals.

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Thank You!

Brad Whitman

Drinking Water Protection Program Coordinator

Bradley.Whitman@ncdenr.gov

919-707-9076

Danny Edwards

Environmental Program Consultant

Danny.Edwards@ncdenr.gov

919-707-9070



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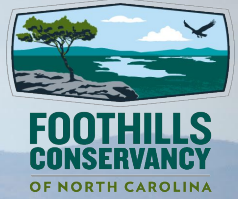
**FOOTHILLS
CONSERVANCY**
OF NORTH CAROLINA

A nonprofit 501(c)(3) land trust that permanently protects land and water through land purchases, donations, and conservation easements.

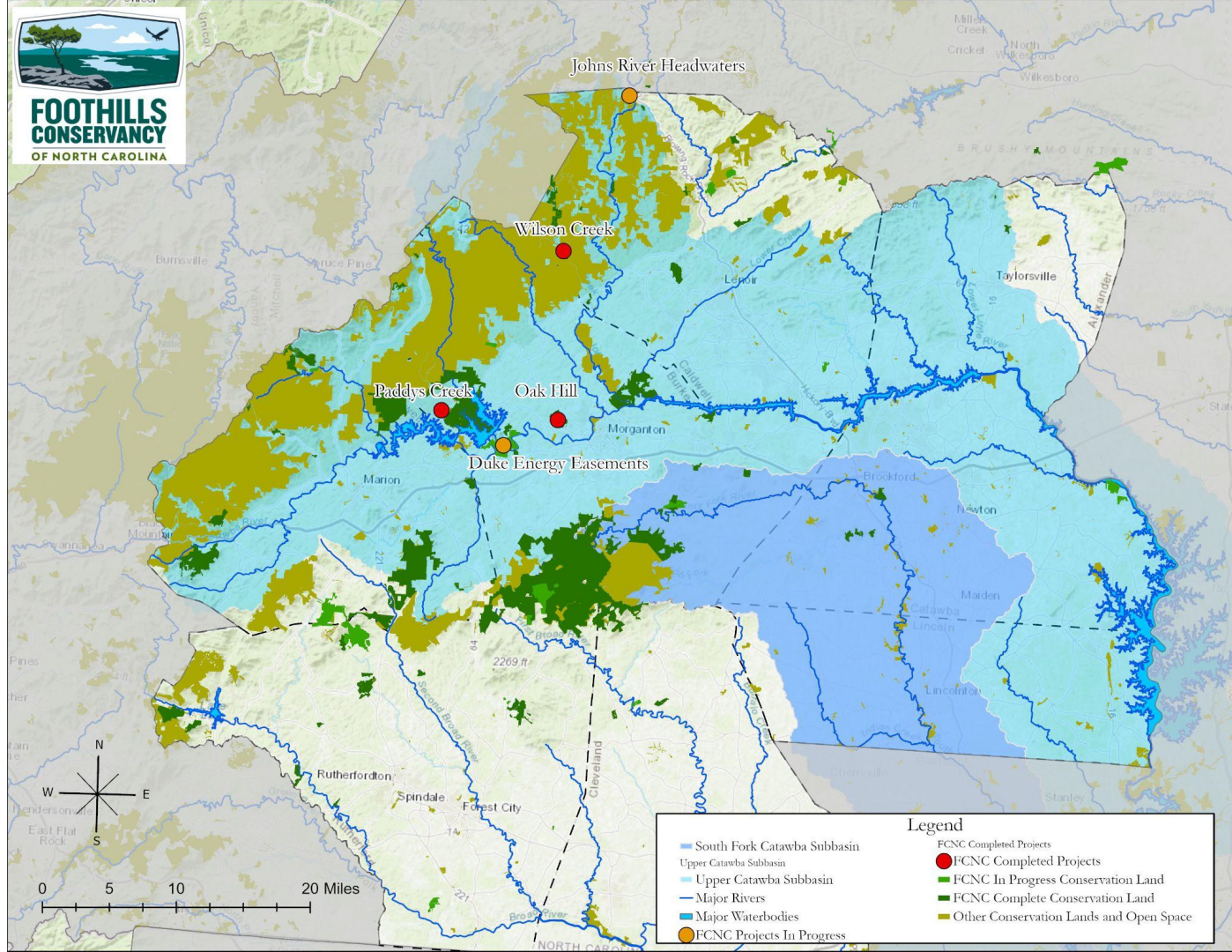
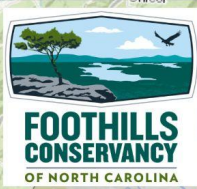
8 counties, 3 major rivers: Catawba, Broad & Yadkin

Focus on protecting clean water, healthy forests, productive farmland, diverse wildlife, securing access to outdoor recreation, and engaging communities that value conservation.

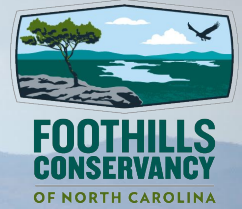
66,016 Acres Permanently Protected Since 1995



- Preserve Lands (acquisition, bargain sale, donation)
- Buy – Hold – Transfer (public lands)
- Acquisition Assist (public lands)
- Conservation Easement (acquisitions & donations)
- Public Trails and Parks

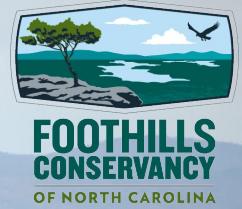


Watershed Protection Values



- Priority Projects in the Catawba River Basin:
 - Headwater tributaries in the Blue Ridge & South Mountains
 - Substantial stream miles, presence of wetlands
 - Significant aquatic habitat (NC NHP), species diversity, fisheries
 - NC DEQ Ratings: ORW, HQW, Trout Waters, 303-d list, WSW
 - National Wild & Scenic River Wilson Creek
 - Impaired 303-d list streams (conservation & restoration)
 - Public access to rivers & streams
- Other Conservation Values: Resilient Landscapes, Outdoor Recreation, Healthy Forests, Rich Biodiversity, Scenic Views, Productive Farms, Wildlife Habitat

Watershed Protection



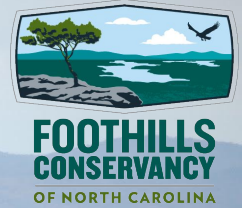
- Riparian Buffer Protection & Upland Conservation Management Practices
 - Intact streamside vegetation
 - 100 - 300 foot buffers (no development)
 - Stream restoration projects
 - Beaver Dam Analog on Canoe Creek
 - Vegetation restoration (& clean-up)



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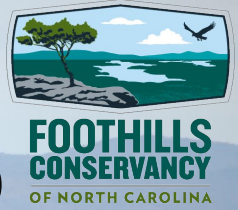
Riparian
Buffer on
Johns River
Headwaters

Partnerships & Funding

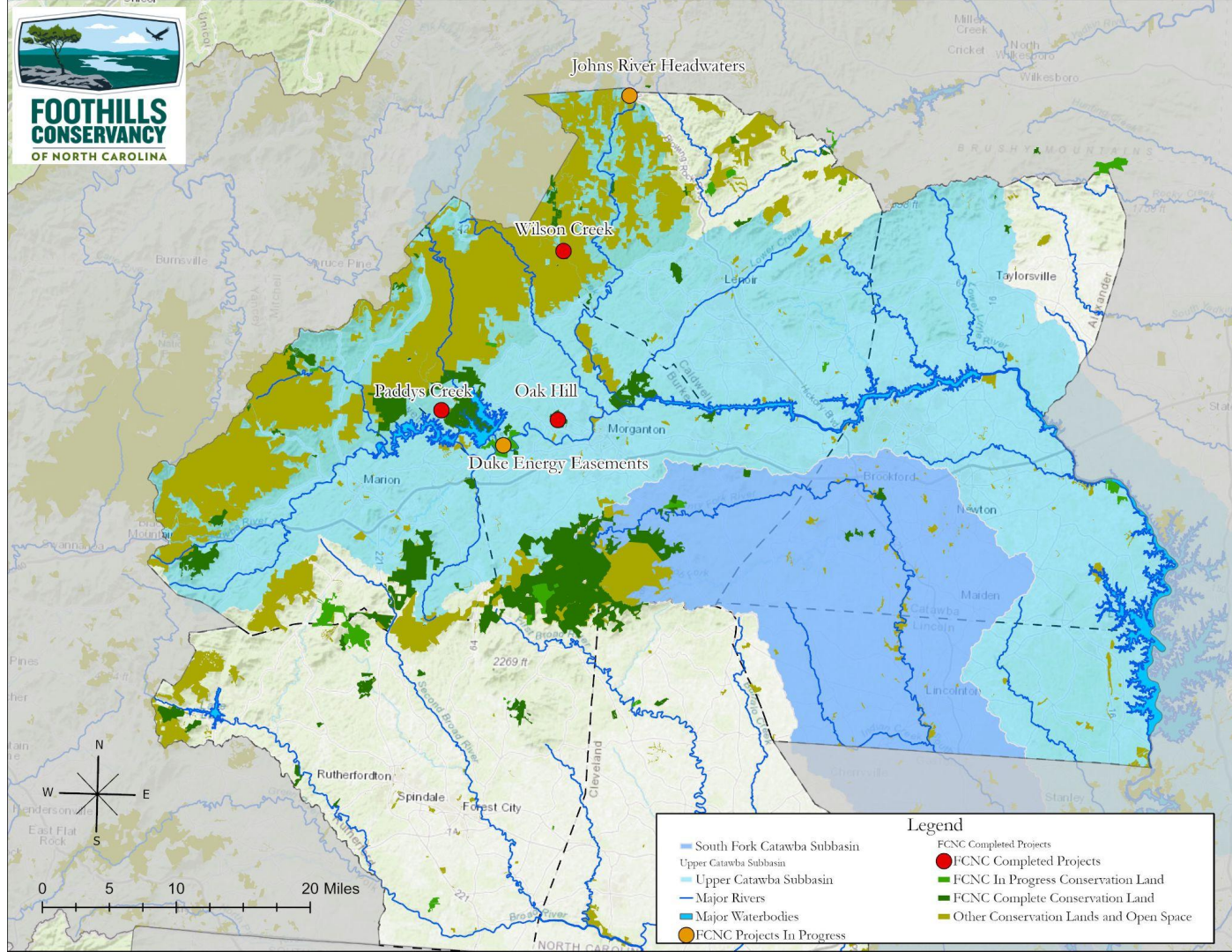
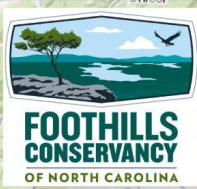


- **Landowners**
- **North Carolina Land & Water Fund**
 - \$150M+ invested in Catawba River Basin for watershed protection
 - Leveraged 3x (or more) by matching funds and donated land value
- **State Natural Resource Agencies**
 - State Parks; WRC; NC Forest Service; NC NHP; NC DEQ;
- **Local Governments**
 - County; Municipal; TDAs; Parks & Recreation
- **Federal Natural Resource Agencies & Funding Programs**
 - USFS; National Park Service; LWCF
- **Other NGOs & Local Groups**
 - Partner land trusts; Catawba Riverkeeper; LJEa; A Clean Wilson Creek
- **Private Philanthropy**
 - Individuals, foundations, families, businesses, corporations

CWWMG & Duke Energy Source Water Protection Partnership

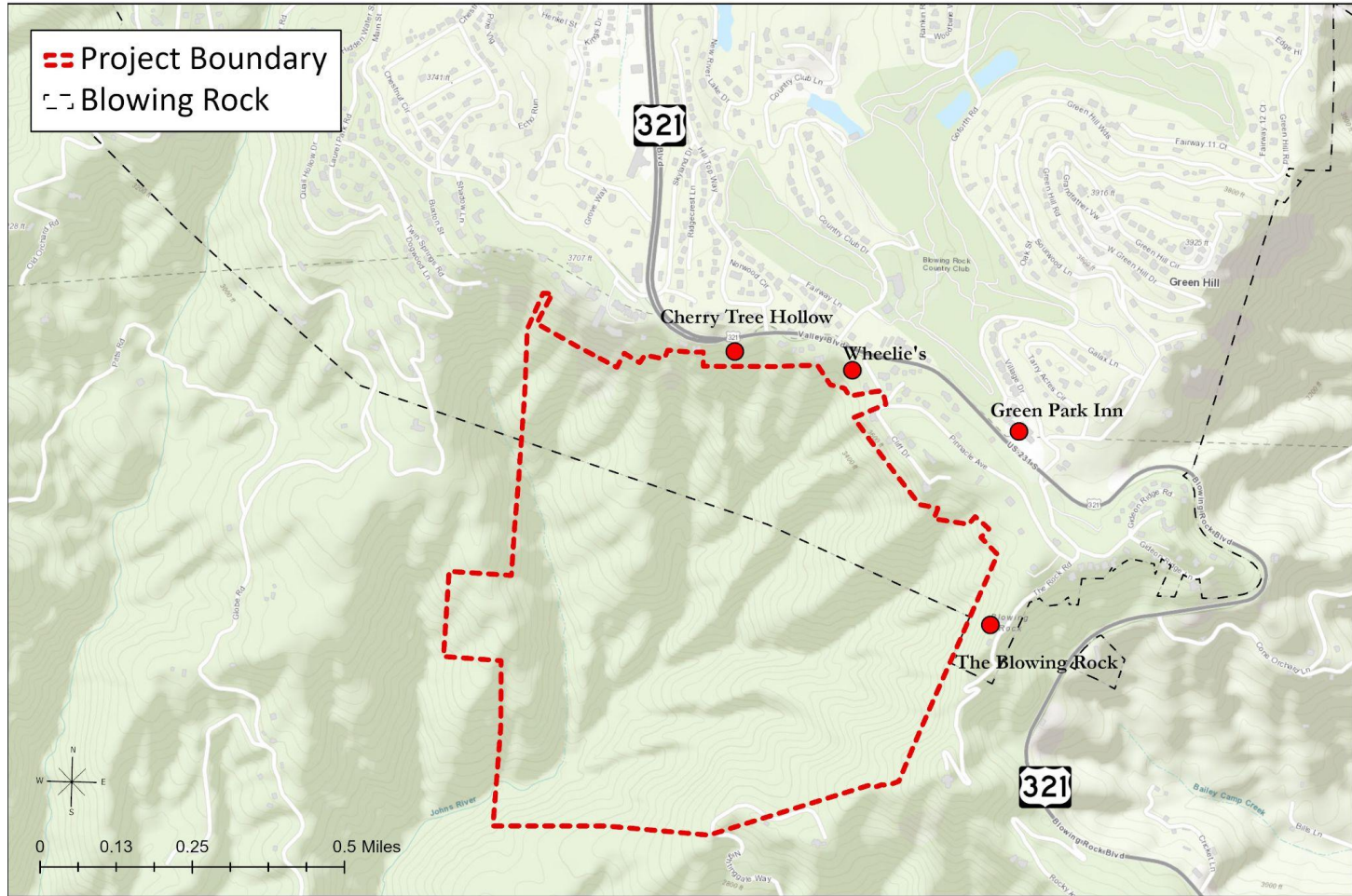


- Quantifying the Potential Benefits of Land Conservation on Water Supply to Optimize Return on Investments
 - Evaluate the extent to which future impacts on water supply can be mitigated through land conservation efforts focusing on geographic “hot spots” within a watershed
- FERC Comprehensive Relicensing Agreement Projects – Duke Energy
 - Duke Energy conservation easements conveyed to FCNC (March 2023)
- Source Water Protection Grant Program funded by CWWMG
 - \$74,000: Wilson Creek (\$40,000); Paddys Creek (\$20,000); Oak Hill Park (\$14,000)
 - Johns River Headwaters - Application Pending



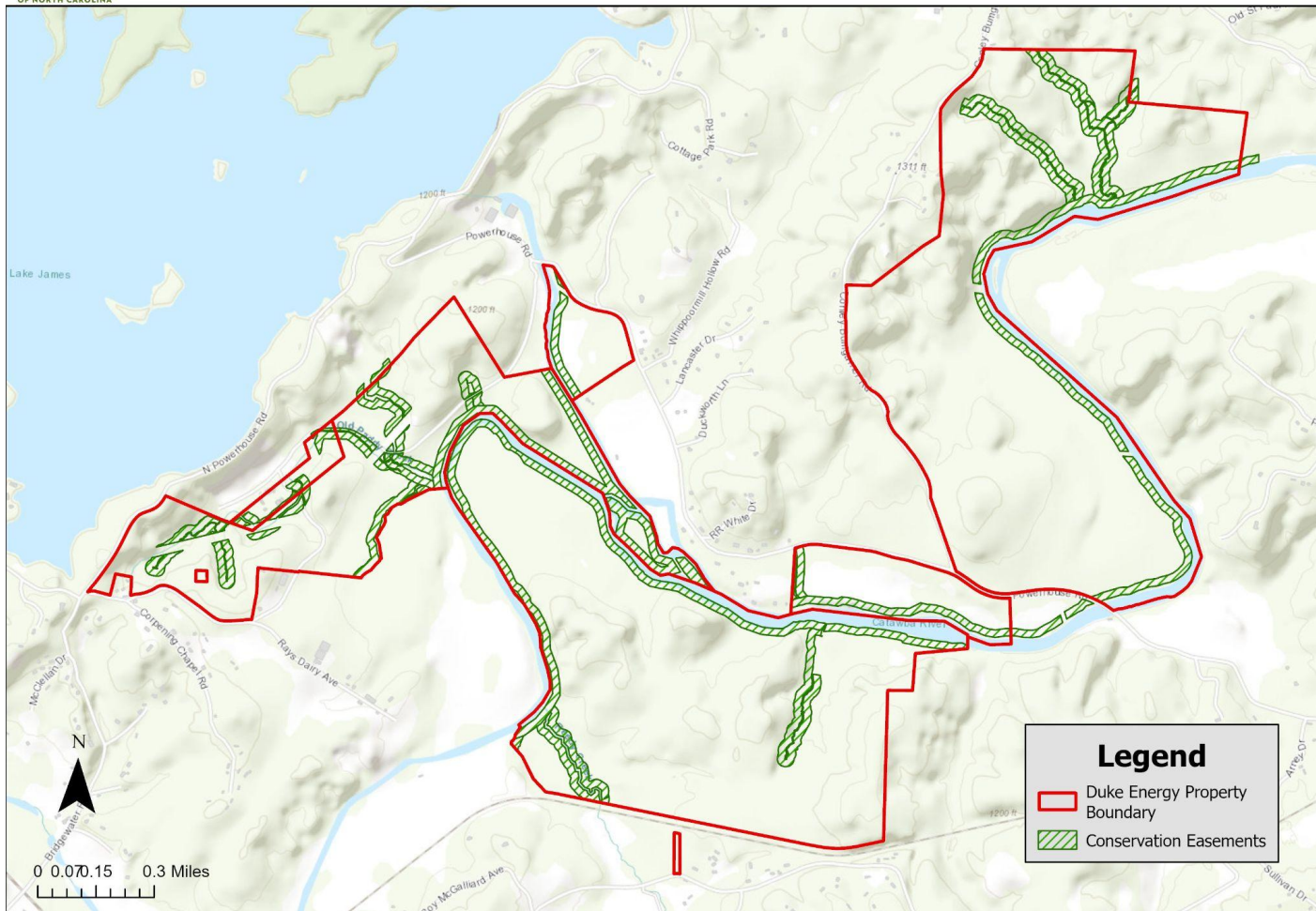


Johns River Headwaters Conservation Project







Duke Energy Conservation Easements, Burke County

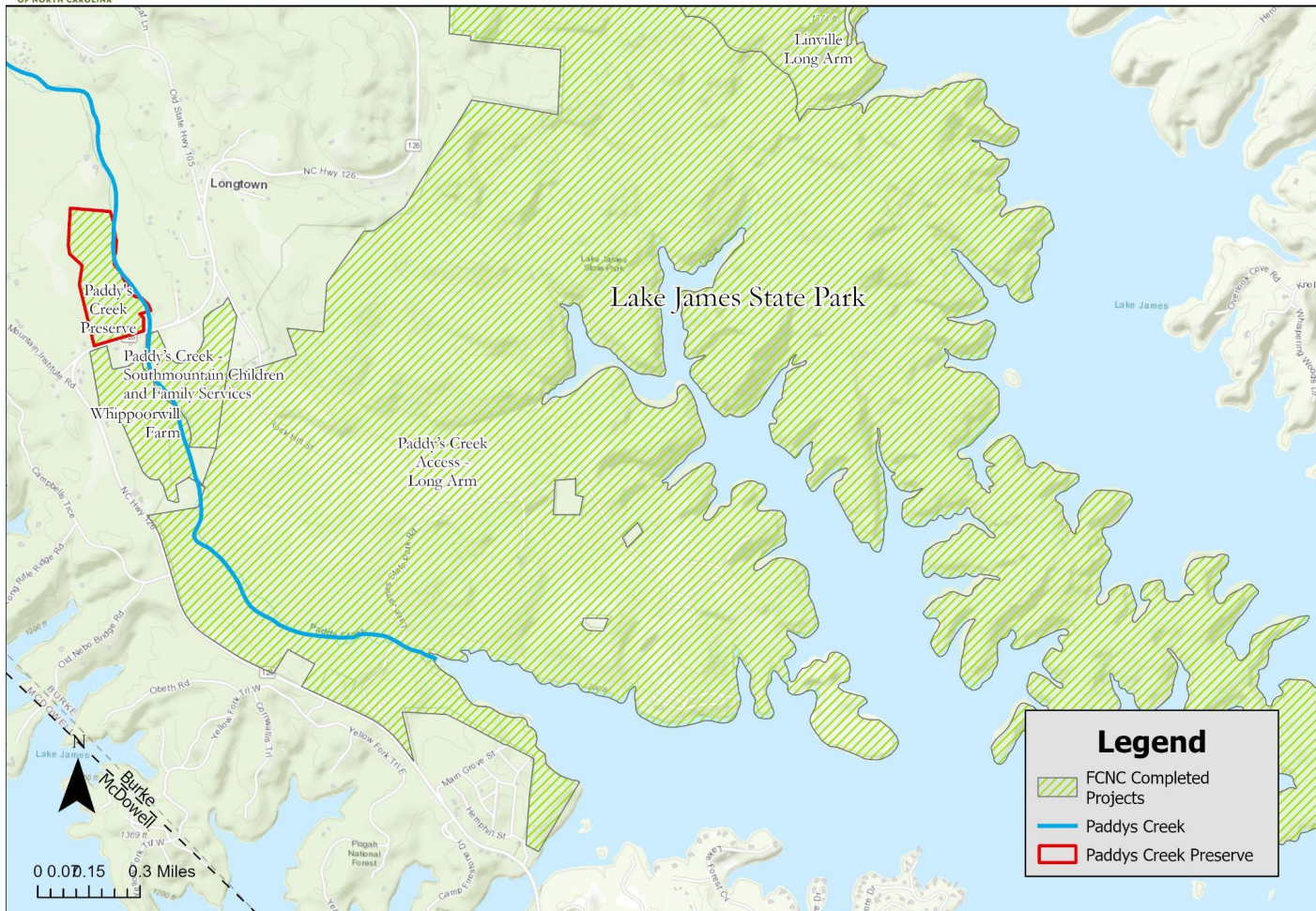


Legend

-  Duke Energy Property Boundary
-  Conservation Easements



Paddy's Creek, Burke County

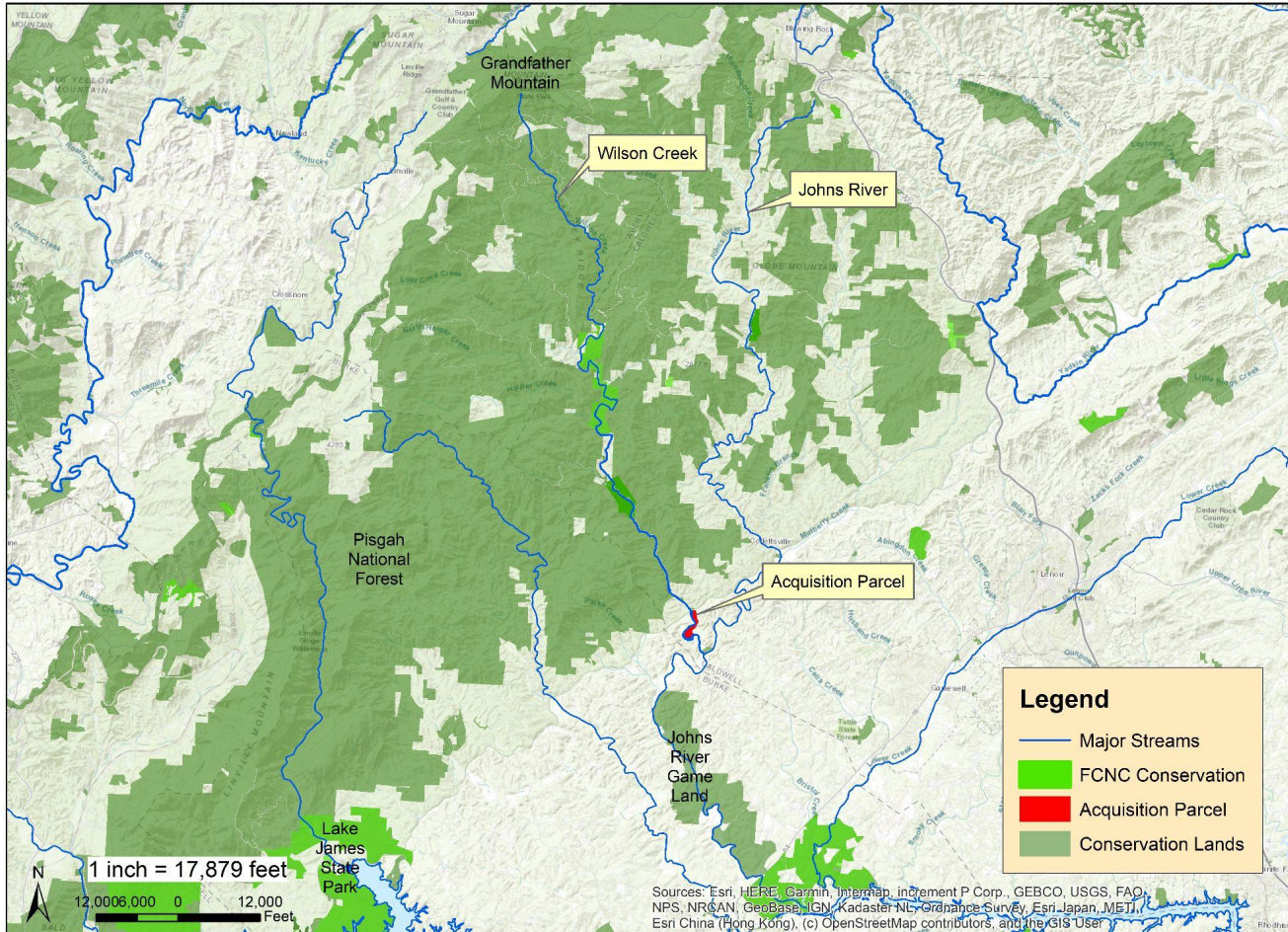


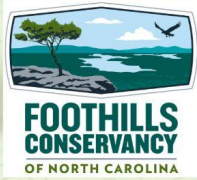
Paddys Creek, Burke County



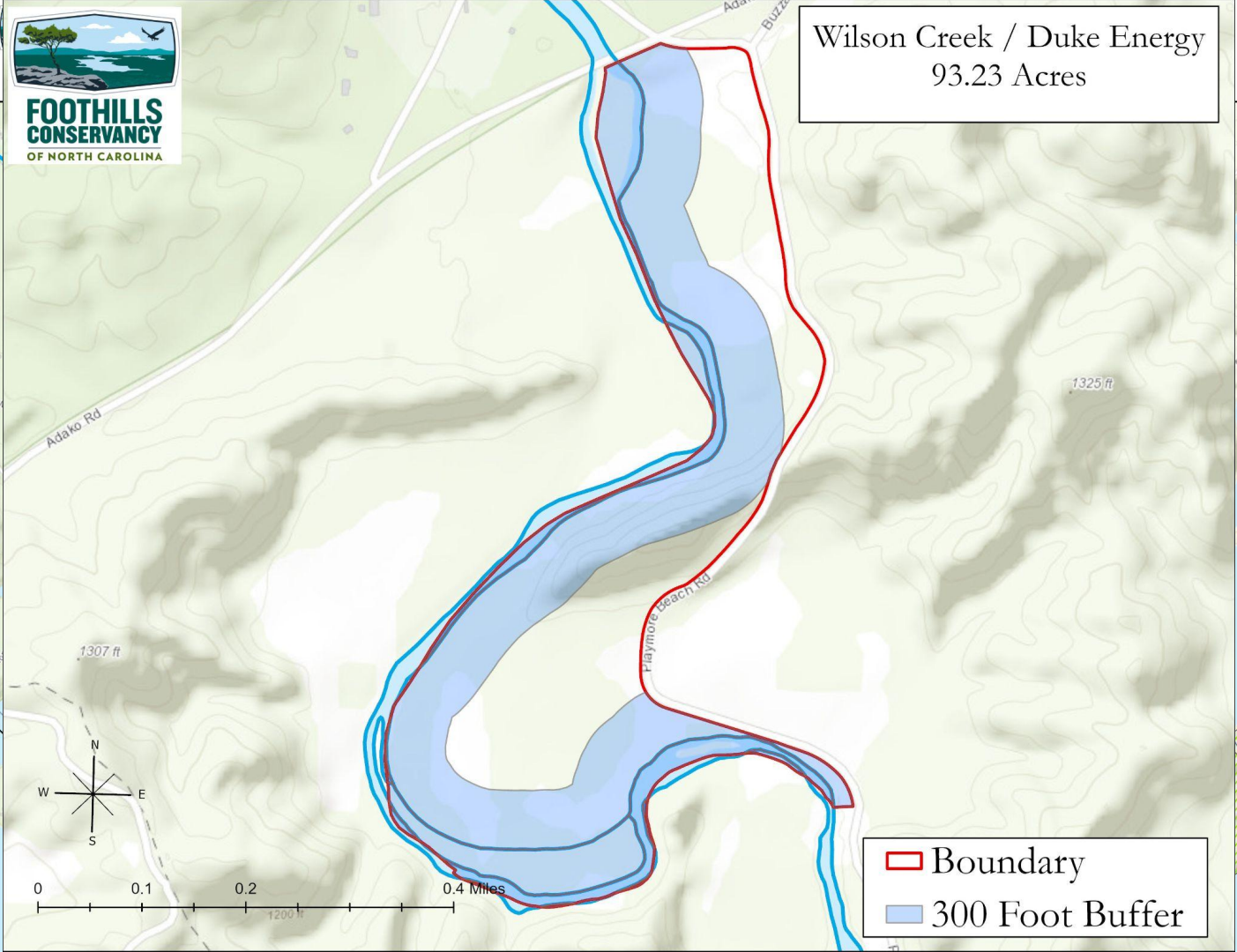
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Wilson Creek Conservation Context Map





Wilson Creek / Duke Energy
93.23 Acres



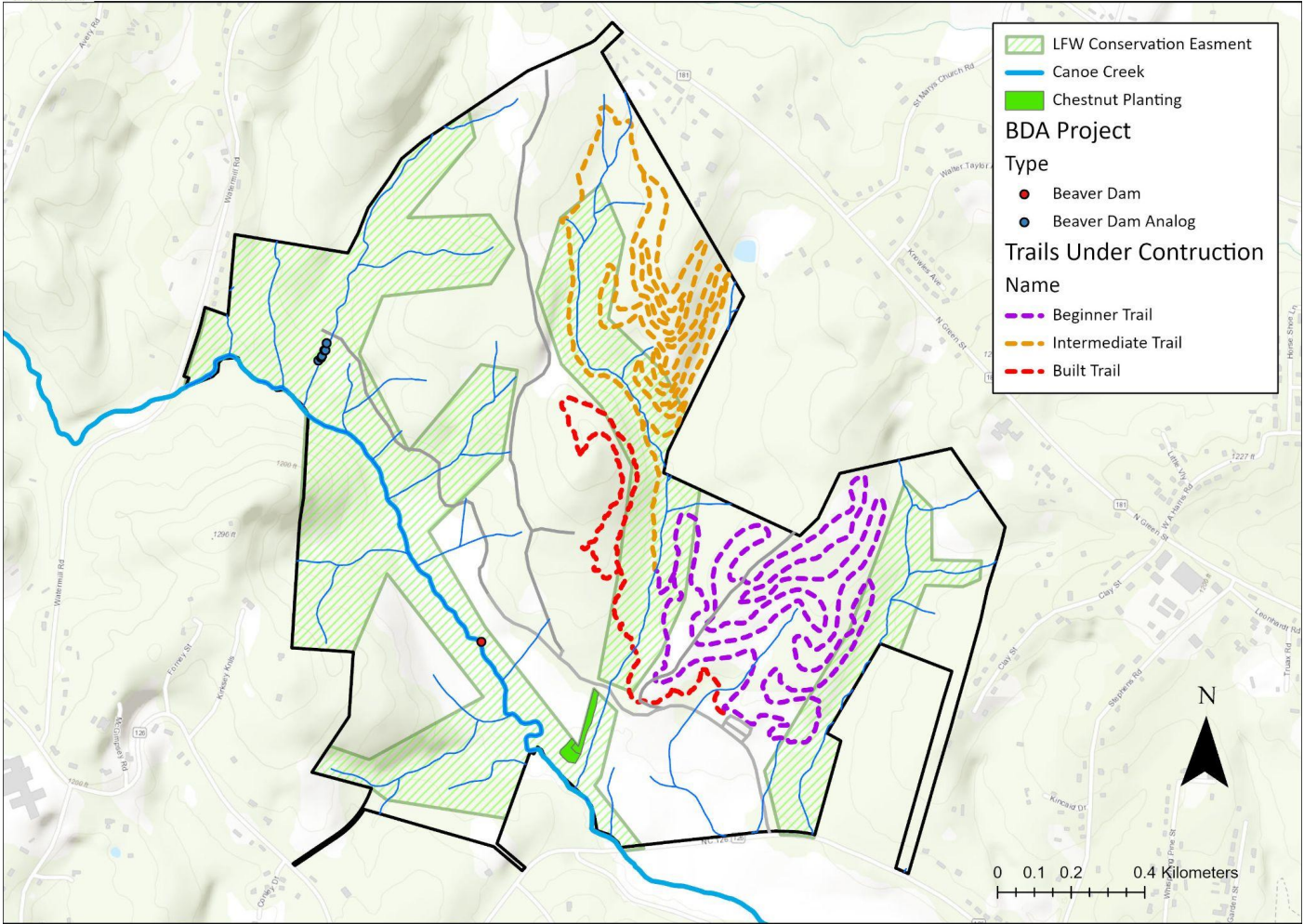
Boundary
300 Foot Buffer

Wilson Creek, National Wild & Scenic River (Duke Energy)





Oak Hill Community Park & Forest



Oak Hill Community Park & Forest



Canoe Creek Oak Hill Community Park & Forest



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www.FoothillsConservancy.org

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