



# RALEIGH WATERSHED PROTECTION PROGRAM

UPPER SWIFT CREEK WATERSHED ASSESSMENT 2015

## Swift Creek Assessment

In 2014, Raleigh's Watershed Protection Task Force made, and the Raleigh City Council subsequently supported, a recommendation to expand the Watershed Protection Program (also known as the Upper Neuse Clean Water Initiative) to include the Upper Swift Creek Watershed. The City had previously supported one project near Lake Benson, but did not have a formal program for work in the Upper Swift Creek Watershed. The recommendation to expand the program formalized the use of watershed protection funds for all of the City's active drinking water supply watersheds. By including the word "active," the program is focused on protecting watersheds currently being used by the City for drinking water.

The Dempsey E. Benton Water Treatment plant is located on 55 acres near Lake Benson. Both Lake Wheeler and Lake Benson provide raw water storage for the plant, which supplies about 25% of Raleigh's treated drinking water. The watershed associated with these two lakes is much more urban than that of Falls Lake. The Upper Swift Creek Watershed is approximately 66 square miles and includes several incorporated areas of Cary, Apex, Garner, and a small portion of the city of Raleigh.

The Benton plant has about a quarter of the capacity of the main E.M. Johnson Water Treatment Plant at Falls Lake, but it provides an important supplemental water source as well as a backup source in case of emergency at the main plant. Given the urbanized watershed and lower raw water quality, the Benton plant has very high treatment standards. The plant, which opened in 2010, holds a LEED Silver Certification, received an Area Wide Optimization Program (AWOP) Award in 2013 and 2014, an AWWA Partnership for Safe Water Director's Award in 2014, and was the first water treatment plant in the state of North Carolina to be granted 3-log *Cryptosporidium* and *Giardia* credit for Ultraviolet Disinfection. Overall, the Benton plant has the capacity to treat water of a lower quality than the E.M. Johnson plant at Falls Lake.

Considering its smaller size and higher percentage of urban cover, fewer conservation projects are likely to be completed in the Swift Creek Watershed than in the Upper Neuse Basin. That said, conservation still is critical to avoid further decline in the water quality in the Benson and Wheeler reservoirs. Moreover, conservation provides opportunities to improve water quality in Swift Creek, which, downstream of Lake Benson, is one of the more biologically-diverse streams in the Piedmont region. Between land protection efforts and high-quality treatment processes, the City of Raleigh will be able to help sustain the ecological and drinking water benefits of this watershed well into the future.

As part of the Upper Neuse Clean Water Initiative Conservation Strategy, a parallel model to the Falls Lake Watershed Protection model was developed and run to update the land conservation priorities for the Swift Creek Watershed. This prioritization used the resources of the Upper Neuse Stakeholder and Technical Team and drew on previous studies of the Swift Creek Basin. By using the same model criteria and ranking system, projects in the Upper Swift Creek Watershed can be evaluated alongside those in the Upper Neuse River Basin.

**Location:** Swift Creek is part of the Neuse River Basin. The basin is home to over 3,000 miles of streams and encompasses 23 counties. The headwaters of the Neuse River Basin are located in the Triangle Area and are heavily impacted by development and urban land uses. The main stem of Swift Creek starts in Cary and flows to its confluence with the Neuse River in Johnston County. Development in the upper reaches of watershed has impacted the water quality of Swift Creek and its associated watershed. This report assesses the upper portion of the watershed from Cary to the dam at Lake Benson, an area that is approximately 66 square miles or 42,362 acres. It incorporates four municipalities, Cary, Garner, Apex, and Raleigh, as well as an unincorporated area of Wake County. The watershed is home to Lake Benson and Lake Wheeler, drinking water supply reservoirs for the city of Raleigh and other municipalities supplied by city of Raleigh.

**Previous efforts:** While small, the Upper Swift Creek Watershed has been extensively studied. Past studies and reports that have helped guide work in the watershed and informed this assessment include:

1. Upper Swift Creek Biological Assessment Report, NCDENR (2002)
2. Wake County Watershed Management Plan, CH2M Hill (2002)
3. Wake County Open Space Plan, Wake County (2006)
4. Upper Swift Creek Local Watershed Plan, Ecosystem Enhancement Program (2005)
5. TMDL for Addressing Impaired Biological Integrity in the Headwaters of Swift Creek (2009)
6. Water Recovery Program, Cary Stormwater (2012)
7. Swift Creek Rapid Conservation Assessment, Triangle Land Conservancy (2012)

**Methods:** The goal of this assessment was to identify and rank conservation areas in the Upper Swift Creek Watershed based on four main goals and twelve criteria (Figure 1.0). The assessment identifies the highest priority conservation tracks for water quality. Although, with some re-interpretation, the model could be used to identify restoration opportunities, that is beyond the scope of this assessment. The 2005 Upper Swift Creek Local Watershed Plan provides an atlas for restoration opportunities and serves as a good resource for restoration work. This assessment used the same methodology described in the Upper Neuse Clean Water Initiative 2015-2045 Conservation Strategy, available upon request from the Upper Neuse Initiative.

**Results:** Each 30\*30 meter cell in the watershed received a score ranging from 0-10. The mean score for the entire watershed was 4.26. For a project to be eligible to be considered for funding from the city of Raleigh’s Watershed Protection Program, the

area submitted for funding must have an average value of 4.2 and be within 50 feet of a water conveyance (stream, wetland, lake). This is the same criteria used to prioritize projects in the Upper Neuse Watershed. By using the same system, eligible projects in the Upper Neuse and Swift Creek can be evaluated side-by-side.

**Map legend:** This map shows the areas that rank above 4.2 (Figure 1.1). Similar to the findings of the 2012 Swift Creek Rapid Assessment, the majority of the high value areas are located in the middle and lower portions of the watershed, outside of incorporated areas, where there is greater forest cover and less impervious surface. Approximately 5,000 (4,928) parcels totaling 17,000 acres or 40% of the watershed could be eligible for funding through the Watershed Protection Program. However, about 300 of these parcels are 10 acres or larger, totaling about 10,000 acres or 24% of the area, and would be the best candidates for future conservation projects to benefit water quality.

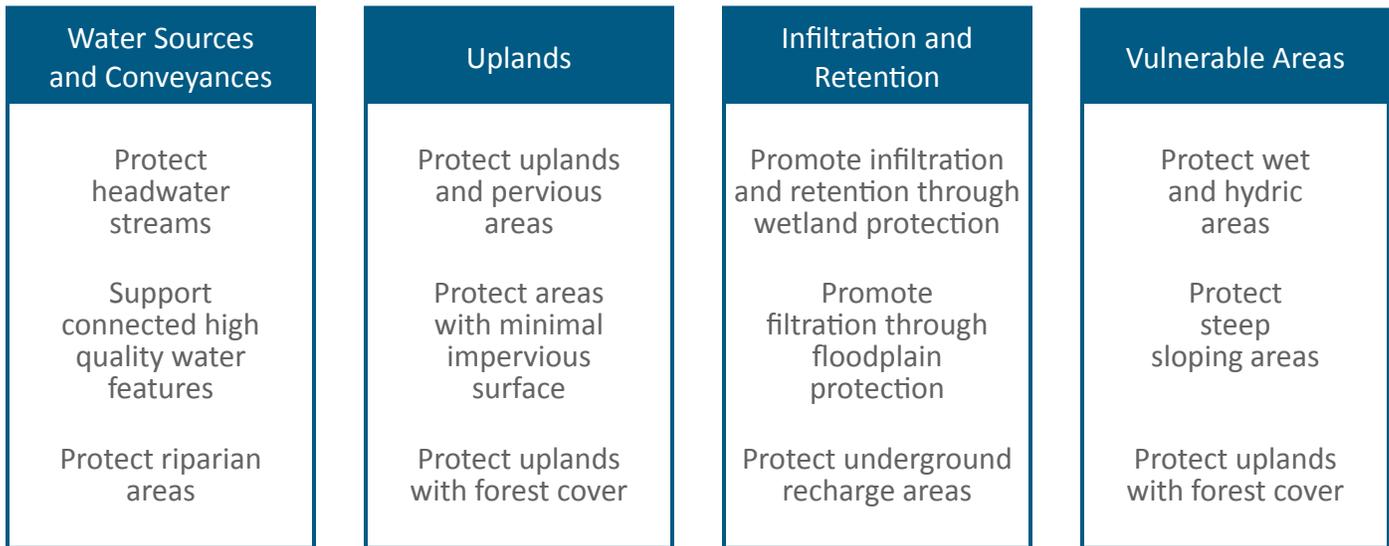
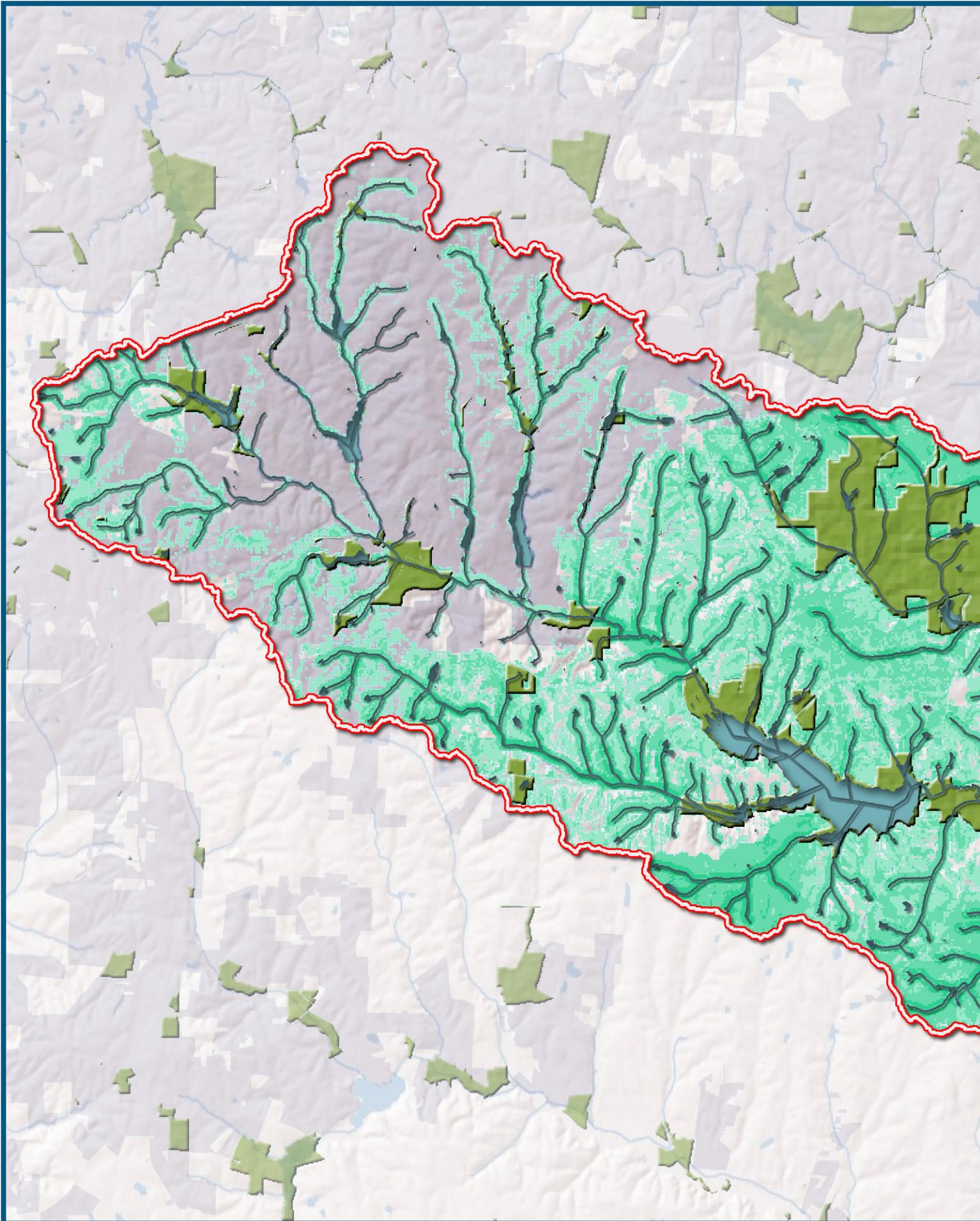
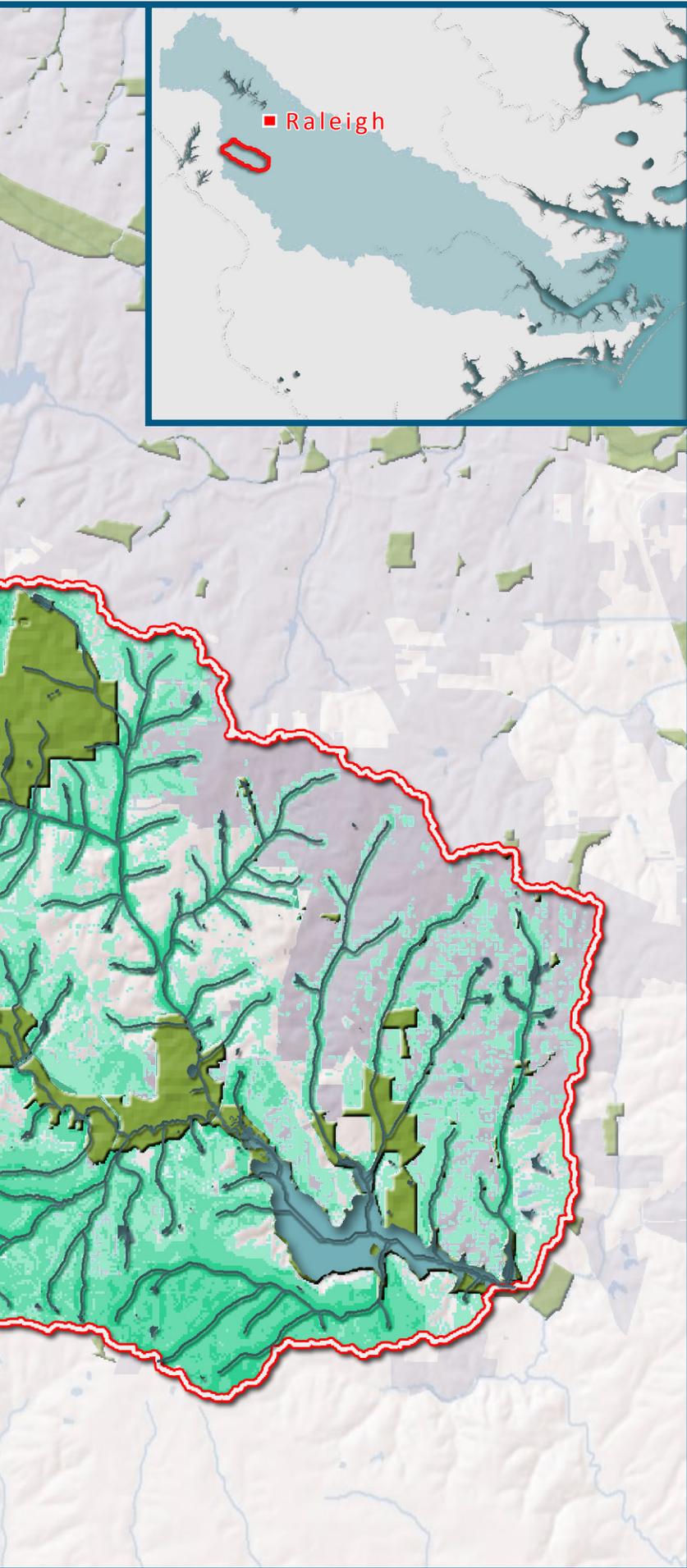


FIGURE 1.0: Watershed Protection Model Goals and Objectives





THE  
CONSERVATION FUND



TAR RIVER  
LAND CONSERVANCY

FIGURE 1.1: Land Conservation Strategy Map

## UPPER SWIFT CREEK: CONSERVATION STRATEGY

2015 MODEL RESULTS

### LEGEND

-  Streams
-  Upper Swift Creek
-  Managed Open Space
-  Municipal Boundaries
-  Lakes
-  Watershed Model Score

0



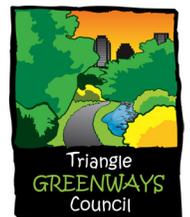
3.2



MILES



# THE CONSERVATION FUND





THE  
CONSERVATION FUND



The City of Raleigh  
PUBLIC UTILITIES DEPARTMENT