

# CHAPTER 1: INTRODUCTION

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## 1.1 OVERVIEW

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Watershed restoration presents a variety of special challenges. One challenge is that restoration requires changes (e.g., repairs, retrofits) to the existing condition rather than an effort pursued originally when a site is developed. Restoration therefore is typically contingent on voluntary cooperation. It is usually more difficult and expensive to retrofit a site relative to inclusion in the original planning, design, and development. Additionally, funding and financing of retrofits can be difficult, without a strong rationale for profitability on the private side, and limited capacity on the public side. It is also more difficult to achieve broad commitment without compelling incentives (carrots), penalties (sticks), and/or a paradigmatic shift. Ultimately, ecological or watershed restoration requires a heightened collective understanding of the harm occurring, valuing of improvement, commitment to reduce the harm, and the ability to follow through with responsible action. In this regard, restoration is fundamentally different than conservation or preservation, which attempt to maintain and protect an ecosystem from harmful future impacts. Obviously, restoration efforts that are ignorant of the need for protection from future impacts are a recipe for failure. Optimally, restoration is also framed in a way that enhances other community values such as enjoyment of place, cultural identity, prosperity, and other measures of human health and well-being.

Recognizing this context for restoration, this Watershed Restoration Plan has also been shaped by several practical influences. The first is EPA's nine key elements of watershed restoration planning that are prerequisites for receiving federal funding for watershed restoration. Specifically, this plan is a required deliverable that must address these elements under an EPA grant being administered by the Town of Chapel Hill, in collaboration with members of the Bolin Creek Watershed Restoration Team. The second influence is a series of studies within the past decade that have lent insight into the condition of the watershed and improvement opportunities. In addition, the approach is geographically oriented around smaller subwatersheds. These sources of guidance and structure are briefly discussed below and more fully developed in the remainder of the plan.

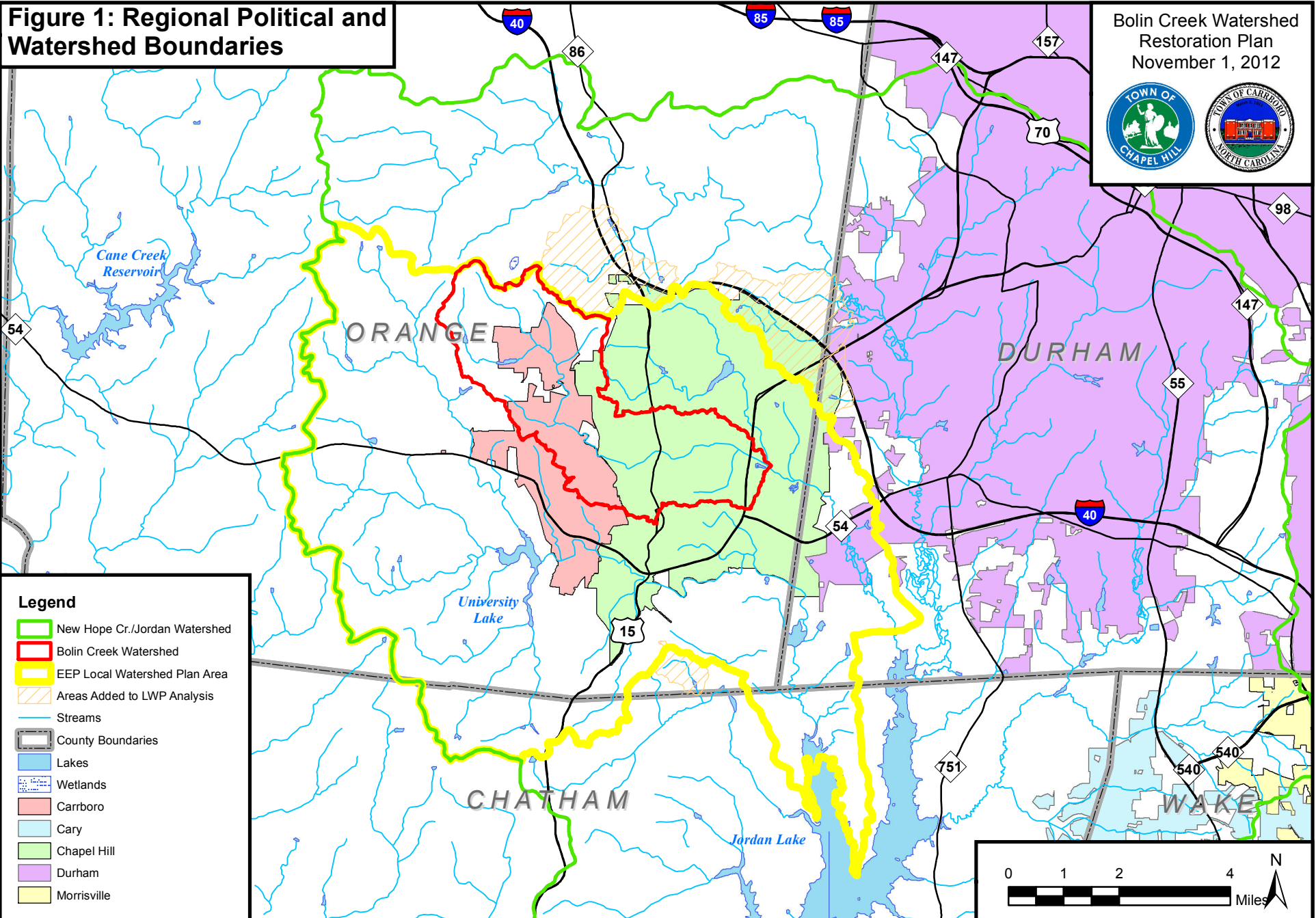
## 1.2 BACKGROUND

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Bolin Creek is one of the major streams draining southern Orange County, as it drains 12 square miles in carving a path through the heart of Carrboro and Chapel Hill (Figure 1). Bolin Creek's headwaters rise to the west of NC Old 86, just north of Carrboro. Moving downstream, the watershed transitions from rural to suburban to urban. Bolin Creek is a major tributary to Little Creek, eventually flowing to Jordan Lake.

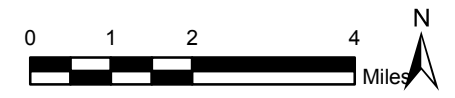
**Figure 1: Regional Political and Watershed Boundaries**

Bolin Creek Watershed  
Restoration Plan  
November 1, 2012



**Legend**

- New Hope Cr./Jordan Watershed
- Bolin Creek Watershed
- EEP Local Watershed Plan Area
- Areas Added to LWP Analysis
- Streams
- County Boundaries
- Lakes
- Wetlands
- Carrboro
- Cary
- Chapel Hill
- Durham
- Morrisville



The local community has a fond relationship with the creek, and at the same time, a growing body of evidence over the past several decades has documented that the aquatic life of Bolin Creek and its tributaries is threatened and impaired from the human activity occurring within its watershed. The details of the harm that has occurred are discussed to a limited degree in this plan, and more thoroughly in studies referenced herein. The causes of the impairment are both simple—land disturbance and development—and complex: alterations in hydrology, erosion and sedimentation, introduction of toxic contaminants and other pollutants, and habitat disruption. The bottom line is that the concern is also an opportunity for restoring the creek to a healthier status.

Staff from the Carrboro Planning Department, Chapel Hill Stormwater Management Division, the North Carolina Department of Environment and Natural Resources (DENR), and the US Environmental Protection Agency (EPA) began meeting in April 2006. Together these organizations formed the Bolin Creek Watershed Restoration Team (BCWRT) to participate in EPA’s Watershed Restoration Program in restoring and enhancing Bolin Creek and its tributaries, and invited other local staff to participate.

In 2008, the Towns received a 319 grant that included several restoration elements, including small stream restorations, installation of stormwater retrofits, and the creation of a Watershed Restoration Plan in the mold of EPA’s 9-element watershed plans. This was undertaken with the understanding that future grant funding was largely contingent on a coordinated, targeted, well-supported approach to restoring Bolin Creek Watershed, as would be presented in the Plan.

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### 1.3 EPA’S NINE ELEMENTS OF WATERSHED RESTORATION PLANNING

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EPA requires that watershed plans address “nine elements” in developing a restoration plan that is funded using 319 funds. 319 refers to the section of the Clean Water Act that allows EPA to fund nonpoint source activities such as technical and financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. These nine elements include:

1. An information/education component to enhance public understanding of the project and increase public participation. (Chapter 4)
2. A monitoring component to evaluate the effectiveness of the implementation efforts over time measured against the criteria. (Chapter 6)
3. An identification of the causes (stressors) and sources or groups of similar sources that need to be controlled to achieve pollutant load reductions estimated in the watershed. (Chapter 3, Appendix 3)
4. An estimate of the improvements associated with the chosen management measures. (Chapter 5)
5. A description of the measures that will need to be implemented to achieve load reductions as well as to achieve other watershed goals identified in the watershed based plan.(Chapter 4, Chapter 5, Appendix 4, Appendix 5)
6. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made towards attaining water quality standards. (Chapter 6)
7. An estimate of the amount of technical and financial assistance needed, associated costs and or sources, and authorities that will be relied upon, to implement the plan. (Chapter 6)

8. A schedule for implementing the NPS management measures identified in this plan that is reasonably expeditious. (Chapter 6)
9. A description of interim, measurable milestones to track progress in achieving restoration goals. (Chapter 6)

The location in this Watershed Restoration Plan where these elements can be found is listed in parentheses after every element.

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#### 1.4 RELATIONSHIP TO REGULATORY EFFORTS

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The initiative has initially focused on hydrologic modification and habitat degradation by addressing some of the primary causes of these stressors including streambank and streambed erosion, disconnection from stream floodplains, sedimentation, scour, thin/absent/bypassed forested riparian buffers, the “flashy” nature of urban streams, very low base flow, and the effects of stream crossings. One note is that water quality issues related to toxins and nutrients have not thus far been a focus of this initiative, as toxic concerns are being addressed primarily through the Towns’ respective Illicit Discharge Detection and Elimination programs as part of their municipal stormwater permits and nutrients are being addressed primarily through the implementation of the Jordan Lake rules. However, through development of the Plan it has become apparent that addressing pollutants will be important to recovering Bolin Creek’s natural functions, but will also be easily combined with other restoration efforts.

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#### 1.5 WATERSHED RESTORATION GOALS

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The Bolin Creek Watershed Restoration Team has developed the following goals to guide the development and implementation of this plan.

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##### ECOLOGICAL GOALS

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- Restore aquatic and riparian habitat in the watershed—in areas where impacts have occurred, implement projects that will provide measurable improvement to habitat in the stream and riparian system.
- Improve water quality in the watershed—implement management strategies that will improve water quality in Bolin Creek so it can support its designated use.
- Reduce nutrients reaching streams and Jordan Lake. Jordan Lake is a critical resource to the region for both drinking water supply and recreation.
- Protect lands critical for habitat and water quality by protecting riparian buffers, floodplains, wetlands, and steep slopes.
- Improve the ability of vegetated buffers to serve as water quality filters by establishing diffuse flow and correcting situations with concentrated flow that bypasses the buffer.

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##### SOCIAL GOALS

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- Improve natural conditions for people living in the watershed. Identify and pursue opportunities to improve human use of managed natural areas and trails. Improve

aesthetics, and reduce impacts from erosion and flooding where these objectives align with the protection of water quality and habitat functions.

- Foster community stewardship of the watershed. Educate and involve the local community in the ongoing implementation of the plan, and long-term stewardship of the watershed.
- Enhance education and outreach by increasing capacity and establishing a program that engages the community. Implement a program in all public schools.
- Encourage restoration through financial and social incentives. Create a defined community response and participation system. Actively promote incentive programs to reach the community. Increase the sharing of responsibility for restoration efforts between more centralized government agencies to more distributed public, private, nonprofit, and grass roots organizations and individuals. Maximize collaborative opportunities and partnerships.

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## IMPLEMENTATION GOALS

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- Monitor plan implementation progress on a schedule that allows identification and funding of new projects as appropriate for capital improvements programs, annual budgets, and other funding opportunities.
- Identify and prioritize restoration opportunities that have the greatest opportunity of resulting in demonstrable improvements in aquatic health. Prioritize opportunities based on effectiveness, feasibility, and cost.

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## 1.6 PLAN FRAMEWORK/STRUCTURE

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The plan is divided into the following components:

This Introduction that presents the overview, purpose and scope, vision, and guiding principles of this plan (Chapter 1).

A characterization of the natural and cultural features of Bolin Creek (Chapter 2)

An analysis and summary of findings about the watershed health, stresses, and causes and sources of impairment (Chapter 3).

Watershed stewardship recommendations that are seen as a cornerstone of restoration progress. (Chapter 4).

Methods for stormwater retrofits, buffer restoration, and stream repair, as well as protection from future impacts (Chapter 5).

Implementation recommendations that identify steps, responsible parties and roles, schedules and milestones, funding and technical assistance needs, monitoring, and plan evaluation (Chapter 6).

Appendices on local environmental policies and programs, local environmental agencies and organizations, stressor sources, source alternative behaviors, selected management practices, and details of a watershed restoration projects database.