

Executive Summary

Bolin Creek and its surrounding forest is a highly-valued community resource which provides recreational opportunities, increases economic value, presents research opportunities, and hosts a vibrant flora and fauna that depend on the health of a stream under increasing duress. The creek itself is part of the network of streams feeding Jordan Lake, a drinking-water supply for many towns and cities in the Triangle area of North Carolina.

In recent decades, Bolin Creek has unfortunately witnessed a deterioration in stream quality, aquatic ecosystem health, and wildlife habitats on the land surrounding the creek. As Chapel Hill and Carrboro continue to urbanize, it is essential to continue to monitor the impact that construction and development are imposing on the ecological health of the Bolin Creek Natural Area and its watershed.

The Bolin Creek Natural Area includes 325 acres owned by the University of North Carolina;¹ the 27 acre Adams Preserve, owned by the Town of Carrboro; and 77 acres, privately owned by P.H. Craig for a total of 429 acres. It is rare to find such contiguous tracts of undeveloped land in an urbanized area, and numerous scientific studies have identified this area as ecologically sensitive and in need of conservation.

[Friends of Bolin Creek](#) (FOBC) is a local 501(c)(3) environmental organization founded in 2003 to protect the Bolin Creek watershed and its surrounding natural areas through community education and action. FOBC is dedicated to conserving this area for future generations by spearheading the creation of a coordinated conservation management plan. Preserving Bolin Creek is critical for addressing climate change, protecting water quality, providing for stormwater management, and maintaining wildlife habitat integrity.

It will take more active state and local management , along with non-profit and volunteer efforts, to address the many threats to this watershed and reverse the present trend of degradation. Today, these threats include stormwater runoff, pollution, sediment from poor construction practices, poor trail maintenance, and continuing urbanization, including the prospect of paving in the stream's riparian zone. Climate change only exacerbates these issues, making responsible management of Bolin Creek essential to the environmental health of our community.

¹ The University of North Carolina owns nearly 1,000 acres of land in this area including the former airport. This study focuses only on the 325 acres described here.

Through encouraging collaboration across public and private institutions and identifying specific goals and strategies, this document lays the groundwork for substantive action to improve the ecological health of our treasured community resource, leading to cleaner water and air, while supporting healthful recreational and educational opportunities for the community.

Our long-term goal is to protect the natural resources of the Bolin Creek Natural Area through coordinated conservation management. By doing so we will:

- Preserve the health of the forest and its botanical and wildlife assets;
- Support the implementation of the Town of Carrboro's Community Climate Action Plan by increasing carbon sequestration and stream health;²
- Honor the value that our citizenry places on conserving our forests, as witnessed by the many thousands of recreational hours that the public enjoys within this natural area every year;
- Build on the extraordinary work accomplished by former town elected leaders and the University of North Carolina administrators to conserve significant portions of the Bolin Creek Natural Area. (See 4.5.)

This Guide provides practical implementation steps to achieve our goal through the coordinated creation and implementation of a land use management plan:

- Form a Bolin Creek Natural Area Planning Committee to coordinate planning for the Bolin Creek Natural Area as a protected reserve for wildlife, recreation and future conservation.
- Invite Carrboro, UNC and all landowners to commit to a coordinated management plan that will protect Bolin Creek's riparian corridor and implement portions of [Carrboro's Community Climate Action Plan](#).
- Meet on site with landowners to identify areas in need of immediate attention.
- Raise funds to pay for the preparation of a land use management plan.
- Contribute to enhanced communication and vigilance of utility maintenance activities, particularly with the upcoming replacement of the OWASA sewer line.
- Encourage elected officials to support recommendations from past initiatives.

² The Carrboro Community Action Plan features several specific recommendations in line with FOBC's suggestions. See Part IV for more detail.

Purpose and Intended Use of this Document

The Conservation Planning Guide for the Bolin Creek Natural Area is a stewardship resource created by Friends of Bolin Creek 501(c)(3).

Bolin Creek Natural Area

The Bolin Creek Natural Area features land divided among multiple landowners and managers, making responsible conservation practices utterly reliant on cooperation and communication. Friends of Bolin Creek aims to facilitate this coordination by consolidating available research and historical information about land management in this document. By identifying the resources of the 429 acres of Bolin Forest, this plan intends to stimulate and inspire government and conservation leaders to work toward the permanent conservation of Bolin Forest and restore the area to a continuous, thriving urban forest.

Community Resource

Perhaps most essentially, this document serves as a community resource to anyone who wishes to know more about the Bolin Creek Watershed and how to protect it from further damage. Local governments will utilize this resource as they continue their efforts to repair Bolin Creek and its tributaries. This watershed has been studied extensively from the formative [2003 Assessment Report: Biological Impairment in the Little Creek Watershed](#) to the [2012 Bolin Creek Watershed Situation Assessment](#). A full list of studies can be found [here](#). Brought together in one place, *Conservation Planning Guide: Bolin Creek Natural Area* pairs a description of local history, politics, and applicable laws and ordinances relevant to the health and management of Bolin Creek with the data and knowledge from a number of state and EPA funded studies of this valued resource.

Friends of Bolin Creek

Friends of Bolin Creek will approach each Bolin Forest landowner with this report, working toward a collaborative management plan that benefits the entire forest. The information and general strategies in this document will provide a foundation for a holistic action plan for the preservation of Bolin Forest, so that it may remain a healthy natural resource for our community.

Friends of Bolin Creek

Friends of Bolin Creek (FOBC)³ is a local 501(c)(3) environmental organization that was founded in 2003 to protect the Bolin Creek watershed and its surrounding natural areas through community education and action. Our work aims to enhance quality of life for all the residents of Chapel Hill and Carrboro by addressing water quality issues, encouraging environmental stewardship, and nurturing an appreciation of our rich Piedmont natural resources. Our community projects include developing water quality curriculum for 8th grade middle schools, organizing nature educational walks, and conducting workshops on climate change, stream bank mitigation, urban stream health, and rain gardens. For a more thorough list of FOBC activities and projects, please see [Appendix II](#).

The mission of Friends of Bolin Creek is to nurture Bolin Creek Forest as a healthy living forest that harbors natural aquatic and terrestrial communities, coexisting next to the growing urban population of Carrboro and Chapel Hill. In our desired future, the 429 acres of the Bolin Creek Natural Area are managed holistically to protect water quality and environmental integrity, while continuing as a recreation mecca and an educational resource.

In June of 2018, FOBC convened a Bolin Forest Advisory Committee to discuss the outline and purpose of this conservation planning document.

The committee members include:

- i. Michael Paul, FOBC, Stream Ecologist
- ii. Robert Crook, FOBC, Forester
- iii. John Morris, FOBC, Water resources
- iv. Betsy Kempter, FOBC, Education and Outreach Specialist
- v. Dick Ludington, FOBC, Conservation Foundation
- vi. Julie McClintock, FOBC, President

In addition to the committee reviewers, we made the final draft available for comment to these additional people and organizations:

- Dave Stancil and Christian Hirni, Orange County, Lands Legacy Program
- Anna Wu and Sally Hoyt, UNC Facilities

³ (Employer Identification Number 37-1451471, NC ID: 0655089)

- Allison Weakley and Ernest Odei-Larbi, Chapel Hill Stormwater Management Division
- Randy Dodd, Stormwater Services, Town of Carrboro
- Laura Janeway and Trish MacGuire, Planning staff, Town of Carrboro
- Dave Andrews, Town of Carrboro Town Manager and Planning staff
- Meg Malloy, Bolin Forest Home Owners Association
- Emily Sutton, Haw River Assembly
- Randee Haven O'Donnell, Science Educator
- Debbie Bolas, Friends of Bolin Creek
- Linda Haac, Friends of Bolin Creek
- Meg Malloy, Conservationist, Bolin Forest Homeowners Association

This document was completed with the guidance of this committee as a stewardship resource for Friends of Bolin Creek, the landowners, and community members and leaders who value Bolin Creek and its forest.

Table of Contents

Executive Summary	1
Purpose and Intended Use of this Document	4
Friends of Bolin Creek	5
Table of Contents	7
List of Figures	10
Acronyms	10
Part I	12
Introduction	12
1.1 A Unique Community Resource	12
1.2 Overview of Bolin Creek Natural Area	13
1.2.1 Defining Bolin Creek Natural Area	14
1.2.2 Conservation Status	16
1.3 Reasons to Conserve At-Risk Portions of the Bolin Creek Natural Area	16
1.3.1 Wealth of Botanical and Animal Assets	18
1.3.2 Water Quality and Stream Health	20
1.3.3 Impact of Paved Surfaces on Water Quality	23
1.3.4 Complying with State Water Quality Rules	27
Jordan Lake Rules Buffer Zones Illustration.	28
1.3.5 Supporting Research Findings and Restoration Projects	29
1.3.6 Community Benefits	32
1.3.7 Community Involvement and Support	33
Part II	37
Bolin Creek Natural Area Partners	37
2.1 Natural and Jurisdictional Features	37
2.2 Jurisdictional Boundaries	39
2.2.1 Adams Preserve	39
2.2.2 P.H. Craig Property	41
2.2.3 Carolina North Forest	43
2.3 Past and Present Land Management	45
2.3.1 Adams Preserve	45
2.3.2 P.H. Craig Property	46
2.3.3 Carolina North Forest	47
2.4 Conservation Status	49

2.4.1 Adams Preserve	49
2.4.2 P.H. Craig Property	50
2.4.3 Carolina North Forest	51
Part III	55
Threats to Bolin Creek Natural Area	55
3.1 Urban Development	55
3.1.1 Impervious Surface Cover	56
3.1.2 Stormwater	56
3.1.3 Stormwater Management Changes and Construction Practices	58
3.1.4 Pollution Sources	59
3.2 Utility Easements	61
3.2.1 Orange Water and Sewer Authority (OWASA)	61
3.2.2 Power Easement	62
3.2.3 Service Roads	63
3.3 Potential Greenway Construction Next to Creeks	63
3.3.1 Paving Controversy History	63
3.3.2 Effects of Paving on the Environment	67
3.4 Inadequate Trail Maintenance	68
3.5 Invasive and Native Pest Species	71
3.6 Clear Cutting	72
3.7 Risk of Potential Future Development	74
3.8 Climate Change	75
Part IV	76
Creating a Conservation Plan	76
4.1 Reasons to Conserve the Bolin Creek Natural Area	76
4.2 Our Goal	77
4.3 Foundational steps taken by university and town leaders over the past two decades that make a joint management plan feasible:	77
4.4 Battle Park as a Model	78
4.5 Framework for the Bolin Creek Natural Area Management Plan	79
4.5.1 Long Term Strategies	82
4.6 What is the Friends of Bolin Creek Agenda moving forward?	83

Appendices	86
Appendix I. Contact Points for Each Property	86
Appendix II. FOBC Education and Outreach Efforts	86
Appendix III. Watershed Ordinances	89
Appendix IV. Bolin Creek Natural Area Wildlife Habitats	90
Appendix V. Bolin Creek Natural Area Landscape and Geology	93
The Geology of Bolin Creek and the Chapel Hill, North Carolina Area	93
Appendix VI. Watershed Restoration Efforts	97
Appendix VII: What a Healthy Urban Forest Looks Like	101
Appendix VIII: Doug Frederick Memorandum. July 23, 2018.	103
Appendix IX. Climate Change Resources	111
Appendix X. Gordon Merklein Correspondence	112

List of Figures

Figure A. Bolin Creek Area Geological Model.	14
Figure B. Bolin Creek Natural Area.	15
Figure C. Artist’s Map of Upper Bolin Creek by Geneva Green	17
Figure D. Haw River Assembly Watershed Map.	22
Figure E. Parcel-Level Analysis of Preservation Potential.	28
Figure F. Strava Global Heat Map: Bolin Creek Forest.	32
Figure G. Adams Tract, Courtesy of Orange County Land Legacy Program.	37
Figure H. P.H. Craig Property.	39
Figure I. UNC-Owned Forest.	41
Figure J. Zoomed-in image of UNC-Owned Forest West of Seawell School Road.	42
Figure K. Carolina North Area Types Specified in Development Agreement.	53
Figure L. Bike Trails in the Bolin Creek Natural Area.	64

Acronyms

BCMP: Bolin Creek Conceptual Master Plan

CN: Carolina North

DEQ, also NCDEQ: North Carolina Department of Environmental Quality

DWQ, also NCDWQ: North Carolina Division of Water Quality

EPA: Environmental Protection Agency

FOBC: Friends of Bolin Creek

NCBG: North Carolina Botanical Garden

NC-GAP: North Carolina Gap Analysis Project

NHP, also NCNHP: North Carolina National Heritage Program

OWASA: Orange Water and Sewer Authority

UNC, also UNC-CH: University of North Carolina (at Chapel Hill)