

BOLIN CREEK GREENWAY **CONCEPTUAL MASTER PLAN REVIEW**

Background

The Bolin Creek Greenway Conceptual Master Plan was completed in December 2009 by Greenways Incorporated. Numerous regulations have been revised or enacted since the completion of the original master plan. The Town of Carrboro is preparing to implement the next phase of the project. In anticipation of moving forward, the Town requested that Sungate Design Group, P.A. review the previously completed Conceptual Master Plan for current Carrboro, FEMAP, State of North Carolina, and national requirements and regulations. This report addresses the portions of the trail that extends from Estes Drive to Chapel Hill School (Phases 3 and 4).

TOWN OF CARRBORO, NC

Sungate has also contacted with Axion Environmental, Inc. (Axion) to review the Conceptual Master Plan and provide comments regarding USACE and NCEM FWR stream and wetland regulations. Sungate Design Group, P.A. and US Fish and Wildlife regulations and other natural environment considerations. A summary of Axion's findings and recommendations of the report are provided.



Data Sources

Sungate obtained the Conceptual Master Plan, FEMAP, and other data from the North Carolina Hydrologic Mapping Program website. The data was used to determine property owners and review topographic constraints.

9/28/2023

Town of Carrboro Land Use Ordinance

The Town of Carrboro last adopted its Land Use Ordinance in March of 2014. Bolin Creek, within the proposed study area, is subject to varying buffer widths which appear to extend 100 feet from the top of the stream bank or to the FEMAP floodplain limits, whichever is greater. Most of the proposed greenway is located within the buffer area. Due to the age of the conceptual master plan, water quality buffers and associated impacts are not discussed in the plan.

PREPARED BY:



SUNGATE DESIGN GROUP, P.A.

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The proposed greenway path is currently shown crossing under an existing Norfolk Southern railroad bridge. It can take extensive time to obtain a permit from the railroad for an encroachment, especially when pedestrians are involved. It is recommended that coordination between the Town and NS commence as soon as possible to prevent project delays and to get concurrence that the railroad will allow the greenway to cross their right-of-way.

Bolin Creek Greenway – Conceptual Master Plan Review

Background

The Bolin Creek Greenway Conceptual Master Plan was completed in December 2009 by Greenways Incorporated. Numerous regulations have been revised or enacted since the completion of the original master plan. The Town of Carrboro is preparing to implement the next phase of the project. In anticipation of moving forward, the Town requested that Sungate Design Group, P.A. review the previously completed Conceptual Master Plan for current Carrboro, FEMA, State of North Carolina, and railroad requirements and regulations. This report addresses the portion of the trail that extends from Estes Drive to Chapel Hill High School (Phases 3 and 4).

Sungate has also contracted with Axiom Environmental, Inc. (Axiom) to review the Conceptual Master Plan and provide comments regarding USACE and NCDEQ DWR stream and wetland regulations, Endangered Species Act, US Fish and Wildlife regulations, and other natural environment considerations. A summary of Axiom's report is listed at the end of the report with

Data Research

Sungate obtained the Conceptual Master Plan from the Town's website. Sungate also obtained the Effective FEMA Flood Insurance Rate Maps and Flood Insurance Study from the North Carolina Floodplain Mapping Program website. Town of Carrboro GIS data was used to determine property owners and review topographic constraints.

Town of Carrboro Land Use Ordinances – Water Quality Buffers

The Town of Carrboro last amended Section 15-269 regarding water quality buffers in March of 2014. Bolin Creek, within the proposed study area, is subject to varying buffer widths which appear to extend 100 feet from the top of the stream bank or to the FEMA floodplain limits, whichever is greater. Most of the proposed greenway is located within the buffer area. Due to the age of the conceptual master plan, water quality buffers and associated impacts are not discussed in the plan.

According to the LUO, *"Greenway / hiking trails designed, constructed and maintained to maximize nutrient removal and erosion protection, minimize adverse effects on aquatic life and habitat, and protect water quality to the maximum extent practical."* Therefore, the Bolin Creek Greenway is considered an allowable activity, however a buffer authorization permit will be required for the buffer impacts. For an activity to be considered 'allowable', the project must demonstrate that there is no practical alternative. For this project, there appears to be other practical alternatives that can minimize impacts to riparian buffer areas.

Norfolk Southern Railroad (NS)

The proposed greenway path is currently shown crossing under an existing Norfolk Southern railroad bridge. It can take extensive time to obtain a permit from the railroad for an encroachment, especially when pedestrians are involved. It is recommended that coordination between the Town and NS commence as soon as possible to prevent project delays and to get concurrence that the railroad will allow the greenway to cross their right-of-way.



NS may require construction of a shelter structure under the railroad bridge to protect pedestrians from potential falling debris or ballast stone. The photograph above is from the Crabtree Creek Greenway in Raleigh where it passes beneath the CSX railroad. The railroad crossing should be investigated further to ensure there is adequate clearance under the trestle to construct the covered structure.

For the Upland Forest Alignment, a portion of the greenway parallels the railroad corridor. The existing rail corridor is 100 feet wide centered on the rail tracks. All greenway construction (cut/fill) will need to occur outside of the railroad corridor.

OWASA Sewer Easement

The Conceptual Master Plan depicts the proposed Creekside alignment located primarily within an existing OWASA easement. OWASA was contacted regarding any Capital Improvement Program plans for repairs, replacement, or relocation of the existing sewer line. Allison Spinelli with OWASA responded that the Bolin Creek Interceptor project near Pathway Drive has been pushed out and design is not anticipated to start until FY29. No other CIP projects are currently funded or planned.

FEMA & Carrboro Floodplain Requirements

Bolin Creek is located in a FEMA Study Area (Detailed Study) with delineated 1% annual chance floodplains and floodways. Based on a review of available flood maps and aerial photography, there does not appear to be any insurable structures located within the Effective 1% annual chance floodplain limits. The Conceptual Master Plan depicts the greenway path crossing Bolin Creek at two locations: 1) just downstream of the railroad and 2) at the trail connection to Tripp Farm Road. Bolin Creek Tributary (FEMA Detailed Study) is also crossed by both the Creekside and Upland Forest alignments.

The Conceptual Master Plan recommends using low water bridges with no railings. This recommendation is not ADA compliant which requires a 54-inch handrail along bike facilities. The bridge rails will need to be included in the hydraulic models as blocked area which will make it challenging to meet the No Rise requirements.

Town of Carrboro LUO Section 15-263(g)(2) states *"For upstream properties, the 1% annual chance flood elevation may not be increased."* Since the surrounding properties are privately owned, a No Rise Certification will likely be required for the project. A No Rise Certification will be difficult if not impossible to achieve at several of the stream crossings and a variance may need to be obtained.

The Conceptual Master Plan did not include any preliminary modeling of the selected corridor and stream crossings. Due to the requirements noted above, it is recommended that a preliminary flood study be completed to evaluate the potential impacts to Base Flood Elevations due to the proposed stream crossings. A preliminary flood study to evaluate and locate stream crossings would cost approximately \$20,000 and take 3 months to complete.

Greenway Location Considerations

Below are a few considerations for the proposed greenway location that could increase the resiliency of the trail and reduce the permitting timeframe.

- 1) Bolin Creek is prone to flash flooding due to the tight topographic conditions of the floodplain. The streambanks are also unstable for significant portions of the stream which is typical of a stream that is transitioning from a natural rural condition to a developed urban condition. Consideration should be given to locating the greenway further away from the streambank (50 feet or more) to provide a natural buffer to allow the stream to continue to evolve and make the greenway trail more resilient and potentially require less maintenance. This does not necessarily mean the Upland Forest alignment is a better option, however, the Creekside alignment may need to meander out of the OWASA easement in areas where the easement is close to the streambank.
- 2) A sizeable portion of the greenway is located within the PH Craig Tract which is privately owned. All trail routes that cross this tract will need to be coordinated with the owner. This is a significant risk as the owner will want to maximize the usable land restricting the potential path of the greenway.
- 3) Consider eliminating the Bolin Creek stream crossing downstream of the railroad and connect the greenway to Estes Drive on the east side of the stream. The MUP could be added to the Estes Drive project and utilize the existing stream crossing.

- 4) Consider using an alternative trail surface such as roller compacted gravel fines instead of a paved surface. Sungate completed the designs for the American Tobacco Trail which uses this type of surface. However, this surface is not recommended in areas located within a floodplain due to potential maintenance concerns from washing out or rutting.



Summary of Axiom Report

Below is a summary of the findings from Axiom's report. The full report is included as attachments.

Jurisdictional Streams and Wetlands: Axiom identified twelve instances where potential jurisdictional streams are crossed by the proposed greenway and/or connector trails. Two potential jurisdictional wetland areas occur in the vicinity of the proposed Creekside alignment (see Axiom Figure 1). No potential wetland areas were noted along the Upland Forest alignment. *The estimated timeframe to complete the wetland, stream, and buffer delineations and Preliminary Jurisdictional Determination (PJD) is approximately 3 months.*

Federally Protected Species: The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) identified four federally protected species that may occur within the site. *The USFWS has identified no areas of critical habitat for any species within the site.*

- **Tricolored bat:** *The site may contain habitat suitable for this species.* Tree removal may be limited to the winter months or immediately following detailed tree-by-tree surveys in the spring and summer.
- **Atlantic pigtoe:** *The site may contain habitat suitable for this species.* NCNHP records indicate no occurrence of this within 1.0 mile of the Site, however, if any in-water work is anticipated, habitat evaluations for this species are recommended. If any individuals of this species are determined to be present and a moratorium on in-water work is required, time-of-year restrictions are likely to occur during the brooding season, from May through July.
- **Monarch butterfly:** *The site may contain varied habitats suitable for this species.* It is unlikely that the proposed project will have any quantifiable effects on monarch butterfly.
- **Bald eagle:** A review of the NCNHP records indicates no occurrence of this species within 1.0 mile of the Site and *this project is therefore anticipated to have no effect on bald eagle.*

State Listed Species: Axiom included a table with the State-listed species for Orange County. Eighty-four species are listed and twenty-one species are afforded state protection (eight are listed as Endangered, eight are listed as Threatened, and five are listed as Special Concern). A brief assessment of potential habitat for each species is listed but no detailed surveys were conducted. *If surveys are required for all of the listed species, the effort would be considerable and likely take 9 to 12 months to complete.*

Permitting Requirements and Timeframes: This project may be authorized using Nationwide Permit (NWP) 23 for Approved Categorical Exclusions. NWP 23 has no limits on the area of impacts to jurisdictional areas allowed. The NWP will require a corresponding General Water Quality Certification (WQC) from the NCDWR.

The USACE requires 45 days to process a complete NWP application and the NCDWR general requires 30 days with a 30-day notification prior to submitting the application.



Axiom Environmental, Inc.

218 Snow Avenue, Raleigh, North Carolina 27603 919-696-3045

September 28, 2023

Mr. Josh Dalton
Sungate Design Group, P.A.
905 Jones Franklin Road
Raleigh, NC 27606

Re: Bolin Creek Greenway Trail Environmental Investigations
Carrboro, Orange County, North Carolina

23-025

Dear Mr. Dalton,

Axiom Environmental, Inc. (Axiom) is pleased to provide you with this summary letter of the results of an environmental review for the proposed Bolin Creek Greenway Trail, Phases 3 and 4 (hereafter referred to as the Site, see attached Figure 1). This assessment is based on a review of the *Conceptual Master Plan, Bolin Creek Greenway, December 2009* (Master Plan) document. The Site is located in the Carolina Slate Belt of the Piedmont physiographic region of the state. Site features are located within the Jordan Lake watershed of the Cape Fear River Basin (US Geological Survey (USGS) Hydrologic Unit Code (HUC) 0303000206). The Master Plan review was conducted by Axiom staff on June 28 and 29, 2023.

Axiom conducted a field investigation of Phases 3 and 4 of the project, which included the proposed Bolin Creek Greenway (BCG), including a connector trail to Tripp Farm Road, and the proposed Bolin Forest Connector (BFC) and proposed Upland Forest Connector (UFC) on September 15, 2023. Potential constraints were noted along the proposed corridors.

Streams and Wetlands

Based on a review of the Master Plan document, Phases 3 and 4, as many as nine potentially jurisdictional streams were identified within the Site in 2009: Bolin Creek and 8 unnamed tributaries (UTs) to Bolin Creek. These features were not delineated or approved by natural resource agencies. The Town of Carrboro GIS website indicates that there may be 13 intermittent or perennial streams that drain to Bolin Creek, and potentially an additional 15 to 20 ephemeral features.

Bolin Creek and its UTs have been assigned a water quality classification of WS-V, NSW indicating Water Supply and Nutrient Sensitive Waters. In addition, Bolin Creek from Pathway Drive downstream is currently listed on the 2022 Final 303(d) List of Impaired Waters due to a *Fair* bioclassification rating based on benthic sampling.

The Master Plan indicates that several wetland areas were identified within the Site, though these features were not delineated or approved by natural resource agencies. The Town of Carrboro GIS

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website (<https://tocgis.ci.carrboro.nc.us/Carrboro>) indicates that a majority of the area adjacent to Bolin Creek is occupied by wetlands. An updated jurisdictional area delineation is recommended in the vicinity of the proposed greenway alignment.

During field investigations, Axiom identified twelve instances where potentially jurisdictional streams are crossed by the proposed greenway and/or connector trails. Two potentially jurisdictional wetland areas occur in the vicinity of the proposed BCG (Figure 1). The proposed greenway is generally centered on the alignment of an existing sewer line easement and crosses Bolin Creek several times. No potential streams or wetland areas located on the opposite side of Bolin Creek from the BCG were assessed.

Bolin Creek is a perennial stream that ranges from approximately 15 to 30 feet in width within the Site. Five unnamed tributaries (UTs) to Bolin Creek flow across, or through culverts under, the BCG to discharge to Bolin Creek before it flows out of the Site through a triple box culvert under Estes Drive. The BFC crosses one UT (UT 3) and the UFC crosses UT 3 in approximately the same location as the BFC as well as crossing three additional UTs draining from the railroad. A summary of the potentially jurisdictional streams and wetlands within the Site is presented in Table 1.

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Table 1. Potentially Jurisdictional Features

Site Number	Feature Name	Flow Regime	Width (feet)	Depth (feet)	Description
1	UT 1	Ephemeral	2	1-2	This feature appears to be created by stormwater that is channelized through a culvert under the railroad. The drainage area for this feature is less than 5 square miles.
2	Bolin Creek	Perennial	25-30	3-8	Bolin Creek is rocky, wide, and shallow.
3	UT 2	Intermittent	5	3	Crosses BCG through culvert.
4	UT 3	Perennial	6-8	3-4	Deeply incised above the BCG and flows across a gravel ford without a culvert.
5	UT 4	Perennial	20	2-6	This channel appears to be a relict portion of Bolin Creek. It is separated from the main channel by the BFC and appears to intercept groundwater and occasional floodwaters from Bolin Creek.
6	Bolin Creek	Perennial	15-25	3-8	Creek is crossed by a wooden bridge structure.
7	UT 5	Intermittent	3-4	2-4	This stream spreads into a potential wetland area (Wetland 2) before draining across trail.
8	UT 3	Perennial	5	1-2	Flows parallel to railroad and crossed by the BFC.
9	UT 3	Perennial	5	1-2	Flows parallel to railroad and crossed by the UFC.
10	UT 6	Ephemeral	0-5	0-5	This feature appears to be created by stormwater that is channelized through a culvert under the railroad but loses all characteristics in the vicinity of the UFC. The drainage area for this feature is greater than 5 acres.
11	UT 2	Intermittent	4	2-3	This channel contained no water during the site visit but had extensive indicators of regular flow.
12	UT 7	Ephemeral	4	0-0.25	This area exhibits signs of moving water without channel or wetland formation. The drainage area for this feature is greater than 5 acres.
13	Wetland 1	This wetland area is thickly vegetated with emergent plants and exhibited standing water and hydric soils extending above and below the BCG.			
7	Wetland 2	This wetland area is sparsely vegetated with signs of standing water and hydric soils and is located adjacent to and above the BCG. The hydrology source is UT5 but it may receive flooding from Bolin Creek.			

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Riparian Buffers

The Site is located within the Jordan Lake watershed of the Cape Fear River Basin and site streams may therefore be subject to Riparian Buffer Rules. Riparian Buffers are applicable to all stream features exhibiting intermittent or perennial flow that are depicted on either the most recent USGS 7.5-minute topographic quadrangle (Chapel Hill, NC, 2019) or Natural Resources Conservation Service (NRCS) soil survey (Soil Survey of Orange County, 1976, maps 26 and 30). USGS mapping depicts Bolin Creek and three UTs that drain to Bolin Creek through or adjacent to the proposed greenway, and the NRCS Soil Survey depicts Bolin Creek and nine UTs that drain to Bolin Creek through or adjacent to the proposed greenway. Based on the information available, Jordan Lake Riparian Buffer Rules will be applicable to many of the stream features depicted in the Master Plan. Jordan Lake riparian buffers extend 50 feet laterally from applicable surface waters.

The Town of Carrboro requires additional riparian buffer protections with similar applicability as the Jordan Lake Riparian buffers including flow regime and depiction on USGS and NRCS mapping resources. Perennial streams, ponds, lakes, and reservoirs in this area receive 100-foot buffers, and intermittent streams, ponds, lakes, and reservoirs in this area receive 60-foot riparian buffers. Additionally, ephemeral streams and ponds with a contributing drainage area of greater than five acres receive a total 15-foot riparian buffer. In all cases, the riparian buffer will extend at least to the special flood hazard area for the same feature, if applicable.

Bolin Creek, UT 1, and UT 2 are depicted on NRCS soil survey mapping and Bolin Creek and UT 2 are also depicted on the USGS 7.5-minute topographic quadrangle. Bolin Creek and UT 2 are perennial and receive a 100-foot riparian buffer, while UT 1 is intermittent and receives a 60-foot riparian buffer. Within the Site, the flood hazard zones of Bolin Creek exceed 100 feet in several locations and riparian buffers will be applicable to these extents (Figure 1).

Potential wetland areas that are located within any riparian buffer areas are considered part of the riparian buffer and do not receive a buffer of their own.

Floodplains and Stormwater

Based on a review of the Master Plan document and existing mapping resources, a majority of the Site falls within the designated 100-year floodplain (Zone AE, 1 percent annual event chance of flooding).

Based on a review of the Master Plan document and existing mapping resources, stormwater requirements for project construction fall under Local Programs that satisfy Phase II requirements. Responsibilities for stormwater review falls under the jurisdiction of the Town of Carrboro, except for a small portion of the proposed greenway that falls under the jurisdiction of the Town of Chapel Hill.

Field investigations indicate that Bolin Creek floods at least occasionally; large areas of wrack (sticks and debris) were washed against trees and shrubs on the opposite side of the proposed greenway from Bolin Creek.

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Federally Protected Species

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC), consulted on June 28, 2023, has identified four federally protected species that may occur within the Site:

- Tricolored bat (*Perimyotis subflavus*), PE
- Atlantic pigtoe (*Fusconaia masoni*), T
- Monarch butterfly (*Danaus plexippus*), C
- Bald eagle (*Haliaeetus leucocephalus*), BGEPA

PE= Proposed Endangered, T=Threatened, C=Candidate, BGEPA= Bald and Golden Eagle Protection Act

The USFWS has identified no areas of critical habitat for any species within the site.

Tricolored bat

Habitat Description: In the winter, tricolored bats are often found in caves and abandoned mines, although in the southern United States, where caves are sparse, tricolored bats are often found roosting in road-associated culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees.

On September 14, 2022, the USFWS announced a proposal to list the tricolored bat as Endangered under the Endangered Species Act. Upon listing, USFWS is expected to provide habitat descriptions and an area of influence/distribution range. Proposed Endangered species are not protected by the Endangered Species Act (ESA) until the rule to list is finalized (anticipated to be fall of 2023); however, under section 7(a)(4) of the ESA, federal agencies must confer with the USFWS if their action will jeopardize the continued existence of a proposed species.

Biological Evaluation: Based on project mapping and descriptions provided in the Master Plan, the proposed greenway route may contain habitat suitable for this species. The USFWS optimal survey window for structure checks (bridges and culverts) is May 1 through September 15. Based on preliminary guidance, a moratoria on tree removal may be established in the summer months. Tree removal may be limited to the winter months or immediately following detailed tree-by-tree surveys in the spring and summer.

Atlantic Pigtoe

Habitat Description: Found in streams with substrate composed of coarse sand and gravel downstream from riffle areas. High populations exist in small creeks to large rivers with excellent water quality.

Biological Evaluation: Based on descriptions provided in the Master Plan, Bolin Creek may contain habitat suitable for this species. A July 28, 2023 review of N.C. Natural Heritage Program (NCNHP) records indicates no occurrence of this within 1.0 mile of the Site, however, if any in-water work is anticipated, habitat evaluations for this species are recommended. If any individuals of this species are determined to be present and a moratorium on in-water work is required, time-of-year restrictions are likely to occur during the brooding season, from May through July.

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Monarch butterfly

Habitat Description: There is currently no official protocol for monarch butterfly surveys. The primary food source for monarch butterfly is milkweeds (*Asclepias* sp.). Milkweeds prefer full sun and typically grow within open areas such as pastures, roadsides, ditches, and old fields.

Biological Evaluation: Based on project mapping and descriptions provided in the Master Plan, the proposed greenway route may contain varied habitats suitable for this species, though it is unclear how much habitat may exist within the proposed greenway area. A July 28, 2023 review of N.C. Natural Heritage Program (NCNHP) records indicates no occurrence of this within 1.0 mile of the Site. Due to the lack of USFWS guidance and minimal disturbance expected, it is unlikely that the proposed project will have any quantifiable effects on monarch butterfly. A review of site conditions and evaluation of potential habitat is recommended prior to permitting activities.

Bald Eagle

Habitat Description: Habitat for bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large, dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.

Biological Conclusion: A review of aerial photography reveals several small ponds within one mile of the Site; however, none are large enough and sufficiently open to be considered potential feeding and roosting habitat for bald eagles. A July 28, 2023, review of the NCNHP records indicates no occurrence of this species within 1.0 mile of the Site and this project is therefore anticipated to have no effect on bald eagle.

State-listed Species

In North Carolina, state Endangered, Threatened, and Special Concern species are given state protection under the State Endangered Species Act (G.S. 113-331 to 113-337). Significantly Rare and Watch List designations are NCNHP designations only and do not afford official state protection.

Conservation ranks are either state (S) or global (G) and are based on a one-to-five scale, ranging from critically imperiled (S1 or G1) to demonstrably secure (S5 or G5). These assessments are based on the best available information, considering a variety of factors such as abundance, distribution, population trends, and threats. State ranks apply only to North Carolina, while global ranks apply to the species throughout its range. The system is widely used as the best available scientific and objective assessment of a species' imperilment throughout its range. A rank involving two numbers indicates uncertainty between the two.

State-listed species for Orange County are provided in the table below. Due to the size of the database records, species only known historically from this area have been omitted from this list; however, a full list is available at www.ncnhp.org. Eighty-four species are listed below and twenty-one species are afforded state protection (eight are listed as E, eight are listed as T, and five are listed as SC). A brief assessment of potential habitat for each species is listed below but no detailed surveys were conducted.

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Table 2. State-listed Species

Scientific Name	Common Name	NC Status*	NC Rank**	Global Rank ***	Habitat Description	Potential Habitat
<i>Agalinis decemloba</i> (syn. <i>Agalinis acuta</i>)	Piedmont Gerardia	W1	S3	G3, G4	dry, open sites	Yes
<i>Agastache nepetoides</i>	Yellow Giant-hyssop	SR-P	S1	G5	oak--hickory forests, especially over mafic rocks	Yes
<i>Alasmidonta undulata</i>	Triangle Floater	T	S3	G4	Roanoke, Chowan, Tar, Neuse, Cape Fear drainages	Yes
<i>Alasmidonta varicosa</i>	Brook Floater	E	S3	G3	Cape Fear drainage, also along Blue Ridge escarpment of Catawba and Yadkin-Pee Dee drainages	Yes
<i>Ambloplites cavifrons</i>	Roanoke Bass	SR	S2	G3	streams in Neuse and Tar systems	No
<i>Ambystoma talpoideum</i>	Mole Salamander	SC	S2S3	G5	breeds in fish-free semipermanent woodland ponds; forages in adjacent woodlands	No
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	W1,W5	S3B,S1N	G5	pastures and other grasslands [breeding season only]	No
<i>Anemone berlandieri</i>	Southern Anemone	E	S1S2	G4G5	thin soils around rock outcrops, usually on basic soil	Yes
<i>Asplenium bradleyi</i>	Bradley's Spleenwort	SR-P	S2	G4	acidic rock outcrops and cliffs	Yes
<i>Atrichum altecristatum</i>	A Catherinea Moss	W7	S2?	G5	open or semishaded soils, usually low elevations	Yes
<i>Atrichum cylindricum</i>	A Catherinea Moss	W7	S2?	G5	moist soils of ditches and stream banks in bottomlands and swamp forests	Yes
<i>Cambarus davidi</i>	Carolina Ladle Crayfish	SR	S3	G3	Neuse and Cape Fear drainages (endemic to North Carolina)	Yes
<i>Carex bushii</i>	Bush's Sedge	SR-P	S1	G4	Upland depression	Yes
<i>Cecropterus confusus</i> (syn. <i>Thorybes confusus</i>)	Confused Cloudywing	W3	S3S4	G4	dry woodland borders and openings, brushy fields; host plants -- legumes	Yes
<i>Cemophora coccinea</i>	Scarlet Snake	W1,W5	S3	G5	sandhills, sandy woods, and other dry woods	Yes
<i>Cryphaea nervosa</i>	A Thread Cedar Moss	SR-T	S1?	G4?	trunks of trees in humid forests, sometimes in swamp forests	No
<i>Cystopteris bulbifera</i>	Bulblet Bladder Fern	W7	S1S2	G5	calcareous rocks	Yes
<i>Dichelyma capillaceum</i>	Hair Claw Moss	SR-P	S1?	G5	bases of trees, stumps, or on rocks in places submerged at high water	Yes
<i>Elliptio congaraea</i>	Carolina Slabshell	W2,W5	S3	G3	drainages north to the White Oak drainage	Yes
<i>Elliptio producta</i>	Atlantic Spike	W3,W5	SU	G3	many Atlantic drainages; very difficult to identify	Yes

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Table 2. State-listed Species (continued)

Scientific Name	Common Name	NC Status*	NC Rank**	Global Rank ***	Habitat Description	Potential Habitat
<i>Elodium paludosum</i> (syn. <i>Helodium paludosum</i>)	Pond Fern Moss	W7	S2?	G3G5	on soil, humus, trees, or logs in swamps, marshes, or meadows	No
<i>Ephemerum spinulosum</i>	Emerald Dewdrops	W7	S2?	G4G5	moist or drying soil in disturbed, partly sunny areas, or on rotting wood	Yes
<i>Etheostoma collis</i>	Carolina Darter	SC	S3	G3	Roanoke, Tar, Neuse, Cape Fear, Yadkin-Pee Dee, and Catawba drainages	Yes
<i>Etheostoma flabellare</i>	Fantail Darter	W5	S3	G5	Cape Fear, Neuse, and Tar drainage populations have limited distribution; Pee Dee, Roanoke, New, and French Broad populations stable	Yes
<i>Fissidens fontanus</i>	Water Pocket Moss	W7	S2?	G5	attached to various substrata in stagnant and flowing water, and in coastal estuaries	Yes
<i>Fontinalis welchiana</i>	Welch's fontinalis moss	SR-T	S1	GU	submerged rocks	Yes
<i>Fothergilla major</i>	Large Witch-alder	SR-T	S3	G3	dry ridgetop or bluff forests, seepage wetlands, and Piedmont longleaf pine forests	No
<i>Fusconaia masoni</i>	Atlantic Pigtoe	T	S3	G1	Roanoke, Tar, Neuse, Cape Fear, Yadkin-Pee Dee drainages	Yes
<i>Gomphurus lineatifrons</i>	Splendid Clubtail	SR	S2	G4	rocky rivers	Yes
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	S3B,S3N	G5	mature forests near large bodies of water (nesting); rivers, lakes, and sounds (foraging) [breeding evidence only]	No
<i>Hemidactylum scutatum</i>	Four-toed Salamander	SC	S3	G5	pools, bogs, and other wetlands in hardwood forests	Yes
<i>Hexalectris spicata</i>	Crested Coralroot	SR-P	S2	G5	dry or mesic woods on basic soils	Yes
<i>Hexastylis lewisii</i>	Lewis's Heartleaf	W1	S3	G3	mesic mixed hardwood forests, streamhead pocosin ecotones	Yes
<i>Hygrohypnum closteri</i>	Closter's Brook-hypnum	SR-T	S1	G3	on rocks submersed in streams	Yes
<i>Hypnum fauriei</i>	A Cedar Moss	W7	S2?	G5	logs and tree bases in deciduous forest	Yes
<i>Hypomecis longipectinaria</i>	Broadly Pectinate Hypomecis Moth	W3	S3S4	G3G4	hardwood stands	Yes
<i>Isoetes hyemalis</i>	Wintergreen Quillwort	W7	S2S3	G2G3	beds of blackwater and other streams	Yes
<i>Lampsilis cariosa</i>	Yellow Lampmussel	E	S3	G3G4	Chowan, Roanoke, Neuse, Tar, Cape Fear, Lumber, Yadkin-Pee Dee drainages	Yes

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Table 2. State-listed Species (continued)

Scientific Name	Common Name	NC Status*	NC Rank**	Global Rank ***	Habitat Description	Potential Habitat
<i>Lampsilis radiata</i>	Eastern Lampmussel	T	S3	G5	Chowan, Roanoke, Tar, Neuse, Cape Fear, Yadkin-Pee Dee drainages	Yes
<i>Lampsilis</i> sp. 2	Chameleon Lampmussel	SR	S2	G2	Tar, Neuse, Cape Fear, and Yadkin-Pee Dee drainages	Yes
<i>Lasmigona subviridis</i>	Green Floater	E	S2	G3	New, Watauga, Roanoke, Tar, Neuse and Yadkin-Pee Dee drainages	No
<i>Leskea australis</i>	A Dusky Moss	W7	S2?	G4	lower parts of hardwood trees and bald cypress and logs in woods along rivers, swamps	Yes
<i>Lespedeza frutescens</i>	Violet Lespedeza	W7	S2?	G5	woodlands and woodland borders	Yes
<i>Lestes eurinus</i>	Amber-winged Spreadwing	W2	S3	G5	lakes and ponds with emergent vegetation	No
<i>Lophodytes cucullatus</i>	Hooded Merganser	W3	S1B,S4N	G5	lakes and ponds, with dead trees for nesting [breeding evidence only]	No
<i>Lythrurus matutinus</i>	Pinewoods Shiner	W5	S3	G3G4	Tar and Neuse drainages (endemic to North Carolina)	No
<i>Lytrosis heitzmanorum</i>	a Geometrid Moth	W3	SU	G5	oak-hickory forests in lower elevation mountains and piedmont	Yes
<i>Lytrosis permagnaria</i>	A Geometrid Moth	SR	S2S3	G3G4	apparently in mixed forests	Yes
<i>Macrochilo louisiana</i>	Louisiana Owlet Moth	W3	S3?	G4	sedgy wetlands	Yes
<i>Matelea decipiens</i>	Glade Milkvine	W1	S3	G5	thin woodlands over mafic or calcareous rocks	Yes
<i>Monotropis odorata</i>	Sweet Pinesap	SR-O	S3	G3	dry forests and bluffs	Yes
<i>Nanopanax trifolius</i>	Dwarf Ginseng	W1	S3	G5	cove forests, northern hardwoods, other rich forests	No
<i>Necturus lewisi</i>	Neuse River Waterdog	T	S2	G2	rivers and large streams in Neuse and Tar drainages (endemic to North Carolina)	No
<i>Neogale frenata</i> (syn. <i>Mustela frenata</i>)	Long-tailed Weasel	W3	S3	G5	forests, brushy areas	Yes
<i>Orbexilum pedunculatum</i>	Sampson's Snakeroot	E	S1	G5T5?	open woodlands	Yes
<i>Panax quinquefolius</i>	Ginseng	W1	S3S4	G3G4	cove forests, other rich forests	No
<i>Parthenium auriculatum</i>	Glade Wild Quinine	SR-T	S3	G3G4	glades and openings over mafic rocks	Yes
<i>Perimyotis subflavus</i>	Tricolored Bat	E	S3	G3G4	roosts in clumps of leaves (mainly in summer), caves, rock crevices, and other dark and sheltered places	Yes

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Table 2. State-listed Species (continued)

Scientific Name	Common Name	NC Status*	NC Rank**	Global Rank ***	Habitat Description	Potential Habitat
<i>Phacelia covillei</i>	Buttercup Phacelia	SR-T	S3	G3	bottomlands, rich lower slopes	Yes
<i>Philadelphus inodorus</i>	Scentless Mock-orange	W1	S3	G4G5	bluffs, cliffs, and rocky woods, mainly over mafic or calcareous rocks	Yes
<i>Plagiochila raddiana</i>	A Liverwort	SR-P	S1	G5	on bark or moist rock in swamps and mountain gorges	No
<i>Platanthera peramoena</i>	Purple Fringeless Orchid	T	S2	G5	bogs, forests	Yes
<i>Pontia protodice</i>	Checkered White	SR	S1S2	G5	fields, pastures; host plants -- mustard species (Family Brassicaceae)	No
<i>Pycnanthemum torreyi</i>	Torrey's Mountain-mint	SR-T	S1	G2	dry upland forests and woodlands, over mafic rocks	Yes
<i>Pyrola americana</i>	American Shinleaf	W1	S2S3	G5	forests	Yes
<i>Ranunculus micranthus</i>	Rock Buttercup	SR-P	S1	G5	rich woods on circumneutral soil	Yes
<i>Ruellia purshiana</i>	Pursh's Wild-petunia	SC-V	S2	G3	glades and woodlands, mostly over mafic or calcareous rocks	Yes
<i>Satyrium favonius ontario</i>	Northern Oak Hairstreak	SR	S2S3	G4G5T4	oak-dominated woods, usually in dry sites; host plants -- oaks (<i>Quercus</i>)	Yes
<i>Scutellaria serrata</i>	Showy Skullcap	W1	S2S3	G4G5	deciduous forests	Yes
<i>Senna hebecarpa</i>	Wild Senna	W7	S2S3	G5	forests	Yes
<i>Sphinx franckii</i>	Franck's Sphinx	W3	SU	G4G5	basic-mesic hardwoods and other habitats with ash (<i>Fraxinus</i>)	Yes
<i>Strophitus undulatus</i>	Creepers	T	S3	G5	Roanoke, Tar, Neuse, Cape Fear, Yadkin-Pee Dee, Catawba, Broad, and French Broad drainages	Yes
<i>Stylurus laurae</i>	Laura's Clubtail	W1	S2S3	G4	medium-size streams with clean sandy substrate	No
<i>Swida racemosa</i>	Gray Dogwood	SC-V	S1	G5	moist soil in riparian zones, roadsides, and thickets	Yes
<i>Syntrichia papillosa</i>	Papillose Tortula	SR-P	S1	G5	bark of hardwoods	Yes
<i>Thermopsis mollis</i>	Appalachian Golden-banner	SR-T	S2	G3G4	dry ridges and open woodlands	Yes
<i>Toxolasma pullus</i>	Savannah Lilliput	E	S2	G2	Cape Fear, Lumber, and Yadkin-Pee Dee drainages	Yes
<i>Tradescantia virginiana</i>	Virginia Spiderwort	SR-O	S2S3	G5	rich woods on circumneutral soils	Yes
<i>Tsuga canadensis</i>	Eastern Hemlock	W5	S4S5	G4G5	moist soils	No
<i>Villosa constricta</i>	Notched Rainbow	T	S3	G3	Roanoke, Tar, Neuse, Yadkin-Pee Dee, and Catawba drainages	No

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Table 2. State-listed Species (continued)

Scientific Name	Common Name	NC Status*	NC Rank**	Global Rank ***	Habitat Description	Potential Habitat
<i>Villosa delumbis</i>	Eastern Creekshell	SR	S4	G4	Cape Fear, Lumber, Yadkin-Pee Dee, and Catawba drainages	Yes
<i>Villosa vaughaniana</i>	Carolina Creekshell	E	S3	G2G3	Cape Fear, Yadkin-Pee Dee, and Catawba drainages (endemic to North Carolina and adjacent South Carolina)	Yes
<i>Vireo gilvus</i>	Warbling Vireo	SR	S2B	G5	groves of hardwoods along rivers and streams [breeding evidence only]	Yes
<i>Virginia valeriae</i>	Smooth Earthsnake	W2	S3	G5	deciduous or mixed woods, usually in mesic soils	Yes

NC Status*: E= Endangered, T= Threatened, SC= Special Concern, SR= Significantly Rare, SR-G= Significantly Rare-Game, W1= Watchlist 1 (Population Decline in NC), W2= Watchlist 2 (Rare but Relatively Secure), W3= Watchlist 3 (Poorly Known in NC), W4= Watchlist 4 (Rare but Questionable Documentation), W5= Watchlist 5 (Threat to Habitat), W6= Watchlist 6 (Rare but Believed Not Native). Detailed descriptions of NC Status codes are provided at www.ncnhp.org.

NC Rank**: S1= Critically Imperiled, S2= Imperiled, S3= Vulnerable, S4= Apparently Secure, S5= Secure, SH= Historical, SX= Presumed Extirpated, SU= Unrankable, SNR= Not Ranked, SNA= Not Applicable, S_B= Breeding, S_N= Not Breeding, S_?= Uncertain. Detailed descriptions of NC Rank codes are provided at www.ncnhp.org.

Global Rank***: G1= Critically Imperiled, G2= Imperiled, G3= Vulnerable, G4= Apparently Secure, G5= Secure, GH= Historical, GX= Presumed Extinct, GU= Unrankable, GNR= Not Ranked, G_T_= Intraspecific Taxon, G_?= Uncertain. Detailed descriptions of Global Rank codes are provided at www.ncnhp.org.

Natural Areas and Land Ownership

A majority of Phase 3 of the Site is located within Carolina Forest North, which is owned and managed by the University of North Carolina at Chapel Hill (UNCCH) Department of Finance and Operations, Facilities Services.

The NCNHP indicates several areas identified as Town of Carrboro Open Space managed areas located within and adjacent to the proposed greenway location.

The NCNHP indicates that a designated Natural Area, the Bolin Creek Natural Area, occupies a majority of the Site. This Natural Area is designated as *R5? (General?)*, indicating that it may contain a high-quality example of a natural element (state or federally protected species, exemplary natural communities, or important animal assemblages), but further inventory is needed. This area has a Collective Rating of *C5 (General)*, indicating that it contains at least one tracked element and scores between 2 and 10 on a scale of 100.

Historic Resources

Based on a review of the NC State Historic Preservation Office (SHPO) data dated June 5, 2023, no properties listed on the National Register are located anywhere within the bounds of the Bolin Greenway Phases 3 or 4.

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An evaluation of archaeological resources is currently unavailable. No potential archaeological resources were identified in the Master Plan documentation; however, a review of the Carolina North Forest description provided by UNCCH Facilities Services (<https://facilities.unc.edu/carolina-north-forest/>), this area is described as “rich in historical and archaeological significance.” Greenway construction typically involves limited ground disturbance, but consultation with NCSHPO will be required as project plans are developed. Areas in which the proposed greenway route is located within disturbed environments such as sewer and power line easements are unlikely to harbor any archaeological sites.

Permitting Issues

Potential funding sources for the proposed project are anticipated from at least one, if not several, local public sources. Project funding with local or state funds trigger environmental documentation requirements under the State Environmental Policy Act (SEPA). Project funding that includes federal funding will trigger environmental documentation requirements under the National Environmental Policy Act (NEPA). However, based on the limited disturbance anticipated, Categorical Exclusion (CE) documentation may be sufficient to fulfill documentation requirements. A more detailed environmental review, including an Environmental Assessment (EA) or Environmental Impact Statement (EIS) may be determined necessary after a review of potential project impacts, particularly bridged stream crossings.

Depending upon project plans and potential impacts, coordination with, and concurrence from, various resource agencies is anticipated, including:

- the U.S. Army Corps of Engineers (USACE), concerning jurisdiction of any potential stream or wetland resources,
- the N.C. Department of Environmental Quality (NCDEQ), Division of Water Resources (DWR), concerning the applicability of riparian buffers,
- the USFWS, concerning potential impacts to federally protected species,
- the NCSHPO, concerning potential impacts to archaeological resources and historic properties,
- the NCNHP and NC Wildlife Resources Commission (NCWRC), concerning potential impacts to wildlife, state-protected species, and managed natural areas.

Depending upon the extent of final project plans, potential permitting activities may be authorized using one or more Nationwide Permits (NWP). These may include NWP 3 for Maintenance, NWP 18 for Minor Discharges, NWP 23 for Approved Categorical Exclusions, and NWP 42 for Recreational Facilities. NWP 3 and NWP 23 have no limits on the area of impacts to jurisdictional areas allowed, whereas NWP 18 is limited to the loss of 1/10 acre of waters of the U.S. (streams and wetlands) or less, and NWP 42 is limited to the loss of 1/2 acre of waters of the U.S. Each of these NWPs will require a corresponding General Water Quality Certification (WQC) from the NCDWR. The USACE requires 45 days to process a complete NWP application and the NCDWR general requires 30 days with a 30-day notification prior to submitting the application. If the project moves ahead without an approved CE and permanent impacts to potential jurisdictional areas exceed 1/2 acre, an Individual Permit (IP) will be

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required along with a corresponding NCDWR Individual WQC. The time required for IP approval is typically six months to a year.

All streams that exhibit an Ordinary High Water Mark (OHWM), regardless of flow regime, are considered potentially jurisdictional and all wetland areas that exhibit jurisdictional wetland criteria are considered potentially jurisdictional wetlands. Approval of jurisdictional areas with a Preliminary Jurisdictional Determination (PJD) assumes that all potentially jurisdictional features receive protections and impact limitations during permitting activities. Approval of jurisdictional areas with an Approved Jurisdictional Determination (AJD) is more involved and requires more significant effort on the part of the applicants and the natural resource agencies (in this case, the USACE and U.S. Environmental Protection Agency); however, potential jurisdictional areas that may not meet jurisdictional connection criteria may be removed from permitting requirements.

Since the 2009 investigation for the Master Plan document, updates to regulatory guidance may result in the addition of potentially jurisdictional stream features that do not exhibit intermittent or perennial flow and potential wetland areas that may not exhibit a direct surface connection to stream features. However, the recent Supreme Court decision in *Sackett vs. the EPA* (May 2023) may result in the removal of these features from jurisdiction. Guidance from the U.S. Army Corps of Engineers (USACE) Wilmington District is anticipated by the end of 2023. An updated delineation is recommended prior to project planning and permitting to appropriately quantify impacts to these features.

The applicability of Jordan Lake and Town of Carrboro Riparian Buffers and impacts to riparian buffers resulting from project activities will require authorization from the NCDWR and the Town. Uses designated as Exempt may proceed without authorization from the NCDWR. Uses designated as Allowable may proceed if there are no practical alternatives and require written authorization from the NCDWR. Uses designated as Allowable with Mitigation may proceed if there are no practical alternatives to the requested use and an appropriate mitigation strategy, such as in-lieu fee payments, is approved by the NCDWR.

- Greenways, hiking trails, and bridges are listed as Allowable under the Jordan Lake Riparian Buffer Rules.
- Temporary sediment and erosion control devices are listed as Exempt or Allowable under the Jordan Lake Riparian Buffer Rules, depending upon where they are situated within the riparian buffer and the type of impacts incurred.
- Temporary access roads are listed as Exempt if they impact less than 2500 square feet of the riparian buffer and Allowable if they impact greater than 2500 square feet of riparian buffer or are associated with culvert or bridge installation.
- The creation or adjustment of drainage ditches that does not alter stormwater flow across the buffer is an Exempt activity, whereas the realignment or creation of drainage with a stormwater management structure that causes drainage across the riparian buffer is listed as an Allowable activity under the Jordan Lake Riparian Buffer Rules. New drainage ditches or stormwater conveyances without stormwater management is Allowable with Mitigation.

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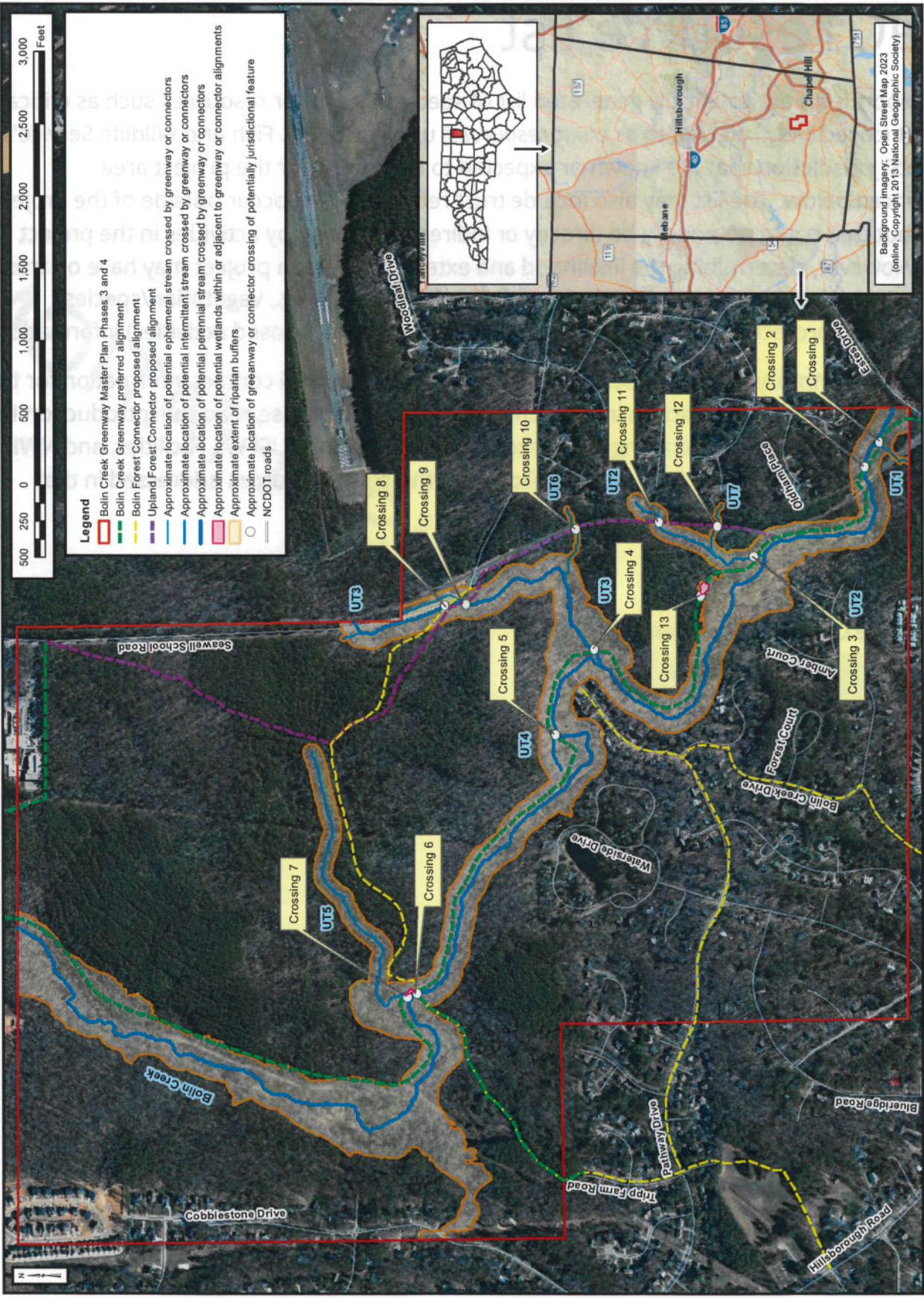
Please let us know if you have any questions about this information. We appreciate the opportunity to assist with this project.

Yours truly,

AXIOM ENVIRONMENTAL, INC.



Scott Davis
Senior Scientist/Project Manager



Legend

- Bolin Creek Greenway Master Plan Phases 3 and 4
- Bolin Creek Greenway preferred alignment
- Bolin Forest Connector proposed alignment
- Upland Forest Connector proposed alignment
- Approximate location of potential ephemeral stream crossed by greenway or connectors
- Approximate location of potential intermittent stream crossed by greenway or connectors
- Approximate location of potential perennial stream crossed by greenway or connectors
- Approximate location of potential wetlands within or adjacent to greenway or connector alignments
- Approximate extent of riparian buffers
- Approximate location of greenway or connector crossing of potentially jurisdictional feature
- NCDOT roads



Prepared for:
SUNGATE DESIGN GROUP

Project:
BOLIN CREEK GREENWAY TRAIL
 Orange County

Title:
Proposed Bolin Creek Greenway and Connectors
Locations and Constraints

Notes:

- Background imagery source: 2017 aerial photography provided by the NC OneMap Program (online, supported by the NC Geographic Information Coordination Council).
- Riparian buffers extend 100 feet from perennial streams, 60 feet from ephemeral streams, and 15 feet from ephemeral streams with a drainage area of greater than 5 acres, or to the limits of designated Flood Hazard Areas, whichever is furthest.
- Potential jurisdictional areas without a crossing of the proposed greenway or an applicable riparian buffer extending into the greenway or connector alignments were not assessed or depicted.

Drawn by: SGD
 Date: Sep 2023
 Scale: 1:7500
 Project No.: 23-025

FIGURE 1

Background Imagery: Open Street Map, 2023 (online, Copyright 2013 National Geographic Society)

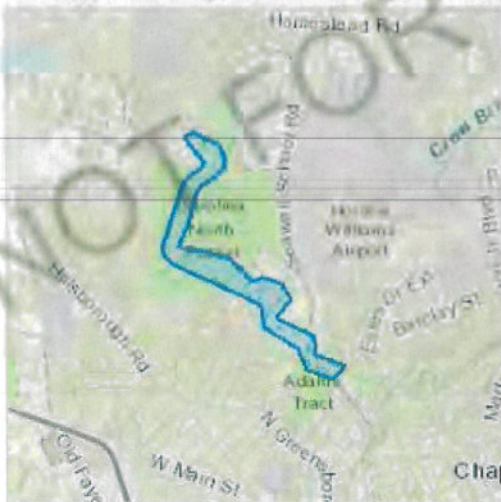
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Orange County, North Carolina



Local office

Raleigh Ecological Services Field Office

☎ (919) 856-4520

📠 (919) 856-4556

MAILING ADDRESS

Post Office Box 33726
Raleigh, NC 27636-3726

PHYSICAL ADDRESS

551 Pylon Drive, Suite F
Raleigh, NC 27606-1487

Endangered species

The primary information used to generate this list is the known or expected range of each species. Additional areas of interest (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., a dam upstream of a fish population even if the dam does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species list is not guaranteed to be found on or near the project area. To fully determine the potential for impacts, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to consult with the Secretary of the Interior when a project is listed or proposed to be listed may be present in the area of such project. For any project that is conducted, permitted, funded, or licensed by any Federal agency, the project must be listed on the official species list which fulfills this requirement. The project must be listed on the official species list from either the Regulatory Review section in the project area (see sections below) or from the local field office directly.

For project evaluations that require USFWS concurrent review, please refer to the IPAC website and request an official species list by doing the following:

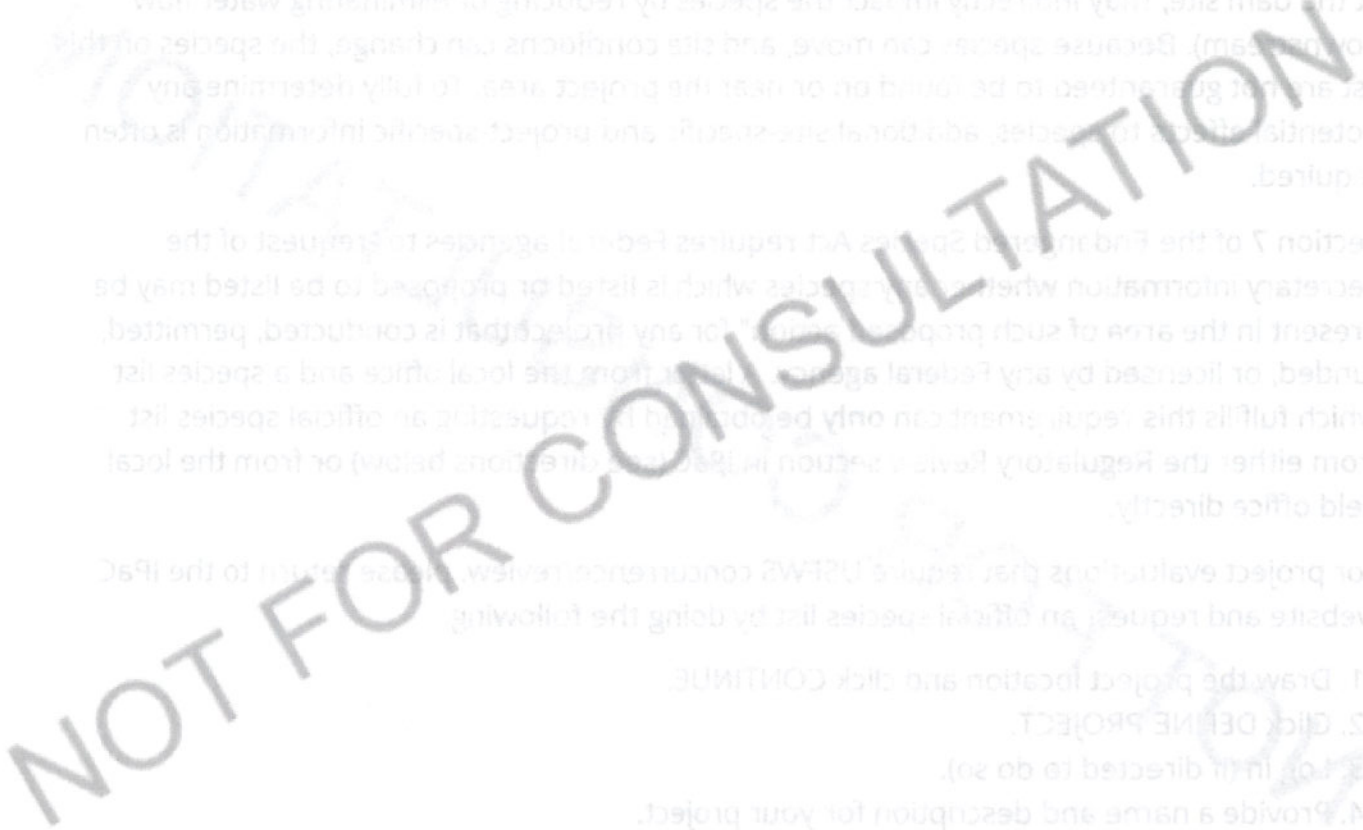
1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Click on the project location (to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species and their critical habitats are managed by the U.S. Fish and Wildlife Service (USFWS) and the Fisheries Division of the National Oceanic and Atmospheric Administration (NOAA Fisheries).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPAC also shows species that are candidates or proposed for listing. See the [listing status page](#) for more information. IPAC only shows species that are regulated by USFWS (see

FAQ)



Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

- 2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Tricolored Bat <i>Perimyotis subflavus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Clams

NAME	STATUS
Atlantic Pigtoe <i>Fusconaia masoni</i> Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5164	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the [Bald and Golden Eagle Protection Act](#) and the [Migratory Bird Treaty Act](#).

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON

Bald Eagle *Haliaeetus leucocephalus*

Breeds Sep 1 to Jul 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Golden Eagle *Aquila chrysaetos*

Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

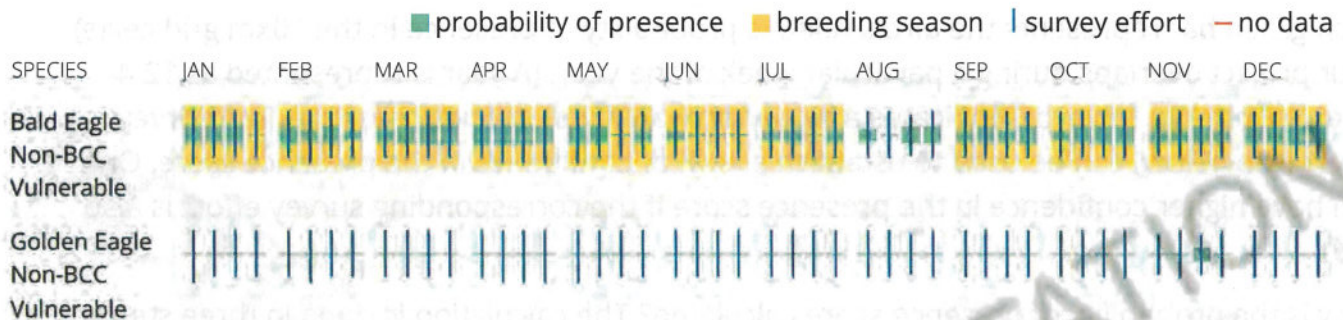
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply). To see a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the [Eagle Act](#) should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern \(BCC\)](#) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON

Bald Eagle *Haliaeetus leucocephalus*

Breeds Sep 1 to Jul 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Black-billed Cuckoo *Coccyzus erythrophthalmus*

Breeds May 15 to Oct 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9399>

Chimney Swift *Chaetura pelagica*

Breeds Mar 15 to Aug 25

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Eastern Whip-poor-will *Antrostomus vociferus*

Breeds May 1 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle *Aquila chrysaetos*

Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Kentucky Warbler *Oporornis formosus*

Breeds Apr 20 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler *Dendroica discolor*

Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler *Protonotaria citrea*

Breeds Apr 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker *Melanerpes erythrocephalus*

Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird *Euphagus carolinus*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Wood Thrush *Hylocichla mustelina*

Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

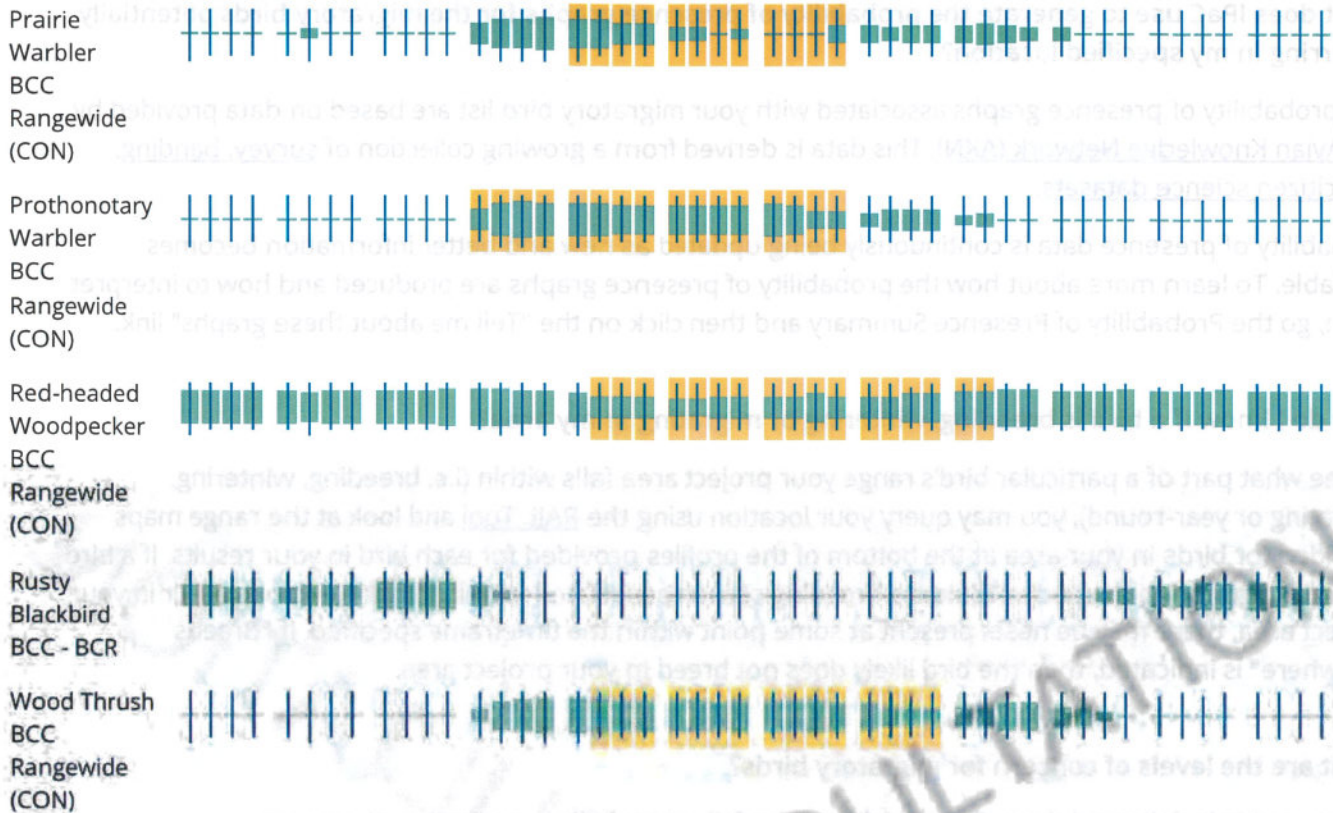
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

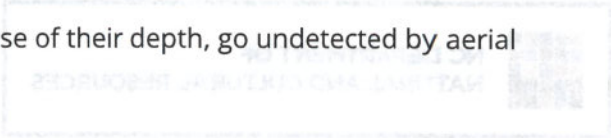
The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also



been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Sincerely,
[Illegible Name]



Roy Cooper, Governor

D. Reid Wilson, Secretary

Misty Buchanan

Deputy Director, Natural Heritage Program

NCNHDE-22463

June 28, 2023

Allison Keith
Axiom Environmental
218 Snow Ave
Raleigh, NC 27603
RE: Bolin Creek Greenway; 23-025

Dear Allison Keith:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: <https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37>.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Land and Water Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Bolton Creek Greenway
Project No. 23-025
June 28, 2023
NCNHDE-22463

No Element Occurrences are Documented within the Project Area

There are no documented element occurrences (of medium to very high accuracy) that intersect with the project area. Please note, however, that although the NCNHP database does not show records for rare species within the project area, it does not necessarily mean that they are not present; it may simply mean that the area has not been surveyed. The use of Natural Heritage Program data should not be substituted for actual field surveys if needed, particularly if the project area contains suitable habitat for rare species. If rare species are found, the NCNHP would appreciate receiving this information so that we may update our database.

Natural Areas Documented Within Project Area

Site Name	Representational Rating R5? (General?)	Collective Rating C? (Unranked)
Bolton Creek Natural Area		

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Orange County Water and Sewer Authority Property	Orange County Water and Sewer Authority	Local Government
Town of Carrboro Open Space - Adams Tract	Town of Carrboro	Local Government
Town of Chapel Hill Open Space	Town of Chapel Hill	Local Government
NC Land and Water Fund Conservation Agreement	NC DNCR, NC Land and Water Fund	State
Orange County Easement	Orange County	Local Government

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project. Definitions and an explanation of status designations and codes can be found at <https://ncnhde.natureserve.org/help>. Data query generated on June 28, 2023; source: NCNHP, Spring (April) 2023. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area

Bolin Creek Greenway
 Project No. 23-025
 June 28, 2023
 NCNHDE-22463

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	7784	Hemidactylium scutatum	Four-toed Salamander	1980-02-24	H	3-Medium	---	Special Concern	G5	S3
Crustacean	33070	Cambarus davidi	Carolina Ladle Crayfish	2008-12-03	E	3-Medium	---	Significantly Rare	G3	S3
Dragonfly or Damselfly	33764	Somatochlora georgiana	Coppery Emerald	2004-Pre	H?	5-Very Low	---	Significantly Rare	G3G4	S1?
Vascular Plant	34235	Crataegus succulenta	Fleshy Hawthorn	1932-Pre	H	5-Very Low	---	Significantly Rare	G5	S1S2
Vascular Plant	8524	Dichantherium annulum	Ringed Witch Grass	1902-Pre	H	4-Low	---	Peripheral	G4	S1
Vascular Plant	36779	Orbexilum pedunculatum	Sampson's Snakeroot	1898-07	H	5-Very Low	---	Endangered	G5T5?	S1
Vascular Plant	22304	Tridens chapmanii	Chapman's Redtop	1894-08-21	H	5-Very Low	---	Threatened	G5T3	S1S2

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Bolin Creek Natural Area	R5? (General?)	C? (Unranked)

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Orange County Water and Sewer Authority Property	Orange County Water and Sewer Authority	Local Government
Town of Carrboro Open Space	Town of Carrboro	Local Government
Town of Carrboro Open Space	Town of Carrboro	Local Government
Town of Carrboro Open Space - Adams Tract	Town of Carrboro	Local Government
Town of Carrboro Open Space - Anderson Community Park	Town of Carrboro	Local Government
Town of Carrboro Open Space - Baldwin Park	Town of Carrboro	Local Government

Managed Areas Documented Within a One-mile Radius of the Project Area

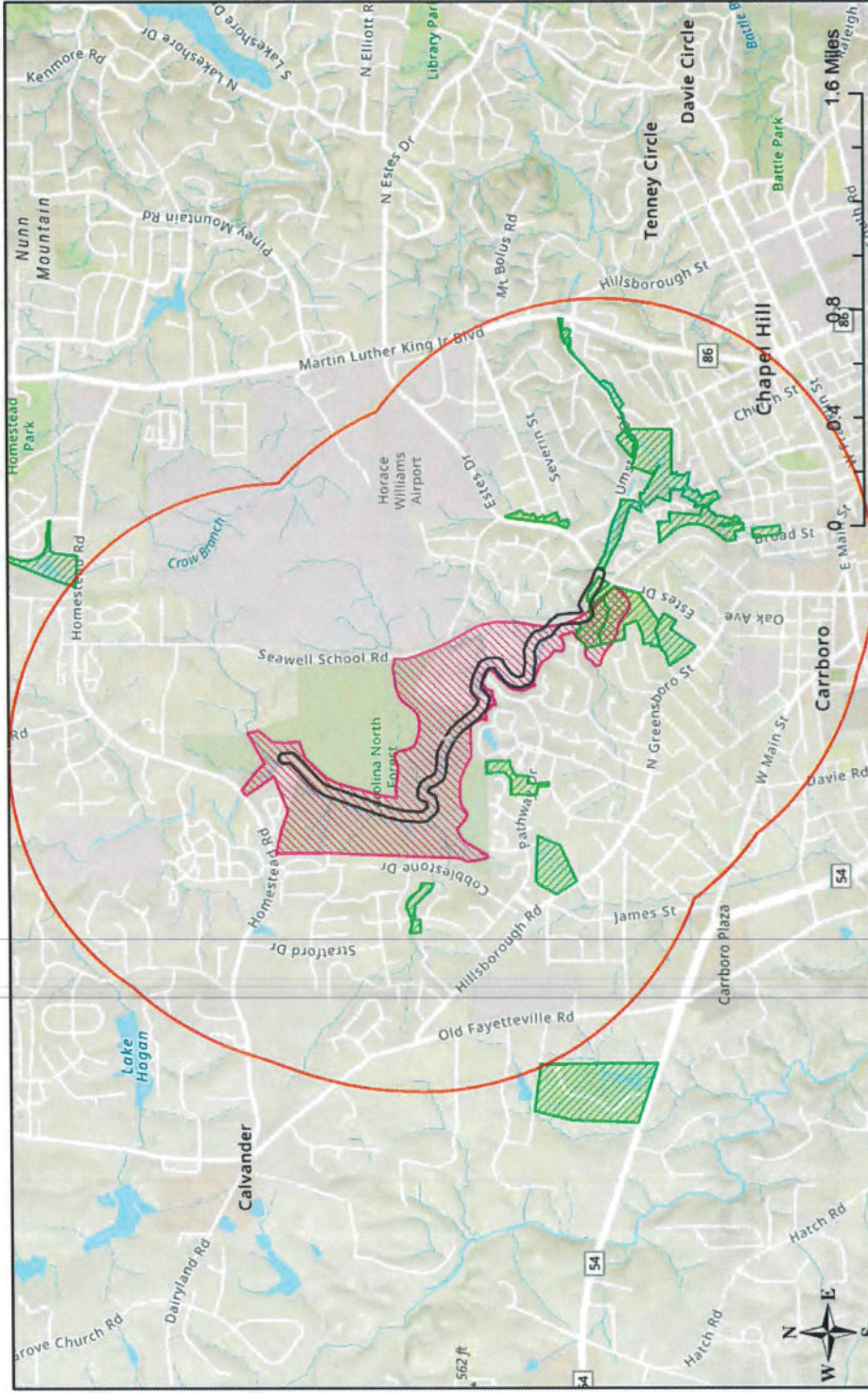
Managed Area Name	Owner	Owner Type
Town of Carrboro Open Space - Martin Luther King Jr. Park	Town of Carrboro	Local Government
Town of Carrboro Open Space - Wilson Park	Town of Carrboro	Local Government
Town of Chapel Hill - Bolin Creek Trail	Town of Chapel Hill	Local Government
Town of Chapel Hill - Umstead Park	Town of Chapel Hill	Local Government
Town of Chapel Hill Open Space	Town of Chapel Hill	Local Government
Town of Chapel Hill Open Space	Town of Chapel Hill	Local Government
Town of Chapel Hill Open Space	Town of Chapel Hill	Local Government
Town of Chapel Hill Open Space	Town of Chapel Hill	Local Government
NC Land and Water Fund Conservation Agreement	NC DNCR, NC Land and Water Fund	State
Orange County Easement	Orange County	Local Government

Definitions and an explanation of status designations and codes can be found at <https://ncnhde.natureserve.org/help>. Data query generated on June 28, 2023; source: NCNHP, Spring (April) 2023. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.



NCNHDE-23493: BOJHU C166K G166UW3A

NCNHDE-22463: Bolin Creek Greenway



- June 28, 2023
- NHP Natural Area (NHNA)
- Managed Area (MAREA)
- Buffered Project Boundary
- Project Boundary

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, M Robinson, NCEAS, NLE, OS, NMA, CoastCommunity, Rijkswaterstaat, GSA, Geoland, FEMA, Source: Esri, HERE, DeLorme, Mapbox, TomTom, Swatch, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community