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## ◊ North Carolina Wildlife Resources Commission ◊

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Town of Chapel Hill  
405 Martin Luther King Jr Blvd.  
Chapel Hill, NC 27514

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To Ms. Willger,

The NC Wildlife Resources Commission (NCWRC) is a partner in the Eno New Hope Landscape Conservation Group and was informed that the Greene Tract Environmental Assessment was available for public comment. Since the Greene Tract is one of the few places in the state where we know that four-toed salamanders (*Hemidactylium scutatum*) are breeding, the NCWRC has a few concerns about the proposed preservation areas recommended in the EA. The NCWRC is glad to provide information that informs decision-makers on how to avoid and minimize impacts to natural resources and wildlife habitats. The recommendations provided below are not regulatory although they may help development projects meet requirements of applicable environmental permits.

### *Improve protection for four-toed salamander habitat*

The Greene Tract is one of the few places in North Carolina where we know four-toed salamanders occur and are breeding.<sup>1</sup> Four-toed salamanders are a small salamander that uses headwater seeps, streams, and wetlands for breeding. Often these habitats are ephemeral and are not typically protected under state and federal regulations, as such four-toed salamanders are threatened by habitat loss, degradation, and fragmentation. The result being that four-toed salamanders are listed as a NC Special Concern species by the North Carolina Wildlife Resources Commission under the State Endangered Species Act (G.S. 113-331 to 113-337). This means that the population is known to be in decline and requires monitoring. NCWRC also considered it a Species of Greatest Conservation Need, a non-regulatory status that prioritizes conservation work for this species.<sup>2</sup> Amphibians, such as these, are sensitive to pollution, habitat fragmentation, and other forms of environmental degradation; their presence on the Greene Tract indicates that the environment is a high quality, connected, and functioning ecosystem.

As described in the Greene Tract EA, the four-toed salamander (and many other species of amphibians) is known to be using the seeps of Bolin Creek and Old Field Creek for breeding. Four-toed salamanders seem to prefer laying their eggs in mossy clumps adjacent to streams and wetlands. Eggs can take over a month to hatch. Upon hatching, the gilled larvae will move into adjacent wet areas and undergo metamorphosis, which will usually take a little over a month, before emerging from the streams and/or

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<sup>1</sup> There are approximately 73 current occurrences in the NC Natural Heritage Element Occurrence data. Most of these data are from observations of females on nests, but many are observations of adults with no indications of breeding. North Carolina Natural Heritage Program. 2021. Geographic Information System (GIS) data. NCDNCR, Raleigh, NC. Available at [www.ncnhp.org](http://www.ncnhp.org). (Accessed: 5/23/2021).

<sup>2</sup> NC Wildlife Resources Commission. 2015. NC Wildlife Action Plan. <http://www.ncwildlife.org/plan>

wetlands as a terrestrial salamander. Four-toed salamanders spend most of the year in the surrounding forest - in burrows underground, under rotting logs, and/or in mossy clumps and leaf litter.<sup>3</sup> Amphibians play an important role in our ecosystem; they are part of the food chain, preying on insect populations and providing nourishment to birds and mammals. They also contribute to nutrient cycling within the forest floor and in wetlands. As noted in Synterra's EA, NCWRC recommends that a minimum 150' no touch buffer be preserved around isolated and ephemeral wetlands to protect *many* of the amphibians using that wetland for breeding. NCWRC also recommends that an additional 600' beyond that critical habitat buffer be protected as much as possible to protect *most* of the amphibians using the wetland for breeding.<sup>4</sup> Four-toed salamanders are known to use forests beyond 150' from their breeding sites for foraging, burrowing, and other salamander activities. It does appear that the preserve scenarios proposed by Synterra will likely provide upland habitat protection to some degree, but it is not clear how far into the uplands these protections will go.

Besides moving between their breeding sites and the forest beyond, four-toed salamanders also move between breeding sites. NCWRC recommends that developers avoid building roads and other development between breeding sites, in small wetland complexes such as those that are present on the eastern side of the Greene Tract.<sup>5</sup> In addition to fragmenting their habitat, roads and other developed land uses contribute to increased stormwater run-off. Stormwater run-off associated with construction and impervious surfaces will impact the hydrology of these sensitive headwater systems and may make them unsuitable breeding habitat for amphibians, like the four-toed salamander. The previously developed land use concept maps (high, medium, and low alternatives) all avoided impacting connectivity of these wetlands by providing north-south road access and crossing Bolin Creek. While under most circumstances, NCWRC would recommend avoiding crossing creeks and streams whenever possible, in this situation a bridge crossing over Bolin Creek would be less impactful to the four-toed salamander than developing a road between the headwaters of Old Field Creek and Bolin Creek. If the currently 'proposed' road (following the old east-west roadbed) will be developed, biologists at NCWRC are available for consultation on reducing hydrologic impacts on the adjacent headwater seeps and on building wildlife underpasses to help amphibians and other wildlife species move between wetlands in the different watersheds.

#### *Protect ecological connectivity on the Greene Tract*

In 2016, the Eno New Hope Landscape Conservation Group was formed to bring together natural resources management and conservation professionals working in the Eno and New Hope watersheds to address concerns over habitat fragmentation in these rapidly developing watersheds. Orange County and the NCWRC jointly funded a landscape-scale habitat analysis to identify priority wildlife habitat patches and corridors for sensitive wildlife species in the Eno and New Hope watersheds. This plan was finalized in late 2019 and is available here: <https://ncbg.unc.edu/research/eno-new-hope-plan/> As of late July 2020, the data for this plan are publicly available via the NC Natural Heritage Program Data Explorer (<http://ncnhde.natureserve.org/content/map>). The Greene Tract is part of the priority habitat network, with medium and higher priority habitat patches for all three habitat types used in the assessment (sparsely-settled, mesic hardwoods, and uplands). Additionally, the tract includes corridors within it to connect mesic hardwood habitat patches and sparsely-settled habitat patches. These corridors are critical for species like four-toed salamander. The protection of wildlife corridors ensures that wildlife will have the ability to move across the landscape to find food, shelter, and mates and can adapt to our changing climate. The proposed

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<sup>3</sup> Meyer, Rachele. 2008. Hemidactylum scutatum. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: [www.fs.fed.us/database/feis/animals/amphibian/hesc/all.html](http://www.fs.fed.us/database/feis/animals/amphibian/hesc/all.html) [2021, May 23].

<sup>4</sup> Based on a review of scientific literature. For more information, see: NC Wildlife Resources Commission. 2012. Conservation Recommendations for Priority Terrestrial Wildlife Species and Habitats in North Carolina <http://www.ncwildlife.org/Portals/0/Conserving/documents/ConservingTerrestrialHabitatsandSpecies.pdf>

<sup>5</sup> Ibid.

east-west road will fragment these habitat patches and reduce the viability of the existing wildlife corridor. NCWRC recommends that planning for roads and other developed land uses avoid bisecting important natural areas so that habitats remain connected across the landscape.

Habitat fragmentation also degrades habitat by creating edge impacts between developed and natural land uses. Erosion, the spread of non-native, edge-dependent, invasive species into forested ecosystems, and daylighting of the forest ecosystem are some of the edge impacts that are associated with habitat fragmentation. NCWRC recommends that sensitive natural areas are buffered from incompatible land use (i.e., any development). Research indicates that transitional areas between forests and incompatible land uses should ideally be at least 200 m. wide to reduce negative impacts associated with edges.<sup>6</sup> Additionally, noise, outdoor lighting, and other disturbances to wildlife that result from proximity to human settlement are also reduced with wide transitional areas. While wide transitional areas are critical for reducing negative impacts from edges, developers can also assist in reducing these impacts by implementing best practices for wildlife. Some examples of these best practices include landscaping with only native plants, reducing lighting, and designing buildings to be bird-friendly. I have attached NCWRC's *Best Management Practices: Minimize Impacts of Development on Adjoining Wildlife Areas* to provide guidance (this was also included in the appendix of the Greene Tract EA).

Thank you for the opportunity to review the Greene Tract EA. NCWRC biologists are available for further consultation on this and other projects that have potential impacts to wildlife habitat.

Thank you for your time and consideration,



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<sup>6</sup> Pfeifer, M., Lefebvre, V., Peres, C. A., Banks-Leite, C., Wearn, O. R., Marsh, C. J., Butchart, S., Arroyo-Rodríguez, V., Barlow, J., Cerezo, A., Cisneros, L., D'Cruze, N., Faria, D., Hadley, A., Harris, S. M., Klingbeil, B. T., Kormann, U., Lens, L., Medina-Rangel, G. F., Morante-Filho, J. C., Olivier, P., Peters, S. L., Pidgeon, A., Ribeiro, D. B., Scherber, C., Schneider-Maunoury, L., Struebig, M., Urbina-Cardona, N., Watling, J. I., Willig, M. R., Wood, E. M., ... Ewers, R. M. (2017). Creation of forest edges has a global impact on forest vertebrates. *Nature*, 551(7679), 187-191.

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**Best Management Practices:  
Minimize Impacts of Development on Adjoining Wildlife Areas**

The NC Wildlife Resources Commission (NCWRC) recommends that sensitive wildlife habitats, such as Natural Heritage Natural Areas, be buffered from development by encouraging adjacent lands to remain in a rural land use. However, when development is going to occur on adjacent lands, we recommend clustering the buildings around existing infrastructure, and minimize clearing of the site to retain the maximum amount of buffer between developed land uses and natural areas. For more information on appropriate siting of development, see the [Preferred Development Design Guide](#). Developments can also incorporate some best management practices into its construction, design, and use to minimize its impact on wildlife habitats and wildlife passage. The following recommendations are a compilation of best management practices for minimizing impacts in developments.

**I. Minimize human conflict with wildlife.**

- A. Do not feed wildlife. Do not intentionally leave out human food, dog food, or any other food for the purpose of feeding wildlife.
  - 1. Discourage the use of bird feeders. If used: clean and disinfect them to prevent the spread of diseases between birds, provide fresh food, clean up loose seeds that attract rodents and squirrels.
- B. Limit human access to natural areas to officially approved trailheads
  - 1. Co-locate new trails within existing right-of-ways.
- C. Limit access of wildlife to trash
  - 1. Use secure garbage containers with tight-fitting lids; garbage cans can be secured with bungee straps, ratchet straps, or latches.
  - 2. Throw out garbage – particularly food waste -- on the morning of pick up, not the night before
- D. Use traps instead of rodenticides to control rodent populations – these poisons can be transferred up the food chain to carnivores and scavengers.
- E. Construct bat and bird boxes to provide roosting and nesting habitat.
- F. Provide materials (booklets, programs, etc.) or a signage program that educates occupants and visitors on wildlife and how to reduce impacts to wildlife habitats. NCWRC can provide assistance in development of these materials.

**II. Minimize lighting impacts**

- A. Plant dense native evergreen shrubs and trees around parking lots to block headlights shining into natural areas
- B. Choose lighting fixtures that are low mounted with baffles that direct light downward and away from natural areas

- C. Lights outside and within buildings should only be on when needed. Use motion-sensors to turn lights off when not needed and/or set lights to an automatic timer to turn off
- D. Light should be no brighter than necessary for the application. Minimize blue light emissions (CCT should be < 3,000 K). Aim for no more than 1.25 lumens per square foot of hardscape.

More information on minimizing light pollution can be found here:

[http://arlington.granicus.com/MetaViewer.php?view\\_id=44&event\\_id=1171&meta\\_id=166632](http://arlington.granicus.com/MetaViewer.php?view_id=44&event_id=1171&meta_id=166632) and <https://www.darksky.org/light-pollution/light-pollution-solutions/>

### **III. Minimize noise impacts and other disturbances related to human presence**

- A. Build solid walls/noise baffles between areas of high noise impacts, such as trash bins and loading docks, and the natural areas
- B. Consider constructing parking lots on the sides of buildings located opposite the natural areas
- C. Restore the native forest around the development to reduce the impacts of noise, lighting, and other disturbances to wildlife
- D. Schedule timing and control of initial construction operations and subsequent operation and maintenance to minimize disruption of biological community structure and function. In general, avoid forest clearing in spring and summer, when young wildlife cannot disperse.
  - 1. Avoid clearing the proposed project during the migratory bird nesting season, roughly March to August, or conduct surveys for active nests prior to construction to avoid wounding or killing migratory birds.
  - 2. Due to the decline in bat populations, avoid tree clearing activities during the maternity roosting season for bats (May 15 – August 15).

### **IV. Minimize runoff and use of landscaping chemicals.** NCWRC encourages stormwater management strategies that maintain post-development stormwater runoff conditions as close to pre-development conditions as possible. Low Impact Development (LID) techniques that preserve natural site features as a first step in site planning are encouraged.

- A. Utilize engineered LID techniques in cases where natural features cannot be protected sufficiently, examples include: pervious pavement, grass swales, rain gardens, bioretention cells.
  - 1. Grassed swales should be used in place of curb and gutter for new developments, except in areas with >5% slope.

2. Check dams, level spreaders, and other associated best management practices should be used to minimize the effect of stormwater runoff entering the riparian buffer areas.
  3. In areas where slopes exceed 5%, stormwater collected in piped conveyance systems should be directed away from surface waters and best management practices shall be employed at both the intake and the outlet areas.
  4. Conduct periodic monitoring of (engineered) mitigation features to assure continuous operation.  
More information on LID techniques can be found here:  
[http://www.onsiteconsortium.org/npsdeal/NC\\_LID\\_Guidebook.pdf](http://www.onsiteconsortium.org/npsdeal/NC_LID_Guidebook.pdf)  
<https://www.epa.gov/nps/urban-runoff-low-impact-development>
- B. Use the following preferred methods of sediment and erosion control:
1. Sediment and erosion control measures should be installed prior to any land-disturbing activity.
  2. The use of biodegradable and wildlife-friendly sediment and erosion control devices is strongly recommended. Silt fencing, fiber rolls and/or other products should have loose-weave netting that is made of natural fiber materials with movable joints between the vertical and horizontal twines.
  3. Silt fencing that has been reinforced with plastic or metal mesh should be avoided as it impedes the movement of terrestrial wildlife species.
  4. Regularly inspect erosion control measures throughout duration of use.
- C. Control water pollution through best management practices. Do not direct any runoff into corridor and stream.
- D. Do not place any engineered stormwater controls, such as bio-retention ponds, in natural areas.
- E. Regrade disturbed areas to contours that provide optimal aquatic and terrestrial wildlife habitat value or approximate original contours.
- F. Plant appropriate native shrubs and trees and other beneficial vegetation to speed recovery and provide pollinator habitat.
- G. Avoid use of herbicides, except to control invasive species.
1. Manage non-native, invasive species by pretreating the project site prior to construction, preventing spread during construction, and control non-native, invasive species throughout the monitoring period.
- H. If pesticides or chemicals will be used for site maintenance, stormwater runoff from the site should be funneled to bio-retention areas prior to discharge to streams or wetlands.

- V. Restore appropriate native vegetation – particularly forest cover – in all areas surrounding development.** NCWRC can provide guidance on appropriate species.
- A. Protect as much of a contiguous native canopy and understory as possible during construction to provide diverse, multi-age forest structure.
  - B. Plant a wide variety of native plants (select species that provide food, cover, and nesting habitat) that are appropriate for the site.
  - C. Avoid fescue-based mixtures because fescue is invasive and provides little benefit to wildlife.
  - D. Control invasive species that often gain a foothold on lands disturbed by grading and clearing
- More information on native and invasive species can be found here:  
<http://nc-ipc.weebly.com/nc-invasive-plants.html>  
[https://ncwildflower.org/native\\_plants/why\\_natives](https://ncwildflower.org/native_plants/why_natives)

**VI. Minimize bird collision with building windows**

- A. Use frosted or fritted glass facades, UV glass, art treatment of glass, netting, and screens, especially in the bird collision zone (from ground level up to 60'). See examples at:  
[http://default.sfplanning.org/publications\\_reports/bird\\_safe\\_bldgs/Standards%20for%20Bird%20Safe%20Buildings%20-%202011-30-11.pdf](http://default.sfplanning.org/publications_reports/bird_safe_bldgs/Standards%20for%20Bird%20Safe%20Buildings%20-%202011-30-11.pdf)
- B. Plant trees either directly adjacent to windows to slow birds down on approach to window, or place them far enough away so that there is no reflection of vegetation in window