



**Instructions for preparing and submitting
Request for Proposals
for the
North Carolina Wildlife Resources Commission**



Investigating Tricolored Bat Winter Roosting Ecology within the North Carolina Coastal Plain

Proposals will be evaluated by relevant biological staff and recommended for funding based on project design, available funding, estimated time to completion, applicant experience, and alignment with agency research priorities.

Proposal should be typed in 11-point font size and should include all required information as listed below. Information provided by NCWRC in the Request For Proposal may be used in the proposal language. Items 1-10 should not exceed 7 pages total, and completed proposal should not exceed 15 pages.

Questions may be addressed to Katherine Etchison (katherine.etchison@ncwildlife.org).

Required Information for Full Proposal:

1. Title Page (title of project, name and contact information for lead personnel)
2. Executive Summary
3. Project Need Definition
4. Background that addresses project need and proven efficacy of planned methodologies. Include citations.
5. Project Objectives and Tasks
6. Methods, including study area and/or lab facility
7. Anticipated Deliverables/Products
8. Anticipated Benefits
9. Potential Risks (to schedule, personnel, local ecosystem, etc.)
10. Concurrent Commitments
11. Budget and Budget narrative. Detail any work that will be subcontracted.
12. Proposed project schedule
13. Personnel biographies (education, relevant experience, etc.); subcontractors should be included in this list. A list of relevant completed projects may also be included. Do not include full resumes and do not exceed ½ page per person.
14. Federal and state endangered species recovery permits held or applied for.

Proposal should be submitted as a single PDF file to research@ncwildlife.org. Deadline for submission has been extended from October 18 to October 31, 2024.

North Carolina Wildlife Resources Commission

Request for Proposal

Date: September 23, 2024

Research Title: Investigating Tricolored Bat Winter Roosting Ecology within the N.C. Coastal Plain

Specific Problem or Research Need

Winter roosting behavior of the tricolored bat (*Perimyotis subflavus*) within the NC Coastal Plain is poorly understood. A radio-telemetry study investigating winter roosting ecology of this species is needed to help inform management decisions and to guide conservation and mitigation strategies on the NC Coastal Plain.

Background

The federal listing of the tricolored bat as endangered has been found to be warranted and a final decision is expected soon from the USFWS. NCWRC staff recently documented tricolored bats roosting in 5 culverts and 16 bridges in winter within the Coastal Plain region of NC. All tricolored bats exhibited behavioral signs consistent with torpor. These findings suggest tricolored bats within the Coastal Plain could be vulnerable to impacts from winter culvert or bridge construction projects because they rarely hibernate underground in this region and may be torpid. Furthermore, many transportation structures in NC are aging and the knowledge gap for tricolored bats relative to their seasonal use of structures and use of torpor may result in increased impacts from winter construction projects.

The extent to which tricolored bats within the NC Coastal Plain use torpor and their general winter roosting ecology (i.e., where they roost, how often they switch roosts, how far they travel when roost-switching) have not been investigated. Newman et al. (2021) studied tricolored bats in winter on the Upper Coastal Plain of South Carolina and found bats roosting in bridges on colder days and in trees on warmer days. They also found that bats used torpor during each day of observation and used both <24-hour and multi-day torpor. A radio-telemetry study similar to the one by Newman et al. (2021), conducted in North Carolina, using NCWRC's recent tricolored bat winter roosting records as capture sites, would provide better understanding of tricolored bat winter roosting ecology, torpor patterns, and surveillance for WNS.

Anticipated Project Objectives and Tasks

Objective 1: Understand selection of winter roost habitats by tricolored bats.

- Task 1.1 – Locate bat roosts through use of radio-telemetry.
- Task 1.2 – Characterize roost types based on features like structure type and dimensions, tree species and dimensions, and other relevant features.
- Task 1.3 – Characterize roost locations by exploring relationships between roosts and surrounding landcover types and proximity to biologically relevant features like roads, streams, and other relevant features.

Objective 2: Discern tricolored bats' winter roosting behaviors.

- Task 2.1 – Collect time and location data from radio-tagged bats until transmitter loss or battery exhaustion.

- Task 2.2 – Analyze data from task 1 to determine selection of roost sites over time during winter.
- Task 2.3 – Determine distances bats travel between roosts.
- Task 2.4 – Document number of bats and bat species present at roost sites and structure types.

Objective 3 – Understand tricolored bat use of torpor in winter.

- Task 3.1 – Determine how often bats use torpor during winter from temperature-sensitive radio transmitter data.
- Task 3.2 – Determine at what ambient conditions bats use torpor.
- Task 3.3 – Explore relationships between torpor use and roost type, location on the Coastal Plain, early vs. late winter, and other relevant factors.

Objective 4 – Understand potential susceptibility to White-nose Syndrome.

- Task 4.1 – Swab bats to determine if *Pseudogymnoascus destructans* (*Pd*) is present on tricolored bats in winter.
- Task 4.2 – Determine if roost temperatures are suitable for growth of *Pd*.

All necessary state and federal permits must be acquired; however, it may be possible for the contractor to work under the Commission’s ESA Section 6 Cooperative Agreement. Field work should be conducted from November to March with a goal of two field seasons and at least 30 tagged bats. NCWRC will provide data on suitable capture sites and will help guide the project. There is potential for periodic field help if needed.

Anticipated Deliverables

- Quarterly progress reports (QPR), at the completion of each quarter
- Final report
- Final presentation
- All raw data collected

Anticipated benefits

The project will increase understanding of winter roosting and torpor behavior of the tricolored bat within the Coastal Plain Region of NC. Results will guide efforts to avoid or minimize negative impacts to roosting tricolored bats and will aid in NCWRC’s management responses to White-nose Syndrome.

Anticipated timeline:

Entire project: January 2025 – December 2027

Field work: November 2025 – March 2027

Anticipated budget: \$100,000 to \$180,000

References

Newman, B. A., S. C. Loeb, and D. S. Jachowski. 2021. Winter roosting ecology of tricolored bats (*Perimyotis subflavus*) in trees and bridges. *Journal of Mammalogy* 102:1331-1341.