



Image Details

# Neuse River Waterdog

## FWS Focus

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## Overview

The Neuse River waterdog is one of the rarest salamanders in the Southeastern US. This permanently aquatic salamander received federal protection as threatened on June 9, 2021. As a narrow endemic, it is only found in the Neuse and Tar-Pamlico River Basins of North Carolina (NC). It lives in medium to large streams and rivers in the Piedmont and Coastal Plains.

The Service and state wildlife agencies are working with numerous partners to conserve the Neuse River waterdog and restore its habitat while meeting the socioeconomic, political and cultural needs of current and future generations. Land trusts are targeting key parcels for acquisition. Federal, state, and university biologists are surveying and monitoring species occurrences, and recently there has been increased interest in efforts to consider captive propagation and species population restoration via augmentation, expansion, and reintroduction efforts.

# Threats

Habitat degradation is the primary threat. It affects water quality, water quantity, instream habitat suitability, and habitat connectivity. The remaining populations are small, isolated, with a contracted range that makes them vulnerable to catastrophic and natural events.?

The Neuse River waterdog is extremely susceptible to the effects of siltation, or the deposit of sediments in freshwater. The major threats to this species arise from water development projects such as the construction of impoundments and stream channelization. Pollution from industrial and urban development can also cause loss of habitat by lowering dissolved oxygen levels and increasing suspended solids and sediments in streams.

Other nonpoint sources of pollution carried into the streams by water, or runoff also affects the Neuse River waterdog. Natural and human-made substances like animal waste, fertilizers, pesticides, herbicides, and chemicals associated with coal mining can all cause changes in water chemistry that severely impact aquatic species. Increased levels of nitrogen and phosphorus, excessive algal growth, instream oxygen deficiencies, increased acidity, and conductivity can all have adverse effects on the health of river dwelling species.

## Actions and partnerships underway

### Research

The USFWS and the North Carolina Wildlife Resources Commission (NCWRC) funded a 5-year research project. As of May 2021, the Service awarded \$110,000 to North Carolina State University to examine the relationship between environmental stressors and the distribution, drivers of reproduction and population viability of Neuse River waterdogs. Researchers will project how future land use may affect the species' ability to persist in its current range and make recommendations for surveys to improve detection.

### Recovery plan under development

In November 2021, the Service adopted a Recovery Outline for the Neuse River Waterdog. The document offers a preliminary road to recovery for the Neuse River Waterdog until a recovery plan for the species is approved. The recovery plan will include objective and measurable criteria that, when met, will ensure the conservation of the waterdog.

## **Facilitating habitat restoration and releasing waterdogs in private lands**

The USFWS and NCWRC have drafted a programmatic Safe Harbor Agreement for 21 aquatic species that will support species restoration efforts, including population augmentation and reintroduction of the Neuse River Waterdog into historically occupied or other suitable habitats. The draft agreement is currently under review by staff at both agencies.

## **Avoiding, minimizing and mitigating impacts from transportation projects**

The USFWS and NC Department of Transportation have entered into a programmatic consultation agreement to minimize and mitigate impacts from bridge and culvert construction and maintenance activities. We seek to ensure projects are conducted with appropriate methods for protecting instream habitat, and support recovery actions for the Neuse River Waterdog through fees.

## **Land acquisitions**

Conservation land trusts are targeting parcels for acquisition in key watersheds occupied by the Neuse River Waterdog.

## **Facilitating conservation at commercial timber thinning or harvest**

The USFWS and the NC Forest Service have partnered to implement Foresters for Healthy Waters, a program that offers supplemental conservation assistance for landowners who want to implement enhanced aquatic habitat protection for rare and at-risk species. The two-year pilot program is underway in seven counties within the Neuse River Waterdog's range, and it may be continued and expanded if successful.

## **Regulatory protections**

The USFWS included exceptions to the prohibition of incidental take in the final listing rule, in accordance with section 4(d) of the Endangered Species Act, for species restoration efforts, channel restoration and bank stabilization projects, and certain forest management activities that are expected to offer net conservation benefits.

The USFWS designated critical habitat at 779 river miles that fall within 18 units in Craven, Durham, Edgecombe, Franklin, Granville, Greene, Halifax, Johnston, Jones, Lenoir, Nash, Orange, Person, Pitt, Wake, Warren, Wayne, and Wilson Counties, North Carolina. The designation extends Endangered Species Act protections to the critical habitats.

The North Carolina Department of Environmental Quality has special nutrient management plans for the Tar-Pamlico River Basin and the Neuse River Basin to help reduce nutrients that cause excessive growth of microscopic or macroscopic vegetation and lead to extremely low levels of dissolved oxygen in the water.

**Scientific Name**

*Necturus lewisi*

**Common Name**

Neuse River Waterdog

**FWS Category**

Amphibians

**Kingdom**

*Animalia*

**Location in Taxonomic Tree** ⓘ ()

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Genus

↳ *Necturus*

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Species

↳ *Necturus lewisi*

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**Identification Numbers**

**TSN:** ⓘ ()

173627 

**Characteristics**

LIFE CYCLE



HABITAT



**FOOD****PHYSICAL CHARACTERISTICS**

# Geography

## Range

Narrow endemic

Found only in the Neuse and Tar-Pamlico River Basins of North Carolina (NC), it inhabits medium to large streams and rivers in the Piedmont and Coastal Plains.

The Neuse River Waterdog historically was known from 40 HUC-10 watersheds (i.e., 10-digit hydrologic units) of the Tar-Pamlico and Neuse River Basins of North Carolina. It is known to occur in streams ranging from larger headwaters in the Piedmont downstream to coastal rivers, to the point of saltwater influence. Neuse River Waterdogs need clean, flowing water characterized by high dissolved oxygen concentrations. Their preferred habitats vary with season, temperature, dissolved oxygen content, flow rate, and precipitation; however, Neuse River waterdogs maintain home retreat areas under rocks, in burrows, or under substantial cover (e.g., leaf litter) in backwater or eddy areas over hard clay, gravel, cobble, or coarse sand (Braswell and Ashton 1985).

## Historical range

The Neuse River waterdog is endemic to the Tar-Pamlico and Neuse River basins in North Carolina. Its historical distribution includes the Piedmont and Coastal Plain regions of North Carolina within all major tributary systems of the Tar and Neuse, including the Trent River Basin.

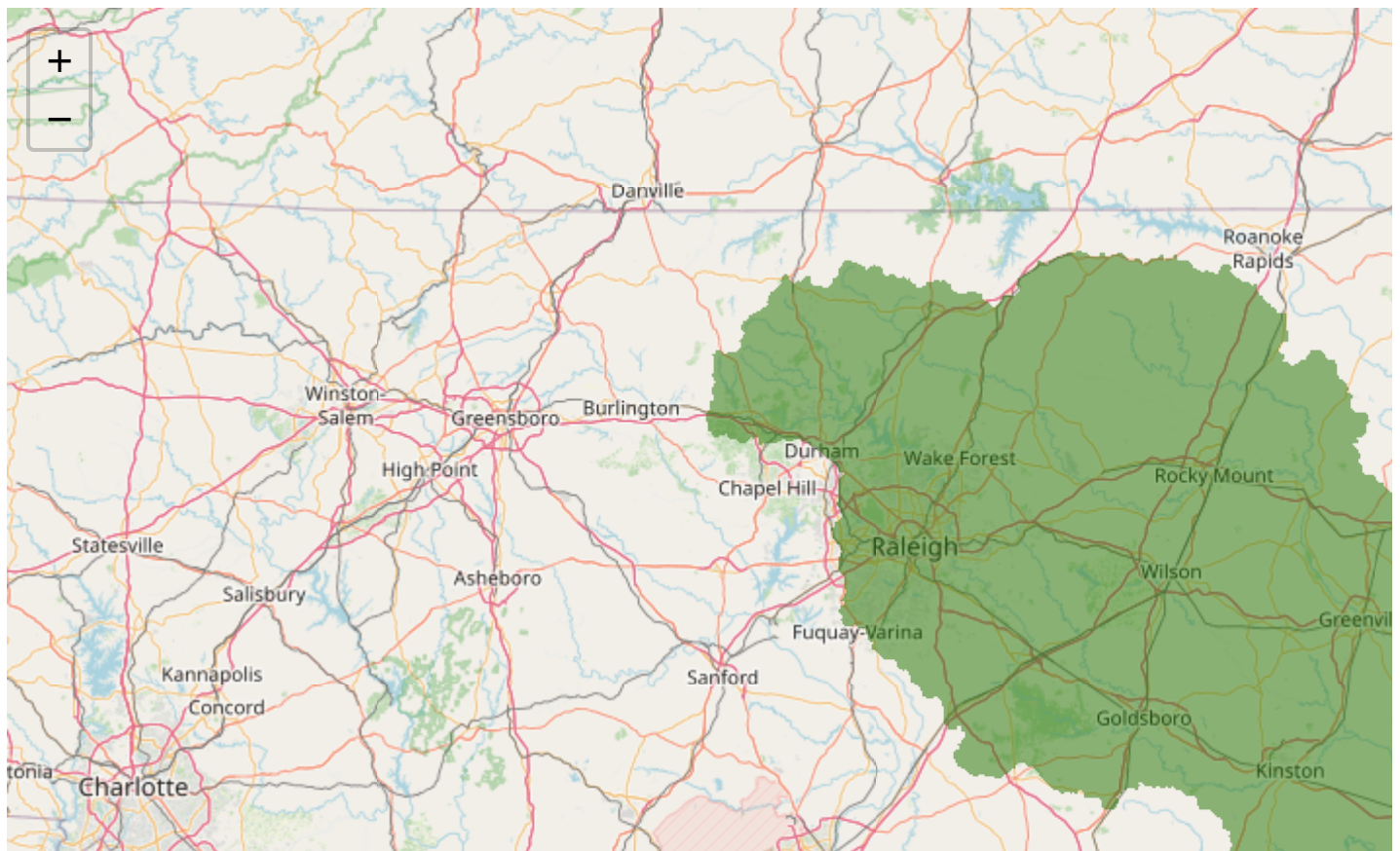
## Current range

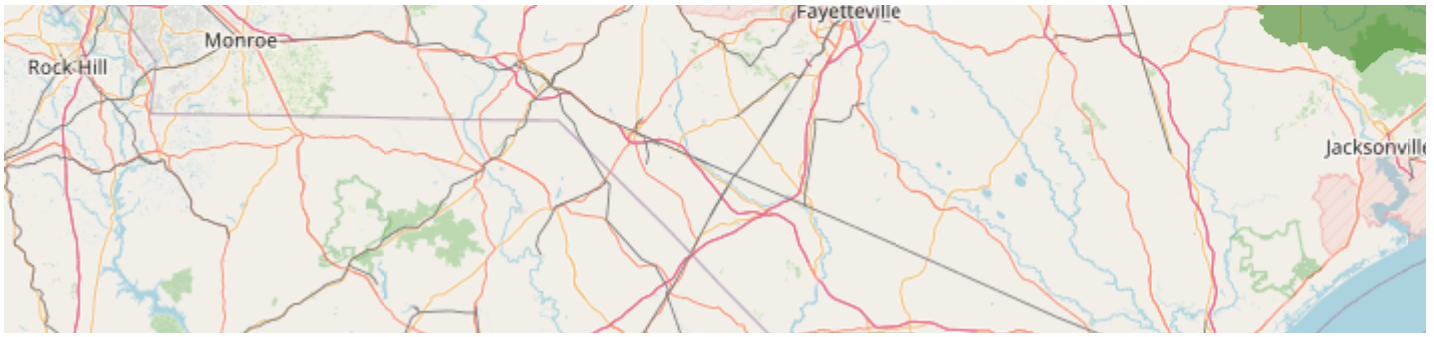
Today, the species is known to occupy the Neuse and the Tar River basins of North Carolina. The species is not known to migrate.

The madtom is known or believed to occur in these counties: Craven, Durham, Edgecombe, Franklin, Granville, Greene, Halifax, Johnston, Jones, Lenoir, Nash, Orange, Pitt, Vance, Wake, Warren, Wayne, Wilson

## Factors that limit the Neuse River waterdog's range:

Several specific habitat requirements of Neuse River Waterdogs limit their persistence in degraded habitats. They need free flowing, highly oxygenated waters; they are not known to occur in lakes, ponds, or impounded waters, and are they unable to persist in intermittently flowing streams that regularly run dry or in perennial stream reaches dried by extended droughts. Like most amphibians, Neuse River Waterdogs have permeable skin, likely making them vulnerable to pollution and other factors that degrade water quality. This species is sensitive to turbidity and sedimentation. Neuse River Waterdogs need uncompact stream bed and foraging habitats that are free of fine sediments and that can support prey species. They also need appropriate protective cover (boulders, woody debris) that is silt free so they can attach eggs and that is unembedded, leaving open space underneath as a retreat area. The egg and larval life stages are particularly vulnerable to these and other stressors (e.g., predation). Finally, the slow growth, delayed reproductive maturity of Neuse River Waterdogs further limits their ability to adapt to rapidly changing habitat conditions or respond to punctuated or long-term impacts to populations.






# Timeline

Explore the information available for this taxon's timeline. You can select an event on the timeline to view more information, or cycle through the content available in the carousel below.

12 ITEMS



Jun 9, 2021

 Listing (Threatened)



## Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for...





**Publication type:** Final

**Population:**

[VIEW FEDERAL REGISTER DOCUMENT](#)

ITEM 12

Key:


-  Event
-  Regulatory Status Change

## Refine Your Search


Content Type

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## Information & Media

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## Partial 90-Day Finding on a Petition To List 404 Species in the Southeastern United States as Endangered or Threatened With Critical Habitat

Listing

Sep 27, 2011

90 day petition finding

## Threatened Species Status With Section 4(d) Rule for Neuse River Waterdog and Endangered Species Status for Carolina Madtom and Proposed Designations of Critical Habitat

4d

May 22, 2019

Proposed

## Threatened Species Status With Section 4(d) Rule for Neuse River Waterdog and Endangered Species Status for Carolina Madtom and Proposed Designations of Critical Habitat

Critical Habitat

May 22, 2019

Proposed

## Threatened Species Status With Section 4(d) Rule for Neuse River Waterdog and Endangered Species Status for Carolina Madtom and Proposed Designations of Critical Habitat

Listing

May 22, 2019

Proposed

Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Neuse River Waterdog and Endangered Status for Carolina Madtom and Designations of Critical Habitat

Critical Habitat

Jul 30, 2020

Proposed

Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Neuse River Waterdog and Endangered Status for Carolina Madtom and Designations of Critical Habitat

Notice

Jul 30, 2020

Comment Period Reopening

Neuse River Waterdog (*Necturus lewisi*) Species Status Assessment v1.2

Species Status Assessment Reports

Feb 1, 2021

version 1.2

Neuse River Waterdog (*Necturus lewisi*) Species Status Assessment v1.1

Species Status Assessment Reports

Nov 1, 2018

version 1.1

## Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Neuse River Waterdog and Endangered Status for Carolina Madtom and Designations of Critical Habitat

4d

Jul 30, 2020

Proposed

## Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Neuse River Waterdog, Endangered Species Status for Carolina Madtom, and Designations of Critical Habitat

Critical Habitat

Jun 9, 2021

Final

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