



# Anuran Community Monitoring, 2014

## Overview

The southeastern U.S. hosts one of the most diverse amphibian communities in North America, accounting for nearly one-half of all the amphibian species in the U.S. Because of their complex life histories, anatomical and physiological characteristics, and dependence on both terrestrial and aquatic community types for some of their life stages, amphibians are well known to be excellent indicators of a wide range of ecosystem stressors and change (e.g., contaminants, land-use, hydrology, climate). They also provide several ecosystem services including insect-pest control and as food for other animals. Long-term trends in the community composition and distribution of amphibian populations provide a measure for assessing the ecological integrity and sustainability in southeastern systems. Significant population declines and extinctions worldwide have increased concern for this group.

## Study Area

Moore's Creek National Battlefield (MOCR) is in southern-coastal North Carolina approximately 32 kilometers (20 miles) northwest of Wilmington, North Carolina (Figure 1). The primary purpose of Moore's Creek is to interpret the pivotal Revolutionary War battle that occurred on the site. However, Moore's Creek also hosts a variety of natural resources. The 36-hectare (88-acre) park contains a small portion of Moore's Creek in its western section, just north of the confluence of Moore's Creek and the Black River. Moore's Creek is a tidally influenced blackwater stream with an approximate width of 8 meters (26 feet).

Vegetation communities within Moore's Creek National Battlefield include riparian areas, dry pine forests, and wet pine savannahs. The riparian areas are generally dominated by bald cypress (*Taxodium distichum*) while the uplands are a mix of loblolly pine (*Pinus taeda*) and sweetgum (*Liquidambar styraciflua*). A large area in the center of Moore's Creek National Battlefield is undergoing a restoration process to return it to its historic condition of wet savannah. Despite its small size, the park hosts several state-listed plant species.

The area adjacent to Moore's Creek National Battlefield consists of pulp-wood forests and other agriculture; however, no effects on Moore's Creek resources from these land use activities have been documented. Moore's Creek National Battlefield has 18 known anuran species.

## Significant Findings

- Automated recording devices (ARDs; Figure 2) were used to collect data from 3/23/2014 through 6/8/2014 at 11 spatially balanced random locations.
- Vocalizations from 13 native anuran species were identified.

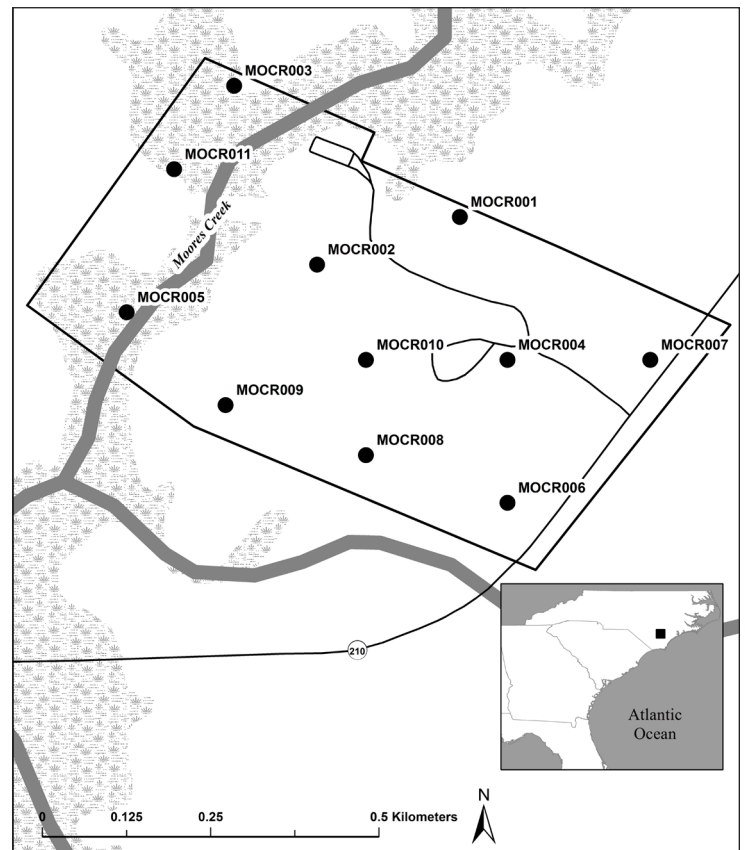


**Figure 1.** Spatially balanced random sampling locations at Moore's Creek National Battlefield, 2014.

- A total of 214 vocal detections were made using the ARD recordings. Each detection represents an identifiable observation of a species or species group during one night of monitoring at a sampling location.
- The Cope's gray treefrog (*Hyla chrysoscelis*) and the pine woods treefrog (*Hyla femoralis*) were the most frequently occurring anurans detected at MOCR in 2014.
- The southern leopard frog (*Lithobates sphenocephalus*) had the highest relative frequency of detection of anuran vocalizations over the 77-day recording period in 2014; the barking treefrog (*Hyla gratiosa*) had the second-highest relative frequency of vocal detections.
- The pine woods treefrog and the Cope's gray treefrog were the most widely distributed species during 2015 monitoring efforts and were detected throughout both the north-south and east-west expanses of MOCR.
- No non-native species were found.

## Sampling Methods

Auditory surveys are a common way to monitor amphibians, specifically vocal anurans (i.e., frogs and toads that vocalize). Because most amphibians vocalize through the night, the peak-vocalization periods differ across species, and the likelihood that anurans will vocalize varies with weather conditions (i.e., temperature, precipitation, relative humidity), automated recording devices (ARD) are an excellent tool to accommodate these challenges.

ARDs allow us to safely collect recordings through the night, encompass a large temporal window, and cover a wide range of climatic conditions that maximize the likelihood of detecting all of the species present.

Every four nights from approximately March/April to June, the ARDs collect a 30-second recording every ten minutes each hour from dusk to dawn for 77 days. The recordings are then analyzed with specialized software programmed to detect the anuran vocalizations, which are later confirmed by an experienced biologist. Data were collected at 11 sampling location at Moores Creek National Battlefield in 2014 (Figure 1).



Figure 2. Automatic recording device used for data collection.

## About the Southeast Coast Network

In 1999, the National Park Service initiated a long-term ecological monitoring program, known as “Vital Signs Monitoring”, to provide the minimum infrastructure to allow more than 270 national park system units to identify and implement long-term monitoring of their highest-priority measurements of resource condition. The overarching purpose of natural resource monitoring in parks is to develop scientifically sound information on the status and long-term trends in the composition, structure, and function of park ecosystems, and to determine how well current management practices are sustaining those ecosystems.

The NPS Vital Signs Monitoring Program addresses five goals for all parks with significant natural resources:

- Determine the status and trends in selected indicators of the condition of park ecosystems,
- Provide early warning of abnormal conditions,
- Provide data to better understand the dynamic nature and condition of park ecosystems,
- Provide data to meet certain legal and Congressional mandates, and
- Provide a means of measuring progress toward performance goals.

The Southeast Coast Network includes twenty parks, seventeen of which contain significant and diverse natural resources. In total, SECN parks encompass more than 184,000 acres of federally-managed land across North Carolina, South Carolina, Georgia, Alabama, and Florida. The parks span a wide diversity of cultural missions, as they include four national seashores, two national historic sites, two national memorials, seven national monuments, and two national military parks, as well as a national recreation area, a national battlefield, and an ecological and historic preserve. The parks range in size from slightly more than 20 to nearly 60,000 acres, and when considered with non-federal lands jointly managed with NPS, the Southeast Coast Network encompasses more than 253,000 acres.

## For More Information

SECN Home Page:

<http://science.nature.nps.gov/im/units/secn/index.cfm>

SECN Reports & Publications:

<http://science.nature.nps.gov/im/units/SECN/publications.cfm>

About the NPS Inventory & Monitoring Program:

<http://science.nature.nps.gov/im/index.cfm>

Data Downloads via the Natural Resource Information Portal:

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