

Southeast Coast Network

National Park Service
U.S. Department of the Interior

Inventory and Monitoring Division
Southeast Coast Network



Vocal Anuran Community Monitoring Program Summary

Overview

Amphibians rely on the availability of fresh, clean water to survive and successfully reproduce. Anuran communities respond fairly quickly to environmental stressors or changes. Changes in anuran species composition, richness, and distribution on the landscape may reflect alterations to underlying ecological conditions of park resources.

National parks comprise valuable protected landscapes where long-term monitoring can detect and track anuran population trends that can inform assessments of ecosystem integrity and sustainability. Our monitoring data contribute to understanding how park resources and natural communities respond to changing environmental conditions, informing park management decision making.

The southern region of the United States hosts the highest amphibian diversity in North America. The South is home to at least 45 species of anurans (i.e., frogs, toads, and treefrogs). Thirty-two species of anurans have been documented (NPSpecies) within the 15 park units that have been monitored by the National Park Service's Southeast Coast Inventory and Monitoring Network (SECN) since 2012.



Parks where monitoring is conducted: CAHA, Cape Hatteras NS; CALO, Cape Lookout NS; CANA, Canaveral NS; CHAT, Chattahoochee River NRA; CONG, Congaree NP; CUIS, Cumberland Island NS; FOFR, Fort Frederica NM; FOMA, Fort Matanzas NM; FOPU, Fort Pulaski NM; FOSU, Fort Sumter & Fort Moultrie NHP; HOBE, Horseshoe Bend NMP; KEMO, Kennesaw Mountain NBP; MOCR, Moores Creek NB; OCMU, Ocmulgee Mounds NHP; and TIMU, Timucuan E&HP (E&HP, Ecological & Historic Preserve; NB, National Battlefield; NBP, National Battlefield Park; NHP, National Historical Park; NM, National Monument; NMP, National Military Park; NP, National Park; NRA, National Recreation Area; NS, National Seashore).



Green treefrog (*Dryophytes cinereus*) is one of the most common anurans found throughout the Southeast Coast Network NPS photo (NPgallery).

Protocol Objectives:

1. Evaluate status of vocal anuran community species richness during the breeding season
2. Assess vocal anuran occupancy and spatial distribution at sampling locations during the breeding season



Automated recording devices at Fort Sumter and Fort Moultrie National Historical Park, left; and Horseshoe Bend National Military Park, right.

Methods

Sampling Design

The network utilizes a randomly-selected, spatially-balanced set of sample locations (up to 30 per park), based on considerations including park size, hypothesized variability in wildlife populations, and logistics. Sample locations are permanent and revisited on a three-year rotation, five parks per year.

Data Collection

Automated recording devices (ARDs) are deployed from March to June. They record every fourth night, in 60-second intervals every 20 minutes from 20:00 to 04:40. The ARDs are collected from the field after recording is complete and audio files are downloaded to a computer for classification and analyses.

Manual Classification of Recordings and Data Analysis

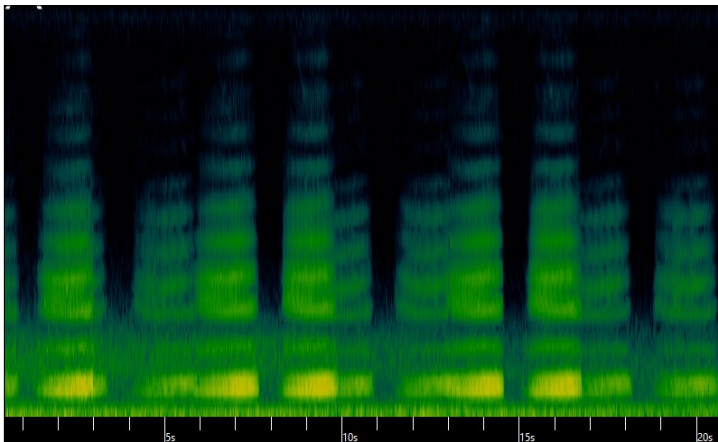
Classification of recordings is completed using the computer program Kaleidoscope Pro. A subset of potential signals are extracted and manually classified. Species richness and related characteristics, occupancy, and spatial distribution of the park's vocalizing anuran community are analyzed. A percentage of potential signals extracted out are manually classified. Only detections of anurans identified to the species level are included in the analysis. Metrics for native vs. non-indigenous species, if applicable, are calculated separately.

Species Richness and Composition

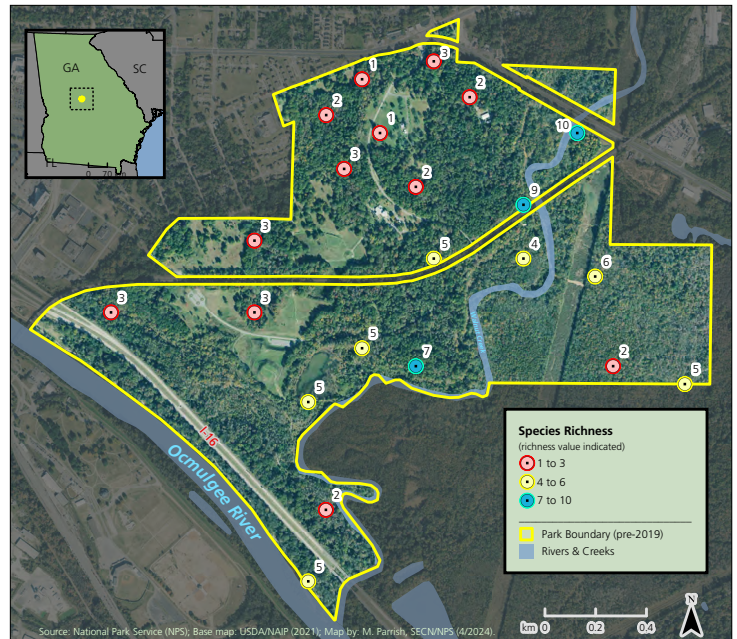
Species richness, a count of unique species, is calculated for each park as a whole as well as at the sample location scale. Species richness is calculated separately for native versus non-indigenous species.

Occupancy

Naïve occupancy or frequency of occurrence is calculated as the percent of sampling locations where a species was detected in one or more recordings.



Audio spectrogram documenting River Frog (*Lithobates heckscheri*) vocalizations recorded at the Thomas Creek unit of Timucuan Ecological and Historic Preserve in 2015.



Anuran species richness at 22 sampling locations in Ocmulgee Mounds NHP based on audio recording detections in 2022.

Spatial Distribution

Species incidence records are mapped to visually assess spatial distributions of detected anurans across the park. Understanding anuran distribution informs park management of species and their requisite habitats. Trend analysis can assess changes in species distribution and community makeup, highlighting influences on park diversity (e.g., land use change and habitat condition, climate issues, and hydrological processes).

About the Southeast Coast Network

The Southeast Coast Network (SECN) includes eighteen administrative areas containing twenty park units, fifteen 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 serve a wide diversity of cultural and natural resource missions and include: five national monuments, four national seashores, three national battlefield parks, two national historic parks, a national memorial, a national recreation area, an ecological and historic preserve, and a single national park. The parks range in size from slightly more than 20 acres to nearly 60,000 acres, and when considered with non-federal lands jointly managed with NPS, the network encompasses more than 253,000 acres.

For More Information

[SECN Home Page](https://www.nps.gov/im/secn/index.htm)

(<https://www.nps.gov/im/secn/index.htm>)

[NPS Inventory and Monitoring Program](https://www.nps.gov/im/index.htm)

(<https://www.nps.gov/im/index.htm>)

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