



Incidence of Chytrid Fungus Parasitism in SECN Parks

Vital Sign Overview

The Southeastern U.S. is host to one of the most diverse amphibian communities in the world. With an estimated 140 amphibian species, more than half of which are salamanders, the Southeast accounts for about half of the total number of amphibians in the U.S. The Southeast Coast Network (SECN) of the National Park Service has 61 known amphibian species; 26 in Caudata, and 35 in Anura. A chytrid fungus, *Batrachochytrium dendrobatidis* (Bd), and the disease caused by this fungal pathogen, chytridiomycosis, has been linked to amphibian-population declines and extinctions around the world. Next to habitat loss, Bd is considered the most significant threat to amphibian populations. Recent efforts have sought to determine the prevalence of Bd within the SECN.

Significant Findings

Bd was detected at Chattahoochee River National Recreation Area (CHAT), Congaree National Park (CONG), Horseshoe Bend National Military Park (HOBE), and Kennesaw Mountain National Battlefield Park (KEMO).

Approximately 10% of all amphibians sampled tested positive. Bd was only detected in amphibians that were in the genera *Lithobates* and *Eurycea*. Frogs in the genus *Lithobates* were the most frequently infected amphibians.

No clinical signs of the disease were observed in any infected animals.

The finding of Bd in *Lithobates palustris* (pickereel frog) at CONG is notable as this species is considered a Species of Special Concern by the state of South Carolina.

One salamander species found to be infected with Bd, *Eurycea cirrigera* (southern two-lined salamander; Figure 1), was both a new species occurrence and a range extension of Bd.



Figure 1. Southern two-lined salamander (*Eurycea cirrigera*) was a new species occurrence and range extension of Bd.

Bd testing has been incorporated into the long-term amphibian-monitoring protocol to identify changes in community structure in parks where Bd is known to occur.

Incidence of Bd in SECN parks

Bd was detected in four parks in the SECN (Table 1). Cooler temperatures and moister conditions are considered more optimal for the prevalence of Bd infection. Due to environmental conditions (i.e., prolonged periods of high temperatures), the fungus is less likely to persist at Canaveral National Seashore (CANA), Cumberland Island National Seashore (CUIS), and Timucuan Ecological and Historic Preserve / Fort Caroline National Memorial (TIMU/FOCA). Additionally, it is less likely to have substantial impacts on populations in these locations or occur frequently enough to be detected in low- to medium-intensity surveys.

Table 1. Incidence of Bd in SECN parks by species and location.

Scientific Name	CALO	CANA	CAHA	CHAT	CONG	CUIS	HOBE	KEMO	MOCR	OCMU	TIMU
<i>Lithobates</i> spp.				X							
<i>Lithobates catesbeiana</i>								X			
<i>Lithobates clamitans</i>							X				
<i>Lithobates palustris</i>					X						
<i>Eurycea cirrigera</i>							X				

Sampling Area

Eleven parks were sampled for Bd from 2005–2008: CAHA, CALO, CANA, CHAT, CONG, CUIS, HOBE, KEMO, MOCR, OCMU, and TIMU/FOCA.

Parks were selected based upon a) estimated high amphibian diversity, b) estimated high relative abundance, c) efficient access across the park, and d) variability in amphibian habitat types.

Sampling effort was approximately equally distributed across each park in an attempt to adequately characterize all park lands, including within and across habitat types.

More than 550 samples from 11 parks were collected and analyzed.

Additional sampling will be required to supplement sample sizes that may have been too small to detect Bd.



Figure 2. Parks within the SECN that were sampled for Bd between 2005–2008.

About the Southeast Coast Network

The Southeast Coast Network (SECN) 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 also, including four national seashores, two national historic sites,

two national memorials, seven national monuments, two national military parks, as well as a national recreation area, 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 Network encompasses more than 253,000 acres.

About the Inventory & Monitoring Program

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 current 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 ecosystem,
- 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 towards performance goals.

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/reports.cfm>

Inventory & Monitoring Program: <http://science.nature.nps.gov/im/index.cfm>

Data Downloads via the Natural Resource Information Portal: <http://nrinfo.nps.gov/Home.mvc>

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