



# DoD Amphibian Disease Survey: Do Frogs Still Get Their Kicks on Route 66?

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## Introduction

For many years, the Department of Defense (DoD) has used an ecosystem management approach to maintain and/or restore biological diversity and sustain use of land and water resources on its properties. DoD lands support a variety of species, including species listed as threatened or endangered under the Endangered Species Act (ESA). This is largely a result of the protected nature of the DoD landscape, in concert with the management and land use.

In recent years, scientists have observed precipitous population declines and die-offs of amphibians worldwide (Skerratt et al., 2007). Emerging diseases such as chytridiomycosis (caused by the fungus *Batrachochytrium dendrobatidis* (*Bd*)) are a major cause of many amphibian population declines and extinctions. While the origin and spread of these amphibian diseases are being studied, their distribution and the species that are most vulnerable are not well understood.

Partners in Amphibian and Reptile Conservation (PARC) is a partnership of federal, state, university, industry, NGO and private sector representatives who work towards conserving amphibians, reptiles and their habitats as integral parts of our ecosystem and culture through proactive and coordinated public/private partnerships. PARC held the first international Amphibian Disease conference in November 2007 to share their efforts in research and management related to emerging diseases including chytridiomycosis. As a result of this conference, a worldwide mapping effort is underway.



Green Treefrog—picture by Paul Black



Gray Treefrog—picture by Joe Mitchell

## Methods

DoD and PARC have joined forces to conduct an emerging disease survey for *Bd* across North America. Amphibians on fifteen DoD installations located along historic Route 64 and 66 (Virginia to California, Fig. 1) are currently being sampled for the presence of *Bd*. The Route 64/66 was selected as a transect for this study because it bisects twelve states, 19 ecoregions (including a diversity of habitat types), and provides a coast to coast sampling distribution.

Three wetland habitats on each of the fifteen DoD sites will be sampled three times in 2009 during the following seasons: 1) mid-spring, 2) mid-summer, 3) mid-fall. The field procedure to collect samples from captured amphibians is based on that of Kriger et al. (2006b, 2007). Amphibians are captured by hand. A sterile swab is stroked over each amphibian's dorsal and ventral surfaces, sides, and undersides of the thighs. Field samples are sent to a qualified laboratory for analysis and detection of *Bd*. Additional data collected from each captured animal includes species, snout vent length and sex. Captured animals are released back to where they were captured.

Precautions to prevent cross-contamination are being taken and include keeping individuals separate from the time of collection, using a new plastic bag to retain each frog, using a new pair of gloves to handle each animal, and swabbing animals before collecting any morphometric measurements.

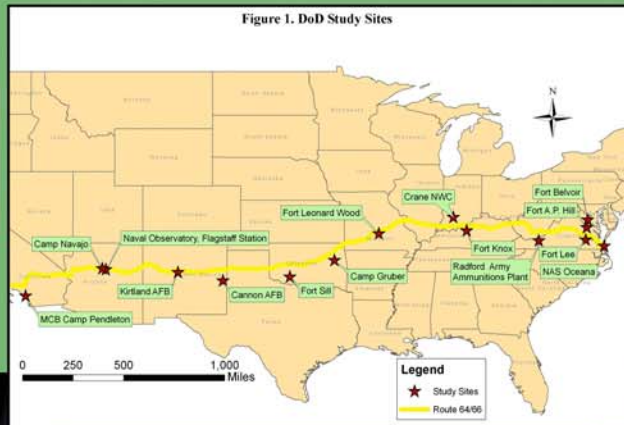


Swabbing a Pine Woods Treefrog—picture by Joe Mitchell

## Abstract

Amphibians (frogs, toads and salamanders) play essential roles, both as predators and prey, in the ecosystems of Department of Defense (DoD) lands. The emerging disease chytridiomycosis (caused by the fungus *Batrachochytrium dendrobatidis*, or *Bd*) is a major cause of many amphibian population declines and extinctions worldwide. DoD and Partners in Amphibian and Reptile Conservation (PARC) have joined forces to conduct an emerging disease survey for *Bd* across the North American continent on DoD lands. Sampling sites are located along Route 64 and historic Route 66 (Virginia to California). The DoD-wide significance of this study is the prevention of negative impacts to military readiness as a result of degrading ecosystem health (amphibian population die-offs and declines). Funding for this project was provided by the DoD Legacy Resource Management Program.

Figure 1. DoD Study Sites



## Project Update

To date, we have completed two of the three (mid-spring and mid-summer) surveys at all fifteen installations. Field samples have been sent to a laboratory for analysis and detection of *Bd*. We have not received the results of those analyses.

Surveys have been opportunistic and included both common and listed species. We have collected data on approximately 500 individuals of 15 species.

The final results of this study we will seek to answer the following questions:

1. Is *Bd* present in amphibians on the surveyed DoD installations?
2. Is *Bd* seasonally more, or less detectable?
3. Do sampled amphibians show signs of the disease chytridiomycosis?
4. Which amphibian species are carriers of the diseases?
5. What amphibian species are most vulnerable to population declines from the disease?



Gray Treefrog—picture by Joe Mitchell

## Benefits to the Military Mission

The DoD-wide significance of this study is the prevention of negative impacts to military readiness as a result of degrading ecosystem health (amphibian population die-offs and declines). In addition, the results of this investigation will support DoD natural resource managers and environmental specialists with the management and conservation of amphibian species by:

1. providing baseline data on the health of amphibian populations (and general health status of the ecosystem)
2. defining mitigation opportunities or liabilities (e.g., areas with, or without amphibian disease detected), so that corrective actions can be taken to remove sensitive or endangered species from further contact with amphibian pathogens
3. assisting with management, and aid in preventing population declines, of listed and common amphibian species, thus avoiding new restrictions on current missions
4. Helping to prevent common amphibian species from being regulated as a result of population declines from emerging diseases.

## Acknowledgements

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