



# DoD Amphibian Disease Survey: Natural Resource Manager Training and Data Collection

Project # 13-426

## Background

Amphibians play an essential role in the ecosystems of Department of Defense (DoD) lands. The fungal disease chytridiomycosis, caused by *Batrachochytrium dendrobatidis* (*Bd*) is a major cause of many amphibian population declines and extinctions worldwide. Successful management and control of these diseases requires effective surveying to detect their presence/absence, an understanding of their distribution and abundance, and preparation to respond to outbreaks.

## Objective

As an extension of previous studies conducted by the authors in 2009 and 2011 (Legacy Projects 09-423 and 11-423), a goal of this investigation was to conduct additional surveys for the chytrid fungus *Bd* on DoD lands. Unlike our previous surveys where we sent one researcher to multiple military sites to sample amphibians for *Bd*, in this investigation we trained DoD natural resource managers at multiple military installations to collect field data simultaneously. As a result we sampled for *Bd* at more than three times the number of military sites than in our previous surveys.

In this study, we sought to answer how widespread *Bd* is on the surveyed DoD installations; whether sampled amphibians show signs of the disease chytridiomycosis; which amphibian species are carriers of the disease; and which amphibian species are most vulnerable to population declines from the disease (including T&E species).

## Summary of Approach

In order to standardize the data collection effort, we developed an amphibian swabbing training video and datasheet and conducted three online training sessions for project volunteers. In addition, we sent volunteers field swabbing kits containing all the materials need to collect field data. We followed a non-invasive protocol for capturing and swabbing amphibians to ensure consistency in data collection and to prevent the transfer of *Bd*, if present, from one amphibian to another.



**Figure 1.** Volunteer swabbing a Spring Peeper (*Pseudacris crucifer*).

## Benefit

The results of our study will benefit the natural resource missions of the installations by determining if the *Bd* pathogen is present or absent on a particular installation; determining which species are infected with the *Bd* pathogen; providing data on if the *Bd* pathogen is reaching levels where it could be lethal to amphibians; and raising awareness about this disease and its potential impacts to amphibian populations.

The DoD-wide significance of this study is the minimizing of negative impacts to military readiness as a result of degrading ecosystem health (potential amphibian population die-offs and declines).

## Accomplishments

We mailed 71 field swabbing kits to military installations within 37 U.S. states and three countries outside the United States (Guam, Spain, and Okinawa). Of the installations who received kits, six were Air Force, 24 were Army, 14 were Army National Guard, 4 were joint bases, 2 were Marine Corps, and 21 were Navy installations. Of the 71 field swabbing kits mailed to military installations, 52 were returned containing 932 unequivocal results. Thirty-five (70%) had at least one positive result for *Bd*. Percent positive samples per installation ranged from 5.0 to 81.1%. Prevalence for all the samples was 24.2% (226 samples). There did not appear to be any spatial pattern to the military sites that contained positive samples throughout the United States. We sampled a total of 57 amphibian species during this investigation. Of these species, 16 tested positive for *Bd*. At no point during this study did we observe dead or dying amphibians.



## Conclusions

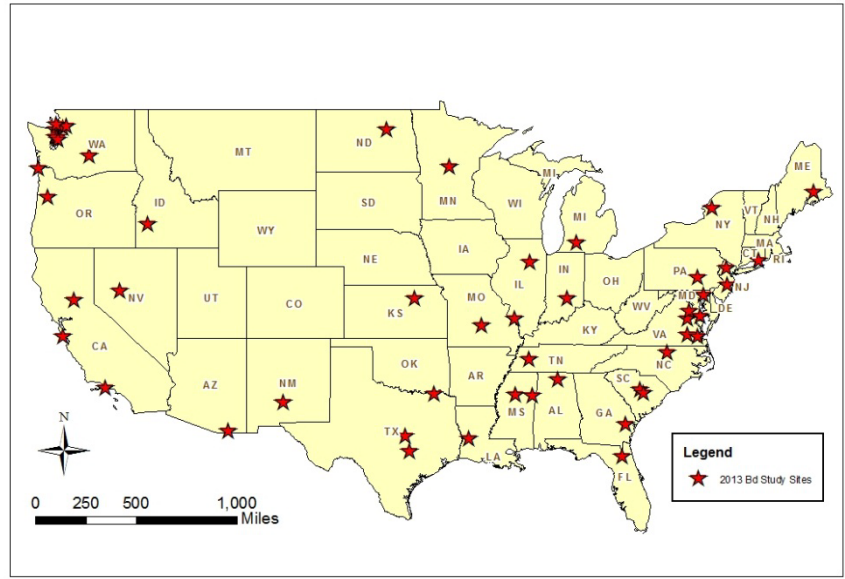
Although *Bd* is present on the majority of the military sites tested in this study, at this time the fungus does not appear to be having a negative impact on amphibian species. The average zoospore equivalent for positive samples was much less than required for a *Bd* infection to be considered the disease chytridiomycosis. Therefore, even though *Bd* is present on many military installations across the United States, it is not reaching the levels of the disease chytridiomycosis and does not appear to be negatively impacting amphibian populations on those sites. The results of this study support the hypothesis that *Bd* can today be considered endemic (likely to have been spread through North America decades ago) rather than epidemic (spreading as a wave and wiping out individuals, populations, and species in its path).

## Contact Information

Robert Lovich  
DoD PARC Director  
619-532-1478  
[robert.lovich@navy.mil](mailto:robert.lovich@navy.mil)

Chris Petersen  
DoD PARC Manager  
757-322-4560  
[chris.petersen@navy.mil](mailto:chris.petersen@navy.mil)

**Figure 2.** Location of military sites that returned samples in 2013.



**Figure 3.** Military sites with positive and negative results for the *Bd* pathogen 2013.

