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**Park/NPS Unit:** El Malpais National Monument

**Title of Project:** Phase III -Characterization of *Geomyces* spp.from Soil Samples from ELMA Caves

**Administered through the:**  Colorado Plateau Cooperative Ecosystem Studies Unit Cooperative Agreement Number H1200-09-0005

**CESU Partner:** University of New Mexico

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X NPS Funding

[ ]  Is this funded using a reimbursable account number? If yes, IMR contracting needs a copy of the Interagency Agreement.

**Project Dates:**

**Start Date:** June 1, 2012

**Any Other Product Milestone Dates you need to include:** none

**End Date:** July 31, 2013

**PROJECT ABSTRACT:**

In 2006, a newly emergent fungal pathogen (*Geomyces destructans,* the putative agent that causes White Nose Syndrome) was first documented on hibernating bats in New York and by 2009 it had moved over 450 miles across eight states and had killed well over 5 million bats. By spring of 2010, *Geomyces destructans* had been found in Oklahoma on cave myotis (*Myotis velifer incautus*), the first evidence of it infecting a western bat species. To understand the potential of this threat to El Malpais National Monument (ELMA) bats, the Principal Investigator and Co-Investigator on the previous CPCESU Project, Debbie Buecher, undertook a study of the presence of *Geomyces* spp. in soil and guano samples, and on the bats themselves in ELMA lava caves. ELMA has many lava caves used by hibernating bats, yet little is known about the microclimate conditions chosen by these animals. Temperate bats in the family Vespertilionidae use hibernation during winter months when they face greater thermo-regulatory demands (cold temperatures), and reduced food resourcesEvidence suggests that *G. destructans* prefers 2-14ºC and high (nearly saturated) humidity. Unfortunately, these conditions are also preferred by many bat species for hibernation. The study of the presence of *G. destructans* was expanded to understand the microclimate conditions in sites chosen by hibernating bats, which will be critical for understanding which species will be at greatest risk from WNS. As part of these studies, DNA was extracted from the soil and guano cave samples and from a subset of bats that were swabbed to obtain microbial inhabitant DNA. This DNA was amplified and selected to look for presence of *Geomyces* using next generation sequencing We have several soil samples from our ten test caves in El Malpais National Monument that test positive with the genetic primers for *Geomyces destructans*. Because these primers are realistically only accurate to the genus level, i.e. *Geomyces*, we undertook next generation sequencing, which results in genetic sequences that are 200-350 bases long. This sequencing showed several positive for the presences of the genus in the ten test caves and further tested suggested that at least one of the caves contained sequences that were very close to that of the type sequence for *Geomyces destructans*. After consulting with Andrea Porras, a fungal genetic expert from Western Illinois University, we determined that the best way to ascertain whether these sequences are likely to be *G. destructans*, was to obtain longer length genetic sequences through cloning and Sanger sequencing of samples that were positive for *Geomyces*.