United States Department of the Interior

NATIONAL PARK SERVICE
Great Basin National Park
100 Great Basin National Park
Baker, Nevada 89311-9700

SNPLMA Round 16: Conservation Initiatives

Title: Can land managers prevent the "inevitable collapse" of bats in the western US?

Amount Requested: $1,193,632.00

Nominating Organization: National Park Service, Great Basin National Park

Agency Contact:
Bryan Hamilton - Wildlife Biologist
Science and Natural Resource Management
5500 W HWY 488
Baker, Nevada 89311
(775) 234-7563
(775) 234-7336 (fax)
bryan_hamilton@nps.gov

Supporting Documentation (attached)

- Cost Estimate Summary
- Four-year Expanded Budget
- Maps
- Letters/Statements of Support

Federal Manager Initials: __SNM__
Steven Mietz
Superintendent
Great Basin National Park
National Park Service
(775) 234-7502- Office
(775) 234-6315 - Cell
steven_mietz@nps.gov

Federal Manager Initials: _____
for Michael J. Herder
Ely District Manager
Bureau of Land Management
702 North Industrial Way
Ely, NV 89301
mherden@blm.gov

Who and What: The National Park Service (NPS; lead agency) in partnership with the Bureau of Land Management (BLM), U.S. Forest Service (USFS), partner wildlife agency, and academia will conserve bat communities at the landscape scale through science-based bat conservation and protection, installation of bat gates, management focused research, educational outreach, and public engagement. This information is intended to protect bat populations from catastrophic declines, engage the public in bat conservation, and prevent future listing of bat species under the Endangered Species Act.

This project will:

1) Identify and gate significant bat roosts and hibernacula in caves and abandoned mines
2) Provide early warning for white-nose syndrome (WNS) via surveillance for *Pseudogymnoascus destructans (Pd)* via:
    a) Estimation of vital demographic parameters of survival, longevity and abundance using capture mark recapture (CMR).
    b) Documenting the ecological physiology of hibernating bats and microclimate selection using thermal imagery.
    c) Quantifying spatial variation in roost site selection and network structure in cavernicolous bats and the potential for roost climates to support WNS using Bayesian habitat modeling.
3) Engage the public in bat conservation through interpretive programs, environmental education, and citizen-science;

Where: As volant animals, bat management requires collaboration across administrative boundaries. This project is multi-scale, and incorporates multiple agencies, land management units, and ecoregions. The project area is Great Basin National Park (GRBA) and the surrounding mountain ranges and valleys, including Schell Creek Range, North Snake Range, South Snake Range, Spring Valley and Snake Valley in White Pine County, Nevada. The project site is centered at 38° 56' 14" W and 114° 18' 17" W. See map 1. Project is located in Congressional District NV04 (2012).

Why: The collapse of bat populations in the western United States may be imminent (Rodhouse et al. 2015). Bats are crucial to ecosystem function and provide billions of dollars in ecosystem services annually. The most pressing issue facing North American bats is disease. White-nose syndrome has devastated bats in the eastern United States, causing the death of up to 6 million bats. Unprecedented levels of bat mortality have led directly to the listing of one species, prevented the delisting of two species, and prompted the petitioning of several other bat species under the Endangered Species Act. Based on its current rate of spread, climate suitability, and geography, WNS is projected to arrive in Nevada by 2021 (Blehert et al. 2009). White Pine County is ranked as the 10th most susceptible county west of the Mississippi for WNS (Ihlo 2013). The recent confirmation of WNS from Washington State suggests that WNS is moving faster than modeling has predicted.

Most bat species susceptible to WNS are NPS Species of Management Concern, Nevada species of conservation priority, BLM special status species, and USFS sensitive species. In addition to disease, bats face several other conservation challenges. Wind energy development, recreational caving, and permanent mine closures also threaten bats in the western United States. Detailed

ecological information about bat populations, prior to the arrival of WNS, is critical for managers to mitigate threats to bat populations, effectively manage bat habitats, and to inform listing decisions under the Endangered Species Act. Products from this project will be used by national parks, land management agencies, and state wildlife agencies across western United States. As such this project would serve as a lasting legacy on the landscape and show the positive impacts of SNPLMA legislation, and specifically the Conservation Initiative.

When: Project is expected to last 5 years from the initiation date, primarily to account for the longevity of bats (up to 40 years); to capture representative temporal and spatial variation in bat migration, hibernacula and roosting, and demographic parameters; conduct educations programs, outreach, and citizen science; and allow planning and installation of bat gates on caves and mines.

Background and Need for Project: Bats are crucial to ecosystem function and provide billions of dollars in ecosystem services annually, yet are threatened by a variety of anthropogenic factors, which combine to reduce the value of those services (Kunz et al. 2011). The most pressing issue facing North American bats is disease. White-nose syndrome (WNS) has devastated bats in the eastern United States, causing the death of millions of bats. Unprecedented levels of mortality led directly to the listing of the Northern Long-eared bat (*Myotis septentrionalis*), prevented delisting of Gray (*M. grisescens*) and Indiana bats (*M. sodalist*), and prompted the petitioning of several other bat species under the Endangered Species Act. First detected in New York in 2006, WNS has rapidly advanced west-ward and has been detected in Oklahoma, western Missouri, western Arkansas, and Minnesota. The recent confirmation of WNS in Washington State is particularly alarming. Based on its current rate of spread, climate suitability, and geography, WNS is projected to arrive in Nevada by 2021(Maher et al. 2012). White Pine County, NV, in which Great Basin National Park is located, is ranked as the 10th most susceptible county west of the Mississippi for WNS (Ihlo 2013).

The vulnerability of White Pine County to WNS is due to several factors. First, White Pine County has numerous caves and mines (over 70 known caves and several thousand abandoned mines). Predictive modeling indicates that the internal climates of many of these features are suitable to support *Pseudogymnoascus destructans* (Pd), the causal fungal pathogen of WNS. Second, White Pine County has multiple cave and mine roosting species of bats that have proven susceptible to WNS in the eastern US. As bats are the major vectors of WNS, the presence of susceptible bat species provides a direct route of transmission, via infected bats due to their frequent movements between roost sites and migratory stop-overs. Third, vulnerability is a function of the distance from the source. White Pine County's predicted earlier exposure is due to its location closer to the leading front of WNS. While it will take longer for WNS to arrive in other Nevada counties, adequate subterranean habitat exists that will easily facilitate the spread of the pathogens upon its arrival across the state.

Although most significant as a stressor to bat populations, disease is not the only reason for bat declines. Wind energy development, recreational caving, and permanent mine closures currently threaten bats in the western United States. In 2011, a series of wind turbines was built in Spring Valley, 9 miles northwest of GRBA. The Spring Valley Wind (SVW) Project is a 151.8 megawatt (MW) facility consisting of 66, 3.2 MW Siemens wind turbines. The SVW Project is located 4 miles from Rose Guano Cave, a migratory stop for up to 2 million Brazilian free-tailed

bats (*Tadarida brasiliensis*). Through aggressive mitigation, impacts to bats have been minimized. The estimated average mortality per year for the three years of operation are: Year 1- 566, Year 2- 198, Year 3- 96. On average, these turbines kill over 287 bats per year through direct strikes and barotrauma. The home ranges of these bats is not known but preliminary data has shown that they utilize GRBA and surrounding BLM and FS areas, throughout Nevada, during migration and other seasonal life history stages.

Recreational caving presents another threat to bats. Cavers are potential vectors of WNS and can disrupt bat colonies to such a degree that roosts are temporarily or permanently abandoned. Abandoned mine closures present yet another potential impact. Bats colonies are often most heavily concentrated in abandoned mines and use discrete mines to facilitate movement throughout the landscape. As abandoned mines are often dangerous to humans, all western states have enacted aggressive and effective mine reclamation programs. If bats are not considered as part of these mine closure programs, the impacts can be devastating, resulting in entombment or elimination of critical roosting habitat.

Cave dwelling (cavernicolous), colonial bats are most susceptible to WNS during hibernation. Several cavernicolous bats occur in Eastern and Southern Nevada, but Townsend's big-eared bats (*Corynorhinus townsendii*) are most widespread and most dependent on caves and mines. As a result, they are particularly sensitive to any perturbations that directly or indirectly impact these resources. Conversely, effective management of these same resources can both stabilize and conserve colonies and populations of this species throughout its range. Townsends big-eared bat populations have declined in Nevada and California (see Pierson & Rainey 1998 for a discussion of larger regional declines), primarily due to recreational caving and mine closures. All species of cave-hibernating bats are potentially susceptible to WNS, with 7 Nevada species currently known to be affected.

A major factor in the susceptibility of spread of WNS among conspecifics includes the seasonal movement of individuals of that species between known or potentially infected regions and currently unaffected regions. While traditionally it has been accepted that Townsends big-eared bats are a relatively sedentary, non-migratory species (Humphrey & Kunz 1976), with high incidence of philopatry for summer and winter roosts, a recent study by Piaggio et al (2009) suggests gene flow over longer distances than previously predicted (300km) and between what are considered separate sub-species of big-eared bats, possibly via male dispersal; adding to the vulnerability of this species. Furthermore, while Pd has not been detected on big-eared bats as of yet, current research in the Southeastern US (Bernard et al. 2015) has confirmed the presence of Pd on the closely related and very similar species Rafinesque's big-eared bat *(C. rafinesquii)*.

All bats do not utilize caves to the same extent and tree-roosting and migratory bats may serve as vectors for Pd through interaction with cavernicolous species. Bernard et al (2015) documented Pd on the migratory tree-roosting bats- the Silver-haired bat(*Lasionycteris noctivagans*) which is also found in GRBA, and Eastern red bats (*Lasiurus borealis*) which are similar in ecology and behavior to Hoary bats (*Lasiurus cinereus*) found in GRBA. While much remains unknown concerning the migration routes and distances of Silver-haired bats, radio-telemetry in combination with simulations estimate daily migration distances of up to 170 miles (275km) and total distances of 932 miles (1500 km; McGuire et al. 2012). With the recent discovery of WNS in Washington state, the frontier of WNS infections is now approximately 400 miles (650km) from Nevada. The migration and seasonal distribution of Hoary bats is even more enigmatic,

especially between sexes. While male Hoary bats appear to spend summers in the Northwestern US, females appear to travel as far as the Northeastern US and Newfoundland from overwintering grounds in Southern California and Mexico (Cryan 2003). The long-range migratory behavior of both Silver-haired and Hoary bats make them more susceptible to infection and to potentially act as vectors than other non-cave dwelling bats. Additional bat species present in the park that have been identified to be infected by Pd in other regions (Blehert et al. 2009) include the Big brown bat (*Eptesicus fuscus*) and the Little brown bat (*Myotis lucifigus*), suggesting their potential vulnerability to infection.

Townsend's big-eared bats are a colonial, highly social species that depend on mines and caves for roosting sites and hibernacula. Townsend's big eared bat populations may be composed of a network of interconnected colonies (viewed as a network of interconnected nodes). Recent research suggests that the most critical nodes are the hibernacula (Sherwin et al. 2003). Suitable hibernation sites are quite rare in the environment and individuals cannot facultatively adjust microclimates during hibernation as they do in warm season roosts. Bats disperse from the hibernacula to maternity colonies and summer roosts to breed, raise their young and forage, then collapse back to hibernacula in winter. These hibernation nodes are the most ecologically significant parts of the population and the habitat. Coincidently, these nodes and hibernacula are also the most vulnerable to white nose syndrome. It is critical to locate the nodes particularly the hibernacula to protect the species from disturbance and initiate WNS surveillance and monitoring at these key sites.

<u>EC values</u>
SUSTAINABILITY: Bat conservation provides long-term, sustainable economic benefits and is critical to sustain natural processes and the services provided by bats. This project is designed to conserve bat populations and ensure the availability of those ecosystem services to future generations. This project contains a substantial educational outreach and interpretive component, which is designed to increase awareness of WNS in the western US and the importance of bats in functioning and sustainable ecosystems. This project is explicitly designed to conserve the functionality, resiliency and integrity of bat communities. By connecting bat populations, protecting migration routes, and understanding WNS risk, managers can take active and effective steps toward bat conservation.

CONNECTIVITY: This project contains a substantial educational outreach and interpretive component, which would increase awareness of WNS in the western US and the importance of bats in functioning ecosystems, encouraging people to meaningfully connect with, appreciate and care for the natural environment. The project will disseminate the scientific results though conference presentations, graduate student theses, peer reviewed scientific papers, and technical reports and will support graduate level education. The project will engage volunteers through participation in citizen science as a tool to connect the public with bat populations through observation and data collection of bats a significant roost sites.

COMMUNITY: Bat conservation provides long-term, sustainable economic benefits and is critical to sustain natural processes and the services provided by bats. This project is designed to conserve bat populations and ensure the availability of those ecosystem services to future generations. This project is explicitly designed to conserve the functionality, resiliency and integrity of bat communities. By connecting bat populations, protecting migration routes, and

understanding WNS risk, managers can take active and effective steps toward bat conservation. This project is inherently collaborative and designed to build a sense of community and pride for natural resources. Products from this project will be used by parks and land management agencies across the region and by partner state wildlife agencies. As such this project would serve as a lasting legacy on the landscape and show the positive impacts of SNPLMA legislation, and specifically the Conservation Initiative. The bat gates, baseline data, purchased supplies and knowledge gained will continue to be beneficial to the public, park staff and natural resources long after the project is finished.

Problem Statement

Given the value of bat populations as a critical resource in Nevada (consuming over 20 tons of insects each night), the particular vulnerability of Nevada bats to WNS and disturbance, the high susceptibility of White Pine County to WNS, and the recent discovery of WNS in Washington State, a thorough bat conservation project is warranted. Great Basin NP in partnership with BLM, USFS, state and academic partners, is submitting multi-agency, landscape-scale proposal in order to combine resources, and create a fiscally economical proposal which can address bat ecology at multiple scales and mitigate the impacts of WNS. This project will have a strong focus on outreach, public education, and citizen science. Additionally this work includes substantial cost sharing and matching funds and has significant implications to larger landscapes.

The numbers of caves and mines in eastern and southern Nevada is staggering. GRBA protects 46 caves, a significant percentage of all the caves in Nevada and 19 AML sites. White Pine County has several thousands of abandoned mine land sites. Bats are the major issue driving National Environmental Policy Act (NEPA) analysis for Abandoned Mineral Lands (AML) closures and cave management.

The Ely District BLM finalized its cave management plan in 2016 (Bureau of Land Management 2016). Great Basin National Park is in the process of developing a cave management plan which is expected to be finalized in fall 2016. The USFS cave management plan is badly outdated (U.S. Forest Service 1975) . All modern cave management plans identify bats as a key biological issue driving the NEPA analyses and recommend extensive bat surveys as part of biological inventories. This project would provide the highest quality scientific information to inform bat conservation and cave management. Similarly, this project would identify biologically critical abandoned mines, enhancing the cost effectiveness of future reclamation and minimizing impacts on bats. This project would identify and gate mines and caves as significant bat roosts and hibernacula; reducing the costs of future reclamation and managements while minimizing impacts on bats. This project would implement cave protection and bat gates at two caves identified in the BLM cave management plan.

Project Timeframe

This will be a 5 year project.

- Years 1-5 – bat captures, roost surveys, acoustic monitoring, acoustic monitoring, citizen science, outreach
- Year 1 – NEPA & Section 106 (gate installation), hiring, contracts and agreements, equipment purchasing, study design, PIT tag array installation
- Year 2 – NEPA & Section 106 (gate installation), PIT tag array installation, bat gate installation
- Year 3 – NEPA & Section 106 (gate installation), PIT tag array installation, bat gate installation
- Year 4 – graduate theses and peer reviewed papers, PIT tag array installation, bat gate installation
- Year 5 – graduate theses and peer reviewed papers, bat gate installation

Location of the Project

As volant animals, bat management requires collaboration across administrative boundaries. This project is multi-scale, and incorporates multiple agencies, land management units, and ecoregions. The project area is Great Basin National Park and the surrounding mountain ranges and valleys, including Schell Creek Range, North Snake Range, South Snake Range, Spring Valley and Snake Valley in White Pine County, Nevada. The project site is centered at 38° 56' 14" W and 114° 18' 17" W. See map 1. Project is located in Congressional District NV04 (2012).

Project Deliverables

Primary

- Identification of critical roost sites
- Installation of three gates at two caves identified in Ely District BLM Cave Management plan.
- Biological and Cultural Inventories at two caves identified in Ely District BLM Cave Management plan (4 acres)
- Screening, education, and decontamination of the 30,000+ visitors to Lehman Cave annually (7,000 caves tours per year).
- Five citizen-science bat blitzes (10 volunteers @5 hrs per event=250 volunteer hours). Citizen science outreach will utilize volunteers during bioblitzes. The NPS has a well established volunteer program.
- Five programs for local schools emphasizing bat ecology and conservation (100 contacts)
- Social media outreach NPS and BLM Twitter and Facebook accounts (50 messages x >25,000 followers= >1,250,000 followers)
- Ten NPS programs with bat ecology and conservation themes (200 contacts)
- GIS based spatial and temporal linkages of populations (colonies) to specific roosts
- Data for roost surveys, bat captures, acoustic monitoring, PIT tagging and mark recapture entered in existing databases with NPS, U.S. Geological Survey (USGS) for WNS data, and partner wildlife agency. All data will be checked to ensure quality control and

assurance. NPS databases will be consistent with the Natural Resource Database Template.

- Acoustic and capture data uploaded to the NABat program database.
- *Pseudogymnoascus destructans* and WNS surveillance data will be incorporated into the national survey database in coordination with USGS Wildlife Health center.

Anticipated

- Installation of up to ten additional bat gates on highest priority caves and mines
- Biological and Cultural Inventories at up to ten additional caves and mines (20 acres)
- Prioritization of fund expenditure from the Abandoned Mineral Lands program to protect both people and bats
- Three graduate student theses
- Five peer-reviewed publications
- Articles highlighting project and accomplishments in the park newspaper and Natural Resource newsletter.
- Final Report from CESU cooperator: 1) Recommendations for cave and mine closures (seasonal and permanent) and seasonal and appropriate bat-compatible closures; 2) Identification of priority sites for protection monitoring and surveillance; 3) Full thermal profiles generated using GIS interpolation; 4) Bayesian WNS models of site susceptibility.
- Three presentations at professional meetings

Standard

- NEPA
- Section 106
- Develop a Scope of Work for contracting and cooperative agreements
- Detailed implementation plan will be developed and entered into a SNPLMA access database
- Budget Tracking
- Quarterly and annual reporting will be completed
- Final project report will be prepared and submitted

Whether the proposal is a science project

The project is not considered under the Science-Based project criteria as set forth by the SNPLMA guidelines.

SNPLMA Performance Measures

Strategic Plan Goal 2: Conserve and Restore the Quality of the Outdoor Environment by Preserving Natural and Cultural Resources and Enhancing Recreational Opportunities

H5 - Acres of Upland Habitat Surveyed, Inventoried or Monitored

Primary Deliverables

- *Gate installation at 2 caves (primary deliverable) and required biological inventories (4acres)*

Anticipated Deliverables

- *Gate installation at 10 caves and mines and required biological inventories (20acres)*

H15- Number of Conservation Actions Implemented for Non-Listed Species
Primary Deliverables

- *Identification of critical roost sites and management recommendations*
- *Gate installation at two caves identified in Ely District BLM Cave Management plan*
- *Biological and Cultural Inventories at two caves identified in Ely District BLM Cave Management plan (4 acres)*
- *Screening, education, and decontamination of the 30,000+ visitors to Lehman Cave annually. Spatial and temporal linkages of populations (colonies) to specific roosts*
- *Data for roost surveys, bat captures, acoustic monitoring, PIT tagging and mark recapture entered in existing databases with NPS, U.S. Geological Survey (USGS) for WNS data, and partner wildlife agency. All data will be checked to ensure quality control and assurance. NPS databases will be consistent with the Natural Resource Database Template.*
- *Acoustic and capture data uploaded to the NABat program database.*
- Pseudogymnoascus destructans *and WNS surveillance data will be incorporated into the national survey database in coordination with USGS Wildlife Health center.*

Anticipated Deliverables

- *Final Report from CESU cooperator: 1) Recommendations for cave and mine closures (seasonal and permanent) and seasonal and appropriate bat-compatible closures; 2) Identification of priority sites for protection monitoring and surveillance; 3) Full thermal profiles generated using GIS interpolation; 4) Bayesian WNS models of site susceptibility.*

C1 - Number of Cultural or Historic Sites or Structures Stabilized or Protected
Primary deliverables

- *Two cave gates to protect cultural resources from theft, vandalism and looting, protecting those sites for perpetuity.*

Anticipated Deliverables

- *Ten additional gates at caves and mines, to protect cultural resources from theft, vandalism and looting, protecting those sites for perpetuity.*

C3 - Acres of Cultural / Paleontological Resources Surveyed, Inventoried or Monitored
Primary deliverables

- *Prior to gate installation cultural surveys will be conducted at two caves (4 acres) Anticipated Deliverables*
- *Prior to gate installation cultural surveys will be conducted at up to ten caves and mines (20 acres).*

O1 - Number of Hazardous Sites Remediated
Primary Deliverable

- *This project will gate 2 caves*

Anticipated Deliverable

- *Gate installation on up to ten additional caves and mines.*

O4 - Number of Scientific / Technical Reports Produced
Primary Deliverable

- *Two peer-reviewed publications*

Anticipated Deliverable

- *Three graduate student theses, three additional peer-reviewed publications*

O5 - Number of Outreach Contacts Made
Primary Deliverables

- *Screening, education, and decontamination of the 30,000+ visitors to Lehman Cave annually (7,000 cave tours/year).*
- *Five programs for local schools emphasizing bat ecology and conservation (100 contacts)*
- *Social media outreach (50 messages x >25,000 followers=>1,250,000 contacts)*
- *Ten NPS programs with bat ecology and conservation themes (200 contacts)*
- *Five citizen-science bat blitzes (10 volunteers @5 hrs per event=250 volunteer hours)*

O7 - Number of Interpretive or Education Presentations Given and/or Community Events Participated In or Hosted
Primary Deliverables

- *Screening, education, and decontamination of the 30,000+ visitors to Lehman Cave annually (7,000 cave tours)*
- *Five programs for local schools emphasizing bat ecology and conservation*
- *Social media outreach (50 messages x >25,000 followers=>1,250,000 contacts)*
- *Ten NPS programs with bat ecology and conservation themes*
- *Five citizen-science bat blitzes (10 volunteers @5 hrs per event=250 volunteer hours)*

O9 – Number of GIS Databases Generated and/or Map Layers Produced
Primary Deliverable

- *GIS based spatial and temporal linkages of populations (colonies) to specific roosts*

Anticipated Deliverables

- *Final Report from CESU cooperator: 1) Recommendations for cave and mine closures (seasonal and permanent) and seasonal and appropriate bat-compatible closures; 2) Identification of priority sites for protection monitoring and surveillance; 3) Full thermal profiles generated using GIS interpolation; 4) Bayesian WNS models of site susceptibility.*

O10 – Number of Volunteers Used
Primary Deliverables

- *Five citizen-science bat blitzes will utilize 50 volunteers. Citizen science outreach will utilize volunteers during bioblitzes. The NPS has a well established volunteer program. Volunteer opportunities and projects will be posted on partner wildlife agency and NPS websites.*

Strategic plan goal 3: Continue the SNPLMA legacy of collaborative success as a model of program management through increased transparency, accountability, and effective governance
O11 – Number of Databases, Reports, and Other Electronic Means of Documenting Activities
Primary Deliverables

- *Data for roost surveys, bat captures, acoustic monitoring, PIT tagging and mark recapture entered in existing databases with NPS, U.S. Geological Survey (USGS) for WNS data, and partner wildlife agency. All data will be checked to ensure quality control and assurance. NPS databases will be consistent with the Natural Resource Database Template.*
- *Acoustic and capture data uploaded to the NABat program database.*
- *Pseudogymnoascus destructans and WNS surveillance data will be incorporated into the national survey database in coordination with USGS Wildlife Health center.*

Project Implementation Process

Methods: Recognizing the absurdity of attempting to manage volant animals within administrative boundaries, this project is multi-scale, and occurs across agencies and land management units and ecoregions. As such project partners include NPS, BLM, USFS, partner wildlife agency, and academia. Environmental education and citizen science will target local schools and universities, NPS visitors, and social media.

This project would use a suite of methods and technology to understand bat ecology and vulnerability of bats across landscapes. NEPA, National Historic Preservation Act (NHPA), and Minimum Requirements Analysis for wilderness compliance will be conducted and completed prior to project implementation but their managing agency. National Environmental Policy Act compliance is complete on the BLM cave management plan but cultural surveys and Section 106 compliance is still required. Additional NEPA compliance will be required on sites identified for gates that are not identified in the BLM Cave Management Plan. USFS has agreed to conduct NEPA for cave and mine closures and bat gates within their administrative boundaries.

Surveys of caves and abandoned mines (along spatial, temporal and elevational gradients) will facilitate determination of types of use (maternity versus hibernacula) and their relative and absolute biological importance for Townsend's big-eared bats, and to link colonies to the roosts. Mines will be surveyed internally, data on environmental parameters collected, and individual bats will be marked utilizing a variety of techniques for tracking among various roosts and across landscapes. The proposed project length is five years; to allow surveying of mines and caves over several years; for identification of biologically significant sites; and for more intensive investigation and tracking of bat migration and roost switching. Bats would be captured at roost sites using mist nets and harp traps and PIT tagged. Subsequent monitoring will record entry and exit times of all tagged bats at all monitored roosts. Surveillance for WNS will follow established USGS protocols at all significant bat hibernacula. Radio telemetry will be used to locate significant bat roosts in caves and mines, with a particular focus on hibernacula. Acoustic monitoring, combined with capture, is most effective at documenting diversity and occupancy trends and habitat associations on the landscape. Monitoring, banding, and ultraviolet powder at Rose Guano cave will be used in conjunction with beam break systems, to minimize bat mortality at wind turbine facilities and determine migration paths and patterns, temporal and spatial variation. Stable isotopes will be used to infer migration and overwintering locations for

migratory bat species, such as free-tailed and hoary bats. Radio telemetry will be used to locate roosts and document foraging patterns.

Research questions include: 1) How similar are the roosting associations and patterns of landscape use of these colonies over space? 2) Can we generalize across ecoregions and long distances and climates and habitats? 3) Are the networks functioning the same way? 4) Are the thermal characteristics the same for the roosts? 5) Is there a general pattern or is there significant spatial and temporal variation?

Current protocols for preventing spread of white nose syndrome will be followed and team members will follow any new protocols as they are released (https://www.whitenosesyndrome.org/). Equipment and clothing used in confirmed or suspected WNS areas will not be allowed.

Level of readiness for project implementation

The park level of readiness to implement the project within one year of notification of funds availability (NOFA) is very high. The park and their partners have much of the staff, training, and resources necessary to implement this project, including 5 acoustic bat detectors, mist netting equipment, and experience and knowledge of bat surveys, acoustic call interpretation, and bat PIT tagging. NPS and partner wildlife agency staff have installed PIT tag arrays on two caves and mines and are familiar with environmental compliance and the procedures for installation. The NPS Institutional Animal Care and Use Committee (IACUC) designated GRBA's 2015 bat project as a "monitoring/management" activity. Given the similarity in methods between GRBA's bat project and the methods of this proposal, it is anticipated that the same IACUC decision will apply.

The park currently has a staff of permanent and term employees, which include:

- Environmental Protection Specialist, permanent
- Cultural Resource Manager, permanent
- Wildlife Biologist, permanent
- Natural Resource Manager, permanent
- Biologist, permanent
- Bio-Sci. Tech. Lead, term
- Ecologist, permanent

The BLM has a staff of permanent and term employees, which include:

- Protection and Environmental Coordinator, permanent
- Cultural Resource Specialist, permanent
- Wildlife Biologist, permanent

Project Relationships: This project is a stand-alone, one-time, non-phased, viable project. No other SNPLMA funds will be requested for this action. This project leverages two NPS funded proposals (FY14 and FY15) which allowed GRBA to collect baseline information and public education programs on bat ecology. Through this funding, GRBA initiated mark/recapture studies on bats with partner wildlife agency and installed four PIT tag reader arrays at caves and

mines. Additional funding was provided as mitigation for Spring Valley Wind project to academia and partner wildlife agency. In 2015, GRBA and state wildlife agency hosted the Nevada Bat Bioblitz which brought together project partners and initiated this proposal. This project builds on previous funding and would build upon this knowledge and funding to expand across multiple spatial and temporal scales.

Proposed Project Budget

This nomination represents the best value option for a viable project. A multidisciplinary team of GRBA, BLM, and USFS senior staff and biologists; wildlife agency biologists; and university professors developed the budget for the project, via conference calls, e-mail, and site visits. As the lead agency, GRBA staff has multiple years of experience implementing SNPLMA conservation initiative projects. The budget represents the best estimate of cost, based on the extensive experience of the federal agencies and partners in implementing similar projects. Projected costs were based on current salaries, indirect costs, supply costs balanced against project deliverables, goals, and objectives. The project deliverables, goals and implementation are all measurable, clear and achievable, with a goal to maintain both quality and cost-effectiveness.

The project scale and scope are vast and multi-faceted. The cost and funding requested is due primarily to the vast area and remoteness of White Pine County, the magnitude of the subterranean AML resources to be surveyed, and the unique difficulties in studying bats. White Pine County has several thousand abandoned mine land sites. These are significant bat habitats that require substantial effort to survey. The majority of the field work will be conducted by graduate students under a cooperative agreement established through the Cooperative Ecosystem Study Unit (CESU). The project will support youth based conservation programs for field work, logistical support and data collection. Great Basin National Park, BLM, FS, and partner wildlife agency will provide logistical support, access, and data on mines, field support, and compliance. Federal employees and project partners in natural resources will be able to learn new and various techniques from an expert which could be applied to their careers and benefit the federal government in the long-term. The budget was developed in close consultation with Cooperative Ecosystem Study Unit (CESU) partners. Use of a CESU partner fixes indirect costs at 17.5%.

This project contains substantial matching contributions from parks, wildlife agencies and academia. These contributions account for 28% of the total project cost and are indicative of the significance of the bat communities regionally and the importance of conducting this project prior to the arrival of WNS.

Total in-kind commitments to this project include are $314,340.00.

- Volunteer labor- $5,340.00
- Salaried Employees- $141,000
- Materials Equipment and supplies- $168,000

Ranking Criteria

1. Project supports one of the three priority types of projects.
This project supports all three of the priority project types: *habitat enhancement, cultural resources and safety* and *public health*.

a. The primary goal of this project is to enhance and protect habitat for bats through installation of bat gates and management focused research.
b. Both caves and mines often possess significant cultural and paleontological resources. Humans have interacted with caves for thousands of years and caves were frequently used by Native Americans for shelter, food storage, spiritual and religious purposes. Euro-Americans also used caves for shelter storage, mining and recreation. Many caves possess rock art both historic and prehistoric. Bat friendly gates installed at caves and mines protect not only bat populations but protect cultural resources within those caves and mines from vandalism, theft, and unintended damage.
c. This project would provide for safety and public health by restricting entry to potentially dangerous caves and mines. Visitor safety is a primary concern with any recreational activity taking place on public lands. Abandoned mine lands are extremely dangerous and this project would gate mines, reducing the health hazard. Abandoned mines present an array of safety hazards such as open shafts, unstable rock, decayed support beams, deadly gases and lack of oxygen, horizontal and vertical openings, highwalls and open pits. The Stay-Out-Stay- Alive program is a national public awareness campaign aimed at warning the public about the dangers of abandoned mine lands. Every year dozens of people are killed or injured in accidents while recreating on mine lands. The Ely District Cave Management plan identified cave closures and gates as a mitigation to provide for safety and public health.

2. Project includes public outreach/education as a component.
This project contains a substantial educational, outreach, and interpretive component. This component is critical to increase awareness of the importance of bats in functioning ecosystems, the impact of WNS on bat populations, and the public's role in preventing the spread of WNS in the western US. Funding will support continued screening, education, and decontamination of the 30,000+ visitors to Lehman Cave annually. The project enhances WNS and bat-related education, outreach, and communication internally and with partners and stakeholders, through social media, outreach to schools and visitors, and citizen science incorporating visitors in bat surveys. The project will also disseminate the scientific results though conference presentations, graduate student theses, peer reviewed scientific papers, and technical reports and will support graduate level education.

Five citizen science bio-blitzes will be held to incorporate data collected by public participation and volunteers into bat conservation. The purpose of the interpretive component is to inform the public of the importance of bats and the threat of WNS and to gain support for behaviors that contribute to the long term survival of bats. Social media (GRBA, BLM, and partner wildlife agency Facebook and Twitter) and park and partner wildlife agency webpages will regularly highlight: 1) the importance of bats as ecosystem drivers; 2) the need for WNS and general bat studies; and 3) the ongoing work status and work products by park staffs and cooperators.

Annual articles in the park newspaper (The Bristlecone) and resource management newsletters are also planned.

3. Project supports 1 of the 20 priority sub-types of projects.

This project supports five of the priority subtypes including:

1. Cultural – protection- Both caves and mines often possess significant cultural and paleontological resources. Humans have interacted with caves for thousands of years and caves were frequently used by Native Americans for shelter, food storage, spiritual and religious purposes. Euro-Americans also used caves for shelter storage, mining and recreation. Many caves possess rock art both historic and prehistoric. Bat friendly gates installed at caves and mines protect not only bat populations but protect cultural resources within those caves and mines from vandalism, theft, and unintended damage.
2. Safety and public health- – This project would provide for safety and public health by restricting entry to potentially dangerous caves and mines. Visitor safety is a primary concern with any recreational activity taking place on public lands. Abandoned mine lands are extremely dangerous and this project would gate mines, reducing the health hazard. Abandoned mines present an array of safety hazards such as open shafts, unstable rock, decayed support beams, deadly gases and lack of oxygen, horizontal and vertical openings, highwalls and open pits. The Stay-Out-Stay-Alive program is a national public awareness campaign aimed at warning the public about the dangers of abandoned mine lands. Every year dozens of people are killed or injured in accidents while recreating on mine lands. The Ely District Cave Management plan identified cave closures and gates as a mitigation to provide for safety and public health.
3. Habitat enhancement-proactive steps to prevent listing. Actions undertaken by this project are expected to prevent or delay the listing of bat species impacted by WNS This project will use federal lands to collect critical information designed to inform listing decisions under the Endangered Species Act. White-nose syndrome has devastated bats in the eastern United States, causing the death of millions of bats. Unprecedented levels of mortality led directly to the listing of the Northern Long-eared bat (*Myotis septentrionalis*), prevented delisting of Gray (*M. grisescens*) and Indiana bats (*M. sodalist*), and prompted the petitioning of several other bat species under the Endangered Species Act.
4. Habitat enhancement-restoration of habitat for sensitive species at the watershed or landscape level- Most bat species susceptible to WNS are NPS Species of Management Concern, Nevada species of conservation priority, BLM special status species, and USFS sensitive species. This project is designed to work across administrative boundaries at the landscape level.
5. Habitat enhancement-cave management- The Ely District BLM finalized its cave management plan in 2016 (Bureau of Land Management 2016). GRBA is in the process of developing a cave management plan which is expected to be finalized in fall 2016. The USFS cave management plan is badly outdated (U.S. Forest Service 1975). All modern cave management plans identify bats as a key biological issue driving the NEPA analyses and recommend extensive bat surveys as part of biological inventories. This project would provide the highest quality scientific information to inform bat conservation and cave management. Similarly, this project would identify biologically critical abandoned mines, enhancing the cost effectiveness of future reclamation and minimizing impacts on bats.

This project would identify and gate mines and caves as significant bat roosts and hibernacula; reducing the costs of future reclamation and managements while minimizing impacts on bats. This project would implement cave protection and bat gates at two caves identified in the BLM cave management plan.

4. Project enhances partnerships in promotion of cooperation and collaboration

As volant animals, bat management requires cooperation and collaboration across administrative boundaries. This project is multi-scale, and occurs across agencies, land management units, and ecoregions. This project will involve citizen groups in its goals and activities, addresses the needs of three federal agencies and includes non-federal public partners.

- This project will utilize citizen groups and organizations in the development and accomplishment of resource management goals and project implementation. Citizen groups such as the Nevada Bat Working group, Great Basin Institute, and Bat Conservation International will participate in the bat blitzes.
- This project addresses the needs of three Federal agencies: National Park Service, Bureau of Land Management, and U.S. Forest Service. USGS and USFWS will also benefit from this project.
- This project will engage non-federal partners in state and academic partners through cooperative agreements and CESU task agreements.

5. Project has identified committed non-SNPLMA sources of funding or in-kind contributions in the development and/or implementation of the project

This project contains substantial matching contributions from parks, wildlife agencies and academia. These contributions account for 28% of the total project cost and are indicative of the significance of the bat communities in the parks and the importance of conducting this project prior to the arrival of WNS.

Total in-kind commitments to this project include are $314,340.00.

- Volunteer labor- $5,340.00
- Salaried Employees- $141,000
- Materials Equipment and supplies- $168,000

6. Project promotes sustainability by providing benefits in the near and long term by emphasizing healthy and resilient landscapes as well as durability, relevancy, and shared support.

The National Park Service mission is to: “preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations.” Bats provide services that are critical to the maintenance of healthy, resilient landscapes. In particular, bats consume millions of tons of insects annually, reducing the need for pesticides and benefiting agriculture. This project will protect bat populations from disturbance by installation of cave gates. This is critical to sustain natural processes and the services provided by bats.

The collapse of bat populations in the western United States has been referred to as “imminent”. White-nose syndrome has devastated bats in the eastern United States, causing the death of millions of bats. This project is designed to conserve bat populations and ensure the availability of those ecosystem services to future generations. Detailed ecological information about bat populations, prior to the arrival of WNS, is critical for managers to mitigate threats, manage bats and the habitat they rely on, and to inform listing decisions under the Endangered Species Act. Products from this project will be used by parks and land management agencies across the region and by partner state wildlife agencies.

As such this project would serve as a lasting legacy on the landscape and show the positive impacts of SNPLMA legislation, and specifically the Conservation Initiative. The bat gates, baseline data, purchased equipment and knowledge gained will continue to be beneficial to the public, park staff and natural resources long after the project is finished.

This project contains a substantial educational outreach and interpretive component, which is designed to increase awareness of WNS in the western US and the importance of bats in functioning and sustainable ecosystems.

Given the value of bat populations as a critical resource in Nevada, the particular vulnerability of Nevada bats to WNS and disturbance, the high susceptibility of White Pine County to WNS spread, and the recent discovery of WNS in Washington State, a thorough bat conservation project is warranted. Bats provide billions of dollars annually in ecosystem services. In Nevada, bats reduce the need for pesticide use and save millions of dollars to the agriculture industry. The installation of bat gates will immediately protect bat roosts and bat populations. Work towards protecting bats and learning about bats will provide long-term, sustainable economic benefits.

7. Project promotes connectivity by linking people to nature and recreational opportunities, and by uniting important places across the landscape

This project is explicitly designed at the landscape scale to improve connectivity of bat populations to roosts foraging areas, enhance migratory routes and protect hibernacula and maternity roosts. Quantifying the nodes and network structure which characterize bat populations is critical to effective bat conservation. This project contains a substantial educational outreach and interpretive component, which would increase awareness of WNS in the western US and the importance of bats in functioning ecosystems, encouraging people to meaningfully connect with, appreciate and care for the natural environment. The project will also disseminate the scientific results though conference presentations, graduate student theses, peer reviewed scientific papers, and technical reports and will support graduate level education. Annual articles in the park newspaper (The Bristlecone) and resource management newsletters are also planned. The project will engage volunteers through participation in citizen science and will provide bat box building as a tool to connect students to bats.

8. Project promotes community by improving the quality of life for the human community and protecting the integrity of biological communities

Bat populations are crucial in ecosystem function and provide billions of dollars in ecosystem services annually. The most pressing issue facing North American bats is disease. White-nose syndrome has devastated bats in the eastern United States, causing the death of millions of bats. This project will conserve and maintain the functionality, resilience and integrity of bat communities across the landscape. The project will implicitly bring together a diverse group of partners both federal and non-federal. This project improves the quality of life by protecting cultural resources through the installation of gates at vulnerable caves and mines.

This project is explicitly designed to conserve the functionality, resiliency and integrity of bat communities. By connecting bat populations, protecting migration routes, and understanding WNS risk, managers can take active and effective steps toward bat conservation.
This project is inherently collaborative and designed to build a sense of community and pride for natural resources.

This project is multi-scale, and occurs across three federal agencies administrative boundaries. The information will be used by the NPS and by partner federal state and private wildlife and land management agencies. Detailed ecological information about bat populations, prior to the arrival of WNS, is critical for managers to mitigate threats and manage bats and the habitat they rely on.

Literature Cited

Bernard, R. F., J. T. Foster, E. V. Willcox, K. L. Parise, and G. F. Mccracken 2015. Molecular Detection of the Causative Agent of White-nose Syndrome on Rafinesque's Big-eared Bats (Corynorhinus rafinesquii) and Two Species of Migratory Bats in the Southeastern USA. Journal of Wildlife Diseases **51:**519-522.

Blehert, D. S., A. C. Hicks, M. Behr, C. U. Meteyer, B. M. Berlowski-Zier, E. L. Buckles, J. T. H. Coleman, S. R. Darling, A. Gargas, R. Niver, J. C. Okoniewski, R. J. Rudd, and W. B. Stone 2009. Bat White-Nose Syndrome: An Emerging Fungal Pathogen? Science **323:**227.

Bureau of Land Management 2016. Ely District Cave & Karst Management Plan and Environmental Assessment.

Cryan, P. M. 2003. Seasonal Distribution of Migratory Tree Bats (Lasiurus and lasionycteris) in North America. Journal of Mammalogy **84:**579-593.

Humphrey, S. R., and T. H. Kunz 1976. Ecology of a Pleistocene Relict, the Western Big-Eared Bat (Plecotus townsendii), in the Southern Great Plains. Journal of Mammalogy **57:**470-494.

Ihlo, C. M. 2013. Predicting the Spread of White-Nose Syndrome in Bats: A Strategy for Prioritizing Resources**:**Masters project submitted in partial fulfillment of the requirements for the Master of Environmental Management degree: Nicholas School of the Environment Duke University: 1-38.

Kunz, T. H., E. Braun De Torrez, D. Bauer, T. Lobova, and T. H. Fleming 2011. Ecosystem services provided by bats. Annals of the New York Academy of Sciences **1223:**1-38.

Maher, S. P., A. M. Kramer, J. T. Pulliam, M. A. Zokan, S. E. Bowden, H. D. Barton, K. Magori, and J. M. Drake 2012. Spread of white-nose syndrome on a network regulated by geography and climate. Nat Commun **3:**1306.

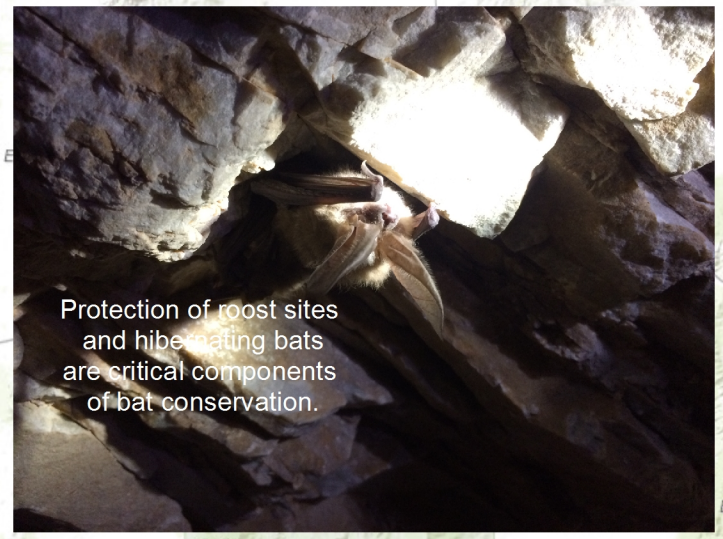
Mcguire, L. P., C. G. Guglielmo, S. A. Mackenzie, and P. D. Taylor 2012. Migratory stopover in the long-distance migrant silver-haired bat, Lasionycteris noctivagans. Journal of Animal Ecology **81:**377-385.

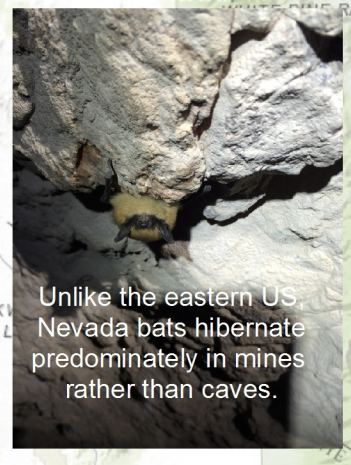
Piaggio, A., K. Navo, and C. Stihler 2009. Intraspecific comparison of population structure, genetic diversity, and dispersal among three subspecies of Townsend's big-eared bats, Corynorhinus townsendii townsendii, C. t. pallescens, and the endangered C. t. virginianus. Conservation Genetics **10:**143-159.

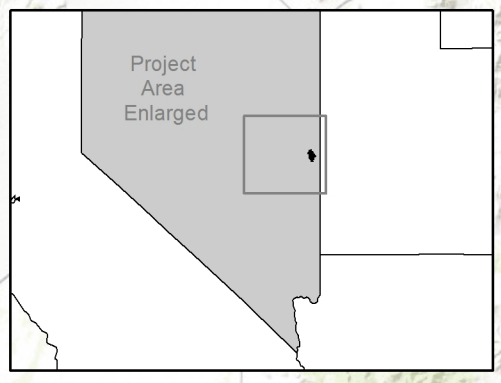
Rodhouse, T. J., P. C. Ormsbee, K. M. Irvine, L. A. Vierling, J. M. Szewczak, and K. T. Vierling 2015. Establishing conservation baselines with dynamic distribution models for bat populations facing imminent decline. Diversity and Distributions **21:**1401-1413.

Sherwin, R. E., W. L. Gannon, and J. S. Altenbach 2003. Managing Complex Systems Simply: Understanding Inherent Variation in the Use of Roosts by Townsend's Big-Eared Bat. Wildlife Society Bulletin (1973-2006) **31:**62-72.

U.S. Forest Service 1975. Cave Management Plan for Ely Ranger District.







0 5 10 20 Miles

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Schedule B						
CONSERVATION INITIATIVE						
ESTIMATED NECESSARY EXPENSES						
Project Name:	Can land managers prevent the "inevitable collapse" of bats in the western US?					
Project #:		**Priority #:**		**Agencies:**	NPS	
Prepared by:	Bryan Hamilton					
Phone:	775-234-7563				**Initial**	x
Date:	4/25/2016				**Updated**	

1. Planning & Environmental Documentation		$ 30,000.00	3%
(Surveys/ reports for cultural, natural, biological, archaeological resources, NEPA documentation, etc)			
2. FWS Consultation - Endangered Species Act		$ -	0%
(direct expenses for FWS if consultation is required)			
3. Direct Federal Labor to Implement Project (Payroll)		$ 239,350.00	20%
(Federal labor costs for completing the project)			
4. Project Equipment and/or Supplies/ Materials		$ 115,600.00	10%
(include specialized equipment, supplies and materials not included in contracts/ agreements)			
5. Travel & Per Diem for Implementation		$ 13,000.00	1%
6. Official Vehicle Use		$ 22,500.00	2%
(Based on agencies procedures for use, fuel, equipment, and mileage charges)			
7. Contracts/Grants/Agreements to complete the project		$ 755,850.00	63%
8. Required Training to Implement Project		$ -	0%
(includes initial and annual training for LEOs and training necessary to implement the project)			
9. Other Necessary Expenses - See Expanded Budget		$ 17,332.00	1%
	TOTAL	$ 1,193,632.00	100%

COMMENTS

Detailed Cost Estimate Other Necessary Expense Worksheet

Project Title: Can land managers prevent the "inevitable collapse" of bats in the western US?

DETAILED COST ESTIMATE			
1. Planning and Environmental Assessment Costs			
NEPA		$	30,000.00
	Subtotal	$	30,000.00
2. FWS Consultation - Endangered Species Act	**Subtotal**	$	-
3. Direct Labor/Payroll to Perform the Project (use fully loaded labor rate)			
NPS - Term Wildlife Biologist, GS_07		$	139,200.00
BLM - Wildlife Biologist, GS-11		$	40,890.00
NPS - Wildlife Biologist, GS-11		$	27,260.00
BLM - Archaeologist, GS-11		$	32,000.00
	Subtotal	$	239,350.00
4. Project Equipment			
	Subtotal	$	-
5. Project Materials and Supplies			
Public outreach (bat boxes, bat detectors, safety supplies, etc.)		$	6,000.00
PIT tag arrays		$	66,000.00
Bat analysis software		$	1,200.00
CF cards and hard drives		$	4,200.00
mist net supplies		$	3,000.00
WNS decon supplies		$	1,200.00
rabies vaccinations and titers		$	9,000.00
Full spectrum bat detectors		$	20,000.00
PIT tags		$	5,000.00
	Subtotal	$	115,600.00
6. Travel (airfare, car rental, per diem, etc)			
backcountry travel		$	2,000.00
travel to conferences		$	4,000.00
travel to training		$	7,000.00
	Subtotal	$	13,000.00
7. Official Vehicle Use			
Vehicle Use 1		$	22,500.00
	Subtotal	$	22,500.00
8. Required Training for Project Implementation (list purpose)			
	Subtotal	$	-
9. Cost of Contracts and/or Agreements to Perform Project			

Cooperative Agreement	$	315,850.00
CESU Cooperative Agreement:	$	440,000.00
Detailed Cost Estimate Subtotal	$	755,850.00
OTHER NECESSARY EXPENSES (APPENDIX B-11)		
10. Examples of Other Necessary Expenses (providing a breakdown of these costs is optional, however a		
ADMINISTRATION COSTS		
Budget Tracking/Accounting and Execution	$	3,485.00
Travel Administration for Required Project Travel	$	1,392.00
Human Resource/Relations Tasks for SNPLMA-funded Personnel	$	3,485.00
Preparing Quarterly Status Reports	$	3,485.00
Tracking Project Activities, Expenses, IGOs, Task Orders (e.g., project database management)	$	3,485.00
Cell Phones, Cell Service, Radios for Project Personnel Primarily in the Field	$	2,000.00
Other Necessary Expenses Subtotal	$	17,332.00
GRAND TOTAL	**$**	**1,193,632.00**
CASH/ IN-KIND CONTRIBUTIONS		
NDOW personnel	$	25,000.00
NDOW equipment	$	6,000.00
USFS NEPA	$	10,000.00
Volunteer labor	$	5,340.00
NPS Wildlife Biologist	$	54,000.00
BLM Wildlife Biologist	$	18,000.00
NPS equipment	$	7,000.00
Academia	$	184,000.00
USGS	$	5,000.00
Total	**$**	**314,340.00**

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Schell Field Office
702 N. Industrial Way
Ely, Nevada 89301-9408
http://www.blm.gov/nv/st/en/fo/ely_field_office.html

In Reply Refer To:
6524 (NVL00000)

MAY 0 5 2010

Steven Mietz
Superintendent
Great Basin National Park
100 GBNP
Baker, Nevada 89311

Dear Mr. Mietz:

The Bureau of Land Management (BLM) supports the National Park Service's SNPLMA Round 16 proposal entitled *Landscape Ecology of Cavernicolous Bats: Can Land Managers Prevent the "Inevitable Collapse" of Bats in the Western US?* and look forward to collaborating on the effort. The BLM has been heavily involved with bat research since the construction of the Spring Valley Wind Energy Facility in 2010. Additionally, the BLM recently prepared the Ely District Cave and Karst Management Plan to protect the geologic, cultural, and biological natural resources within these unique features. The Ely District has seventeen bat species on their Special Status Species list that they are dedicated to preserve and protect. The BLM is contributing $18,000 for in-kind support for vehicle and equipment use for this project.

We hope that SNPLMA will agree this project is worthy of funding. The BLM fully supports this research and looks forward to working closely with the National Park Service. If you have any additional questions, please contact Nancy Herms, Wildlife Biologist at 775-289-1838 or nherms@blm.gov.

Sincerely,

Michael J. Herder
District Manager
Ely District Office

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
National Wildlife Health Center
6006 Schroeder Road
Madison, Wisconsin 53711-6223
608-270-2400

May 6, 2016

Steven Mietz
Superintendent, Great Basin National Park
National Park Service
steven_mietz@nps.gov

Dear Mr. Mietz:

This letter is to inform you that the USGS National Wildlife Health Center supports the proposed research grant effort by Bryan Hamilton (NPS) entitled, "Can land managers prevent the 'inevitable collapse' of bats in the western US?" Our organization is prepared to collaborate with state, federal and private colleagues to support the coordination and field activities required to accomplish White-nose Syndrome (WNS)/*P. destructans* surveillance and investigation.

Our Center will commit in-kind diagnostic and consultative services to investigate unusual bat morbidity and mortality events under the proposal. In addition, samples collected in collaboration with on-going national *P. destructans* surveillance efforts by our Center will be supported. These services can be used to support high-priority activities related to field surveys or regional coordination needs that arise over the course of this project. We also have a very active WNS research program aimed at increasing our understanding of WNS that will be of benefit to agencies responsible for managing WNS.

It is my sincere hope that our joint efforts to better understand WNS and find ways to control its spread will benefit the long term conservation of North American bats.

Sincerely,

Jonathan Sleeman

Jonathan Sleeman, MA, VetMB, Dipl. ACZM, Dipl. ECZM, MRCVS
Center Director
USGS, National Wildlife Health Center
6006 Schroeder Road
Madison, WI 53711

OIE Collaborating Centre for Research, Diagnosis and Surveillance of Wildlife Pathogens

CHRISTOPHER NEWPORT
UNIVERSITY

May 5, 2016

Dear Reviewer,

I am writing this letter in strongest support for the awarding of SNPLMA funding for the project "Can Land Managers Prevent the "Inevitable Collapse" of bats in the Western US? I have read the proposal thoroughly and am extremely impressed with the scope, depth, and objectives of this project. The current threats to cave and abandoned mine roosting bats have grown exponentially with the threat of White-nose syndrome and could very likely have similarly devastating impacts in the west as observed in the aastern United States. This proposal provides a proactive approach to locate, assess, and mitigate areas of risk while concurrently developing management strategies to minimize and even curtail the spread of this pathogen.

The proposal is ambitious but clearly articulated and the objectives are attainable. The combination of ecological research, physiological ecology of hibernating bats, and Bayesian modeling is compelling and particularly exciting.

I have spent the last 20 years studying bats in the western United States and have focused on the long term conservation of many species that are dependent upon subterranean roosting habitat. These projects have included collaborations with many land management agencies and private mining companies to locate and protect hundreds of biologically critical subterranean roosts. Unfortunately, the threat of White-nose syndrome will effectively undo all of these conservation efforts if left unchecked.

I have worked closely with personnel involved in this proposal and have tremendous respect for their expertise, creativity, and ability to work collaboratively in past conservation efforts.

I am committed to the success of this project and to the agencies involved and have offered use of 12 thermal imaging cameras to precisely measure and analyzed subterranean microclimates to both better understand roosting associations, but most importantly more precisely diagnose those subterranean features most likely to serve as incubators for this pathogen. I have also offered to provide professional assistance to train participants in the use of this equipment and to complete any needed analyses in my research lab. These in-kind contributions total in excess of $180,000.00

Sincerely,

Rick Sherwin, PhD
Department of Organismal and Environmental Biology
Christopher Newport University
1 University Place
Newport News, VA 23606
rsherwin@cnu.edu
757 775-5129

BRIAN SANDOVAL
Governor

STATE OF NEVADA
DEPARTMENT OF WILDLIFE
6980 Sierra Center Parkway, Suite 120
Reno, Nevada 89511
Phone (775) 688-1500 • Fax (775) 688-1495

TONY WASLEY
Director
LIZ O'BRIEN
Deputy Director
JACK ROBB
Deputy Director

25 April 2016

Steven Mietz
Superintendent
Great Basin National Park
National Park Service

Dear Steve,

The Nevada Department of Wildlife would like to express our support for Great Basin National Park Service's SNPLMA Round 16 proposal "Can land managers prevent the 'inevitable collapse' of bats in the western U.S.?" NDOW is a strong proponent of using science-based conservation research projects to make informed land- and wildlife-management decisions, and the management directives that would be provided from this important work are clearly lacking for such a cryptic and difficult taxa to study. The funds directed in this proposal towards bat gates on mines and caves will also clearly help with efforts to protect both the wildlife and the public in eastern Nevada.

This proposed project is a collaborative effort between GBNP, BLM, USFS, NDOW, and academia, and we look forward to partnering with GBNP on this project with project advisement, field work, and data analysis. Over the course of the project, NDOW projects that we will contribute $25,000 in labor hours on this project. We also project that we will use $6,000 towards the life of equipment on this project that we currently own (mine/cave gear, bat capture gear, etc.).

If you have any questions, please don't hesitate to contact me.

Sincerely,

Jason Williams
Wildlife Biologist
Nevada Department of Wildlife
1218 N. Alpha Street
Ely, NV 89301