RESEARCH PROPOSAL TO SOUTHWEST PARKS AND MONUMENTS ASSOCIATION

ALL PROPOSALS MUST FOLLOW THIS FORMAT. THE INFORMATION REQUESTED MUST BE LIMITED TO THE SPACE PROVIDED AND MUST BE SUBMITTED ON THESE FORMS. PROPOSALS RECEIVED IN ANY OTHER FORMAT WILL BE RETURNED.
NO ADDITIONAL ATTACHMENTS ARE PERMITTED.

Park(s) in which research is to be conducted: Timpanogos Cave National Monument

Title of project: Identifying High Frequency Bat Calls

Name, address and phone number of principal investigator(s):		If grant is to be paid to PI(s), enter Soc. Sec. #s here. If grant is not to be paid to PI(s), enter name and address of payee here:
Jon Jasper and Cami Pulham Timpanogos Cave National Monument RR 3, Box 200 American Fork, UT 84003 (801) 756-5239		National Park Service
Amount desired: $6,950.00	Desired start date: June 2002 NOTE: Not prior to 12/1	Proposed duration: 5 months
Name(s) of research participant(s) who will acquire advanced degree(s) as a result of working on this project, if any: N/A		Format of final report, i.e., technical report, checklist, map, manuscript, etc.: Technical Report

Abstract (To be provided by PI(s). Do not exceed space provided below:

Bats are highly misunderstood mammals, with a general negative public perception. In reality, they are very valuable to our ecosystem. Bats can be identified and studied by analyzing their unique calls. This proposal to purchase a high frequency recorder called an Anabat Detector, will allow the monument to identify and research bats in flight, and educate the visiting public about the value of bats through evening program presentations and bulletin boards. The Anabat detectors will enhance Timpanogos Cave National Monument's ability to identify the bat species present in the monument, identify in what capacity the bats are using the monument, evaluate the effectiveness of new 'bat friendly" cave gates to be installed in 2002, and provide an increased awareness of the value of bats to the public.

1) JUSTIFICATION (TO BE PROVIDED BY SUBMITTING PARK)

LIMIT TO SPACE BELOW. SPECIFY THAT NPS-APPROPRIATED FUNDS ARE NOT AVAILABLE. WHERE DOES THIS PROJECT APPEAR ON NPS RESEARCH PRIORITIES? SPECIFY IF THIS PROPOSAL WAS SOLICITED BY THE PARK. HOW WILL THIS RESEARCH ENRICH ONE'S UNDERSTANDING OF THE PARK AND/OR AUGMENT INTERPRETATION OF THE PARK? WHAT IF ANY ARE THE IMPLICATIONS FOR RESOURCES MANAGEMENT?

Bats may be the most misunderstood animals in the United States and suffer from a poor public image. Of the 45 bat species in the United States, 6 species are listed as endangered and 20 species are listed as Species of Concern (Harvey et al 1999). Due to the lack of understanding and proper management, bat populations are showing significant declines throughout the United States.

Bats are crucial to our ecosystem. They are an important control for insect populations. Bats eat more than half their body weight in insects each night. Bats also are important for pollination and seed dispersal. Many plant species depend almost entirely on bats for pollination. Bats are important for dispersing seeds into areas that have been clear-cut. Without bats, the health of our ecosystem would be greatly compromised.

Timpanogos Cave National Monument, which is located along the Wasatch Front between the metropolitan areas of Salt Lake City and Provo, Utah, has an opportunity to gather information about the monument's bats and educate the public. The monument receives over 130,000 visitors annually, and often over 75 people will attend interpretive evening programs. Currently three bat species of special concern are thought to inhabit the monument. They are the Spotted Bat (Euderma maculatum), Western Small-footed Myotis (Myotis ciliolabrum), and Townsend's Big Eared Bat (Corynorhinus townsendii). Since over half of the bat species in the United States are threatened, it is important to know what species are present at Timpanogos Cave N.M., what kind of habitat the monument is providing, and educate the public on the importance of bats.

Bats produce sounds beyond the human range of hearing. These sounds are used for echolocation, which allow bats to navigate and hunt insects in the dark. Bats echolocate by producing a series of short pulses of high frequency sound. The sound spreads as it travels and when it strikes an object, it is reflected back as an echo. With this information, the bat can determine the size, shape and momentum of the object of interest (Hill et al 1992).

Most bat species have their own unique calls, which enable researchers to study bats using high frequency recording device. An Anabat detector modulates the bat high frequency calls into audible sound. An Anabat ZCA Interface Module converts these frequencies into digital data that graphically recorded and analyzed on a computer. Without a computer, the high-frequency calls cannot be correctly recorded and analyzed. These graphical images of the calls are used to identify different species. Through the use of the Anabat detectors we will be able to determine the presence or absence of bat species, estimate population densities, provide a hands-on learning experience for the general public, and educate the public about the importance of bats.

I have read and agree to abide by the research guidelines in effect at the time of this application.

SIGNATURE OF PRINCIPAL INVESTIGATOR(s) DATE

SIGNATURE OF PARK SUPERINTENDENT DATE

* * * *

2) CONCISE STATEMENT OF RESEARCH OBJECTIVES, DESIGN, AND METHODOLOGY

Include facilities and sites to be used. Limit to two pages, single spaced.

Objectives

1. To identify all bat species present at Timpanogos Cave National Monument and determine how bats are using the cave and surface resources (hibernation, foraging, maternity).

2. To identify, protect, and preserve bat habitat.

3. To estimate bat population densities.

4. To increase public awareness of threatened bat species through ranger led programs and a hands-on opportunity to participate in bat research.

5. To evaluate and monitor the effectiveness of new "bat-friendly" cave gating to be installed 2002.

Methodology

Resource Management staff and volunteers will perform monthly bat surveys at various locations throughout the monument. Surveys conducted at the visitor center will be offered to the public as part of interpretative evening programs, and will provide hands-on opportunities for the public to participate in bat research at the monument. These programs will be advertised in community newspapers and on park displays. The other locations identified for bat surveys are as follows: along the cave trail, at the cave entrances, and along the river. The surveys will be conducted between the months of June through October. All recordings of bat calls will be saved and entered into an echolocation library. Once calls for bats have been recorded and identified, we will be able to compare echolocation patterns with any bat vocalization in our library. These recordings will provide the monument with a record of which species are present in the monument and how they are using the resources available.

In May 2002, we will attend an Anabat training course hosted by Bats Conservation International in Phoenix, Arizona. This training course will teach proper use of the Anabat detectors, improvements in Anabat technology, and how to record, analyze, and organize bat calls. Training will also include mist-netting of bats, and give attendees the opportunity to record pre-identified bats. Finally, this course will teach participants how to identify bats while in flight with the use of a spotlight. Attendance at this training course by monument resource management staff will maximize use of the Anabat detector.

Many areas of the Timpanogos Cave system are difficult to reach, making it hard to determine the extent of the bat habitat in the cave system. Anabat detectors will take automated recordings without risk to researchers and volunteers.

Through interpretive programs, the Anabat detectors will allow visitors to learn how to appreciate bats by hands-on use of bat research. These programs will be advertised through local newspapers and park displays. By sharing information gained and educating the public, bat conservation will be greatly improved.

STATEMENT OF RESEARCH OBJECTIVES, DESIGN, AND METHODOLOGY (Continued)

(3) QUALIFICATIONS OF THE INVESTIGATOR(S) TO CONDUCT THE RESEARCH

USE THIS PAGE ONLY. DO NOT ATTACH A VITA. LIST ONLY THOSE QUALIFICATIONS DIRECTLY RELATED TO THIS GRANT REQUEST. INCLUDE A CONCISE LIST OF OTHER SPMA-FUNDED RESEARCH CONDUCTED BY THIS PI.

National Park Service rangers, Jon Jasper and Cami Pulham, will be the primary investigators. Jon Jasper, Resource Management Specialist at Timpanogos Cave N.M., has spent much of his life dealing with cave related issues, such as identifying and evaluating bat habitat in caves. He has experience using Anabat detectors to evaluate the effectiveness and to understand the cave usage by bats at Great Basin National Park. He has attended an Anabat training course under Mike Farrell (bat research consultant) and Chris Corbin (inventor of the Anabat detector). Cami Pulham is the assistant Resource Management Specialist at Timpanogos Cave N.M. She is currently using Hobo Dataloggers to monitor cave temperature and humidity of possible bat habitats and will be assisting in the 2002 installation of the "bat-friendly" cave gates to promote bat use in the Timpanogos Cave system. Cami spent several seasons as a National Park Service Interpreter and is the Regional Representative of NSS Conservation and Education Task Force. This Task Force is responsible for community education programs on proper cave and bat ethics through out the United States.

BUDGET FOR RESEARCH PROPOSAL

Project title and submitting park:

PERSONNEL

SENIOR PERSONNEL	FUNDS PROVIDED BY SPMA	CASH OR IN-KIND CONTRIBUTION Please specify which and source
1. Jon Jasper	$0.00	$800.00
2.		
3.		

OTHER PERSONNEL (Specify number in brackets. **Specify duties to be performed to earn funds on next page.)**

1. ☒ Other professionals (technicians, programmers, etc.)	$0.00	$400.00
2. ☐ Graduate students		
3. ☐ Undergraduate students		
4. ☐ Secretarial/clerical		
5. ☒ Other	$100.00	$0.00
A. TOTAL PERSONNEL COSTS	$100.00	$1,200.00
B. EQUIPMENT COSTS (List item and dollar amounts for those items costing in excess of $50 each on next page.)	$4,516.00	$900.00
C. TRAVEL AND SUBSISTENCE (Itemize on next page.)	$2,000.00	$0.00

OTHER COSTS

1. Supplies and materials	$300.00	$100.00
2. Consulting services		
3. Computer services		
4. Subcontracts (Itemize on next page.)		
D. TOTAL OTHER COSTS	$300.00	$100.00
TOTAL PROJECT COSTS A+B +C+D	$6,916.00	$2,200.00

COSTS (Continued)

Equipment Costs

2 Anabat II Bat Detectors @ $632	$1,264
2 Anabat ZCA Interface Modules & Software @ $376	$ 752
2 Laptop Computers	$2,500
TOTAL	$4,516

Travel and Subsistence

Principal Investigators Jon Jasper and Cami Pulham travel to Phoenix to attend Anabat Training course sponsered by Bats Conservation International. This is a three day training course.

Air Fare for 2	$650
Lodging for 2	$600
Tranportation	$300
Per Diem	$350
Miscellaneous	$100
TOTAL	$2,000

Other Costs

Folding Tables	$100
Spot Lights	$200
TOTAL	$300