

**FEDERAL AID
ANNUAL PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
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**Alaska Department of Fish and Game
State Wildlife Grant**

Grant Number: T-21 **Segment Number: 1**
Project Number: 16.0
Project Title: Population and habitat assessments for CWCS featured species in Southcentral Alaska
Project Duration: 16 April 2011 – 30 June 2015
Report Period: July 1, 2013 - June 30, 2014
Report Due Date: 28 September 2014
Principle Investigator: David Tessler, ADF&G
Project Location: Southcentral, Interior, and Western Alaska (ADF&G Regions II, III, IV; GMUs 6 – 25)

I. SUMMARY OF WORK COMPLETED ON JOBS FOR LAST SEGMENT PERIOD ONLY

***Objectives:** It is anticipated that several species' population and habitat assessments may be accomplished during this project. The following objectives would be components of each species' assessment.*

***Objective 1:** Conduct surveys and/or monitoring of selected species in West and Southcentral and Central Alaska to determine population status, abundance, and distribution of the species.*

***Job/Activity 1a:** Recruit, hire, and train a field crew as necessary to carry out fieldwork. Purchase equipment and arrange charters as necessary to support the fieldwork.*

***Job/Activity 1b:** Conduct surveys and studies using identified techniques. Water-borne, aerial, and ground-based approaches may be employed, depending upon taxa studied. Techniques for birds could include standard North American Breeding Bird Survey roadside counts, Alaska Landbird Monitoring System protocols, line transect surveys, point counts, calling surveys, and specialized techniques as needed to produce accurate and credible information on abundance and distribution. Mammal survey techniques include a variety of visual, aural, and sign (track, scat, hair) surveys with more specialized techniques as needed.*

***Job/Activity 1c:** Conduct genetic analysis where deemed appropriate to determine genetic relatedness, demographics, movements, and distinctiveness of area endemic species.*

STUDY NEED

The status of the Little Brown Bat (*Myotis lucifugus*) is unknown in Alaska, but is generally expected to be secure. However, the species is in rapid decline in the core of its range in central North America – and has been petitioned for listing under the Endangered Species Act - as a consequence of massive mortality events at hibernacula as a consequence of White Nose Syndrome (WNS), caused by the novel fungal pathogen, *Pseudogymnoascus destructans*.

Introduction

Bats are integral components of most North American ecosystems, fulfilling a variety of roles, most notably they consume vast numbers of flying insects. Their control of aerial insects and the role some species play in pollination of certain crop species amounts to an economic benefit estimated at nearly 4 billion dollars per year in North America. Bats are also identified as reservoirs of a growing range of zoonotic and potentially zoonotic pathogens (pathogens virulent in humans); even apparently healthy bats are now known to carry zoonotic disease agents. The potential for wide-spread dispersal of rabies and other pathogenic viruses by bat populations is high due to their unusual immune system that allows persistent infection and shedding of viral pathogens for months, their ability to fly and migrate, their gregarious social structure (which contributes to the amplification of viruses in bat colonies) and the known close association of bats with human habitation. Yet despite their ecological and economic importance, and association with human health, bats in North America remain poorly understood in general, and the ecology of bats in Alaska is described only at the most rudimentary level.

From a conservation perspective, insectivorous bats in North America are currently experiencing sudden and dramatic population declines resulting from two major new threats: Large-scale wind energy development which is causing unprecedented mortality in several migratory tree-dwelling bat species in eastern North America; and White-Nose Syndrome (WNS), an emerging, infectious, epizootic disease that is decimating populations of hibernating cave-dwelling bats in eastern North America. These new threats present considerable challenges to resource managers charged with wildlife conservation. While there have been a number of new or proposed listings of bats under the Endangered Species Act, the extent to which these threats may impact the conservation or persistence of bats in Alaska is unknown because critical information on the distribution, habitat associations, and ecology of Alaska's bats is lacking.

Very little is understood about the distribution, habitat usage, and seasonal movements of bats in Alaska, and it remains unclear whether bats throughout most of the state migrate to other locations for the winter or if they hibernate in place. Locations of summer roosts and winter hibernacula remain almost totally unknown, and it is unclear whether bats throughout most of Alaska use natural substrates (caves and/or mines) for roosts or hibernacula or if they are completely dependent on human structures. This last point is likely a function of the recent natural history of bats in the region and whether or not bats were extant at the time of western cultural contact, or if bats followed western settlement across the region. There are likely different answers to these questions for different populations around the state. The current lack of information on the distribution, habitat associations, life history, and ecology of Alaska's bats represents a serious impediment to their conservation with respect to understanding and managing the consequences of WNS. Due to the potential of anthropogenic vectors to spread the

pathogen (contaminated equipment and clothing of individuals frequenting caves and mines), geographic separation between affected and unaffected areas offers little protection against the spread of the disease: it could arrive in Alaska tomorrow. To insure the conservation and continued persistence of bats in Alaska, it is important to focus our attention on delimiting the geographic distribution of summer roosts, maternity colonies, and winter hibernacula. We have developed a collaborative, coordinated project using a suite of methodologies (including citizen science, acoustic monitoring, capture, genetics, disease surveillance, and telemetry) to address these issues across land management jurisdictions across Southcentral, Central, and Western Alaska.

Project Description

This project coordinates several concurrent localized research projects undertaken by a variety of institutions and individuals in order to address the major information needs limiting the conservation of bats in South-central, Interior, and Western Alaska in a comprehensive manner. The objectives of this collaborative effort include:

- 1) We will conduct targeted and randomized acoustic surveys using active and passive techniques to detect presence of bats in different habitats around the state. We will characterize habitats at survey and monitoring sites using standardized methods (USDA Forest Service Common Stand Exam) to determine habitat associations.
- 2) We will conduct seasonal acoustic monitoring at targeted sites to determine seasonality of bat presence and relative degree of use. Most sites will be monitored from April through November while a subset of sites will be monitored year round. These efforts will focus on locations where bats are likely or known to occur in Southcentral, Central, and Western Alaska, including at some of 48 recently identified maternity colonies (Tessler et al. 2014). Attention will also be given to locations of recent range extensions (Kotzebue, Saint Michael, and White Mountain) to determine whether observations in these locales represent persistent populations or casual/accidental occurrences. Multiple partners will be engaged in acoustic monitoring within their respective jurisdictions. Data from at least some of these monitoring sites will be shared with BatAMP – The Bat Acoustic Monitoring Portal.
- 3) We will capture bats at a variety of sites where they are detected for a range of purposes:
 - a) We will collect wing punch samples for genetic analyses of mitochondrial and nuclear DNA to verify taxonomy genetically and to assess the overall level of genetic population structuring.
 - b) We will take a series of morphometric measurements and assess sex, age, and body condition.
 - c) We will euthanize a small proportion (n=1-2) of bats at each sampling site for museum curation to enable comparisons morphological and phenotypic characters now and into the future (currently less than 100 specimens have been collected – from 1881 to present - from only 25 locations in all of Alaska north and west of the panhandle).
 - d) We will record reference calls of captured bats to inform taxonomic differentiation based on acoustic data –reference calls will be shared with a northern or Alaskan bat call library (in development) and will be coupled to the genetic identification of individuals

(possibly archived in ARCTOS) to aid in the future identification of bats detected acoustically;

e) We will collect samples of bat-borne pathogens using non-invasive techniques to gain a preliminary understanding of the viral and fungal pathogens present in Alaska bat populations. We will focus specifically *Pseudogymnoascus destructans* (the organism responsible for WNS) and members of the closely related genus *Geomyces*, *Histoplasma capsulatum* (responsible for histoplasmosis), and RNA viruses commonly found in insectivorous bat species: Orthomyxoviruses, Coronaviruses, Paramyxoviruses, and Rhabdoviruses – including Lyssaviruses (e.g. rabies). In addition to establishing the prevalence of these specific viral and fungal pathogens, we will also assess the genetic structure of their respective populations.

f) We will attempt to determine if Little Brown Bats from a selection of large summer roosts or maternity colonies overwinter in place or if they leave to hibernate elsewhere using a variety of passive techniques including: Passive Integrated Transponder (PIT) tags, Radio Frequency ID (RFID) tags, and/or Harmonic Radar tags.

g) We will attempt to locate additional summer roosts, maternity colonies, and hibernacula, quantify range size and habitat use, and determine propensity for migratory behavior of different populations of Little Brown Bats at various study sites around the state using conventional VHF telemetry studies.

Locations

This project will include study locations on state, federal, and private lands across Southeast, Southcentral, and Interior Alaska. Locations include the vicinities of Prince of Wales Island, Sitka, Juneau, Cordova, Prince William Sound, Anchorage, the Kenai Peninsula, the Matanuska and Susitna valleys, Copper Center, Glennallen, Talkeetna, Salcha, Fairbanks, Delta Junction, Tok, Kodiak Island, Kotzebue, White Mountain, St. Michael, Dillingham, and King Salmon.

Accomplishments:

Objective 1:

Objective 1: Job/Activity 1a: October 2013-May 2014 we purchased equipment and materials to begin extensive bat acoustic monitoring and capture operations throughout southcentral and interior Alaska.

February-May 2014, we recruited and hired a staff of six seasonal technicians for this project. May 2014 biologist Marian Snively participated in weeklong bat monitoring and capture training program hosted by Bat Conservation and Management (BCM) at the USDA Southwest Research Station in Arizona. June 2014 all six technicians and biologists Snively and Tessler participated in a bat survey and capture training session conducted in Girdwood and Portage, Alaska by Dr. Susan Loeb of the USDS Southeast Research Station. Tessler and Snively trained the technicians on the basics of bat ecology, acoustic monitoring for bats, and how to use the equipment to gather and process echolocation data.

Objective 1: Job/Activity 1b: September 2013 – May 2013: To begin to determine the seasonality of bat occurrence we deployed Wildlife Acoustics ultrasonic bat detectors at

eight (8) study sites on private, municipal, and state land in southcentral Alaska in the following locations : Talkeetna, Palmer, Nancy Lakes, Eagle River, Anchorage, Anchorage Coastal Refuge and Potter Marsh. The detectors were deployed from September, 2013 through May 2014, and were used to determine the presence of bats, relative abundance, and quantify the timing and frequency of bat calls as related to habitat and date. Detectors were checked every 2-3 weeks at which time and batteries and memory cards were replaced.

May-June 2013: We conducted passive and active bat monitoring and surveys at numerous locations throughout southcentral Alaska, with a primary emphasis on locations in Willow, Wasilla, Palmer, Sutton, Chugiak, Eagle River, Anchorage, Potter Marsh, Girdwood, Portage, and sites in Prince William Sound (Knight Island, Entrance Cove State Marine Park, and Granite Mine. These surveys were intended to determine the presence of bats, relative abundance, and quantify the timing and frequency of bat calls as related to habitat and date, and to assess locations for intensive trapping efforts later in the summer of 2014.

Objective 1: Job/Activity 1c: We have no progress to report for this objective within the reporting dates, however, assessing the genetic population structure of *Myotis lucifugus* and using genetic means to determine if other species may be present is a major component of our coordinated bat project. Intensive capture activities were undertaken from July – September 2014.

Objective 2: Identify habitat types and needs associated with the selected species and identify existing or potential problems, needs, or concerns regarding habitats

Job/Activity 2a: Based on results of surveys, identify habitats that are important for population maintenance, especially for those species with indicated declines either on a national level or within the state.

Accomplishments:

Objective 2; Job/Activity 2a: The acoustic monitoring and survey effort of this project are intended 1) identify habitats where bats are most likely to occur, as well as isolating those habitats that support the greatest densities of bats in southcentral, interior, and western Alaska. The winter month acoustic monitoring is intended to provide insight into the season behavior of bats around the state and ascertain whether bats hibernate in place or if they undertake seasonal migrations. We also expect to continue to explore the links between bat activity and human structures. Preliminary analyses of these acoustical data will not begin until winter 2014.

Objective 3: Examine population dynamics and identify factors limiting population growth or reproductive success, such as predators, habitat loss or degradation, and contaminants

Job/Activity 3a: Where possible, gather supplemental ecological data to accompany population parameters on West and Northwest Alaska vertebrates. These data may include demographic information, predation risks and factors, and habitat preference or avoidance parameters.

Accomplishments:

Objectives 3; all Jobs/Activities: Population dynamics, productivity, and demography and not components of this project, although it is possible that bats banded during capture activities may contribute to our understanding of bat demography in Alaska.

Objective 4: Analyze, disseminate and share information and data with partners, cooperators, the scientific community, and the general public.

Job/Activity 4a: Analyze data, prepare reports, maps, and associated publications and presentations.

Job/Activity 4b: Attend conferences and workshops and/or write articles to present findings

Accomplishments:

Objectives 4; all Jobs/Activities:

Preliminary analyses of the data from this project have yet to commence.

The results of this first season of effort were distributed in a report to Chugach National Forest, and were published in the Western Bat Working Group Newsletter, Spring 2014. This project was also featured in several pieces in the popular press, including the Alaska Public Radio Network and the Anchorage Daily News, Sunday 2 December 2012.

II. PUBLICATIONS

Tessler, D.F., M.L. Snively, J.K Ilse, D. Causey, M. O'Dell, M. Dzierzynski, and B. Hansen. 2013. Autumn acoustic surveys for little brown bats along Turnagain Arm in South-central Alaska. Western Bat Working Group News, Volume 8, Number 1, pp8-9.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

IV. RECOMMENDATIONS FOR THIS PROJECT

Prepared by: David Tessler, ADF&G

Date: September 30, 2014