

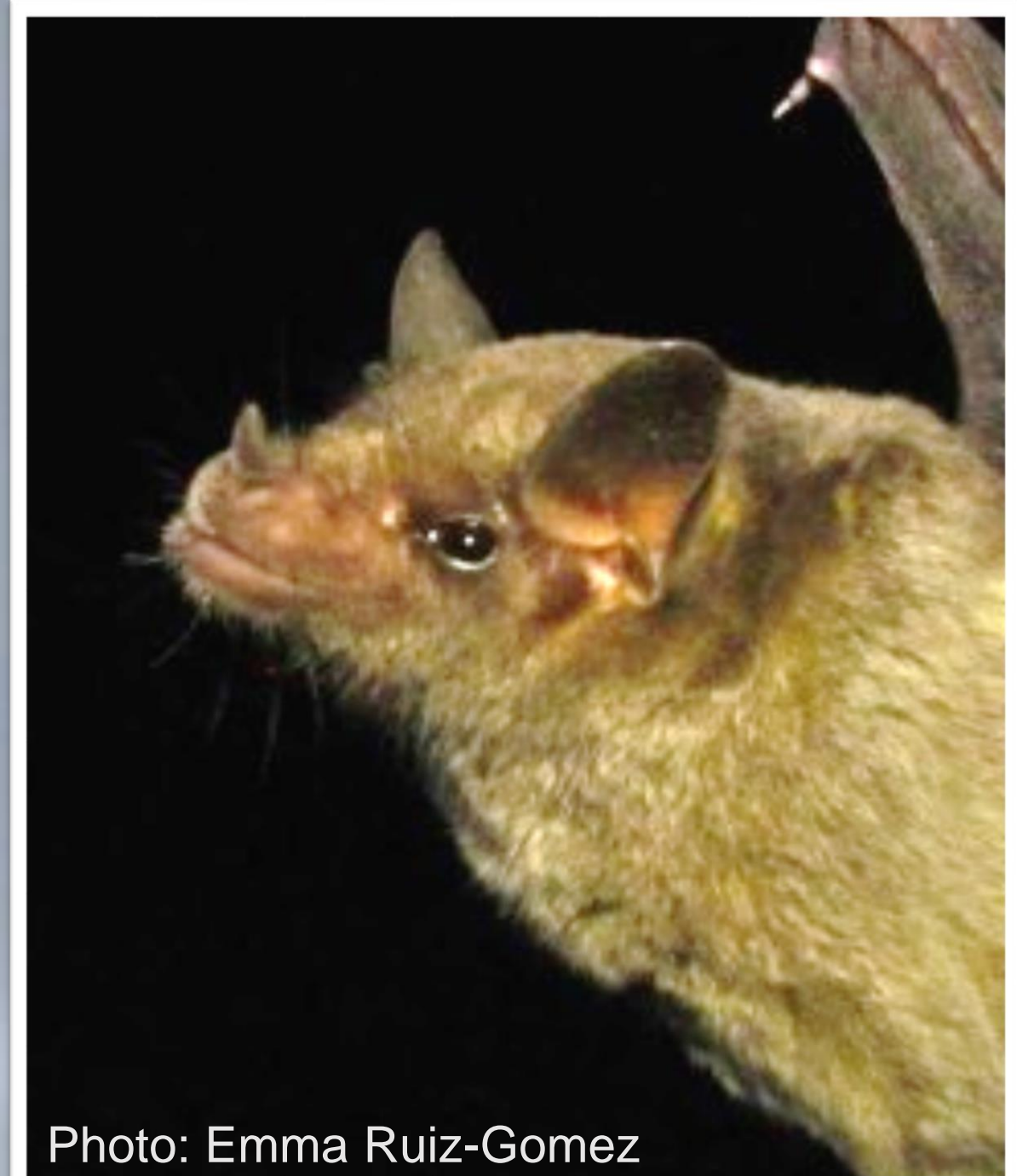
# Conserving an Endangered Pollinator Through “Bat-friendly” Agave Management Programs in Northeast Mexico

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## Introduction

- The endangered Mexican long-nosed bat (*Leptonycteris nivalis*) relies on the nectar of Agave plants (*Agave spp.*) as an important food source.
- Agaves are also an important economic and cultural resource in Mexico, but agave harvesting and use may be contributing to declines of the Mexican long-nosed bat.
- Recent efforts (e.g. “Bat-Friendly” tequila and mezcal) are promoting “bat-friendly” agave management in some parts of Mexico.
- However, there are few “bat-friendly” agave management efforts in northeast Mexico, home to two critical roosting caves.



The Mexican long-nosed bat (*Leptonycteris nivalis*)



Agaves in the Chihuahuan Desert of Coahuila (northeast Mexico)

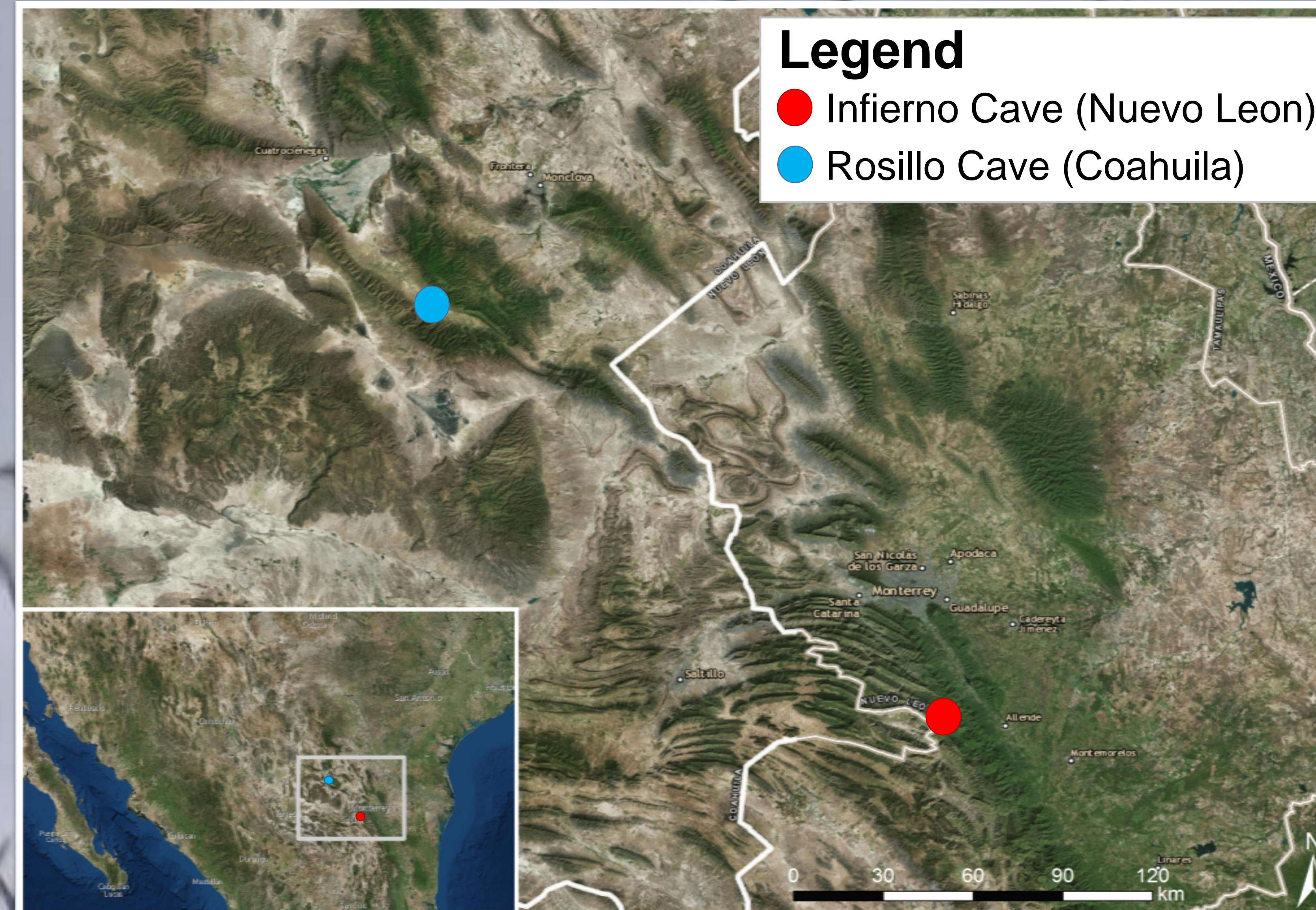
## Project Goal

- Understand how “bat-friendly” agave management can be implemented in northeast Mexico in ways that are most **ecologically and socially appropriate**.

## Research Questions

- 1) What agave and landscape characteristics create high-quality foraging areas for Mexican long-nosed bats?
- 2) What spatial arrangement of flowering agaves on the landscape is optimal (i.e. most energetically efficient) for foraging bats?
- 3) To what extent are communities’ agave management practices “bat-friendly”, and what factors drive management decisions?
- 4) In communities where agave management is not “bat-friendly”, how can “bat-friendly” practices be incentivized?

## Study Areas

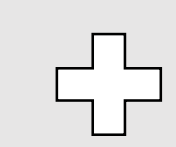


## Methods

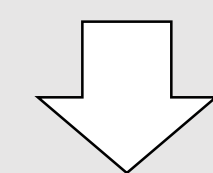
### Ecological Components:

- 1) Determine key agave and landscape characteristics for foraging areas:

Bat foraging study (infrared cameras)



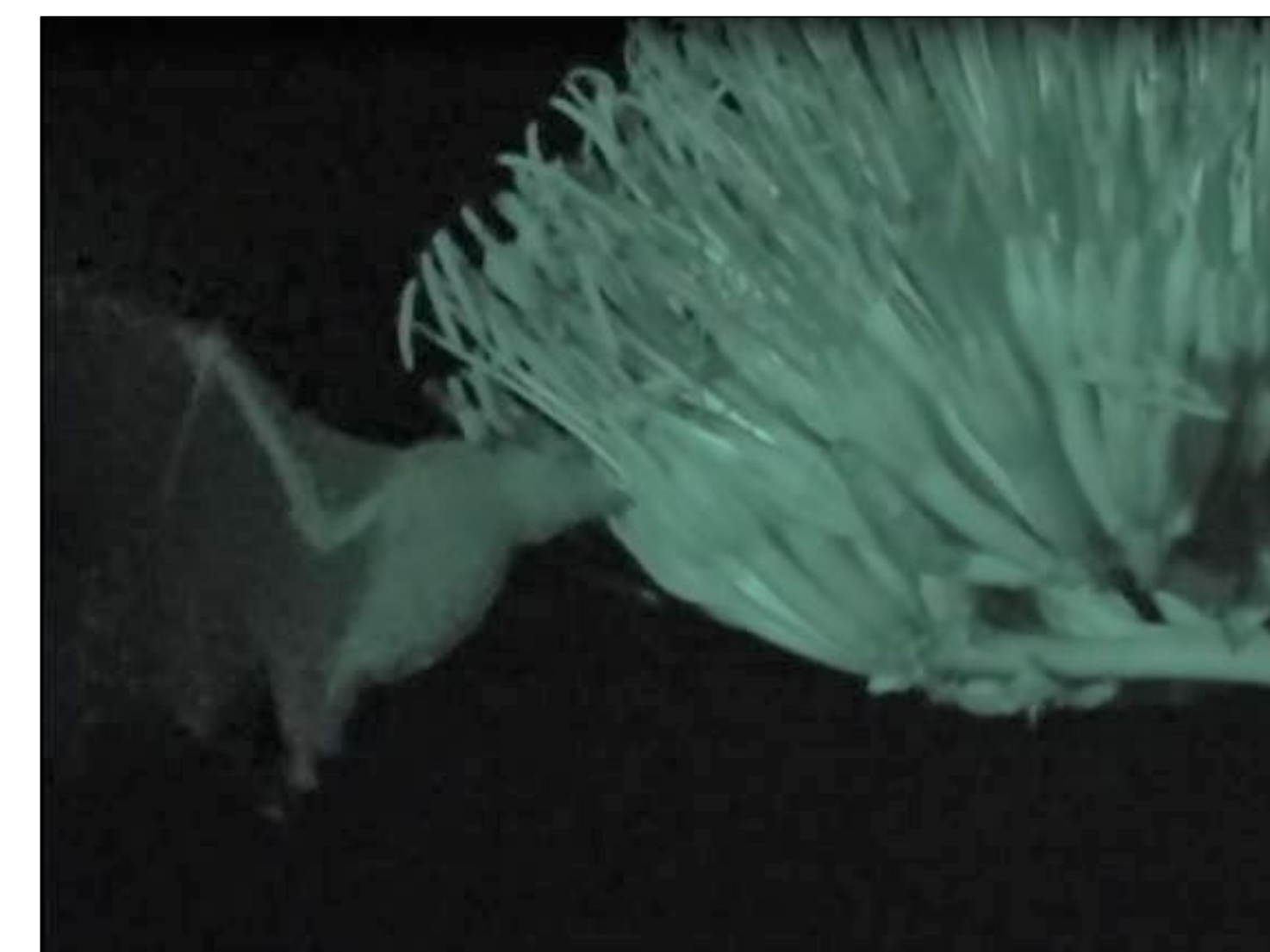
Agave surveys



Bayesian hierarchical modeling

- 2) Determine optimal spatial arrangement of flowering agaves:

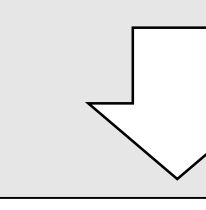
Agent-based modeling (ABM)



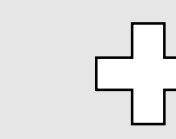
### Social Components:

- 3) Current management and drivers of land use decisions:

Semi-structured interviews (community leaders and agave harvesters)



Thematic analysis



Institutional analysis

- 4) Identify incentives for “bat-friendly” practices:

Stated-choice experiments



## Preliminary Results & Conservation Implications

- 27 nights (~ 440 hours) of monitoring, 40 focal agaves in 12 groups: Bats prefer agave patches with higher densities of flowering agaves. This supports **clustering of flowering agaves in “bat-friendly” management programs**.
- 14 communities, 26 interviews: **Each community has differing social, political, and economic contexts** (e.g. uses of agaves, management strategies, access to markets, etc.)
- **There is no “one-size-fits-all” solution**. Incentives for “bat-friendly” practices should be tailored to local contexts.
- Ultimately, this project will facilitate conservation groups to make well-informed decisions for implementing “bat-friendly” agave management programs in northeast Mexico.

## Next Steps

- Complete field work in summer 2018
- Develop educational programs about bats for local communities

## Funding

