

Montana Natural Heritage Program

Bat Research

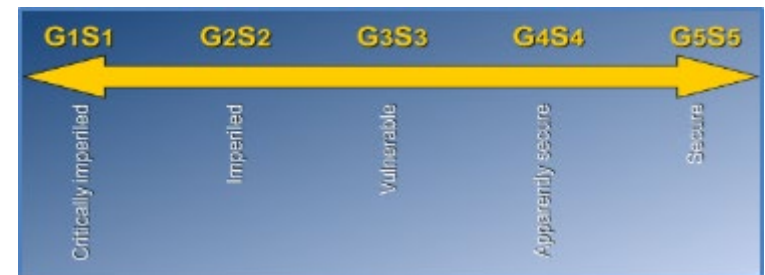
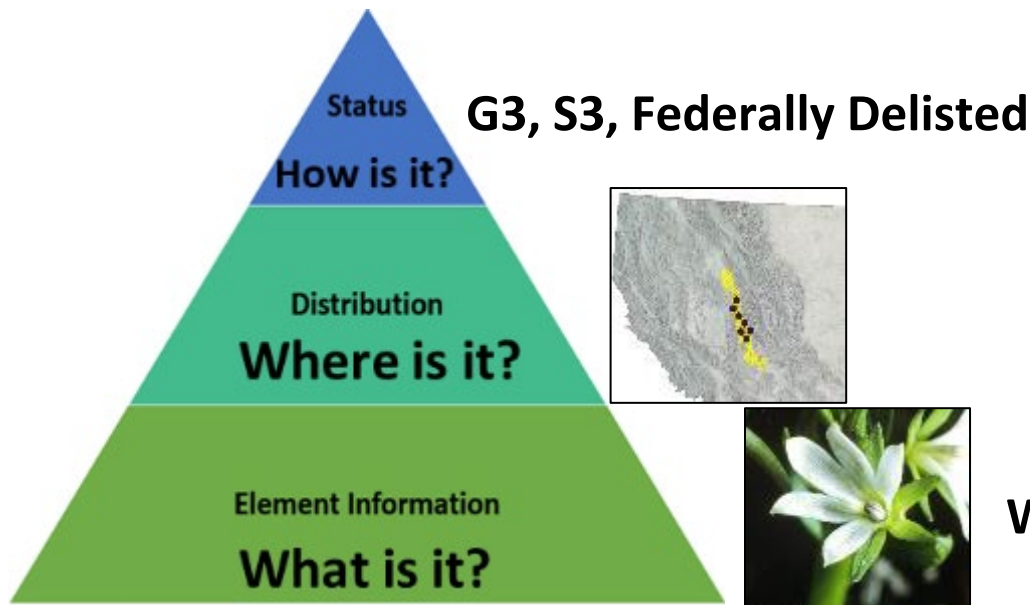
Bryce Maxell, Program Coordinator bmaxell@mt.gov



- Information Managed
- Information Delivery & Use
- Bat Research Efforts

Why have a Natural Heritage Program?

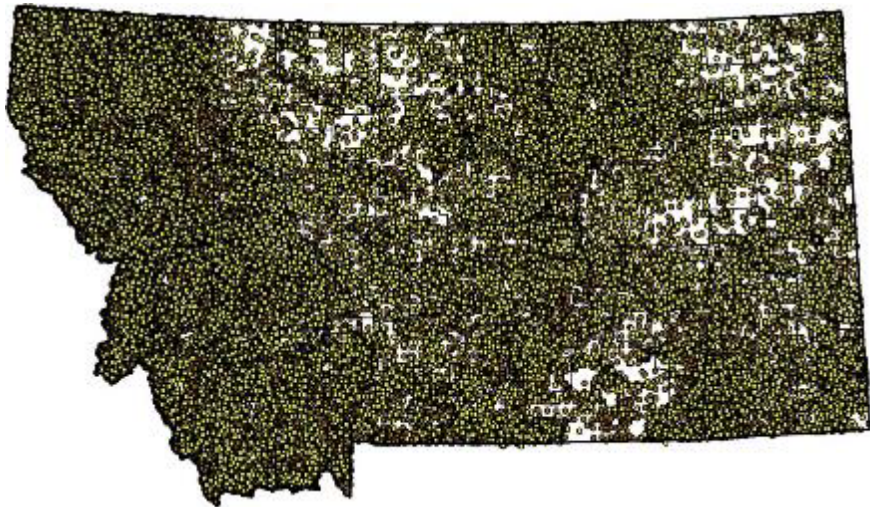
- Common set of information available to everyone
- Inform species and habitat management decisions
- Inform environmental review, permitting, and planning processes
- Inform disaster and invasive species response efforts
- Make informed decisions quickly
- Avoid litigation
- Maintain local authority over species management
- Save time and money



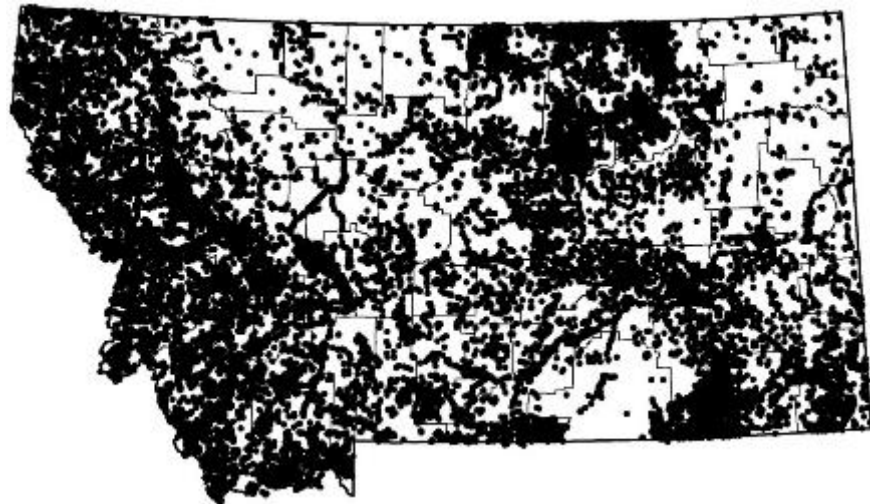
Water Howellia (*Howellia aquatilis*)

Distribution of 16,593 Species

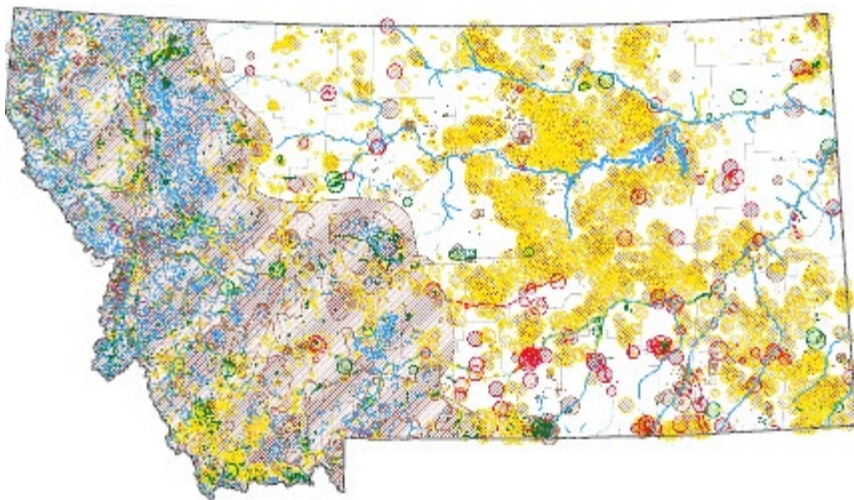
~5.3 Million Observations



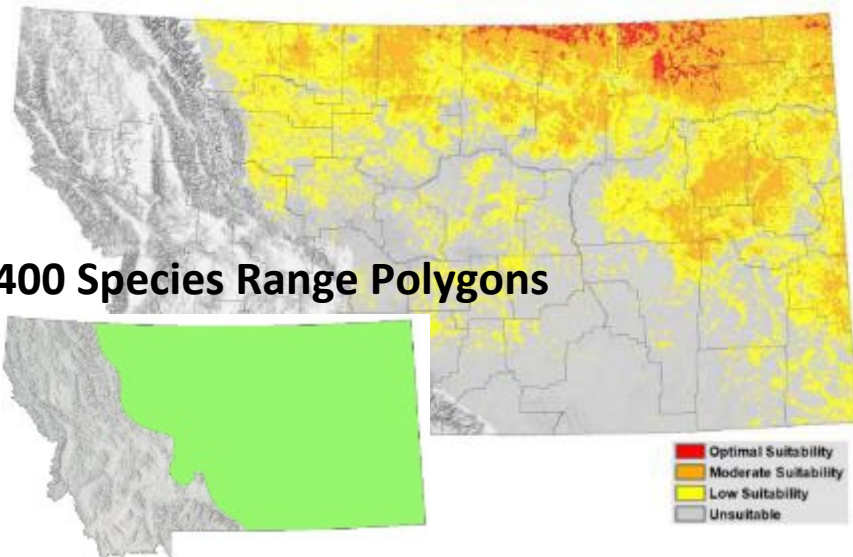
~479,000 Surveys



~97,500 Species of Concern Occurrences



1,400 Species Modeled

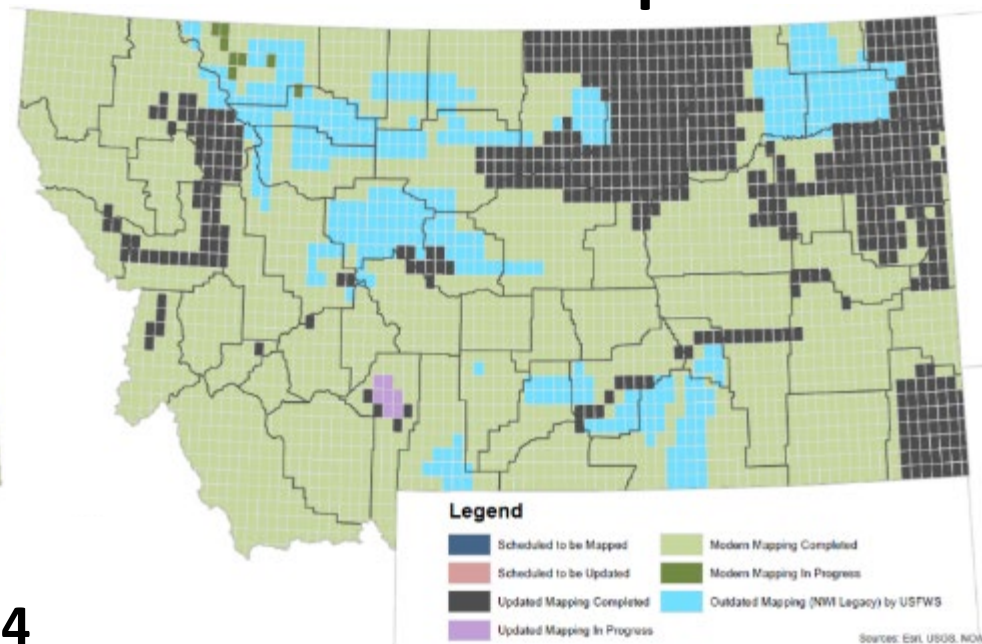


Habitat Data Products

Land Cover



Wetland & Riparian



- * Moving toward NVC for July of 2024
- * Spatial Data Infrastructure Homepage
https://msl.mt.gov/geoinfo/msdi/land_use_land_cover/
 - Story Map
 - Downloads and Web Service
 - Ecological Site Reviewer
 - Land Cover Validation Tool Kit

- * 3.2 million + acres mapped
- * 87% of state is mapped
- * 385 quads at ~\$3,000/quad
- * Funding ready for ~15 quads

Environmental Summary Report

Standard report for all NEPA,
MEPA, and permitting processes

Video on How to Interpret and Use
Environmental Summary Reports

<http://tinyurl.com/bdz5ayk8>

Table of Contents

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 - Introduction to Montana Natural Heritage Program
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 - Introduction to Invasive and Pest Species
 - Additional Information Resources



NATURAL HERITAGE PROGRAM mtnhp.org

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Latitude 45.69648
Longitude -112.68851
45.82961 -112.86051

Summarized by:
Charcoal Creek-Big Hole River
(100200041104 - 6th Code Watershed)



Suggested Citation

Montana Natural Heritage Program. Environmental Summary Report
for Latitude 45.69648 to 45.82961 and Longitude -112.68851 to -112.86051. Retrieved on 4/1/2024.

The Montana Natural Heritage Program is part of the Montana State Library's Natural Resource Information System. Since 1985, it has served as a neutral and non-regulatory provider of easily accessible information on Montana's species and biological communities to inform all stakeholders in environmental review, permitting, and planning processes. The program is part of the NatureServe network that is composed of over 60 member programs across North America that work to provide current and comprehensive distribution and status information on species and biological communities.

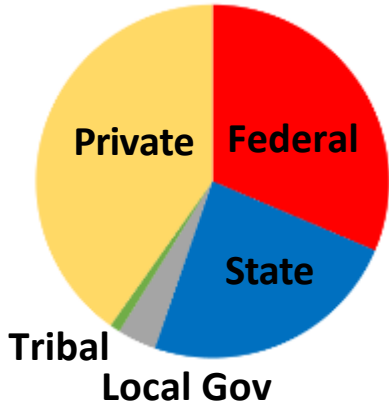


Environmental Summary

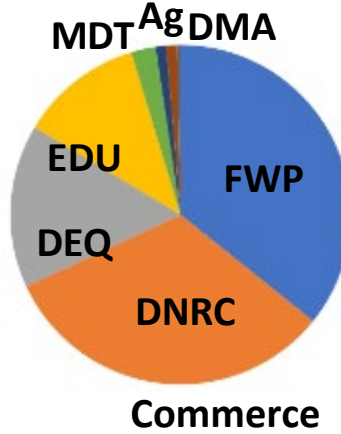
Map Viewer Use



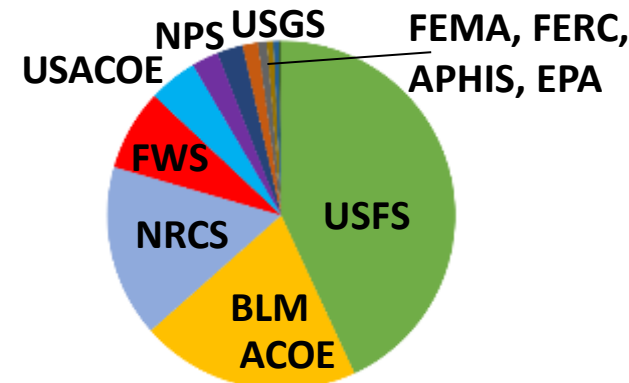
Overall Users



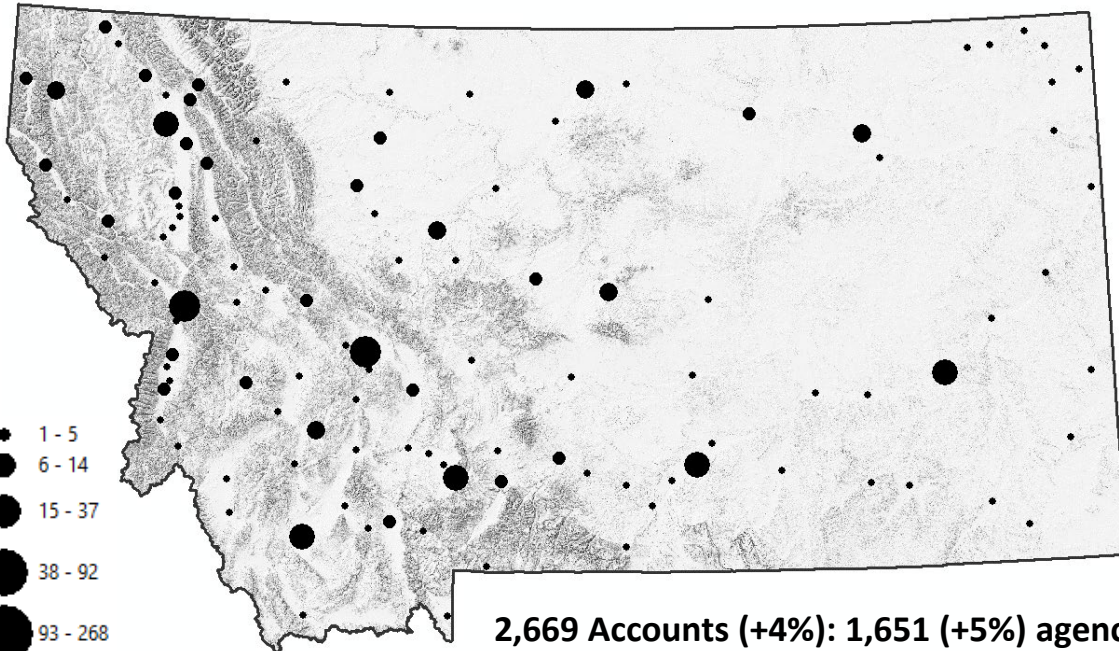
State Users



Federal Users



Spatial Distribution & No. of Agency Accounts



Agency	No. of Accounts
USFS	361
FWP	214
DNRC	193
BLM	171
NRCS	134
DEQ	93
County	73
University	70
USFWS	63
MSL	40
USACOE	38
Tribal	25
NPS	21
USGS	20
City	15
MDT	14
FEMA	12
City	7
FHA	7
Dept of Ag	6
Military Affairs	6
FERC/WAPA/BPA	5
APHIS	4

Bats of Montana



Pallid Bat
(*Antrozous pallidus*)



Townsend's Big-eared Bat
(*Corynorhinus townsendii*)



Big Brown Bat
(*Eptesicus fuscus*)



Spotted Bat
(*Euderma maculatum*)



Silver-haired Bat
(*Lasiurus noctivagus*)



Eastern Red Bat
(*Lasiurus borealis*)



Hoary Bat
(*Lasiurus cinereus*)



California Myotis
(*Myotis californicus*)



Western Small-footed Myotis
(*Myotis ciliolabrum*)



Long-eared Myotis
(*Myotis evotis*)



Little Brown Myotis
(*Myotis lucifugus*)



Northern Myotis
(*Myotis septentrionalis*)



Fringed Myotis
(*Myotis thysanodes*)



Long-legged Myotis
(*Myotis volans*)



Yuma Myotis
(*Myotis yumanensis*)

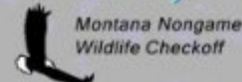
Discover Montana's Wildlife
discover, preserve, protect



MONTANA
Natural Heritage
Program



Michael Duran/Mohor Photos/Bat Conservation International



Montana Fish,
Wildlife & Parks



The University of
Montana

For more information on all of Montana's
native species visit the Montana Field Guide
<http://fieldguide.mt.gov>

Thanks to the contributing photographers, editors,
and sponsors that made this poster possible!



Why Should We Care About Bats?

- A single little brown bat can eat 1,200 mosquito-sized insects in one hour
- A colony of 150 big brown bats can eat 33 million cucumber beetles each summer
- The 20 million Mexican free-tailed bats from Bracken Cave, Texas eat 200 tons of insects nightly
- Their positive impact on agriculture alone is likely in the tens of billions of dollars each year
- Tropical bats pollinate plants and help reseed forests
- Bat studies have led to new medical treatments

Bats Face an Array of Threats

Of North America's 45 bat species, mortalities of 11 have been detected at wind energy facilities with 75% of documented mortalities in 3 species (Kunz et al. 2007)

Wind Energy Development

White-Nose Syndrome



(Kunz et al. 2007)

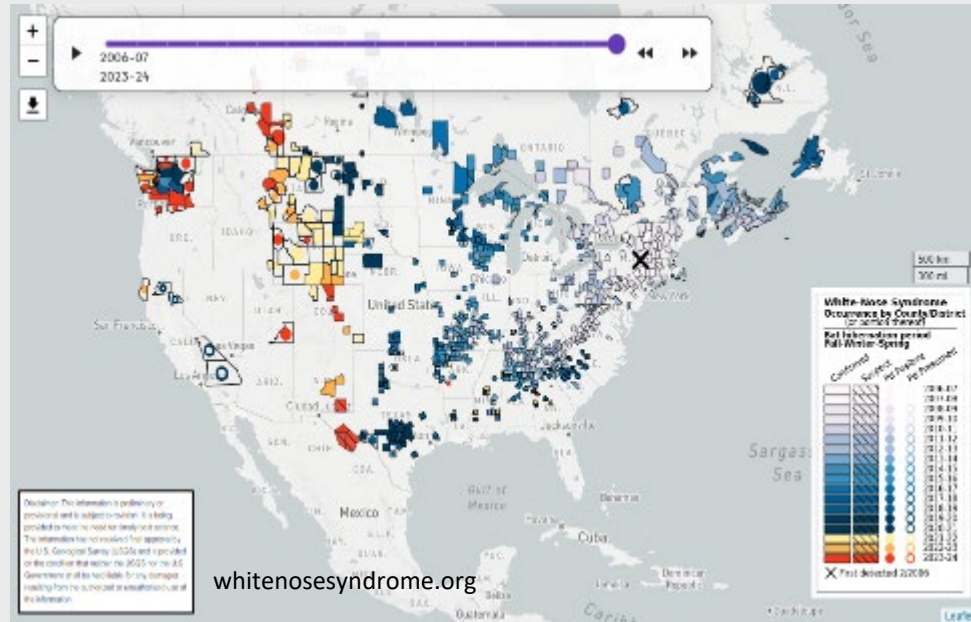
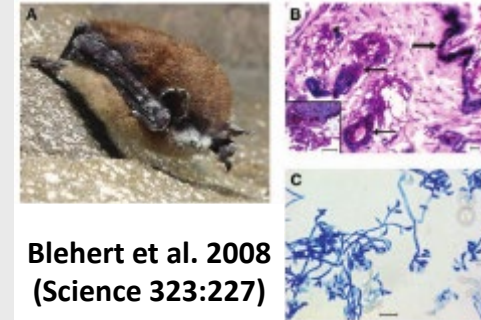


Photo from clean-energy-ideas.com



Collaboration!



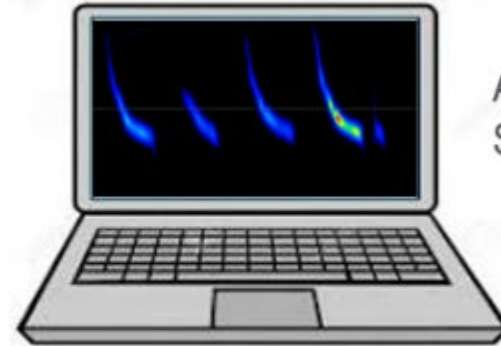
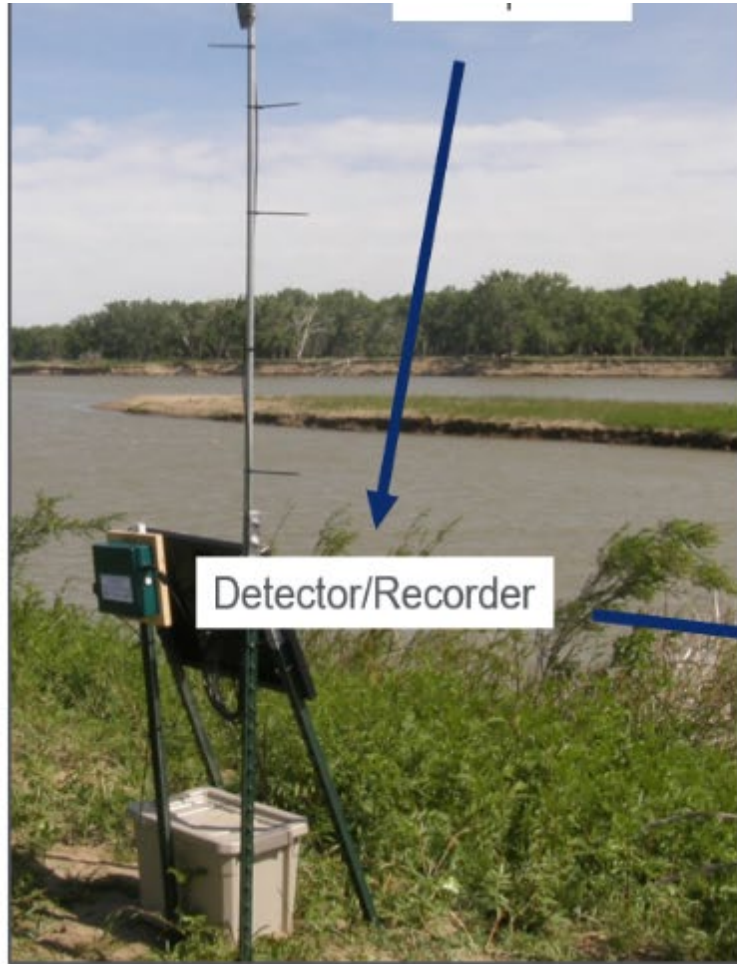
US Army Corps of Engineers®

Roost Monitoring





Acoustic Monitoring



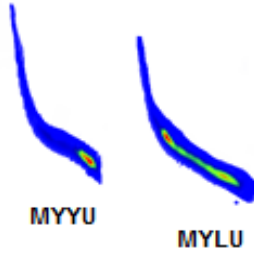
Analysis and
Species Identification

Diagnostic Montana Bat Call Shapes

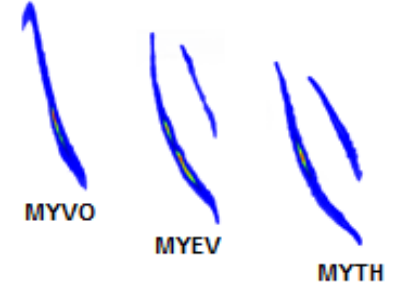
(Within groups calls are organized by relative frequency)

Pronounced Inflections

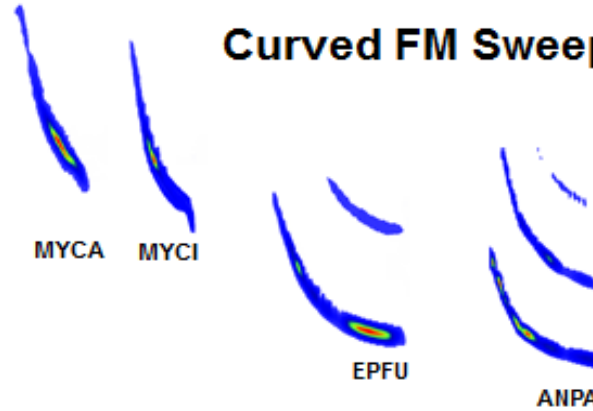
(hockey stick)



Steep with High Bandwidth



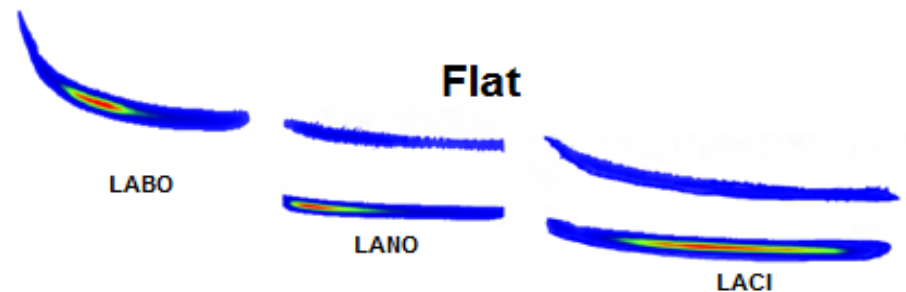
Curved FM Sweep



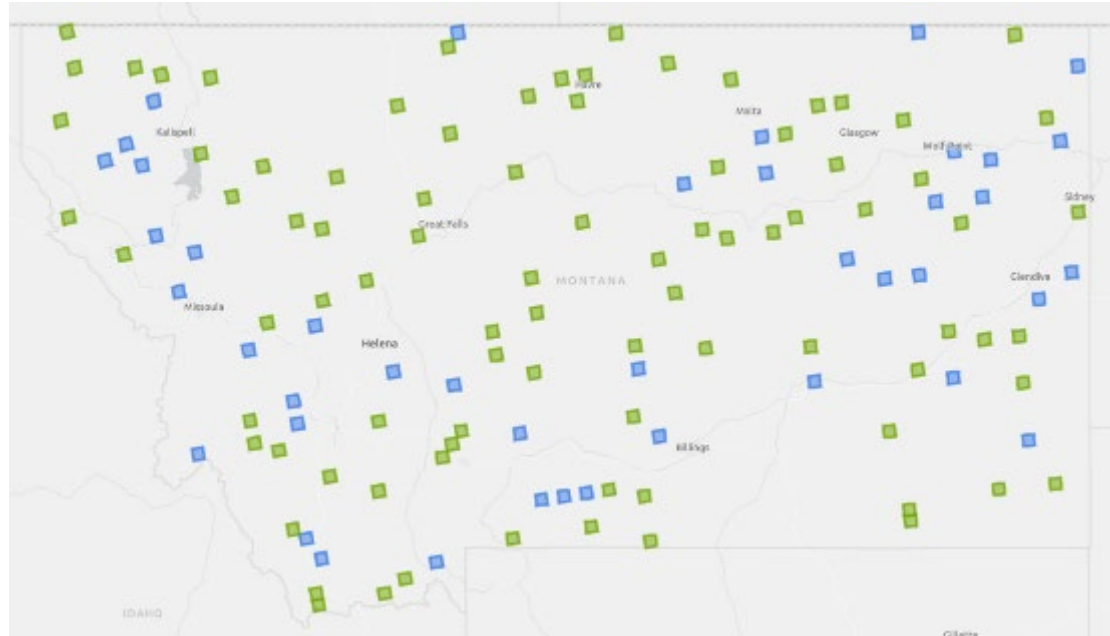
Simple Linear FM Sweep



Flat



North American Bat Monitoring Program



Survey goals:

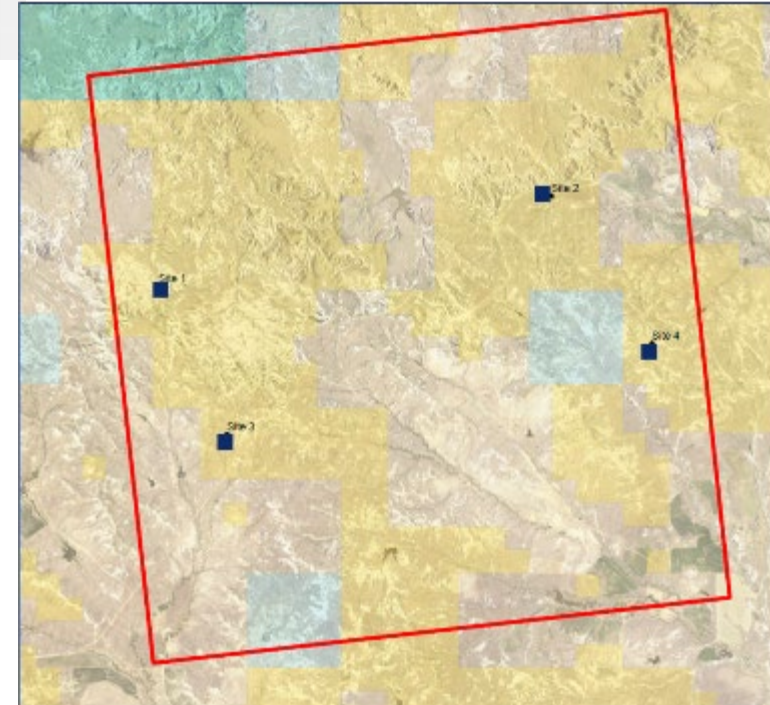
- Assess species present within grid cell

Protocols:

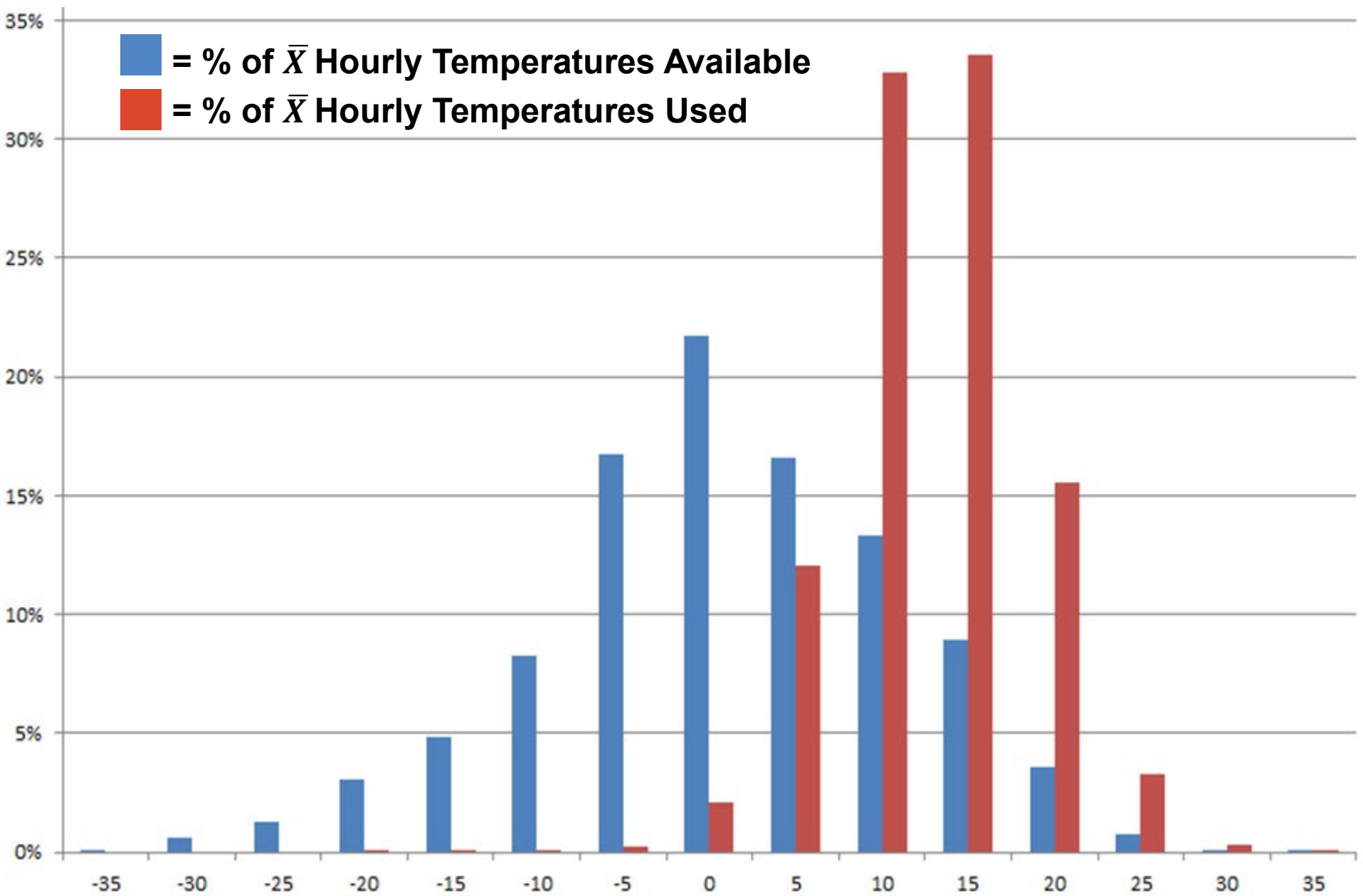
- 4 sites within the cell
- 4 nights of survey per site

Deployed at:

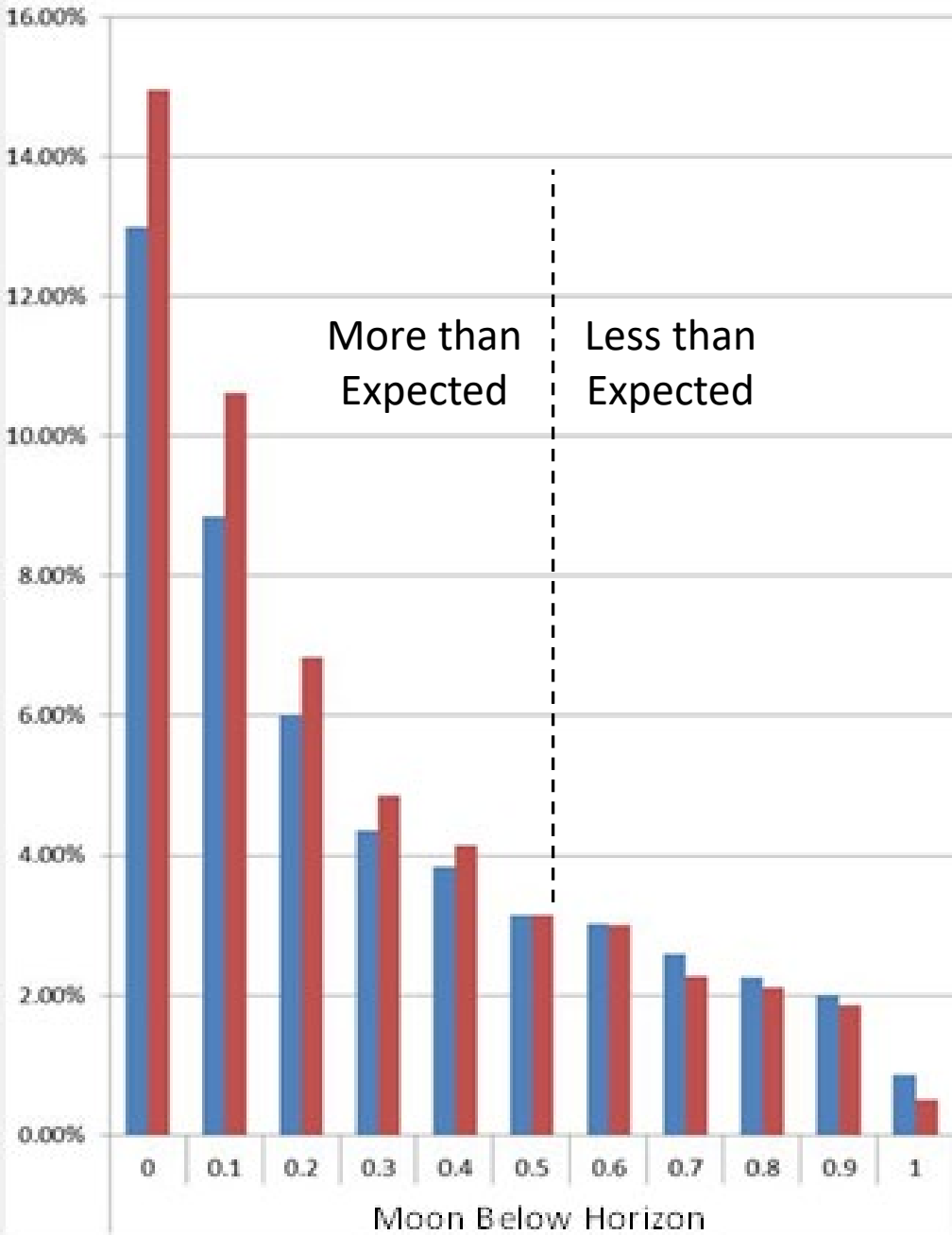
- Water sources
- Roosts
- Foraging areas





Bats are more active than expected at higher temperatures (°C)



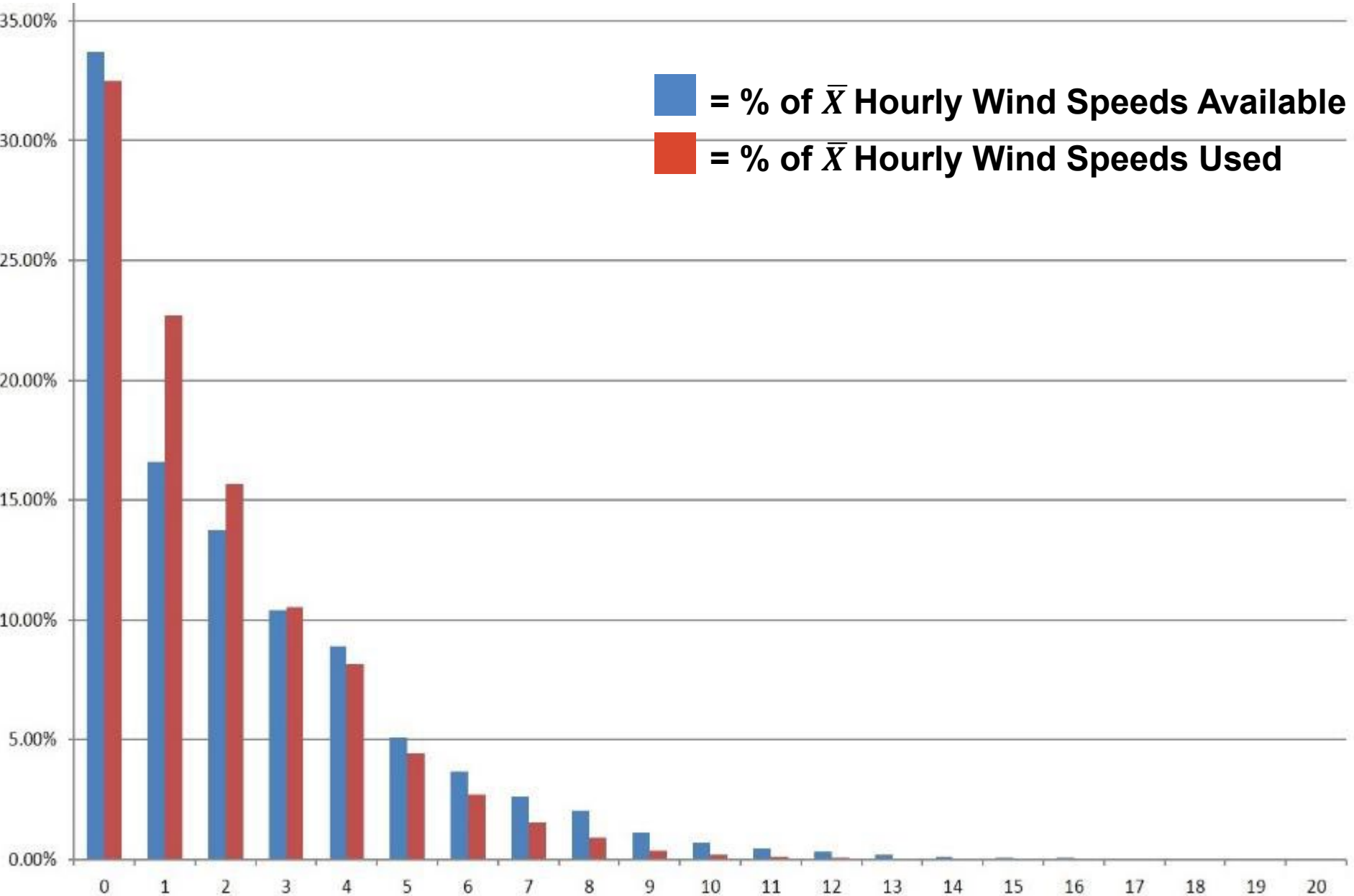
Bats are more active than expected at lower moon illumination levels - moon below horizon



 = % of \bar{X} Hourly Illumination Available
 = % of \bar{X} Hourly Illumination Used
0 = No moon illumination
1 = Full Moon



Bats are more active than expected at wind speeds of 1-3 meters per second



Numbers of Bats at Montana Hibernacula

Lick Creek Cave

- 200+ Myotis species
- 2 Long-legged Myotis
- 1 Long-eared Myotis

Whitaker Sink

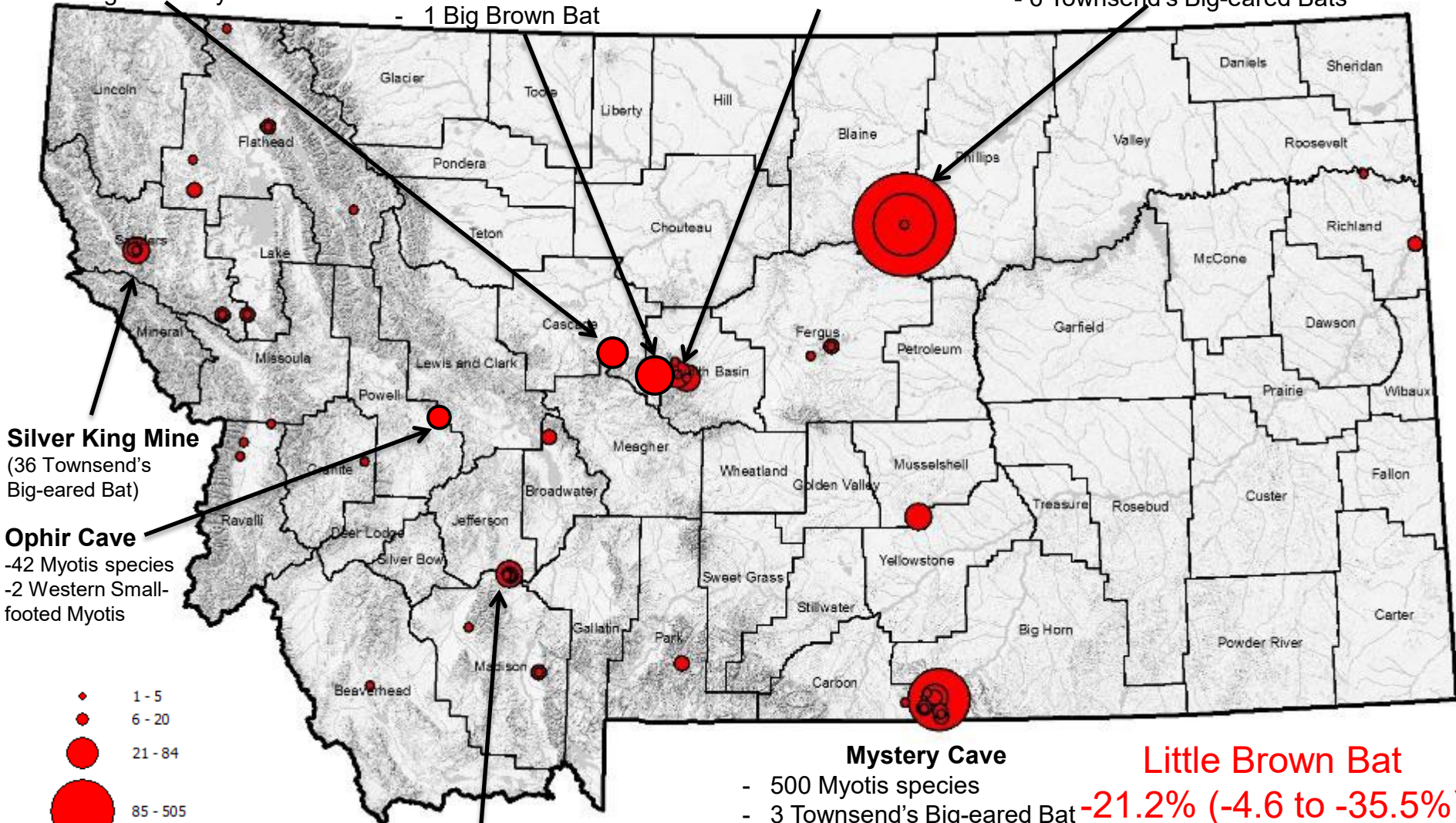
- 214 Myotis species
- 1 Long-legged Myotis
- 1 Big Brown Bat

Old Dry Wolf Station

- 63 Unidentified bats

Azure Cave

- 1751 Myotis species
- 6 Townsend's Big-eared Bats



Silver King Mine

(36 Townsend's Big-eared Bat)

Ophir Cave

-42 Myotis species
-2 Western Small-footed Myotis

Lewis & Clark Caverns

- 14 Townsend's Big-eared Bat
- 3 Western Small-footed Myotis
- 12 Myotis species

Mystery Cave

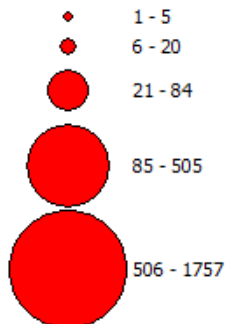
- 500 Myotis species
- 3 Townsend's Big-eared Bat
- 1 Big Brown Bat
- 1 Long-eared Myotis

Little Ice Cave

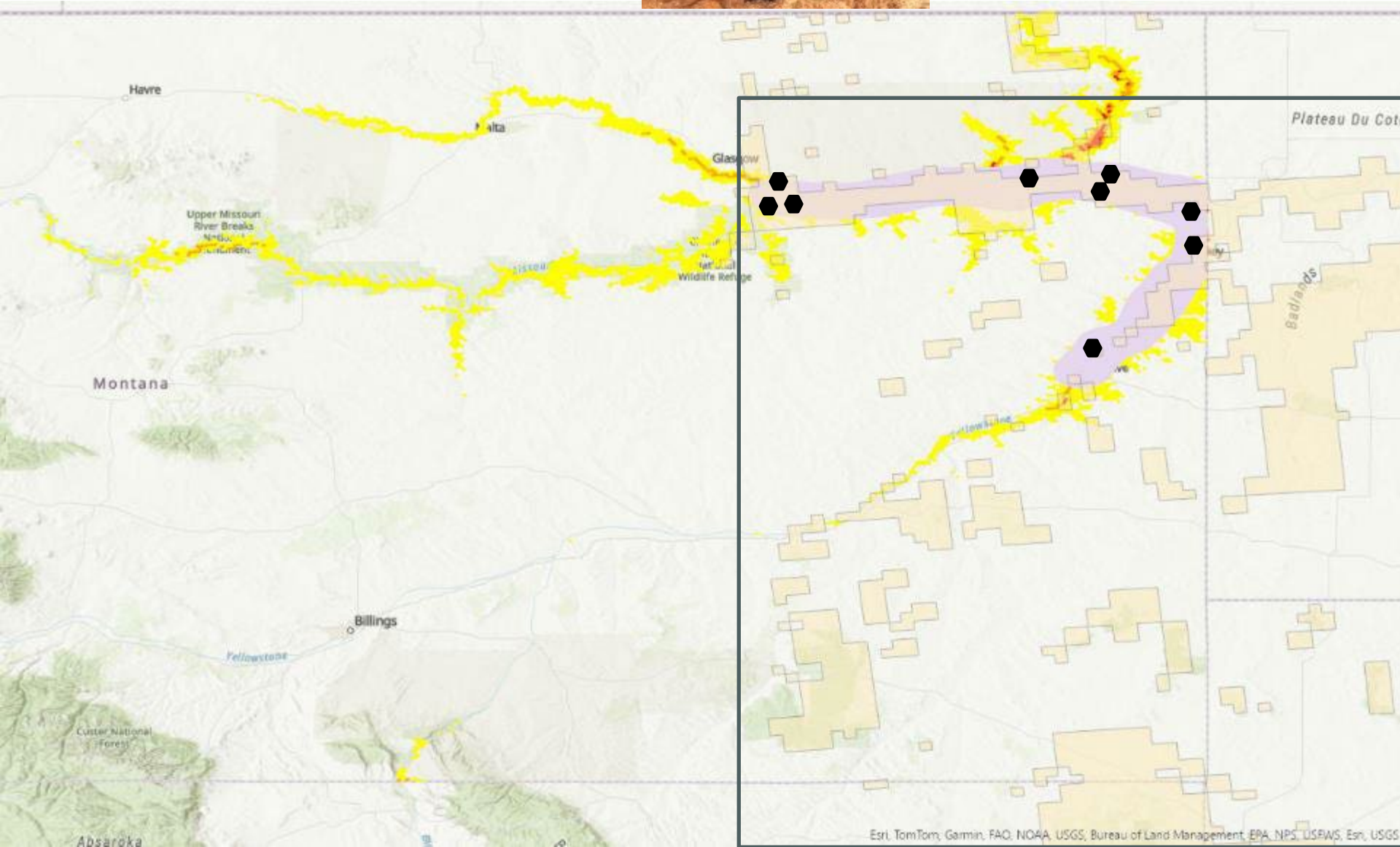
- 200+ Myotis species

Little Brown Bat

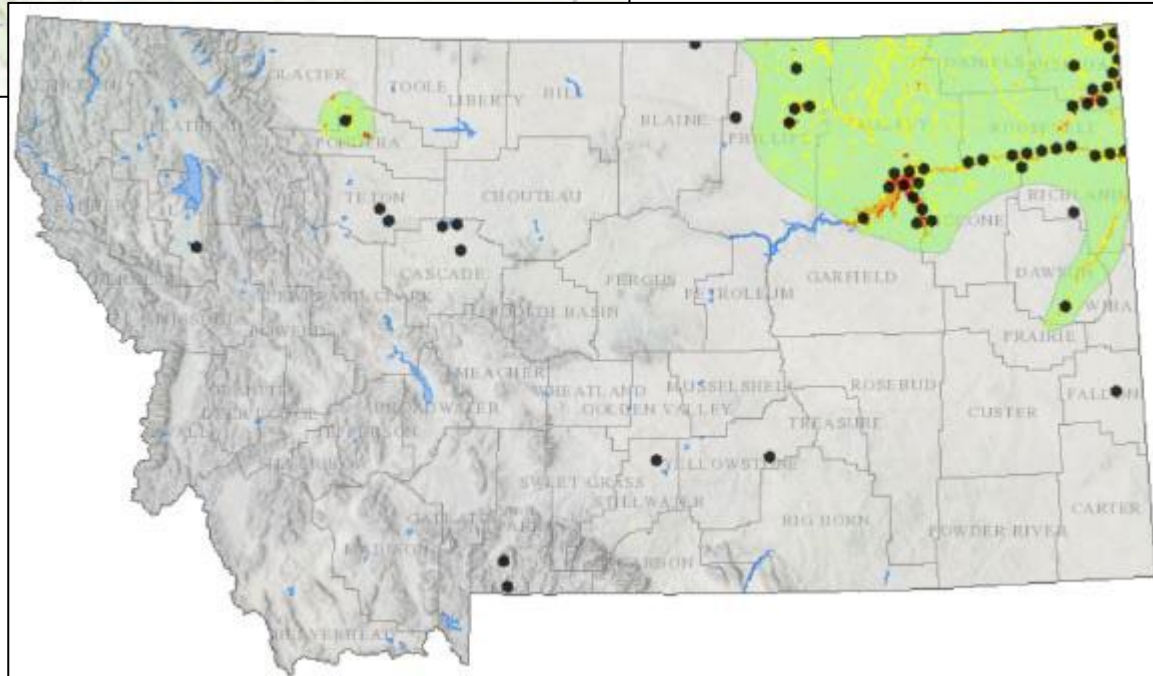
-21.2% (-4.6 to -35.5%)
2012 to 2019



Northern Myotis



Piping Plover



Questions?

Bryce Maxell

bmaxell@mt.gov

(406) 444-3989



Montana Natural Heritage Program

Key Statutes (MCA 90-15)



- "Natural heritage program" means a program of information **acquisition, storage, and retrieval for data relating to the flora, fauna, and biological community types of Montana.**
- The Montana natural heritage program **shall be designed to be compatible with similar programs in other states.**
- "**Principal data source agencies**" means any of the following state agencies: the department of natural resources and conservation; the department of fish, wildlife, and parks; the department of environmental quality; the department of agriculture; the department of transportation; the state historical society; and the Montana university system.
- State agencies shall cooperate with the library in the planning of the natural resource information system.
- Within the limits of available resources, **state agencies shall provide data requested by the library for purposes of the natural resource information system and the Montana natural heritage program.** If an agency does not possess requested data or is unable to locate requested data, the agency shall inform the library. It is not necessary for an agency to conduct fieldwork or literature searches to obtain requested data.
- Except as provided in subsection (3), **the library shall make information from the natural resource information system available to local, state, and federal agencies and to the general public.**
- **If necessary, the library shall establish procedures to protect confidential information in the possession of state agencies.**