



The North American Bat Monitoring Program

Collaboratively monitoring
bat populations

Bryan Levi, Midwest Bat Hub

North American Bat Monitoring Program (NABat)

- Continental effort to **standardize bat research and create a common database for bat data**
- Consists of many federal, state, local, tribal, NGO, and community scientist partners
- Performs annual status and trends analyses to support bat conservation



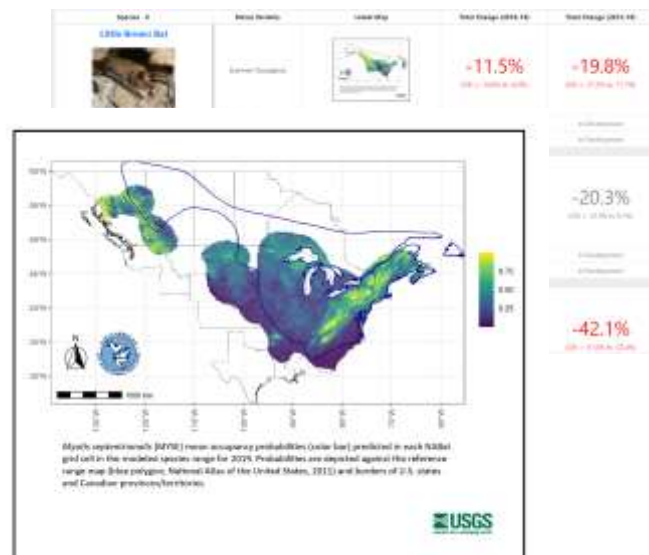
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Common sampling framework



The Master Sample

a probabilistic sampling approach

NABat monitoring follows a master sample approach in which North America is divided into a series of 10 x 10 km (100 km) grid cell frameworks. The generalized random-tessellation stratified (GRTS) survey design algorithm then assigns a spatially balanced and randomized ordering (GRTS order) to each cell within its respective framework.

Grid cells are prioritized numerically; the lower the number, the higher the sampling priority. Cells can then be selected for monitoring following the GRTS order, ensuring both randomization and spatial balance. Monitoring within this standardized framework allows statistical inference to non-surveyed locations and ensures the validity of analyses at regional and range-wide scales using data collected by dozens of partners across the continent.

Common sampling framework



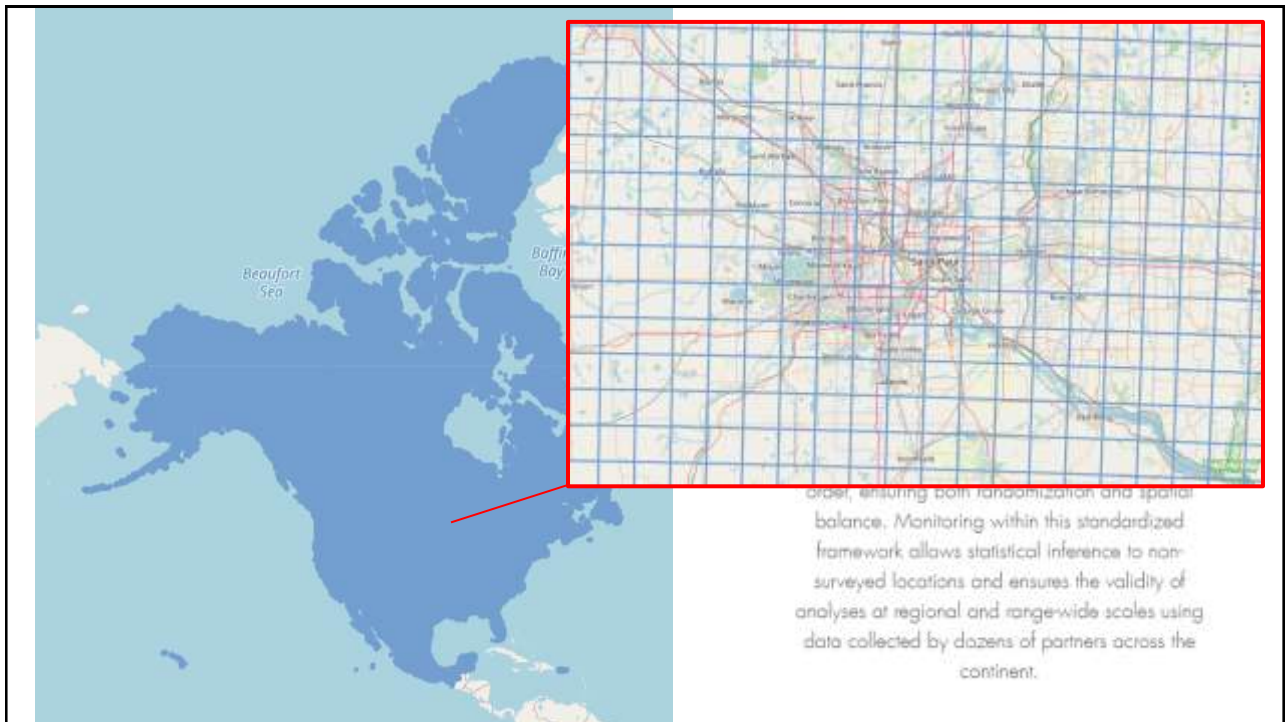
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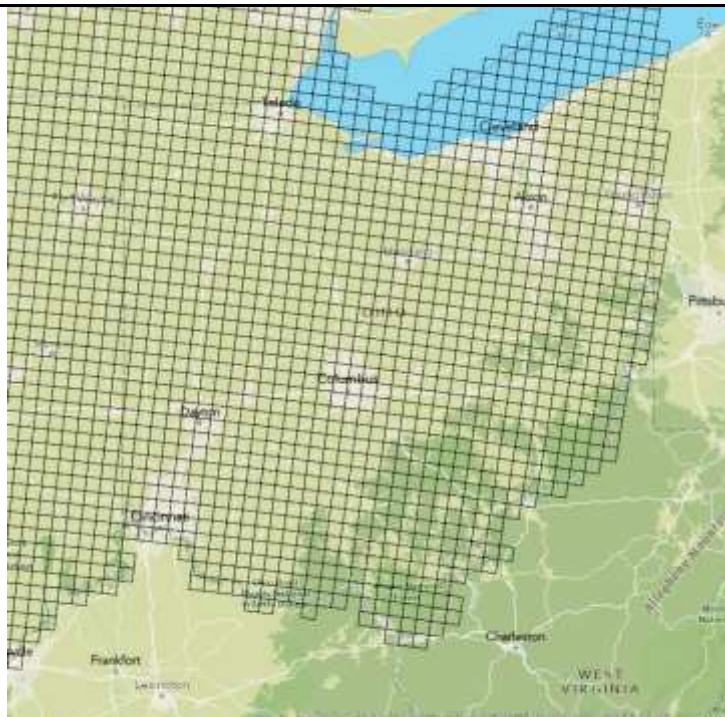
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Prioritizing Sites Using GRTS

- Each grid cell has a GRTS ID value
- Lower GRTS ID = higher priority
- Sample in order of importance (GRTS), can skip cells if need be
- Ensures scalable, randomized sampling



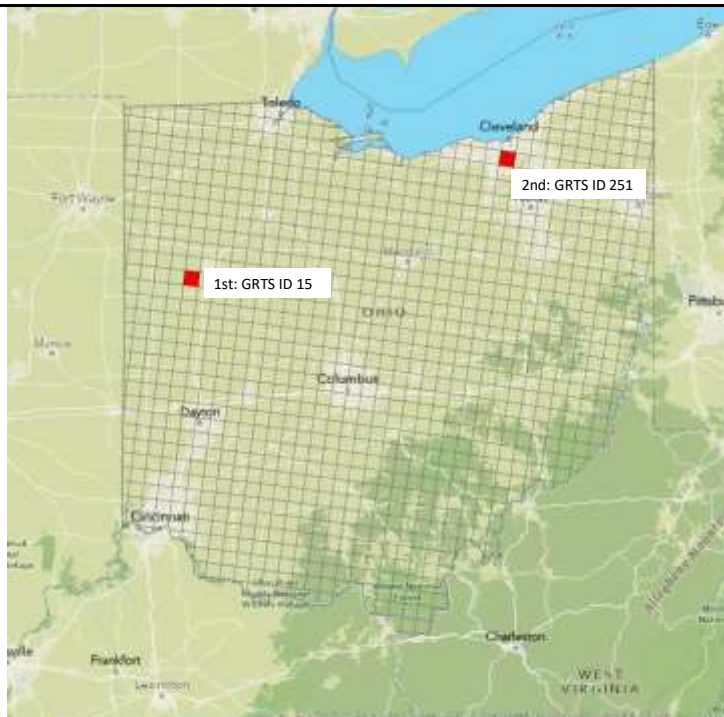
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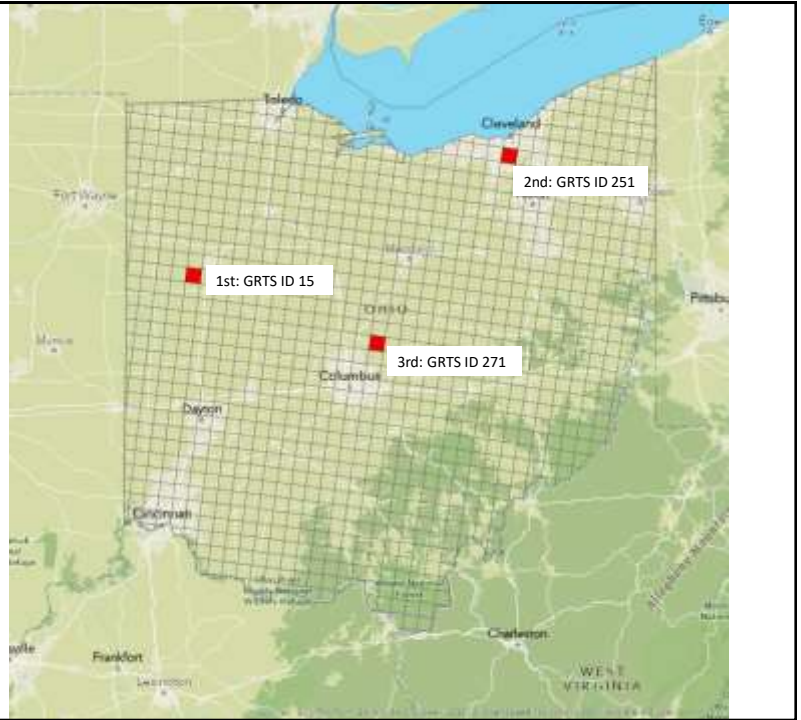
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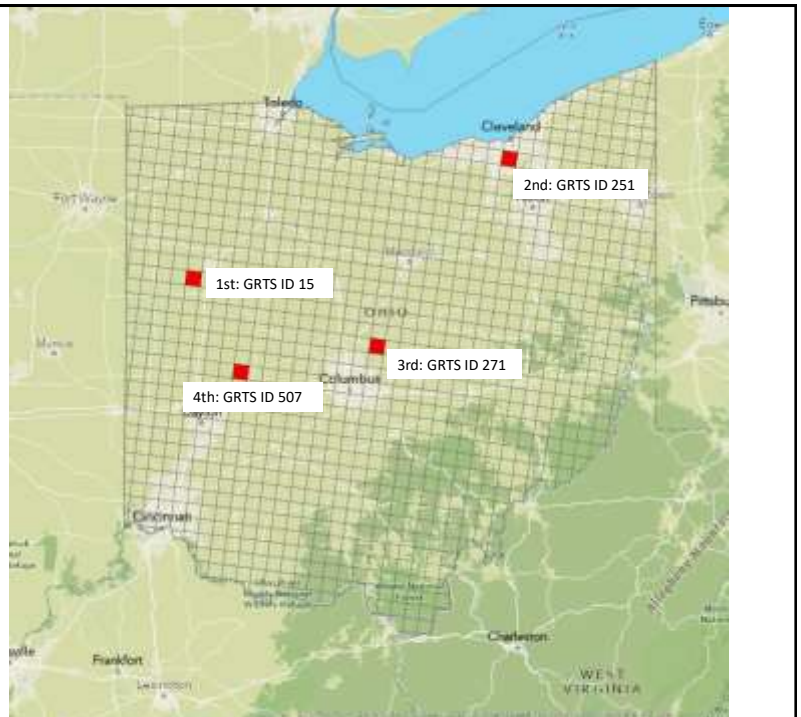
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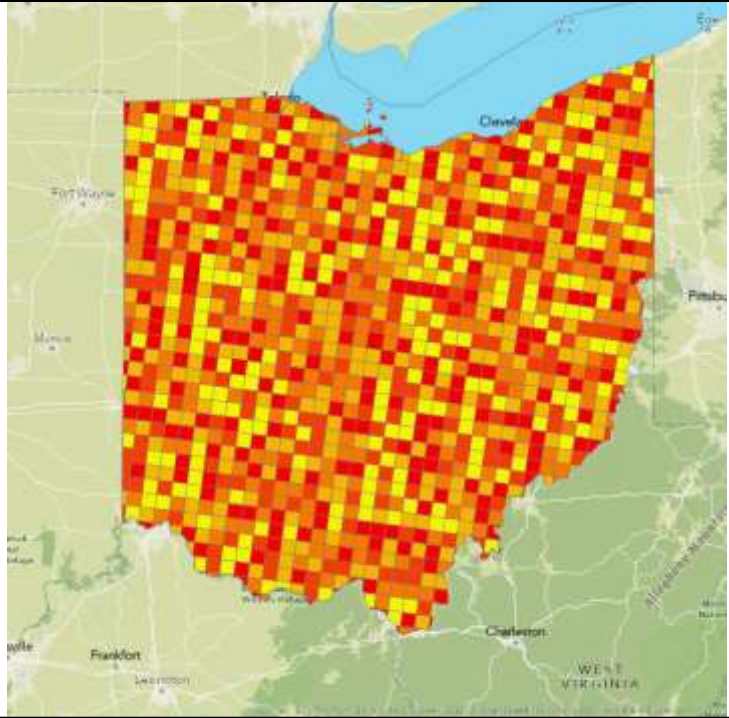
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NABat Accepts Many Data Types

NABat currently accepts data from the following survey types:



NABat Accepts Many Data Types

If collecting new data for NABat submission, NABat offers guidance and standardized protocols/workflows



NABat Accepts Many Data Types

- NABat also encourages submission of legacy data
- Need survey metadata in addition to collected data

Example: Stationary acoustic data

Survey Metadata

Field	Status
J GRTS Cell Id	REQUIRED
Grid Cell Quadrant	RECOMMENDED
Surveyor(s)	REQUIRED
Latitude	REQUIRED
Longitude	REQUIRED
Site Name	REQUIRED
Survey Start Time	REQUIRED
Survey End Time	REQUIRED
Unusual Occurrences	RECOMMENDED
Detector Model	RECOMMENDED
Detector Serial Number	NOT REQUIRED
Microphone Model	NOT REQUIRED
Microphone Serial Number	NOT REQUIRED
Microphone Weather Proofing	RECOMMENDED
Microphone Orientation	NOT REQUIRED
Microphone Height (m)	NOT REQUIRED
Distance to Nearest Water (m)	RECOMMENDED
Water Type	RECOMMENDED
Broad Habitat Type	NOT REQUIRED
USNVC Habitat Code	NOT REQUIRED
Land Unit Code	NOT REQUIRED

Collected Data

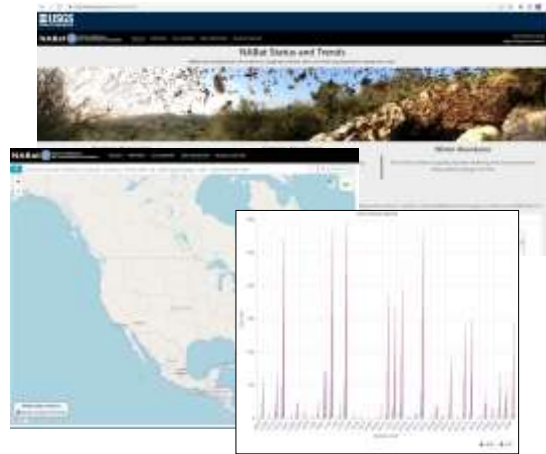
Field	Status
Auto ID Software	CONDITIONALLY REQUIRED
Auto ID	CONDITIONALLY REQUIRED
Manual Id	CONDITIONALLY REQUIRED
Manual Id Vetter	CONDITIONALLY REQUIRED
Name of Species List for Auto Id	CONDITIONALLY REQUIRED
Name of Species List for Manual Id	CONDITIONALLY REQUIRED
Audio Recording Name	REQUIRED
Audio Recording Time	REQUIRED

Common Database for Bat Data

All partners contribute data to NABat by uploading to the **NABat Partner Portal**

NABat Partner Portal

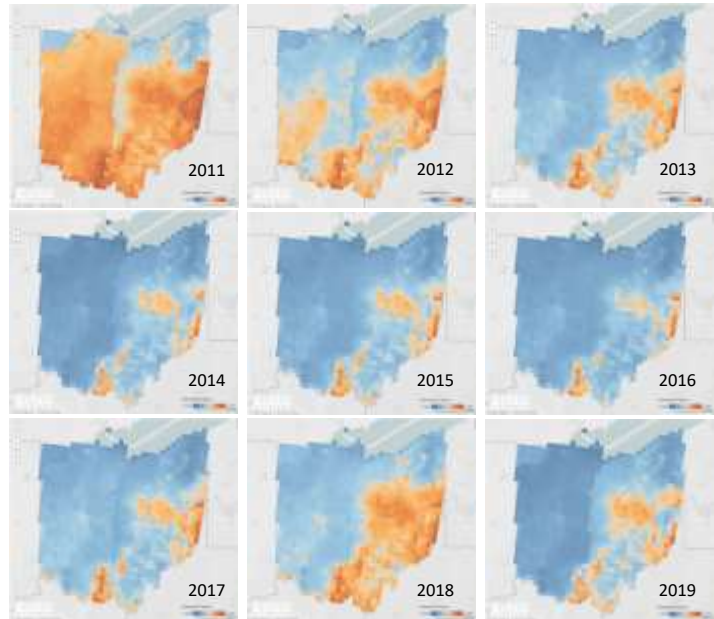
- Website for uploading and storing bat data to NABat database
- Project/data management, reporting, data queries
- Data sharing, program visualizations, data analyses



Partner Portal Example #1

Northern Long-Eared Bat in Ohio: an NABat Example

- Latest status and trends products contain occupancy models for 2010-2019
 - Summer occupancy trends
- New status and trends products are in development



Northern Long-Eared Bat: quick aside



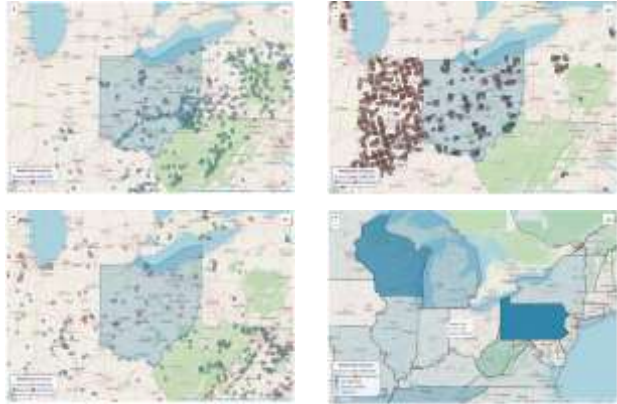
Photo credit: Nicole Dobrosky



Photo credit: Johnny Baakliny

Northern Long-Eared Bat in Ohio: an NABat Example

- Query the entire continental database for quick data summaries
- Submit a data request to get raw upload files containing data of interest



Partner Portal Example #2



Midwest Bat Hub

Assists region in bat monitoring and participating in NABat

- Advise on data collection
- Assist with data processing
- Equipment loans
- Volunteer bat monitoring
- Hub supplementary monitoring



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Midwest Bat Hub

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Marissa Foley



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If you are interested in contributing data to NABat, please contact the Hub for assistance in getting started

Or visit us at <https://midwestbathub.nres.illinois.edu/> to learn more!

Questions?