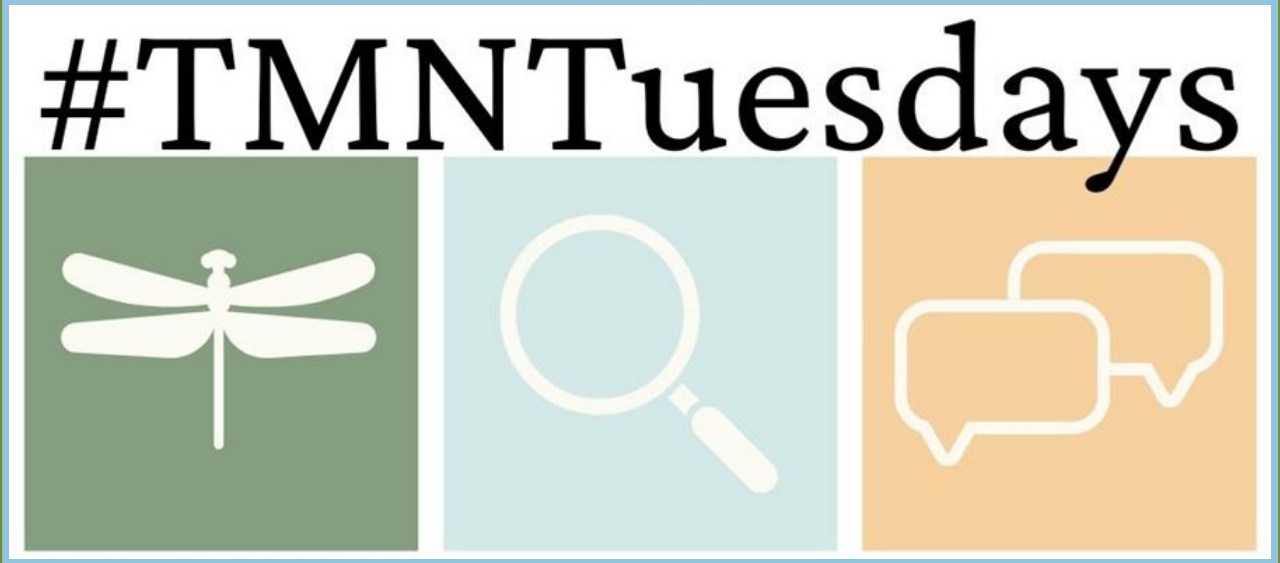
Acoustic Monitoring of Texas Bats: A Citizen Science Project for TMNs (In Partnership with Texas Nature Trackers)



TNT Mini Series Webinar Etiquette

We will get started right at 11:00pm Central.

If you are experiencing issues with WebEx, please refer to our WebEx Help Guide - https://txmn.tamu.edu/tmntuesdays/

Chat function is open for on-topic discussion only. Please be professional and respectful in all comments & questions in the chat room.

This session will run for about TW**O** hours and can count for the amount of time it runs. The **recording** will be posted to our website by the end of the following day. If you missed the live event, watching the recording can count for AT also.

Attendees are not able to unmute during the WebEx Event. Please use the Chat Box to ask questions. Questions will be moderated and answered at the end of the presentation.

Help Support Future Events Like This!

Scan this code to complete a short, **voluntary** survey so that we can continue to remain eligible for funding that helps pay for events like this.

OR

Click the link to answer the short **voluntary** survey so that we can continue to remain eligible for funding that helps pay for events like this:
https://survey.tpwd.state.tx.us/TakeSurvey.aspx?PageNumber=1&SurveyID=96KM5lmL&utm_source=QR&utm_medium=print&utm_campaign=usfws-survey2023#

Thank you for your participation!

TEXAS Master Naturalist™

#TMNTuesdays

TEXAS PARKS & WILDLIFE

#TMNTuesdays

NATURE TRACKERS
TEXAS PARKS AND WILDLIFE

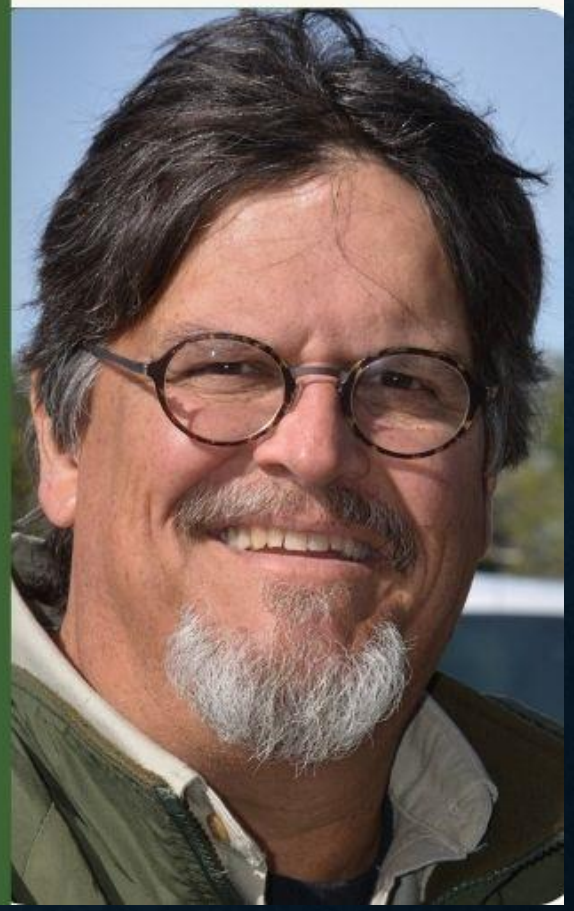
Texas Nature Trackers
Mini Series

Craig Hensley, Texas Nature Trackers Biologist, TPWD

presents

"Acoustic Monitoring of Texas Bats: A Community Service Project for TMNs"

January 23, 11am-1pm



TMNTUESDAY - TNT MINI-SERIES

January 23rd - 11am - 1pm

Acoustic Monitoring of Texas Bats: A Community Science Project for TMNs

Gaining a better understanding of the distribution of more than 30 species of bats across a state the size of Texas is a daunting challenge. However, with the power of community science and Texas Master Naturalists, we can make headway in a significant and important way. Join TNT Biologist Craig Hensley for an introduction to the bats of Texas, their challenges and this new effort to better understand these flying mammals through acoustic monitoring. We are looking for Master Naturalists chapters and individuals interested in surveying bats in your area using acoustic monitors beginning this May. Specifically, we are looking for one individual in each participating chapter to help coordinate the effort within their respective chapter, members willing to put an acoustic monitor on their property and sharing those results with TPWD, and generally, individuals across the spectrum of TMNs interested in helping with data storage and analysis.

#TMNTUESDAY 2024

January 9th - State of the Program
*January 23rd - TNT Mini Series
*February 6th - TNT Mini Series
February 13th
March 5th (shifted a week)
April 9th - Virtual Volunteer Fair
May 14th
June 11th
July 9th *Joint #TMNTuesday/Presidents Mtg
August 13th
September 10th
October 8th - TMN Project Fair Competition
November 12th *Joint #TMNTuesday+Presidents Mtg
December 10th *Joint #TMNTuesday+Presidents Mtg

The Details:

- "Typically" Second Tuesday of Each Month at Noon cst
- Up to 1 Hour Advanced Training (sometimes more)
- Watch Live or Recorded
- Speakers & Topics Announced Monthly
- *Some additional special #TMNTuesdays added in 2024
- Always more info at: https://txmn.tamu.edu/tmntuesdays/

#TMNTuesdays

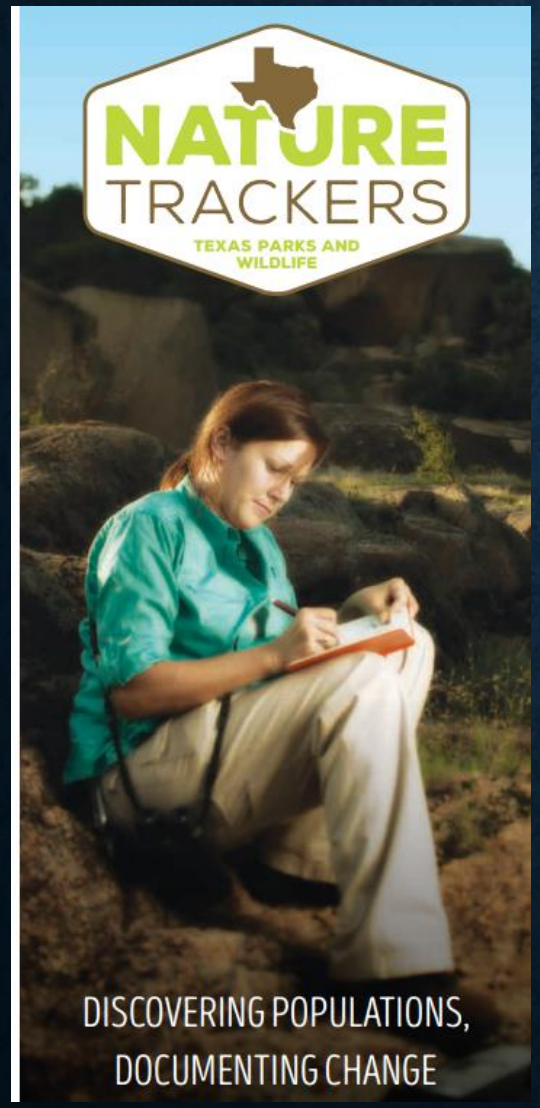
STATE EVENTS

2024 #TMNTuesdays

January 9
February 13
March 5*
*first week of the month
April 9
May 14
June 11
July 9
August 13
September 10
October 8
November 12
December 10

TEXAS
Master Naturalist

TMNTUESDAY - TNT MINI-SERIES



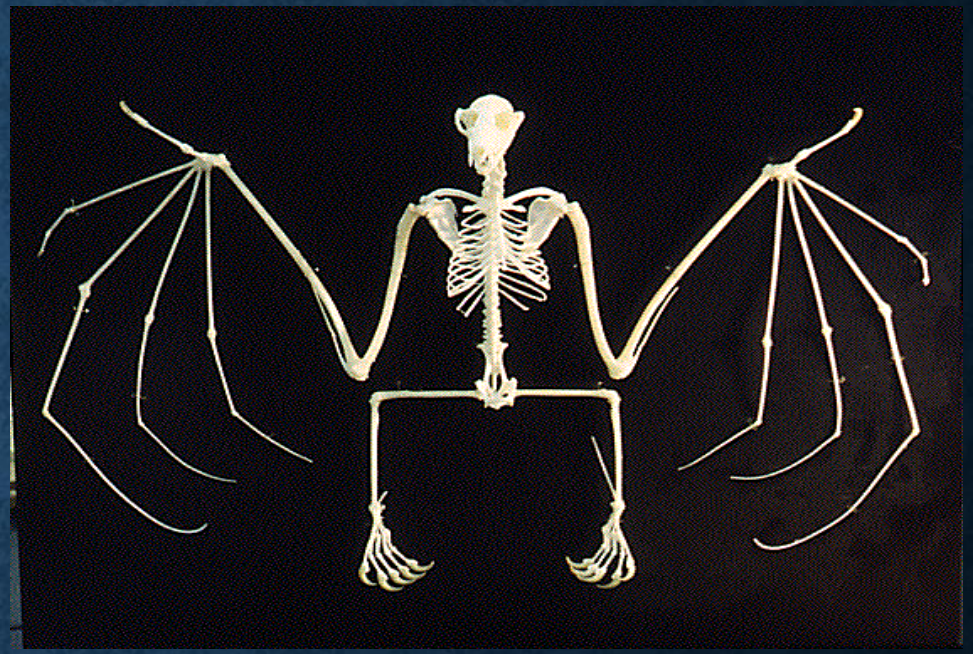
February 6th - 11am - 1pm

iNaturalist Train the Trainer Workshop

The Texas Nature Trackers (TNT) program is looking for Master Naturalists interested in becoming TNT certified iNaturalist workshop trainers across Texas. During this workshop we will provide you the training needed to get started as an iNaturalist trainer for your chapter, community and/or region. As a pre-requisite, we are looking for individuals that are already consistent users of iNaturalist, having a good understanding of the platform, and have an interest in teaching others in your community to engage with the platform. We'll provide a quick overview of the app, provide an in-depth overview of the website and how data are used by TPWD, and finally tips and tricks for teaching it to others. We will provide attendees intending to become workshop trainers with a PowerPoint presentation to take home that will get you started. Should you accept this challenge, you will become an advocate not only for its use as an educational tool within your chapter but also for promoting community science and better understanding of the distribution of the state's flora and fauna.

Agenda:

1. Overview of Texas bats & challenges faced
2. Distribution of bats as related to TMN chapters
3. Introduction to NABat
4. Overview of Acoustic Monitoring
5. Master Naturalist engagement possibilities
6. Moving forward



- Bats are known as Chiroptera
- Means hand-winged
- Our only true flying mammal

Classification of Bats

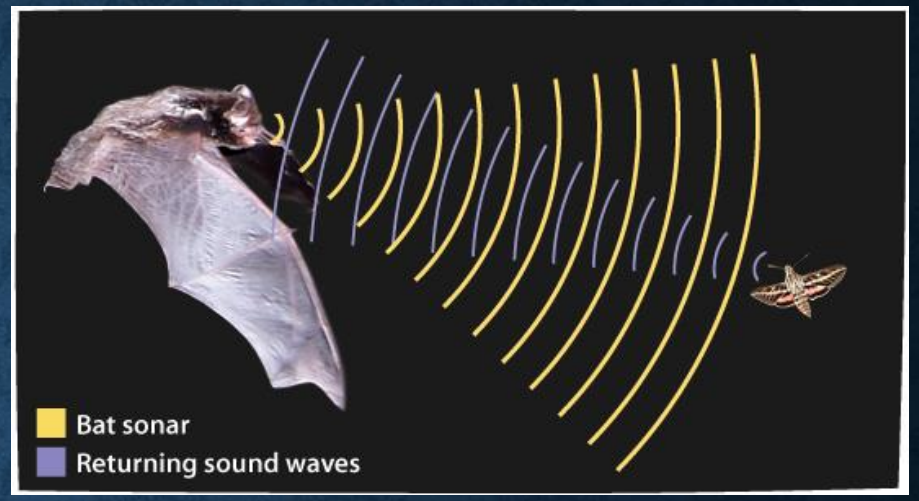
Vespertilioniformes or "Micro" bats:

- Echolocate
- Have a claw only on the thumb
- Includes all Texas bats

Pteropodiformes or "Mega" bats:

- Majority do not echolocate
- Have a claw on the thumb and second digit
- Wingspans may exceed two feet

Sensory World of Bats: Echolocation



Courtesy of Bat Conservation International

Echolocation

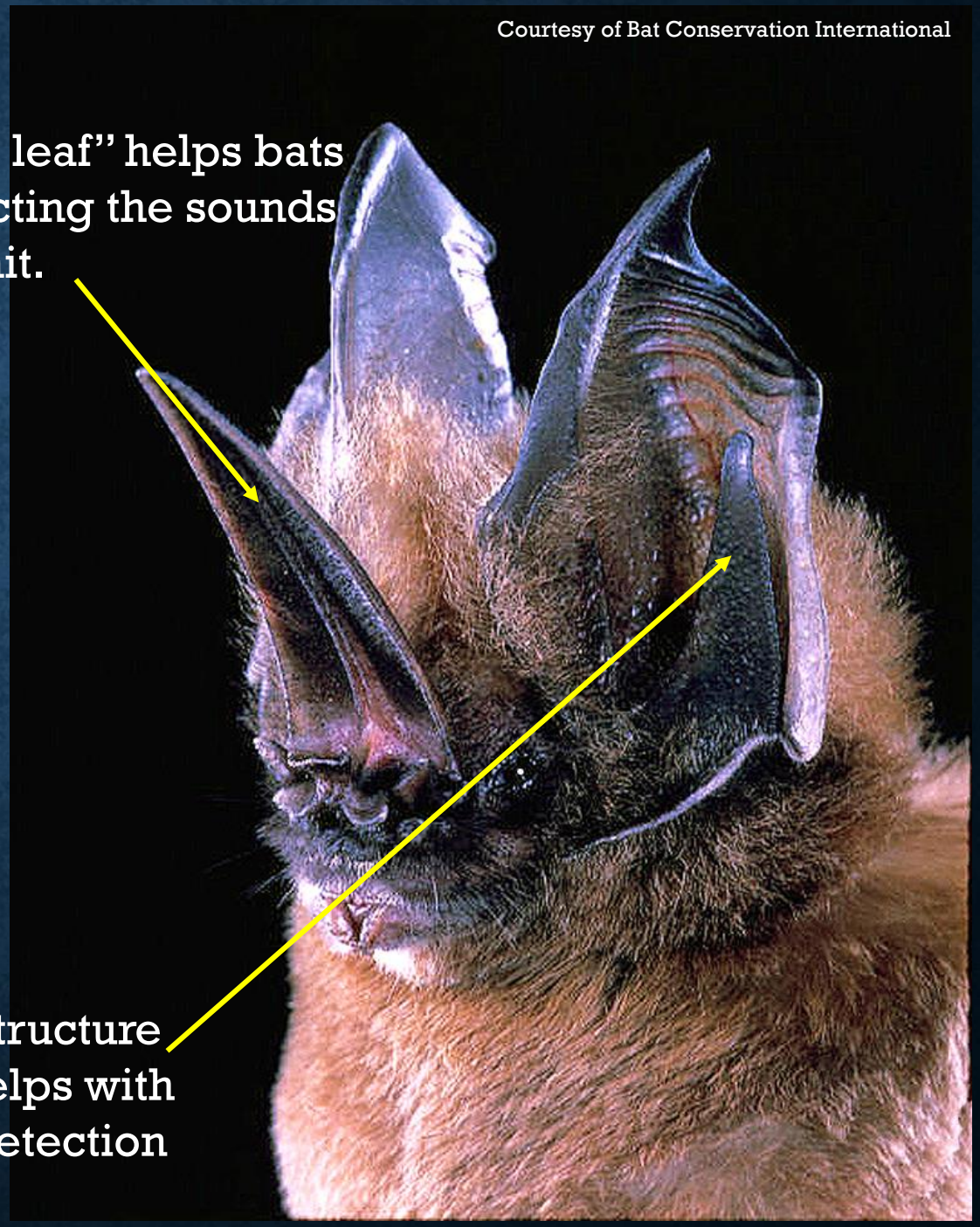
- Emitting of high-frequency sounds
- Range is about 20 meters (65 feet)
- Used for:
  - Navigation
  - Avoiding obstacles
  - Capturing prey
- Determine distance, direction, velocity, shape, size and texture of prey

Variation of frequency

- Number of pulses vary with behavior
  - When moving from place to place may be 5 pulses per second
  - When closing in on prey may increase to 200 pulses per second
  - This is known as a feeding buzz

- Bats with small ears use high frequency sounds to capture small prey that are free-flying

- Bats with larger ears use low frequency sounds to capture larger prey, including those that glean insects from leaves or hunt them from the ground

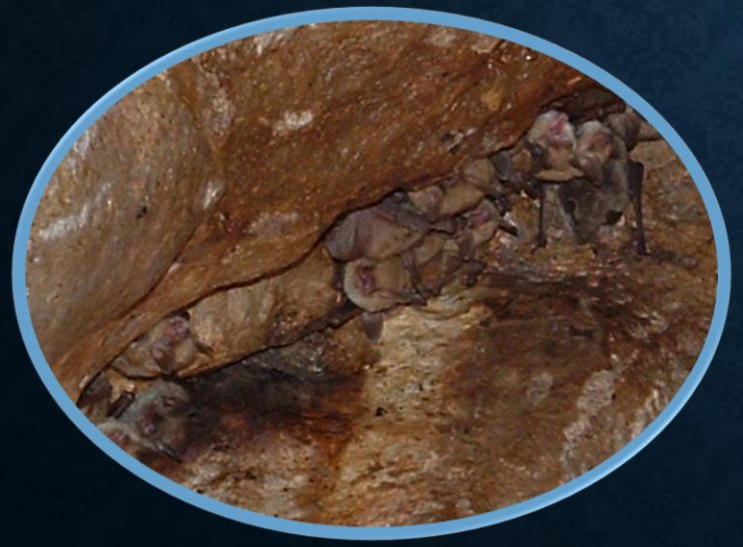


Seasonal Survival Strategies

Migration

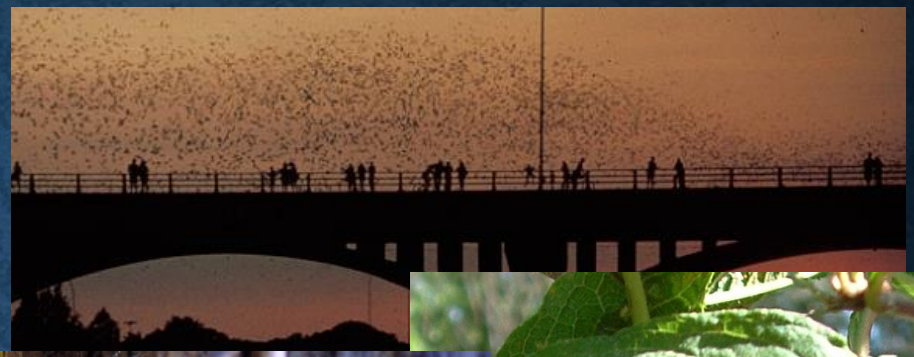
- Many bat species are seasonal residents of Texas
- Mexican (Brazilian) free-tailed bats come to Texas to breed and mostly retreat south in winter (changing)
- Some spend the winter here or farther south and summer as far north as Canada
  - hoary bat
  - Eastern red bat
  - Northern yellow bat

Hibernation



- Will enter torpor where metabolism, heart rate and breathing slow
- Live off stored fat during winter months
- Include:
  - cave myotis
  - pallid bat
  - American perimyotis (tricolored) bat

Home is where the roost is



Species of Greatest Conservation Need Defined:

- A species of plant or animal that is in decline or has become rare and is in need of intervention to recover its population for long-term survival.
- **S1: Critically Imperiled** – very few found, in steep decline with extirpation possible without intervention
- **S2: Imperiled** – due to very restricted range, few populations, steep declines, or other factors making it vulnerable to extirpation
- **S3: Vulnerable** – due to restricted range, relatively few populations, recent and widespread declines, or other factors.
- **S4: Apparently Secure** – Uncommon but not rare; some cause for long-term concern due to declines or other factors
- **S5: Secure** – Common, widespread, and abundant

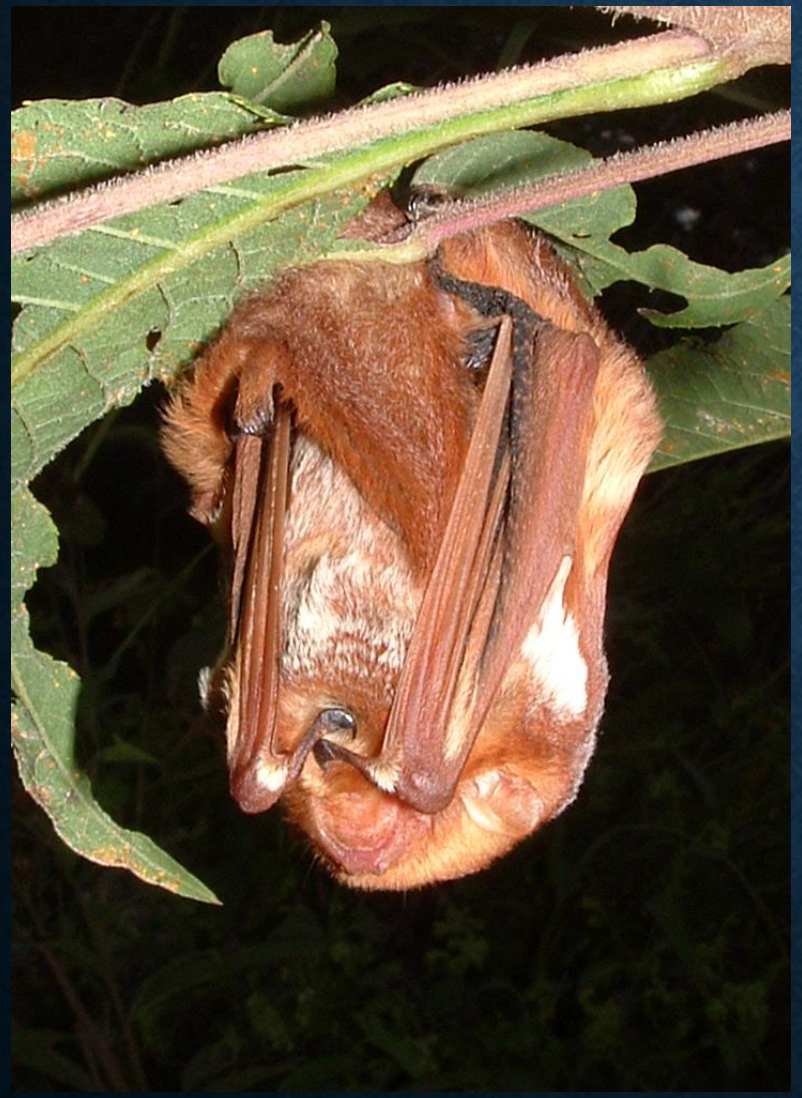
Brazilian/Mexican Free-tailed Bat

(*Tadarida brasiliensis*)

- Most common bat in Texas; estimated 100 million
- Largest colony at Bracken Cave in San Antonio
- High and fast flying bat, found at 10,000 feet or more
- Diet primarily corn earworm moths
- **Not an SGCN**
- Distribution: Statewide

Video courtesy of Lee Smith, Information Specialist, TPWD

Eastern Red Bat *(Lasiurus borealis)*



- Roosts alone under leaves of trees and even herbaceous plants
- Highly migratory species
- Gives birth to 1-5 young
- Females have white tips to fur
- **Not an SGCN**
- Distribution: Statewide

- Gives birth in northern states
- Roosts in trees
- High flying with a diet heavily weighted to large moths
- Females seem to migrate first (reverse of bird migration)
- **SGCN: S3 – Vulnerable**
- Distribution: Statewide

Hoary Bat

(*Lasiurus cinereus*)

Cave Myotis (*Myotis velifer*)

- Year –round resident of TX with seasonal distribution

- Second most numerous bat in the Hill Country

- Has suffered an estimated 90% population decline in Texas Hill Country due to WNS

- **SGCN: S2 - Imperiled**

- Distribution: Chihuahuan Desert, Edwards Plateau, Southwestern Tablelands, Western High Plains, Southern Texas Plains, southern Western Gulf Coastal Plain, Cross Timbers, Central Great Plains, East Central Texas Plains, Texas Blackland Prairie

Tri-colored/American Perimyotis (*Perimyotis subflavus*)

- Small, yellowish bat
- Fluttering flight like a moth; gorges self in 30 minutes
- Roosts in caves, trees, crevices
- Gives birth to two babies, each weighing 50% or ½ the weight of their mother at birth!
- **SGCN: S2 - Imperiled**
- Distribution: Virtually statewide

Canyon Bat or American Parastrelle

(*Parastrellus hesperus*)

- The smallest bat in Texas and the U.S. – weighs in at 4 grams
- Non-migratory and not active hibernators
- Often forage before dark and after first light
- **SGCN: S3 – Vulnerable**
- Distribution: Chihuahuan Desert, South Texas Plains (west), Western High Plains, Southwestern Tablelands, Central Great Plains, western Edwards Plateau

Western/Greater Western Mastiff Bat

(*Eumops perotis* & *E. p. californicus*)

- The largest bat in Texas and the U.S.
- Wing-span measures 19-20 inches
- Active year-round
- Emit sounds that are cardinal-like and heard from good distances
- **SGCN: S2-S3 – Imperiled/Vulnerable**
- Distribution: southern Chihuahuan Desert (along Rio Grande)

Photo by Brock Fenton

Pallid Bat
(*Antrozous pallidus*)

- Known for eating scorpions and centipedes and other ground-dwelling prey
- Capture prey by listening for sounds they make
- Recently discovered that they feed on pollen, moving nectar
- **Not an SGCN**
- Distribution: Chihuahuan Desert, Southern Texas Plains, western Edwards Plateau, Southwestern Tablelands, Western High Plains

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

- Year-round resident that hibernates
- Very distinctive, large ears
- Emerge long after sunset
- Forage close to ground
- **SGCN: S3 – Vulnerable**
- Distribution: Chihuahuan Desert, Western High Plains, Southwestern Tablelands, western Edwards Plateau

Spotted Bat (*Euderma maculatum*)

- Relatively large bat with black pelage with large white spots
- Largest ears of any bat in N.A.
- Strong fliers whose low frequency calls can be heard by human ears
- Moths comprise nearly 100% of diet
- **SGCN: S3 – Vulnerable**
- Distribution: Chihauhuan Desert (Big Bend NP)

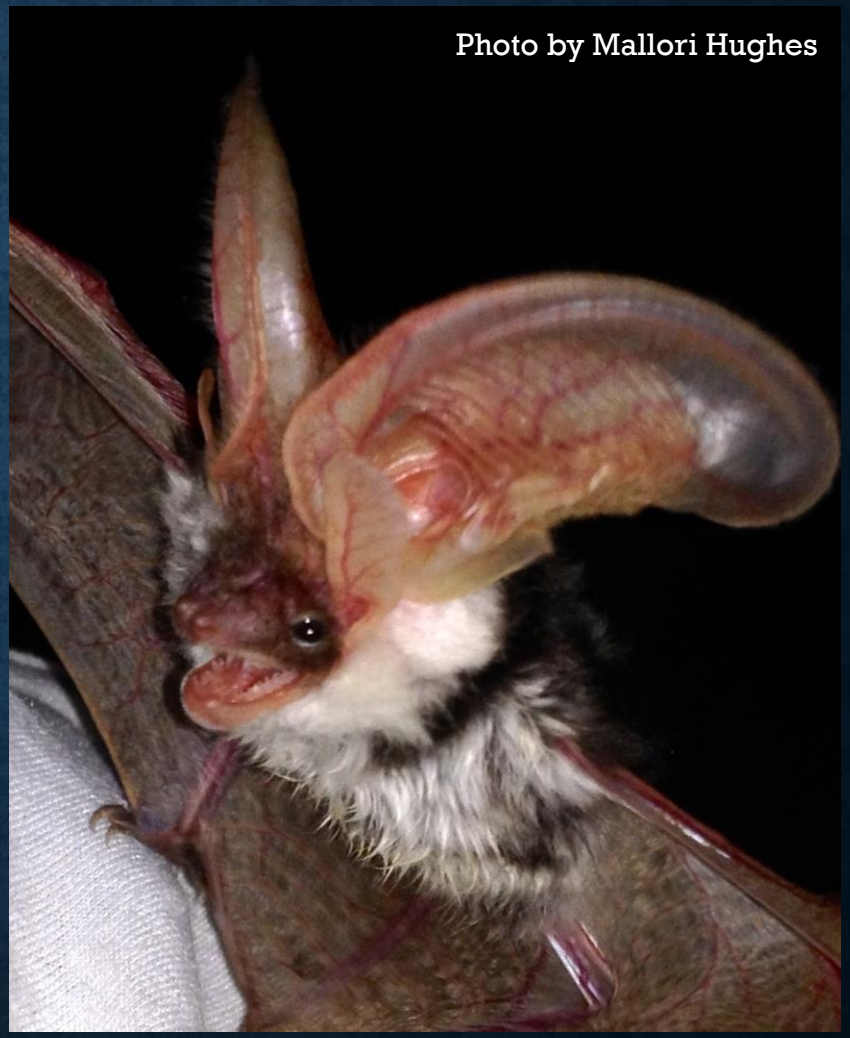


Photo by Mallori Hughes

Pocketed Free-tailed Bat
(*Nyctinomops femorosaccus*)

- Medium-sized bat that somewhat resembles a Mexican free-tailed bat
- Has broad ears connected basally at the midline of the head
- Diet is variable, from moths to beetles
- First recorded in Texas in 1967
- **SGCN: S3 – Vulnerable**
- Distribution: southern Chihuahuan Desert

Ghost-faced Bat (*Mormoops megalophylla*)

- Large bat with reddish to brown fur
- Has rounded ears and uniquely patterned face
- Feeds primarily on moths
- Found in summer months in west, during winter farther east in caves
- **SGCN: S2 - Imperiled**
- Distribution: Chihuahuan Desert, southern Edwards Plateau, Southern Texas Plains, and southern tip of Western Gulf Coast Plains


Photo by George Smiley

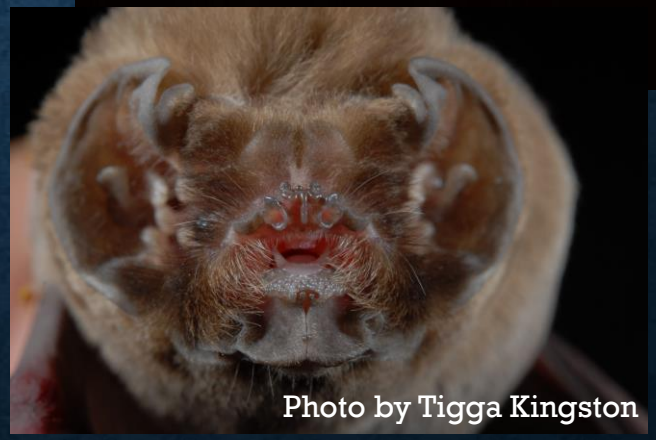


Photo by Tigga Kingston

California Myotis
(*Myotis californicus*)

- One of smallest myotis in Texas
- Feed late in evening on small insects
- Roosts in small groups in buildings, rock fissures, behind loose bark
- **SGCN: S3 – Vulnerable**
- Distribution: Chihuahuan Desert

Yuma Myotis (*Myotis yumanensis*)

- Small, pale-colored bat
- Roosts in a variety of places, from structures to caves and cliff crevices
- Varied diet of insects
- Prefers lowland areas near water, particularly the Rio Grande and adjacent waterways
- **SGCN: S3 – Vulnerable**
- Distribution: Chihuahuan Desert primarily

Statewide Distribution

Perimoytis subflavis (American perimyotis/tricolored bat) SGCN Status: S2 - Imperiled

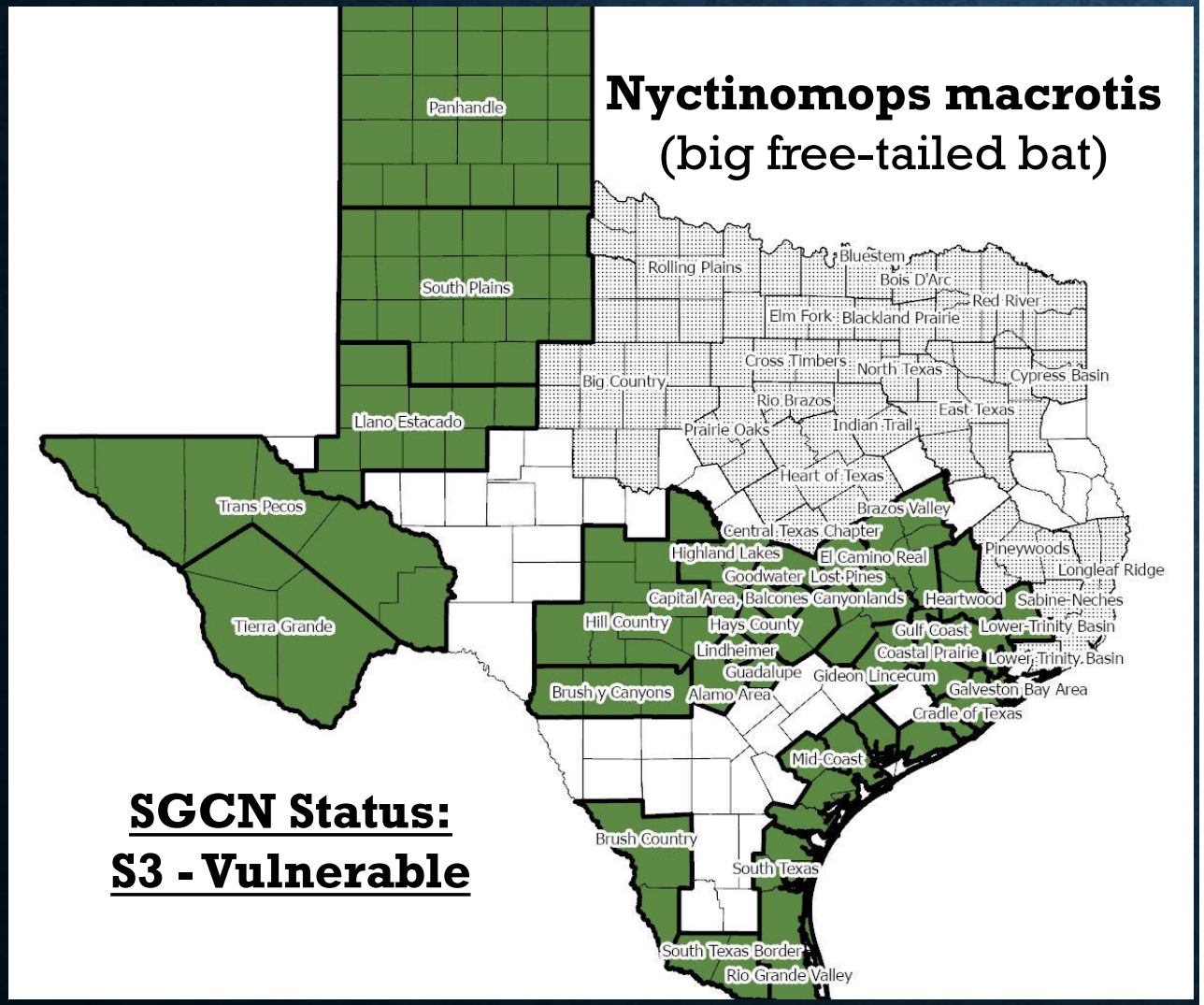
Tadarida brasiliensis (Mexican free-tailed bat)

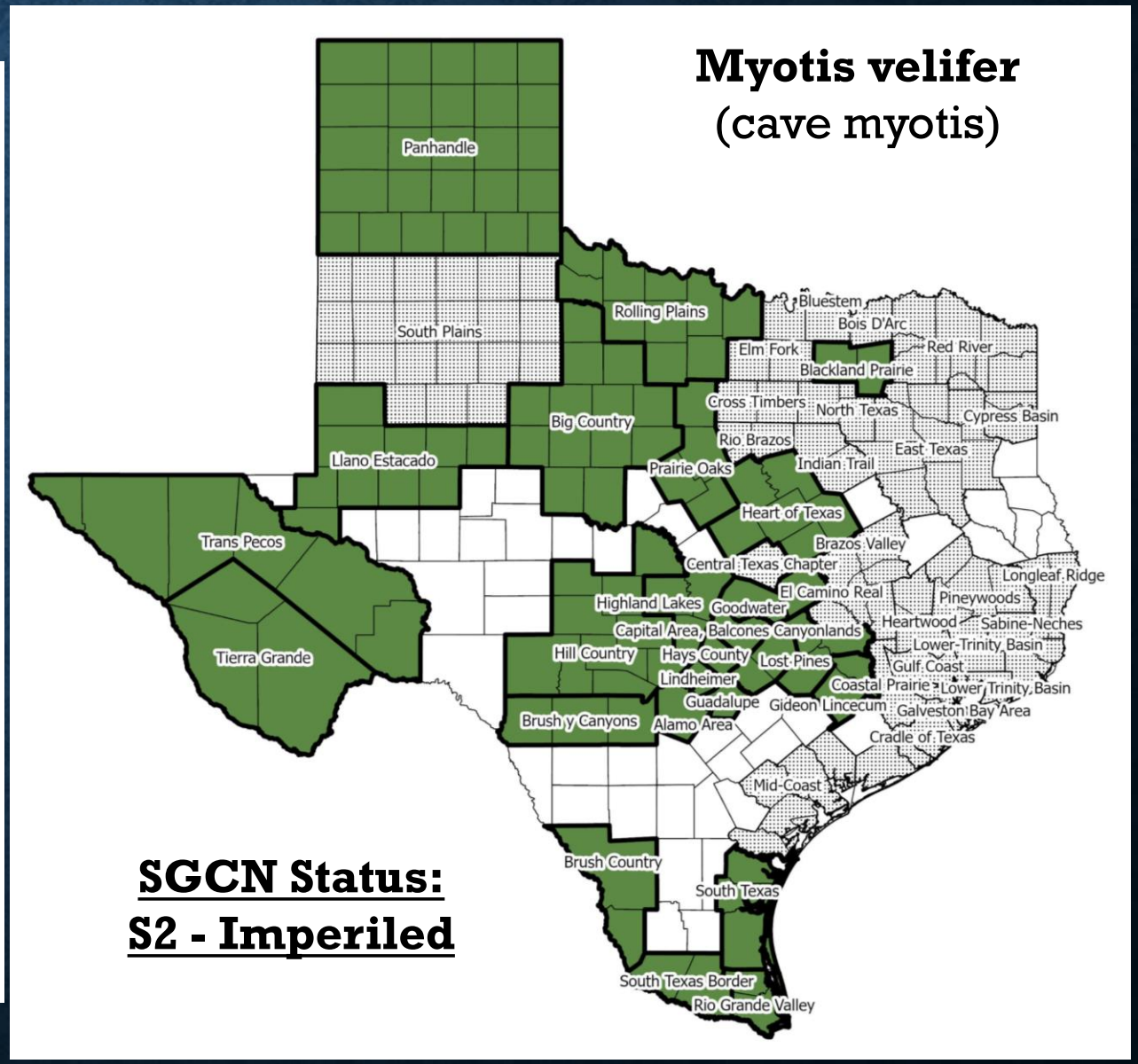
Lasionycteris noctivagans (silver-haired bat)

Lasiurus borealis (eastern red bat)

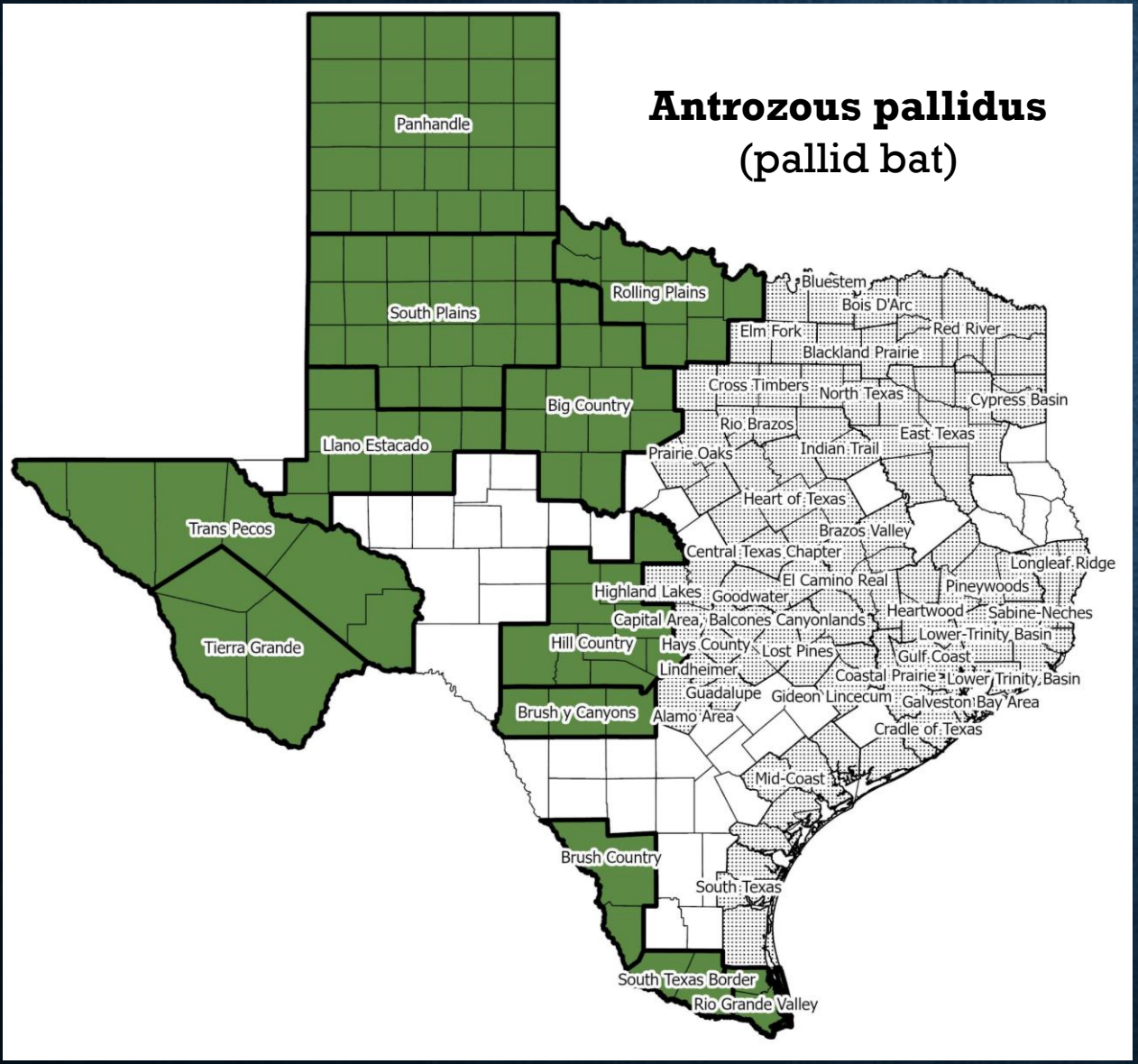
Lasiurus cinereus (hoary bat) SGCN Status: S3 - Vulnerable

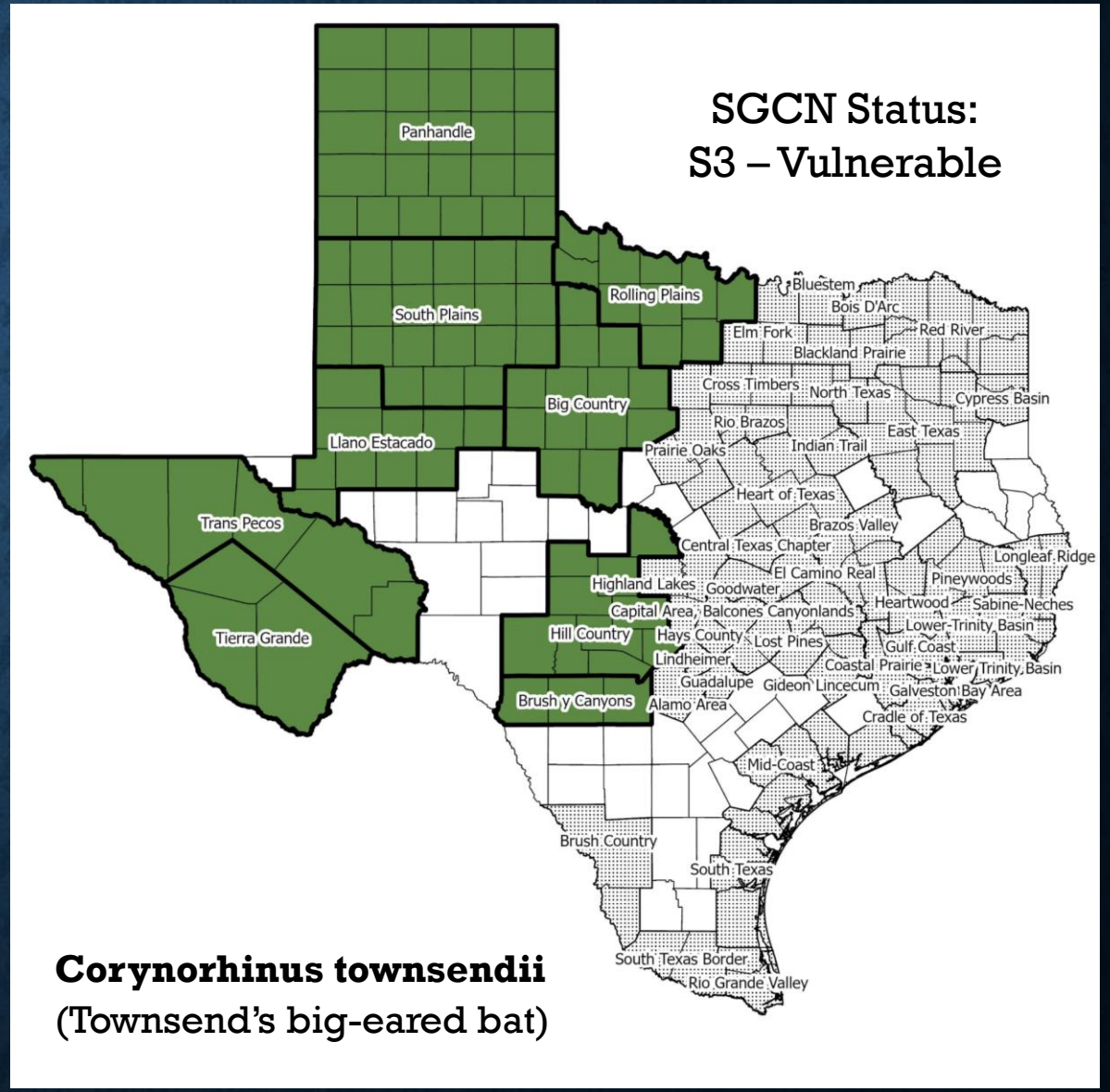
Widely Distributed but not Statewide



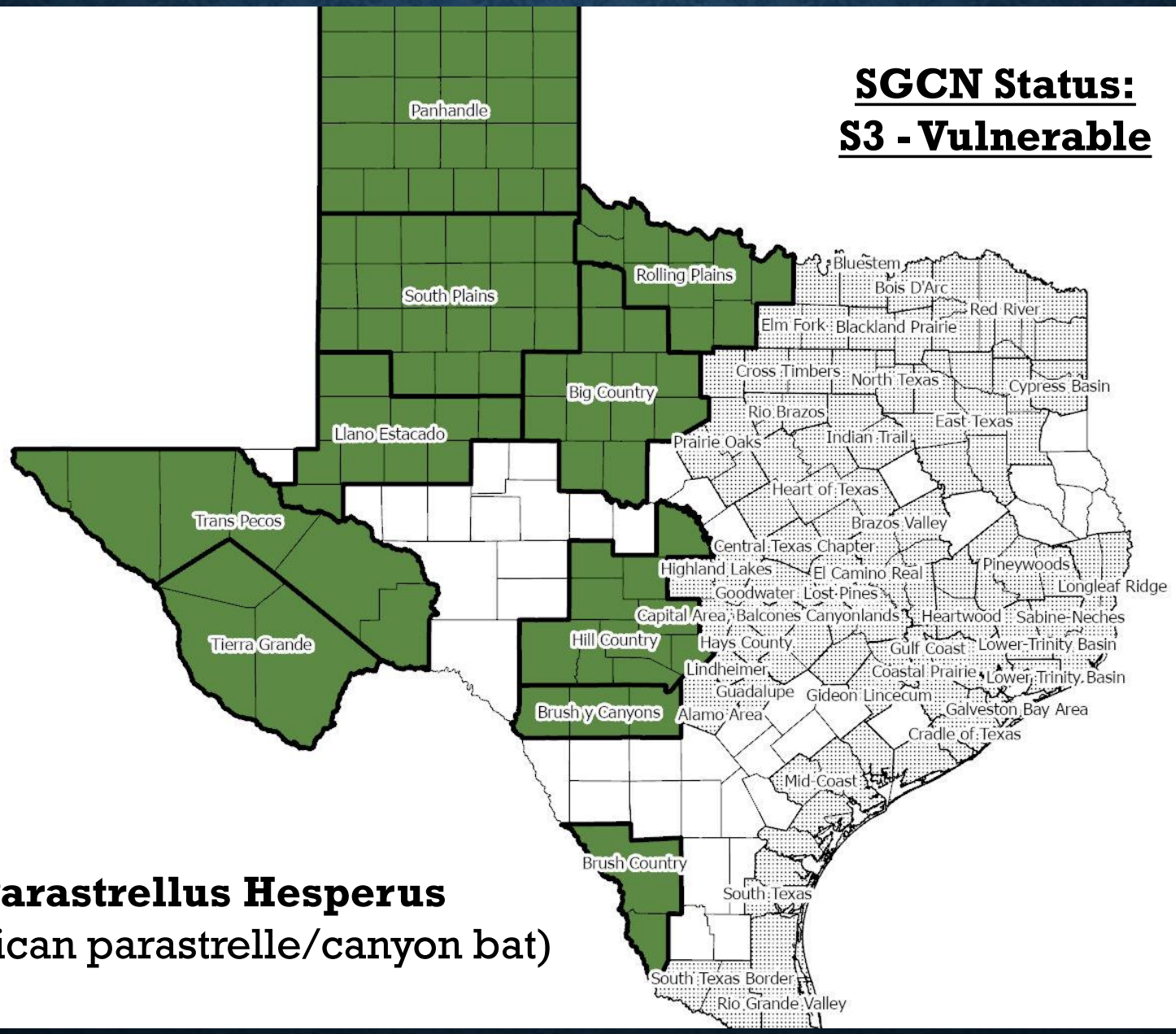


Western Half of Texas, generally





Western Half of Texas, generally

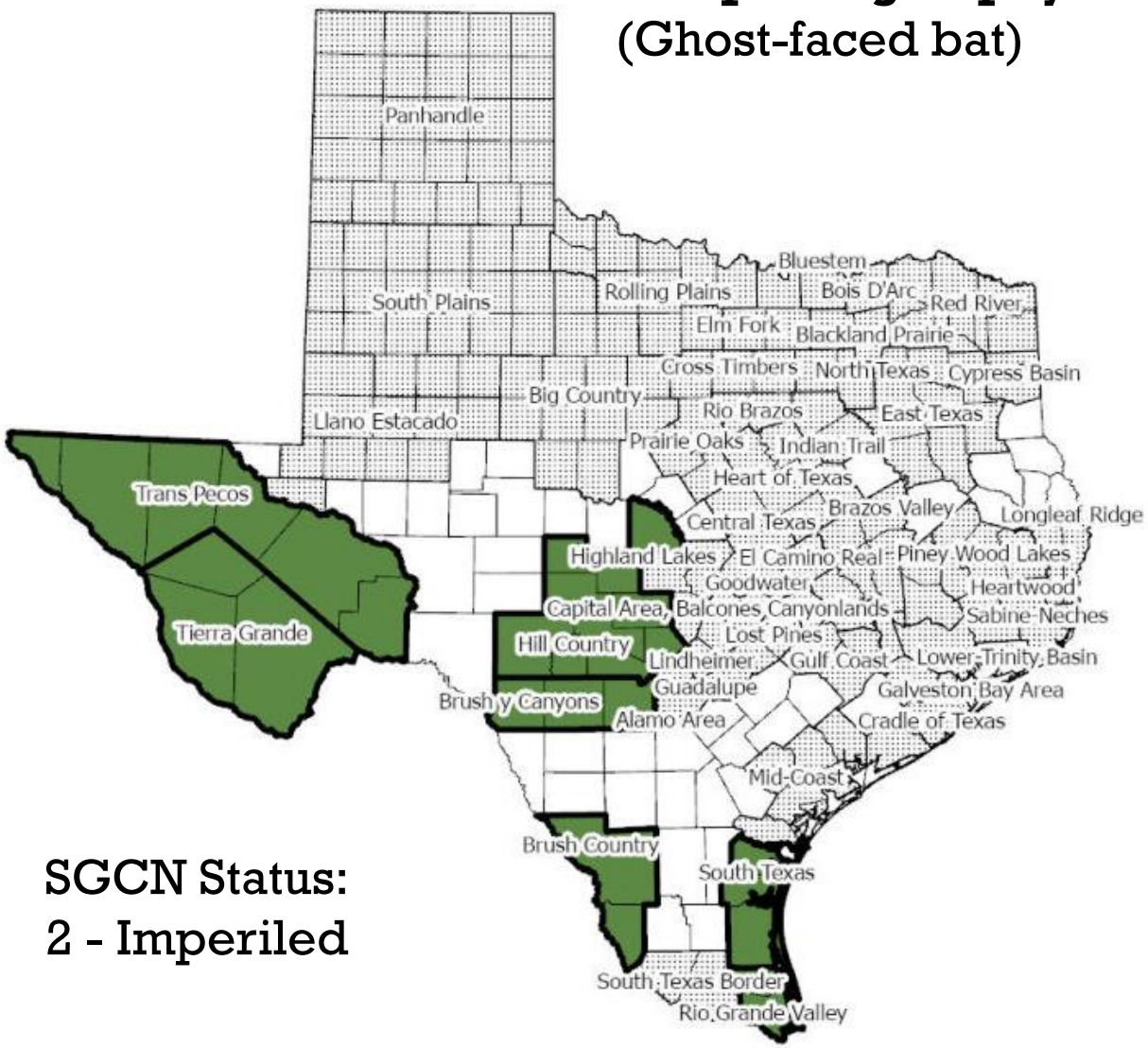


SGCN Status:
S3 - Vulnerable

Parastrellus Hesperus
(American parastrelle/canyon bat)

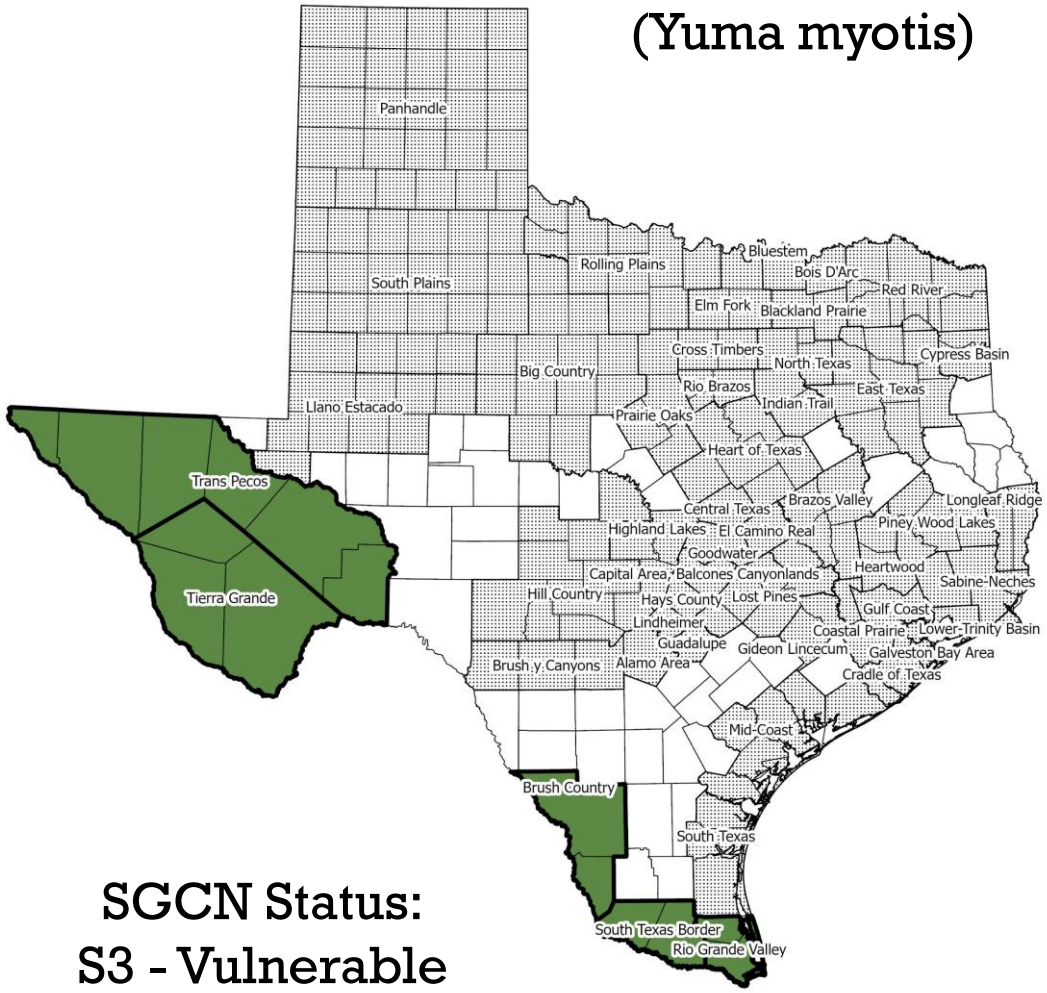
West/South Texas, generally

Mormoops megalophylla
(Ghost-faced bat)



SGCN Status:
2 - Imperiled

Myotis yumanensis
(Yuma myotis)



SGCN Status:
S3 - Vulnerable

Trans Pecos and Tierra Grande Chapters Only

SGCN Status: S1 - Critically Imperiled

Lasiurus xanthius (Western yellow bat)

Myotis volans (Long-legged myotis)

SGCN Status: S2 - Imperiled

Eumops p. californicus
(Greater western mastiff bat)

SGCN Status: S3 - Vulnerable

Euderma maculatum (Spotted bat)

Eumops perotis (Western mastiff bat)

Myotis californicus (California myotis)

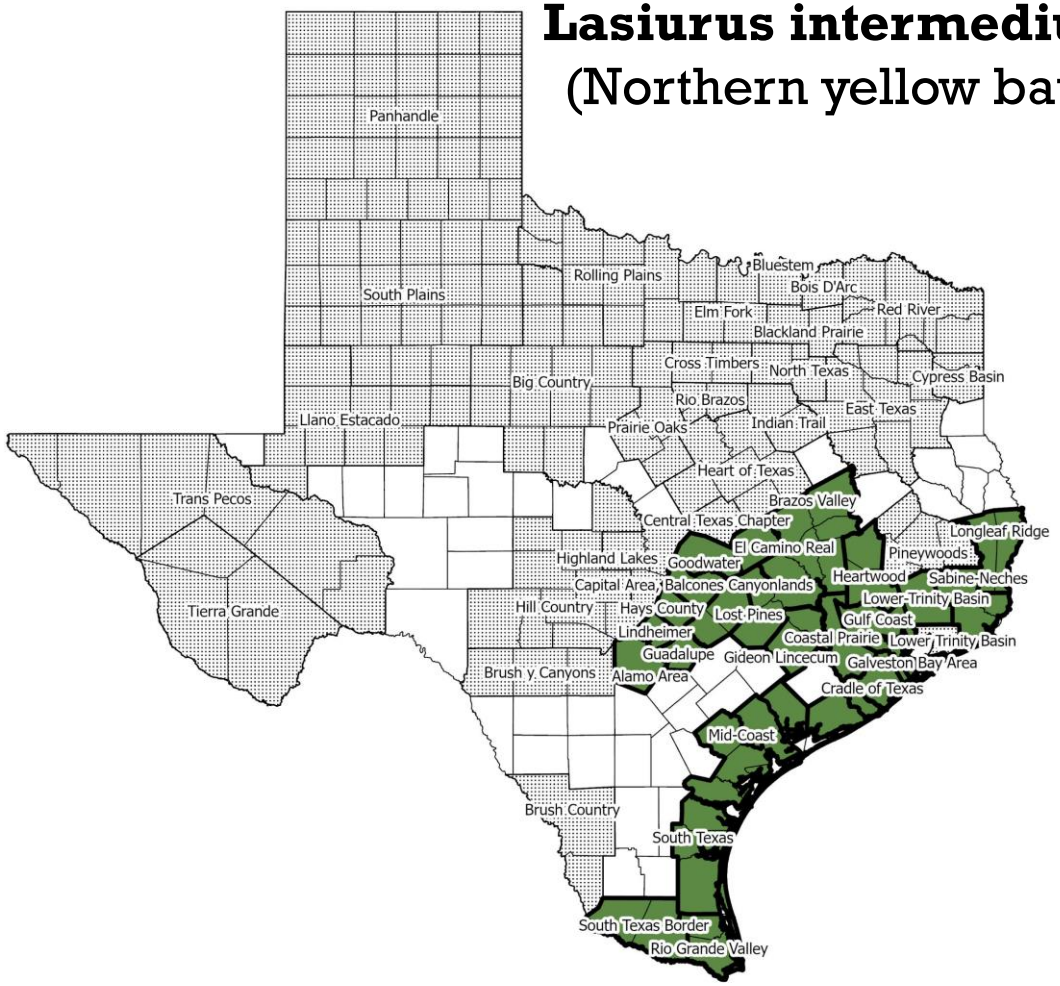
Myotis ciliolabrum
(Western small-footed myotis)

Myotis thysanodes (Fringed myotis)

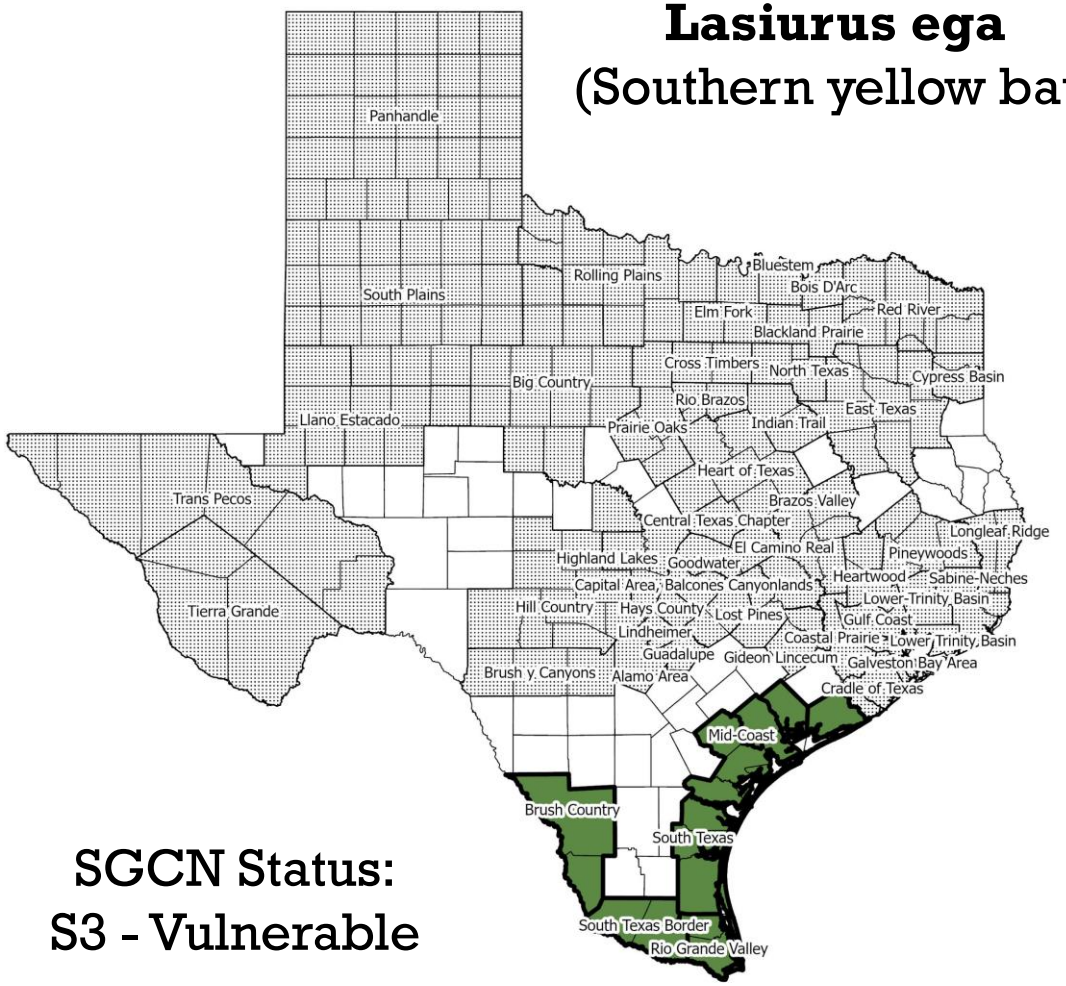
Nyctinomops femorosaccus
(Pocketed free-tailed bat)

Yellow Bats

Lasiurus intermedius
(Northern yellow bat)



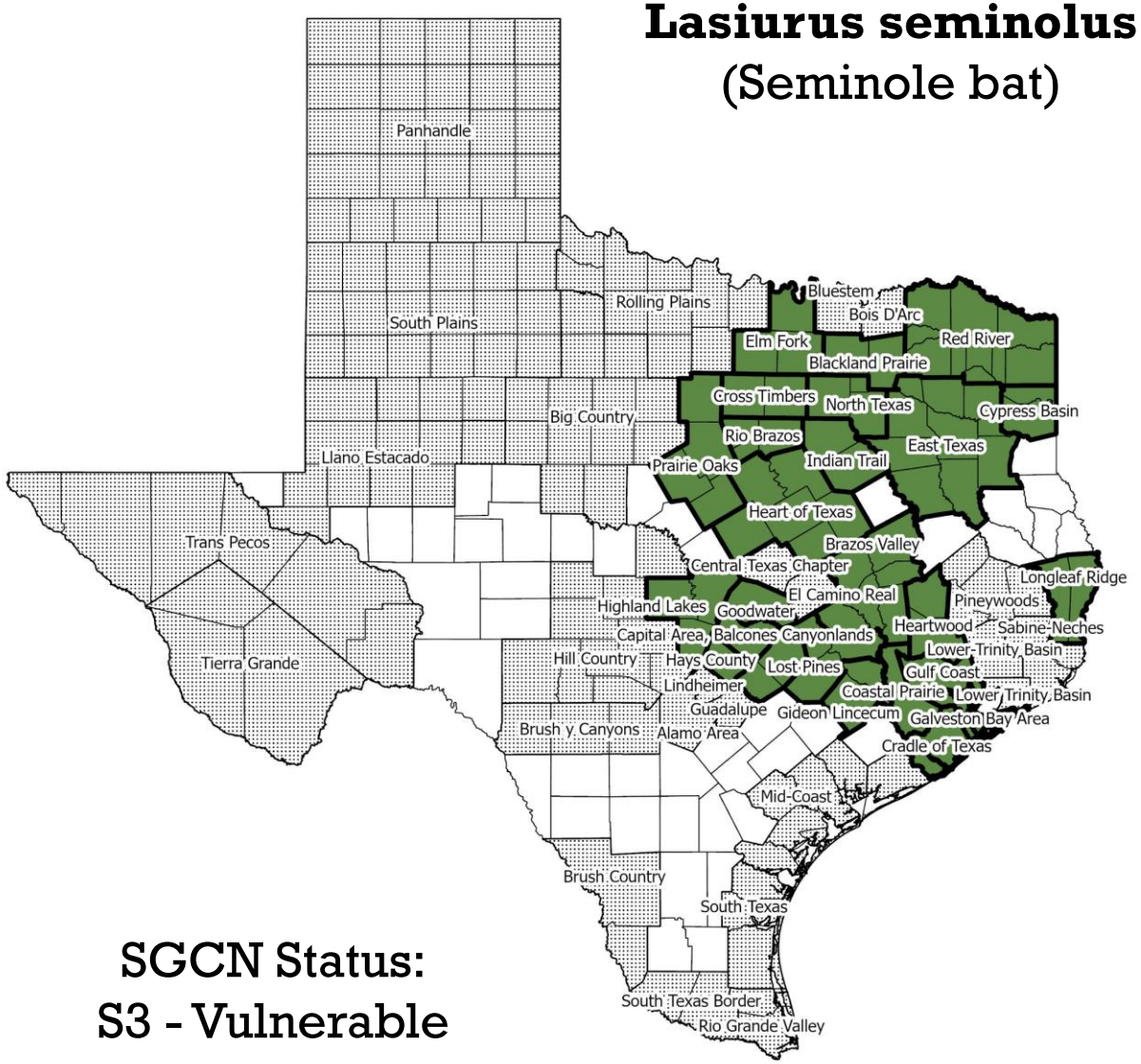
Lasiurus ega
(Southern yellow bat)



SGCN Status:
S3 - Vulnerable

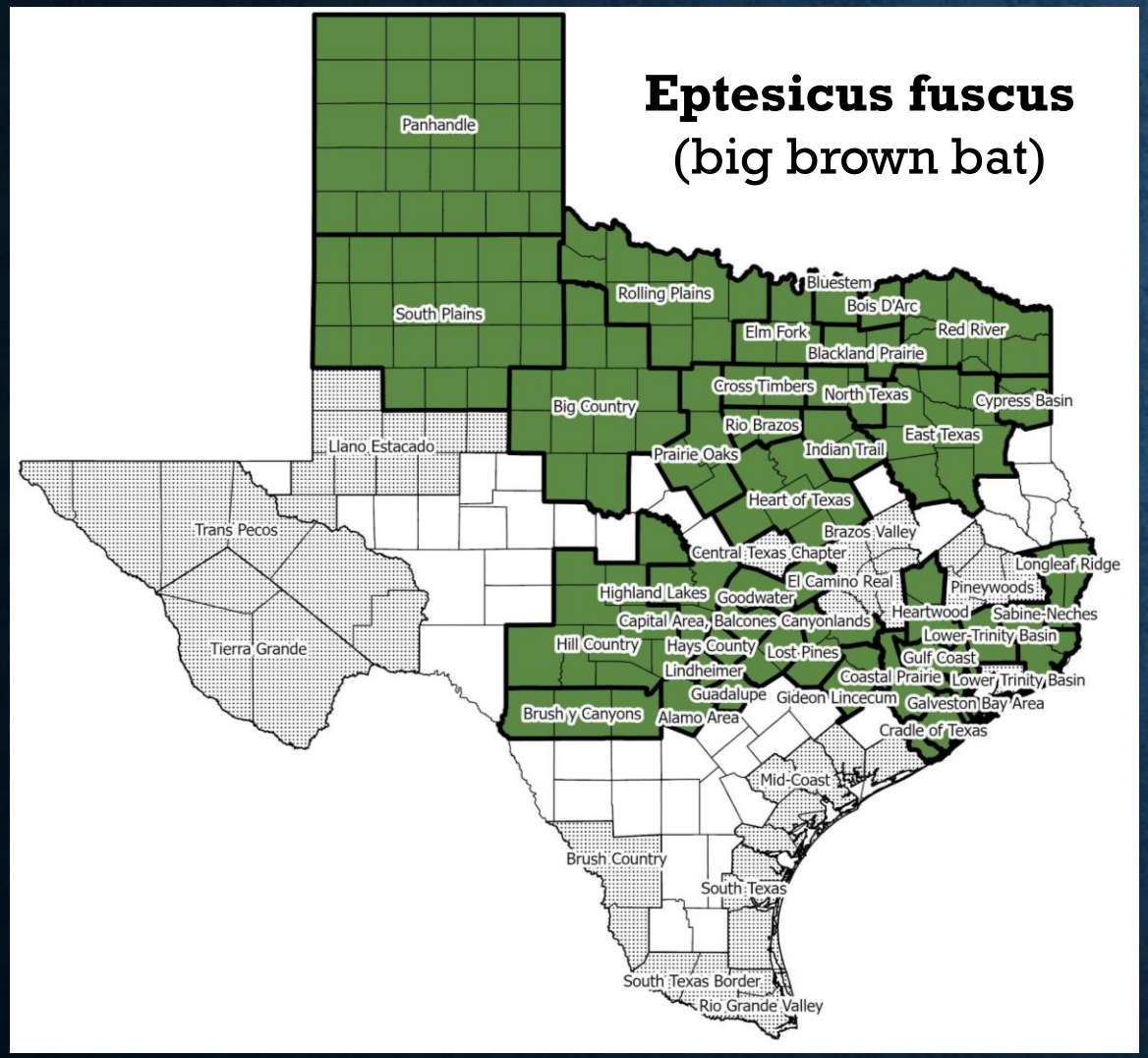
Northeastern Texas, generally

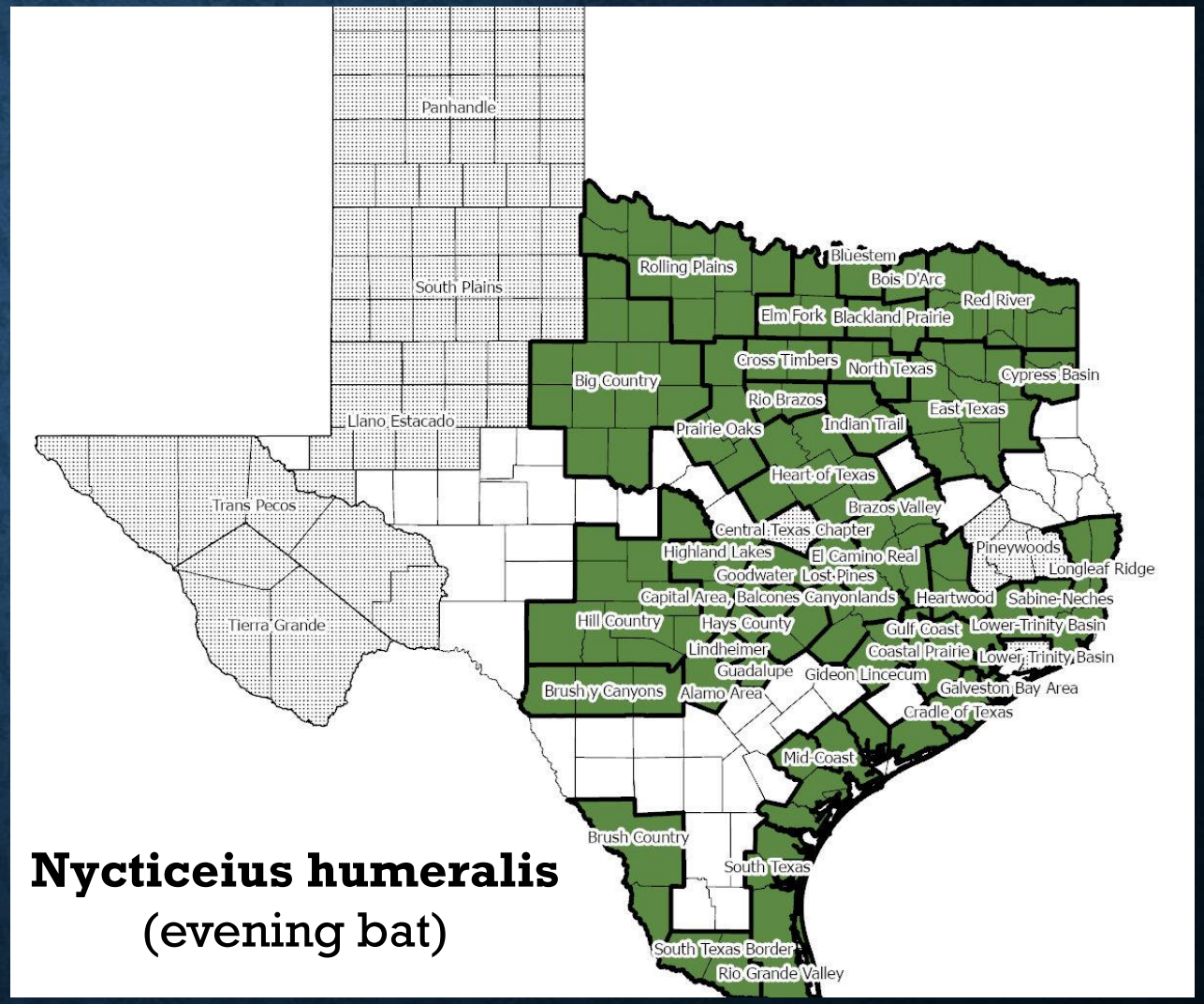
Lasiurus seminolus
(Seminole bat)



SGCN Status:
S3 - Vulnerable

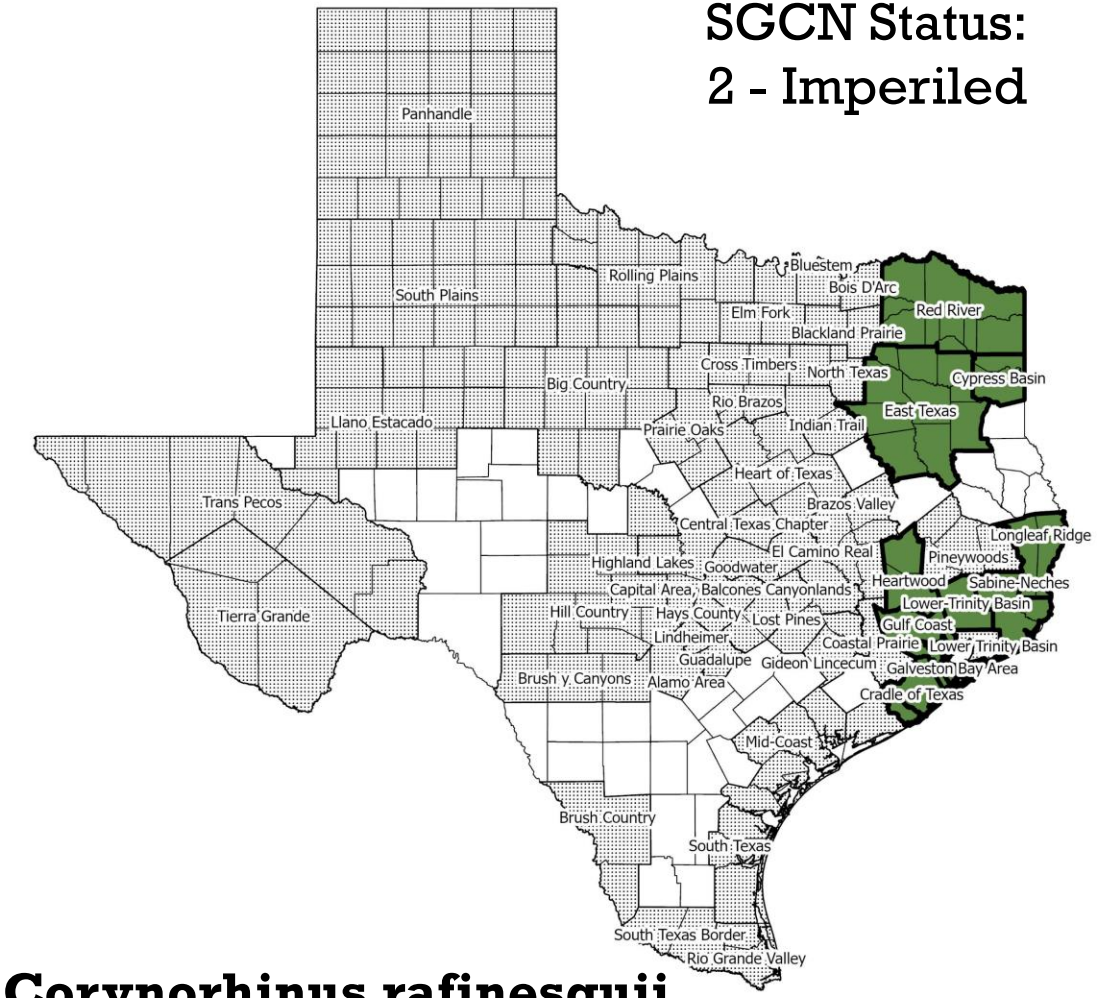
Widely Distributed but not Statewide





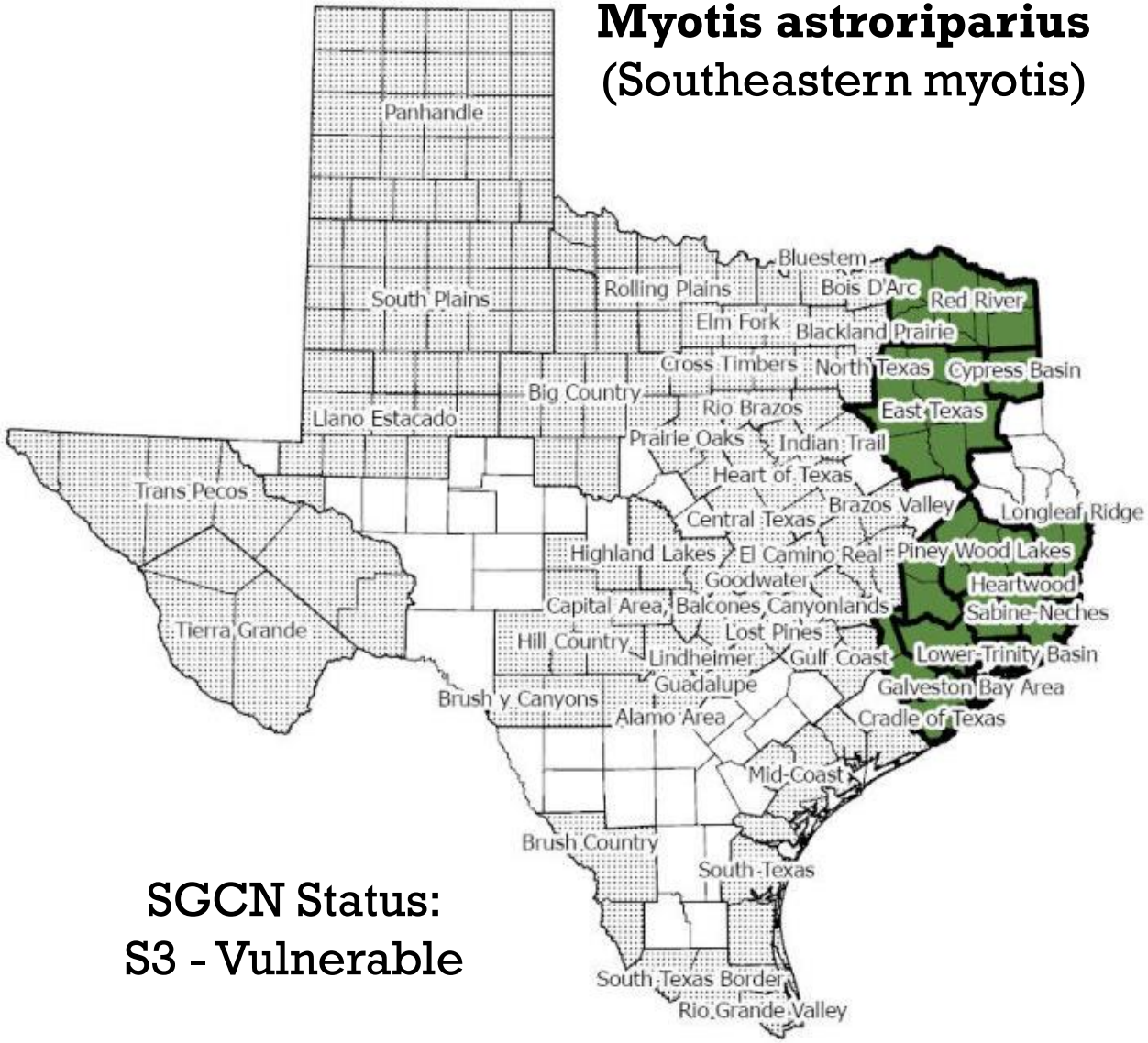
East Texas

SGCN Status:
2 - Imperiled



Corynorhinus rafinesquii
(Rafinesque's big-eared bat)

Myotis astroriparius
(Southeastern myotis)

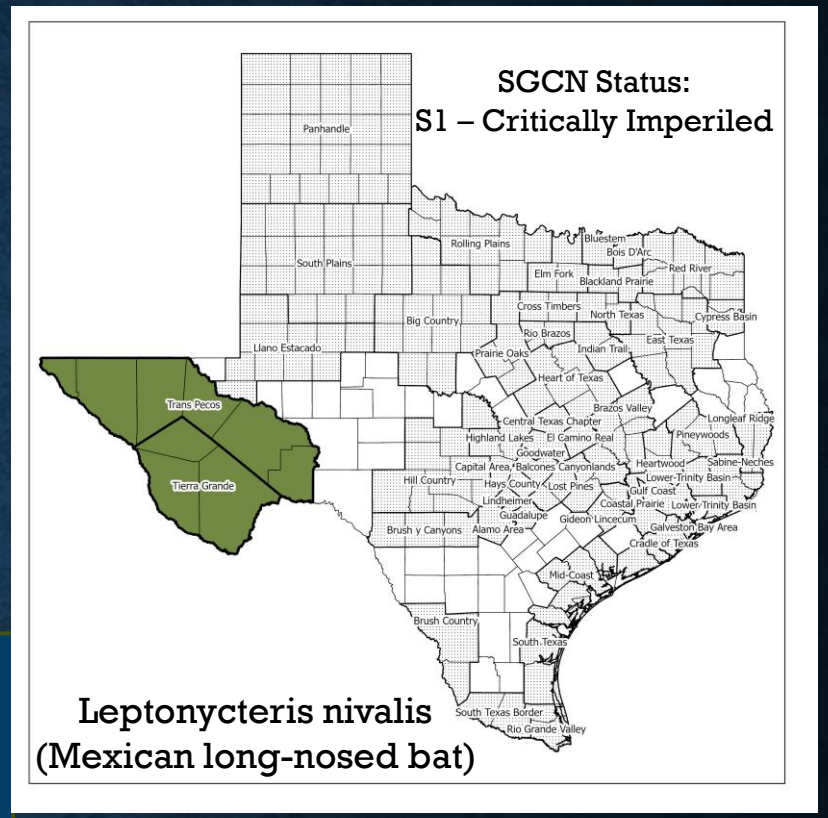


SGCN Status:
S3 - Vulnerable

Nectar-feeding Bats

Leptonycteris nivalis (Mexican long-nosed bat)

Choeronycteris mexicana (Mexican long-tongued bat)



Species with Single Record

Lasiurus frantzii (Western red bat)

Myotis occultus (Southwestern small-footed myotis)

Myotis septentrionalis (Northern long-eared myotis)

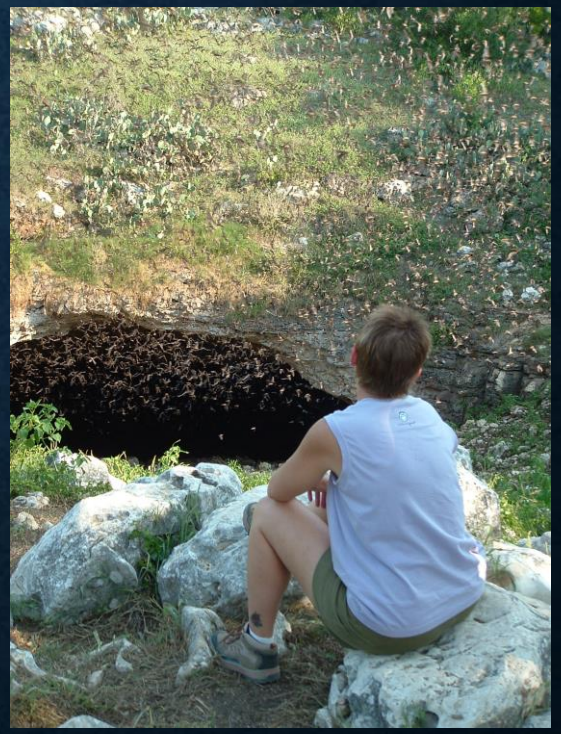
Number of Species (SGCN) per TMN Chapter

TMN Chapter	No. Species (SGCN)
Alamo Area	10 (4)
Balcones Canyonlands	11 (5)
Big Country	11 (5)
Blackland Prairie	9 (4)
Bluestem	7 (2)
Bois D' Arc	7 (2)
Brazos Valley	9 (4)
Brush Country	13 (8)
Brush "y" Canyons	14 (6)
Capital Area	10 (5)
Central Texas	10 (5)
Coastal Prairie	11 (5)
Cradle of Texas	12 (6)
Cross Timbers	8 (3)
Cypress Basin	10 (5)
East Texas	10 (5)
El Camino Real	10 (4)
Elm Fork	8 (3)
Galveston Bay Area	12 (6)
Gideon Lincecum	11 (5)
Goodwater	11 (5)
Guadalupe	10 (4)
Gulf Coast	12 (6)
Hays County	11 (5)
Heart of Texas	9 (4)
Heartwood	12 (6)
Highland Lakes	10 (5)
Hill Country	13 (7)
Indian Trail	8 (3)
Lindheimer	10 (4)
Llano Estacado	10 (6)
Longleaf Ridge	11 (5)
Lost Pines	11 (5)
Lower Trinity Basin	11 (5)
Mid-coast	9 (4)
North Texas	8 (3)
Panhandle	11 (6)
Piney Wood Lakes	10 (4)
Prairie Oaks	9 (4)
Red River	10 (5)
Rio Brazos	8 (3)
Rio Grande Valley	13 (7)
Rolling Plains	11 (5)
Sabine-Neches	10 (4)
South Texas	11 (6)
South Plains	10 (5)
South Texas Border	12 (6)
Tierra Grande	22 (17)
Trans Pecos	22 (17)

2023 NA State of Bats Report Findings*:

Bats provide economic benefits including:

- Consuming insect pests thus improving crop yields
- Reducing pesticide use
- Nectar-feeding bats aid in plant pollination
- Economic gain through bat tourism
- Scientific advancement



*Published by the North American Bat Conservation Alliance (NABCA) -- https://digital.batcon.org/state-of-the-bats-report/2023-report/

2023 NA State of Bats Report Findings*:

By the Numbers

52% - at risk of decline

82% - impacted by climate change

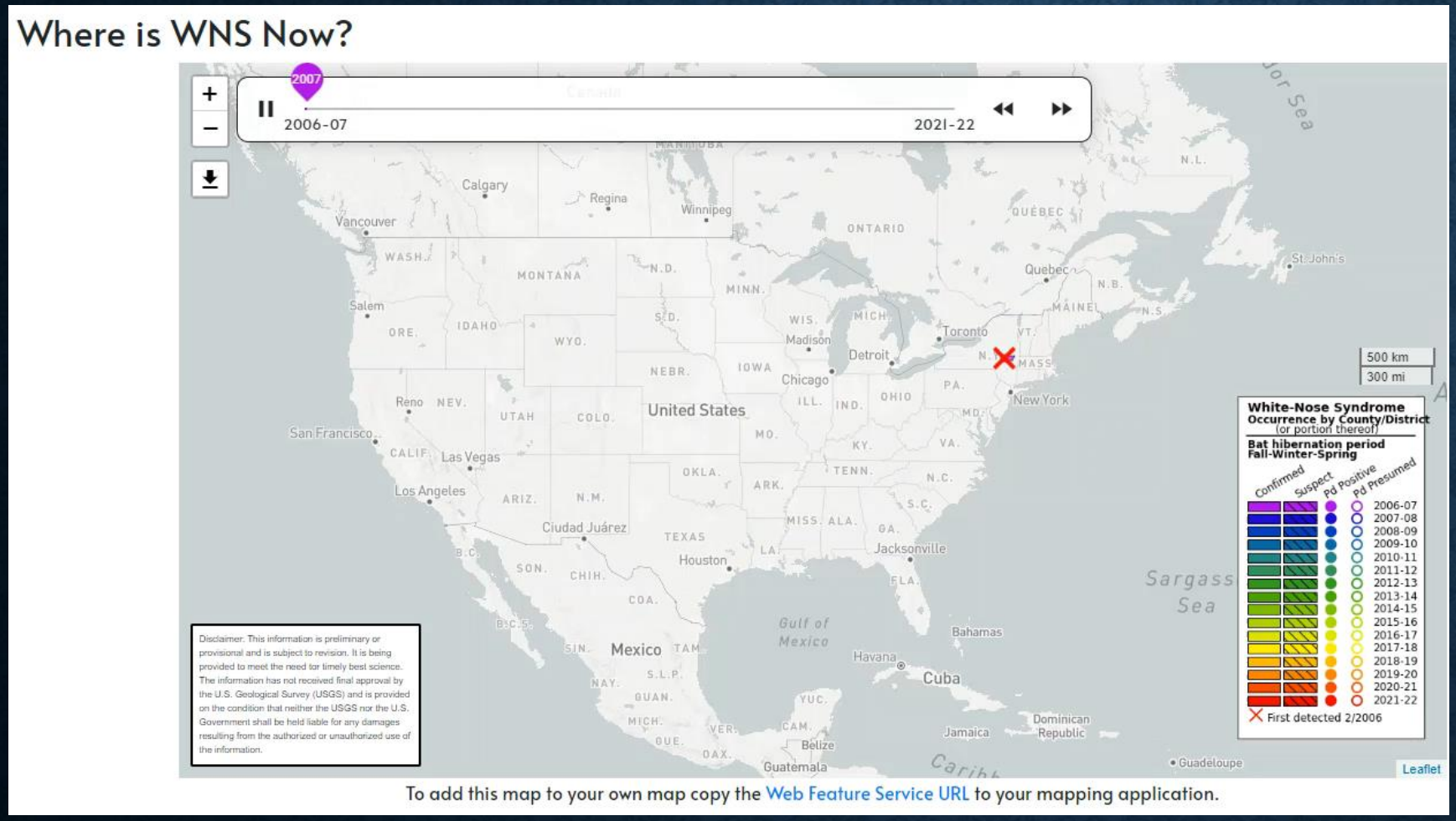
98% - losing habitat

Top threats include:

- Severe drought
- Temperature extremes
- Destruction of bat roosts
- Consumption of poisoned prey
- Mortality from wind turbines
- White-nose syndrome (WNS)

*Published by the North American Bat Conservation Alliance (NABCA) -- https://digital.batcon.org/state-of-the-bats-report/2023-report/

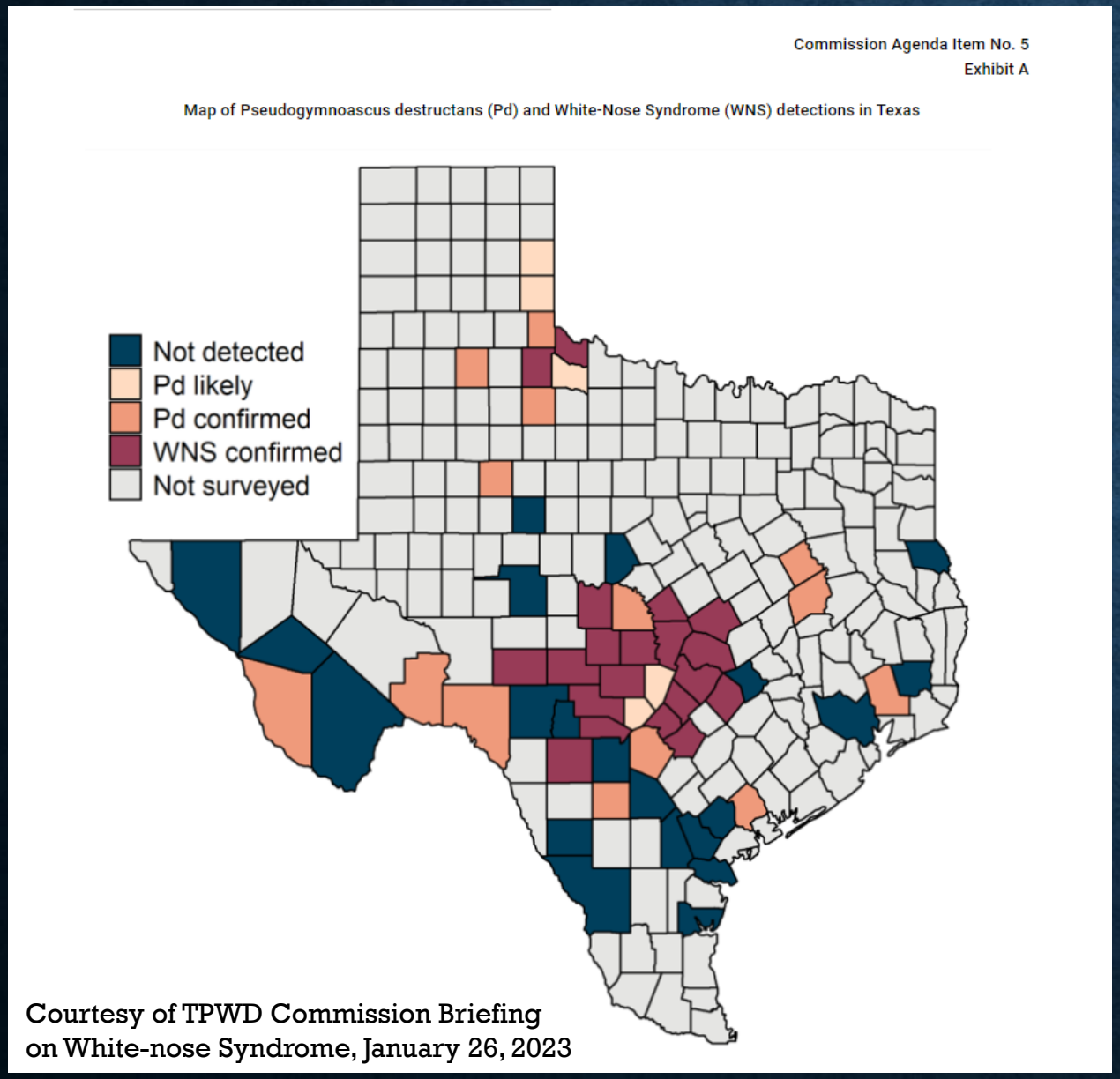
White-Nose Syndrome



- Fungus (Pd*) afflicts hibernating bats
- Million of bats killed
- 100% roost mortality
- Bats deplete fat reserves, causing starvation

*(Pseudogymnoascus destructans)

Meanwhile in Texas:



Courtesy of TPWD Commission Briefing on White-nose Syndrome, January 26, 2023

By the Numbers:

2007 – 1st detection in Panhandle

37 – counties where fungus is known

20 – counties with confirmed WNS

4 – species found carrying fungus

1 – species detected with WNS

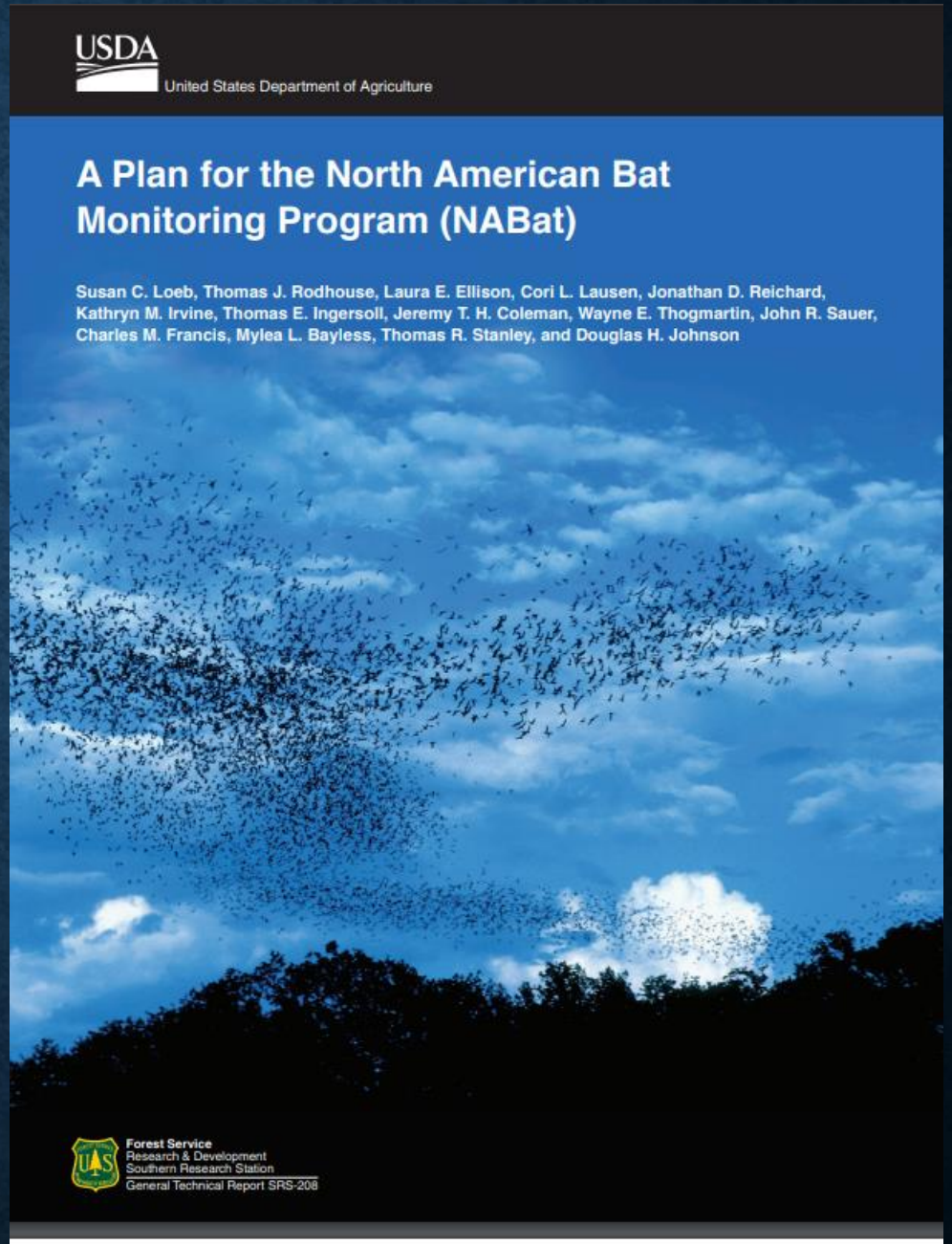
Purpose: create a continent-wide program to monitor bats at local to range-wide scales for effective conservation decision-making and long-term viability of bat populations across the continent

Goals:

- Develop and maintain a long-term continental program to monitor bat distributions and indices of abundance at range-wide, regional, and local scales

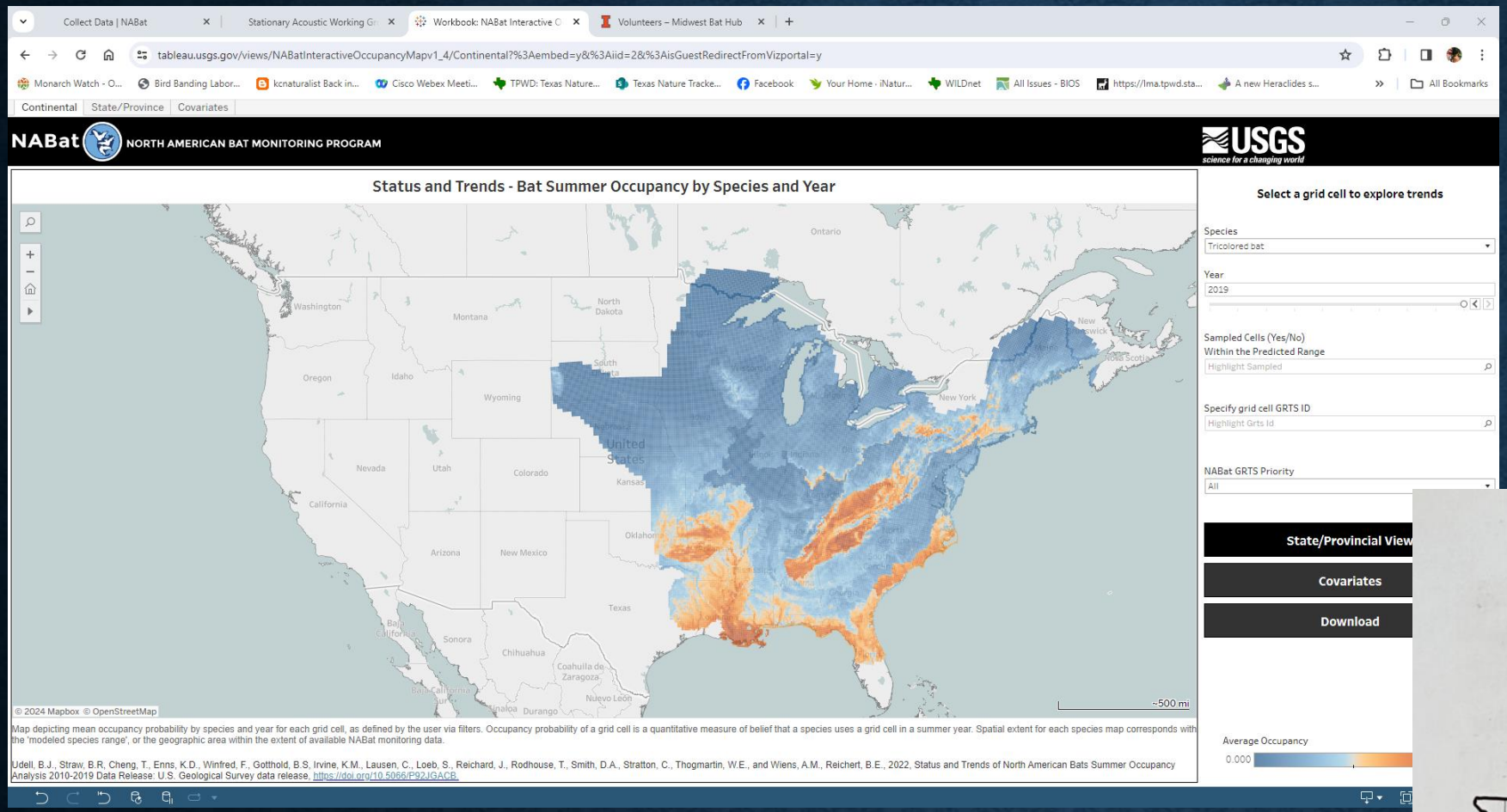
- Provide regular analyses and reporting on the status and trends of bat populations to inform managers and policymakers so that they can manage bat populations effectively.

- **"The success of NABat will likely depend on the use of citizen scientist volunteers."**
  - page 73, 10.3 of on-line manual

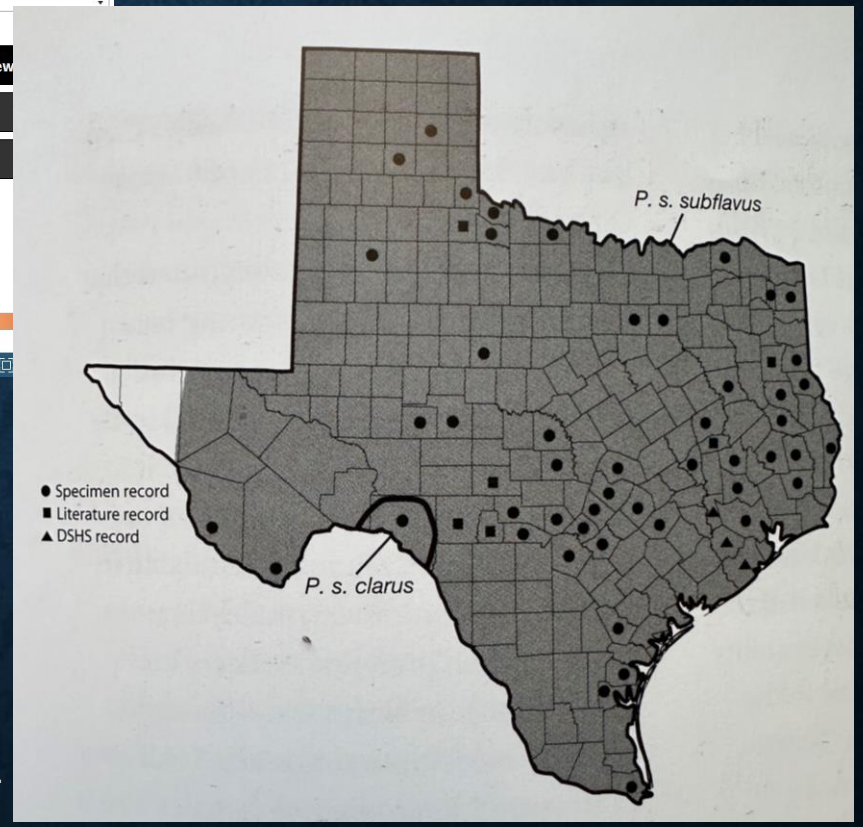


Published in June 2015

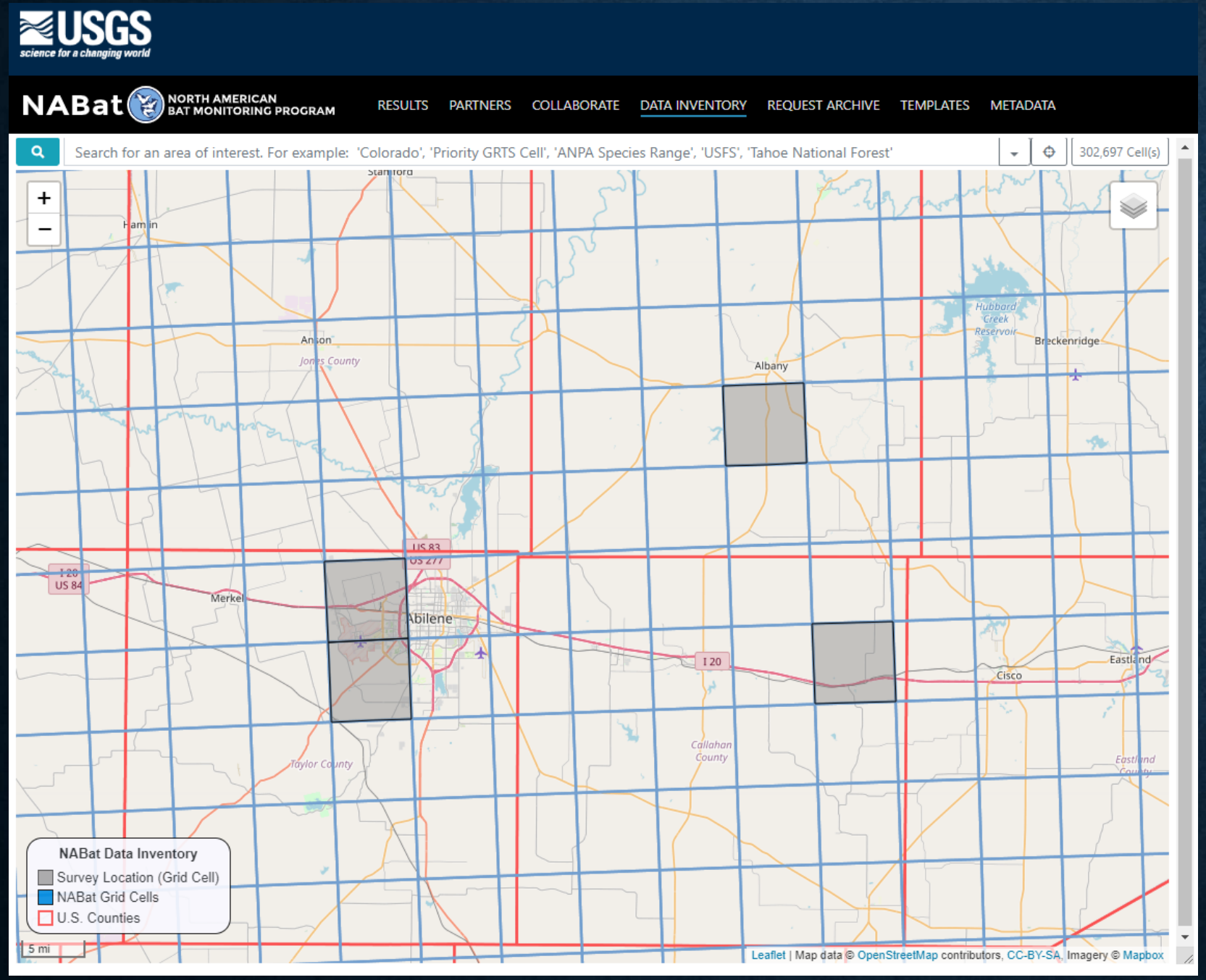
Data Deficiencies



From:
https://tableau.usgs.gov/views/NABatInteractiveOccupancyMapv1_4/Continental?%3Aembed=y&%3Aiid=2&%3AisGuestRedirectFromVizportal=y

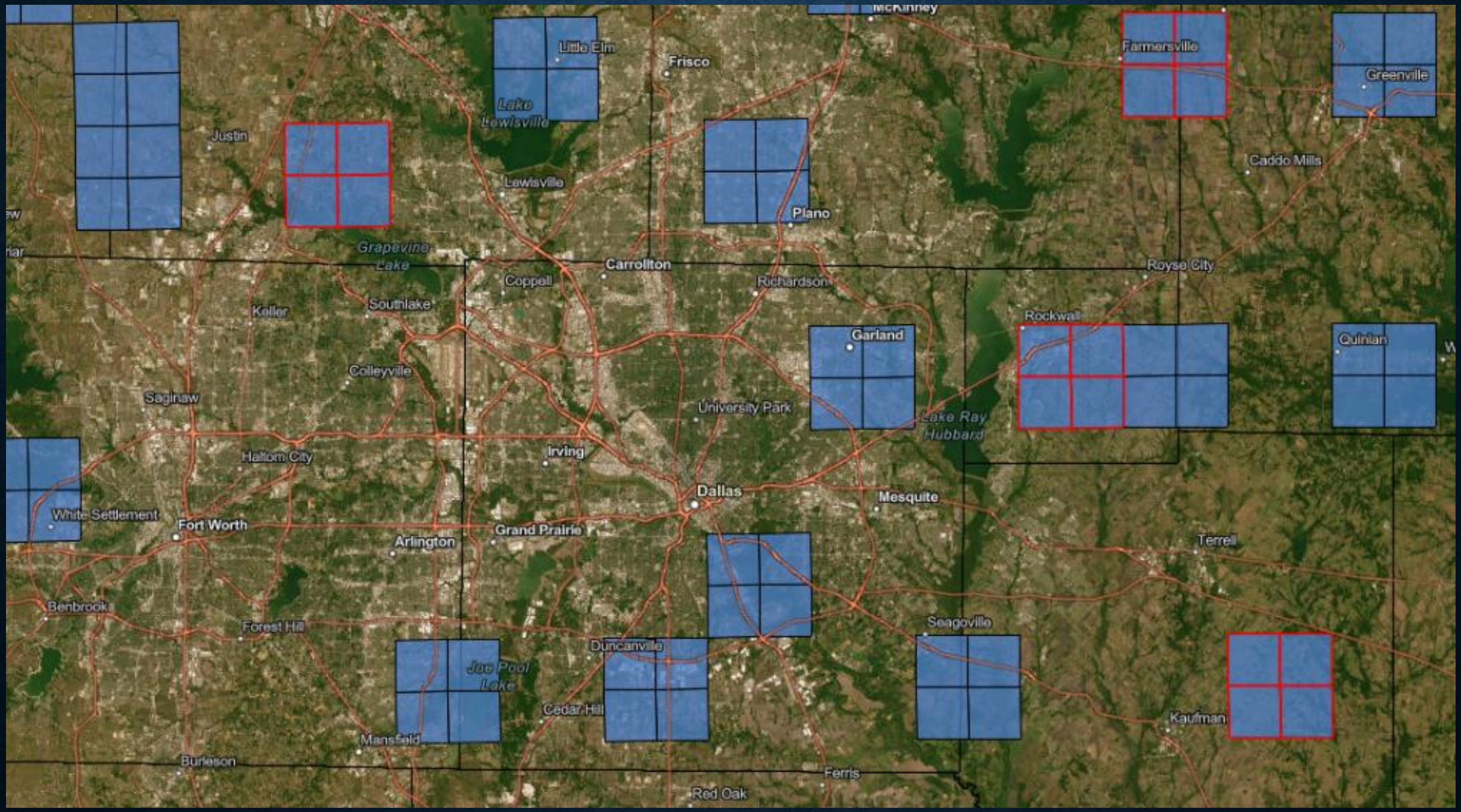


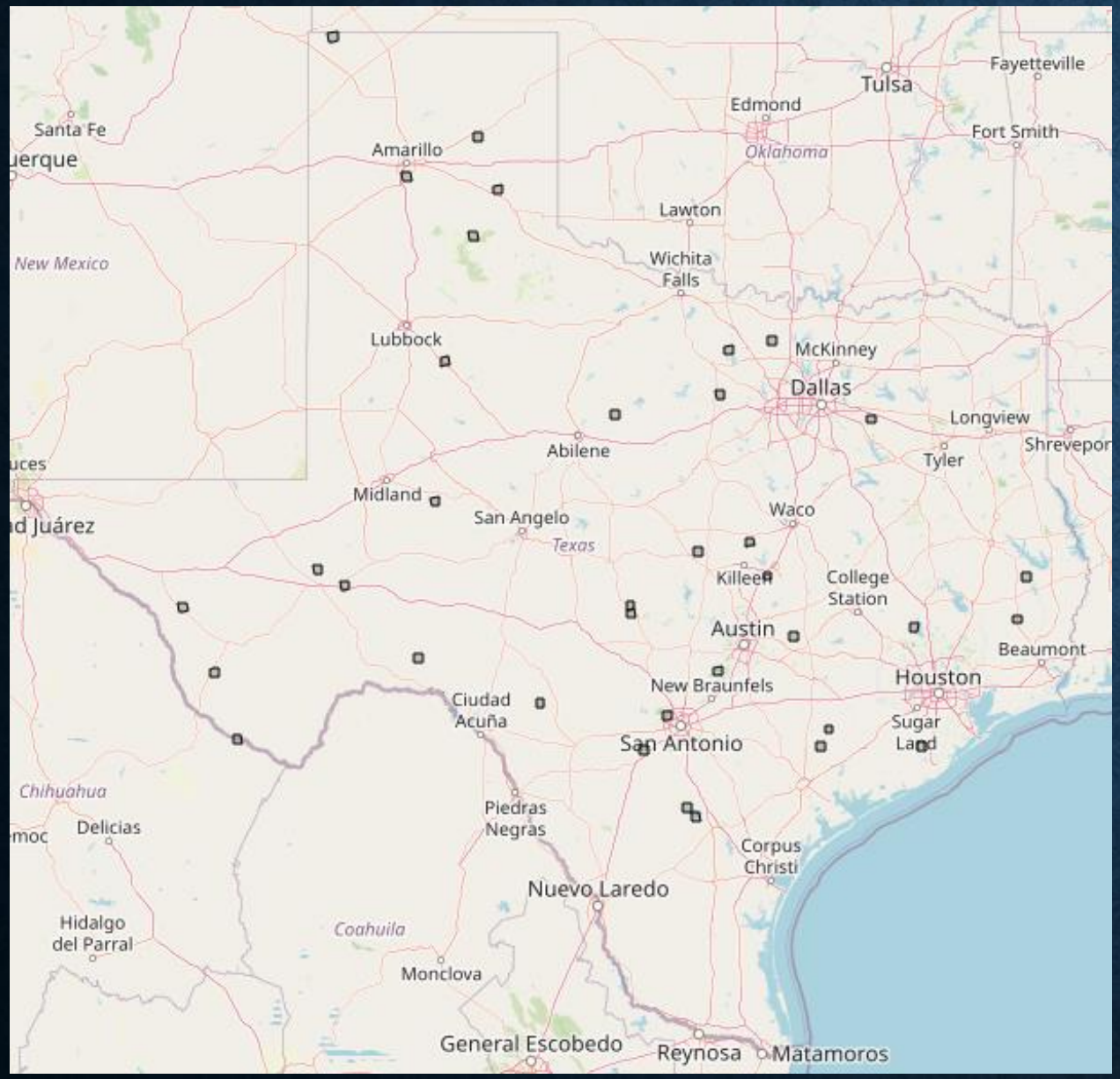
From: *Bats of Texas* b y L.K. Ammerman, C.L. Hice & D.J. Schmidly, page 163, Map 18.
Distribution of the two subspecies of the American Perimyotis, Perimyotis subflavus.



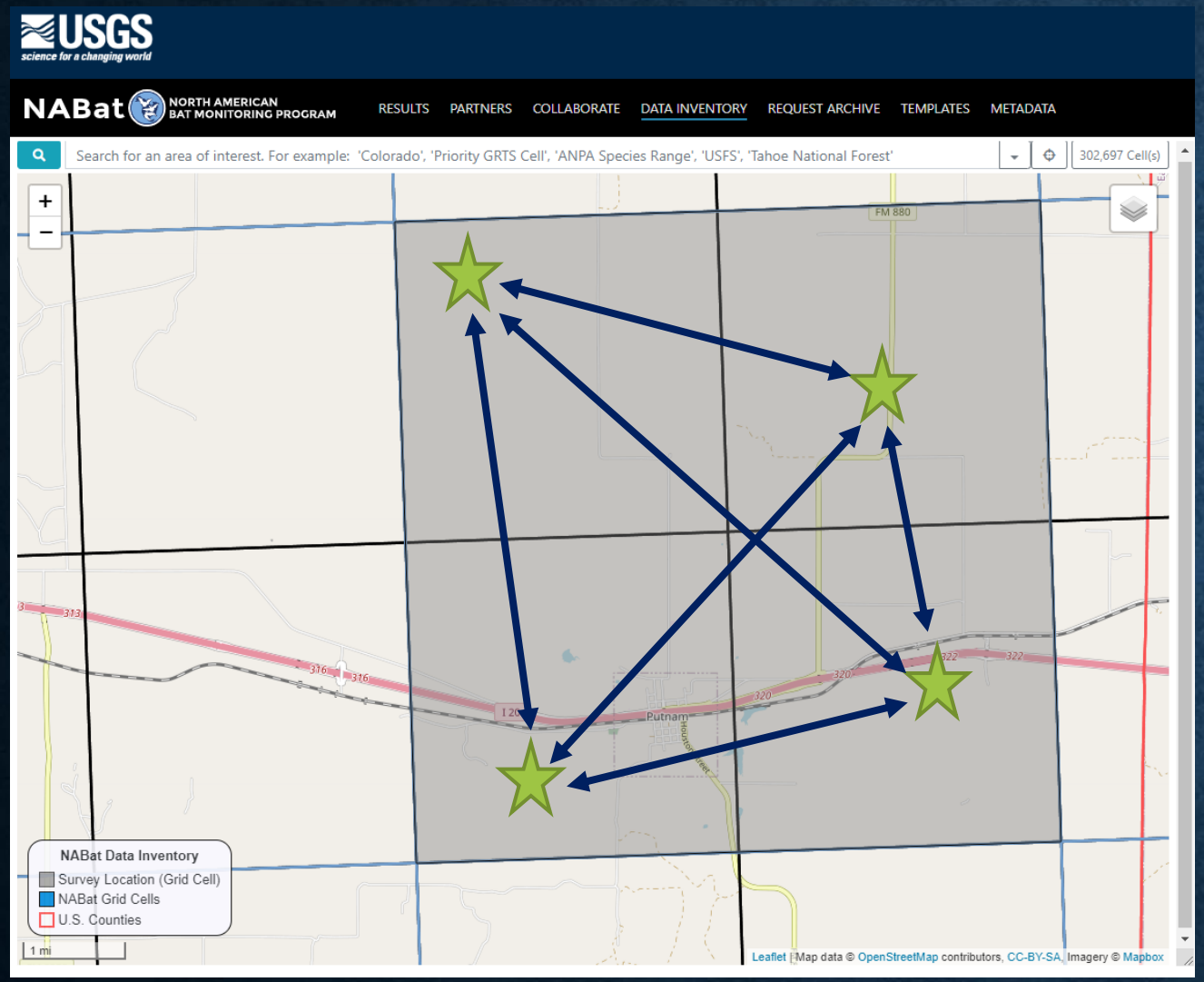
GRTS Cells

- No. of cells in Texas:
  Full cells – 6,563
  Partial cells – 655
  Current cells adopted – maybe 140


McKinney
Little Elm
Frisco
Farmersville
Greenville
Lake Lewisville
Justin
Caddo Mills
Lewisville
Plano
Grapevine Lake
Carrollton
Royse City
Coppell
Richardson
Southlake
Keller
Rockwall
Garland
Quinlan
Colleyville
Saginaw
University Park
Lake Ray Hubbard
Haltom City
Irving
Dallas
Mesquite
White Settlement
Fort Worth
Grand Prairie
Arlington
Terrell
Benbrook
Forest Hill
Seagoville
Duncanville
Joe Pool Lake
Cedar Hill
Kaufman
Mansfield
Burleson
Ferris
Red Oak


Santa Fe
Amarillo
Edmond
Tulsa
Fayetteville
Fort Smith
Oklahoma
Lawton
Wichita Falls
New Mexico
Lubbock
McKinney
Dallas
Longview
Tyler
Abilene
Midland
San Angelo
Texas
Waco
Killeen
College Station
Austin
Beaumont
Houston
New Braunfels
Ciudad Acuña
San Antonio
Sugar Land
Chihuahua
Delicias
Piedras Negras
Corpus Christi
Nuevo Laredo
Hidalgo del Parral
Coahuila
Monclova
General Escobedo
Reynosa
Matamoros

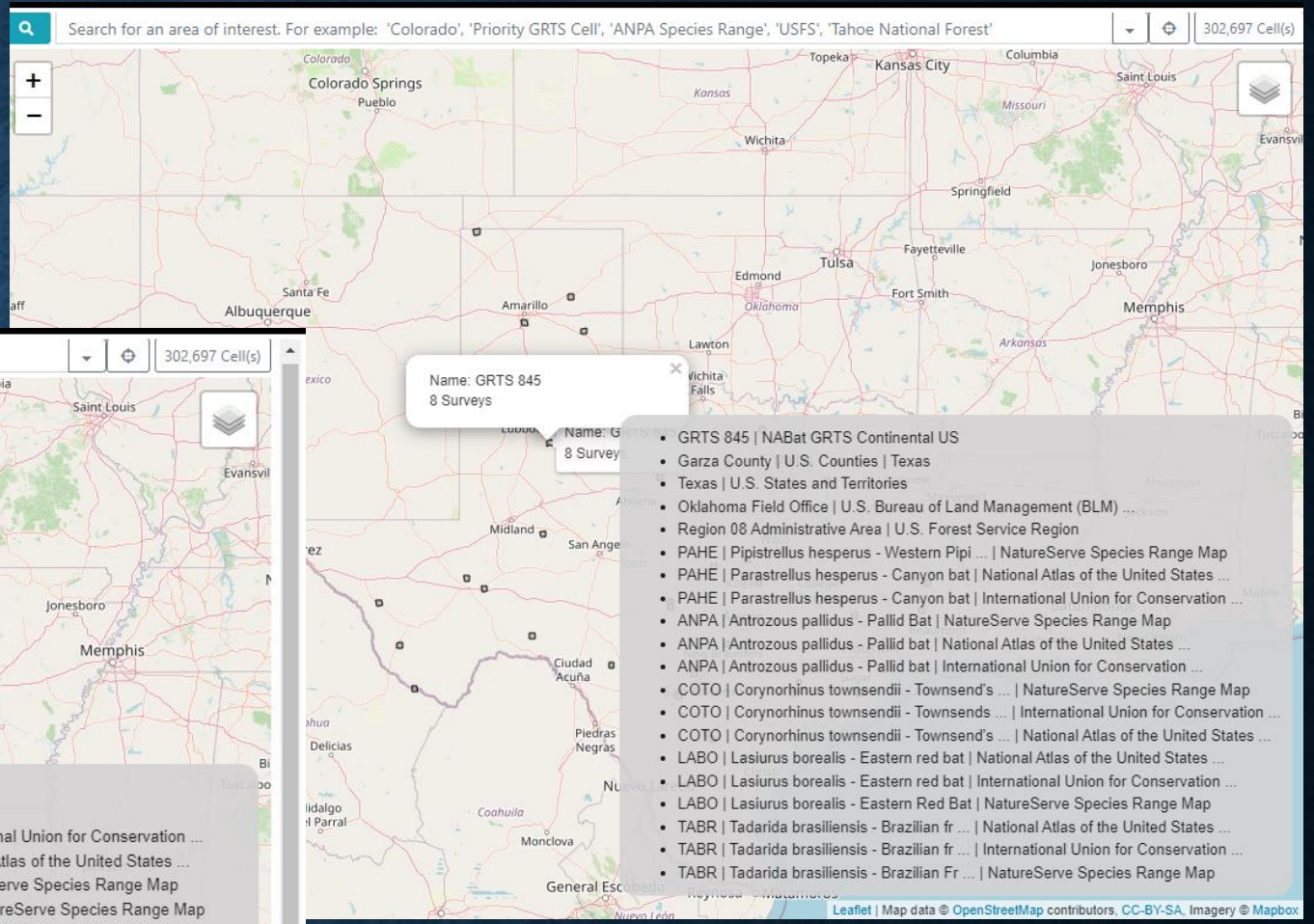

NABat Data Inventory
Request Data
Expand
Share
Reset
Filter
Week by Year
Species by Year
Date by Species
Covariate by Species
Chart
Stationary Acoustic (Manual ID)
Show Chart Legend
Grid Cells By Species
Grid Cells
35
30
25
20
15
10
5
0
ANPA
CORA
COTO
EPFU
EUMA
EUPE
LAEG
LAXA
LENI
MOME
MYCI
MYLU
NYFE
NYMA
TABR
Species Code

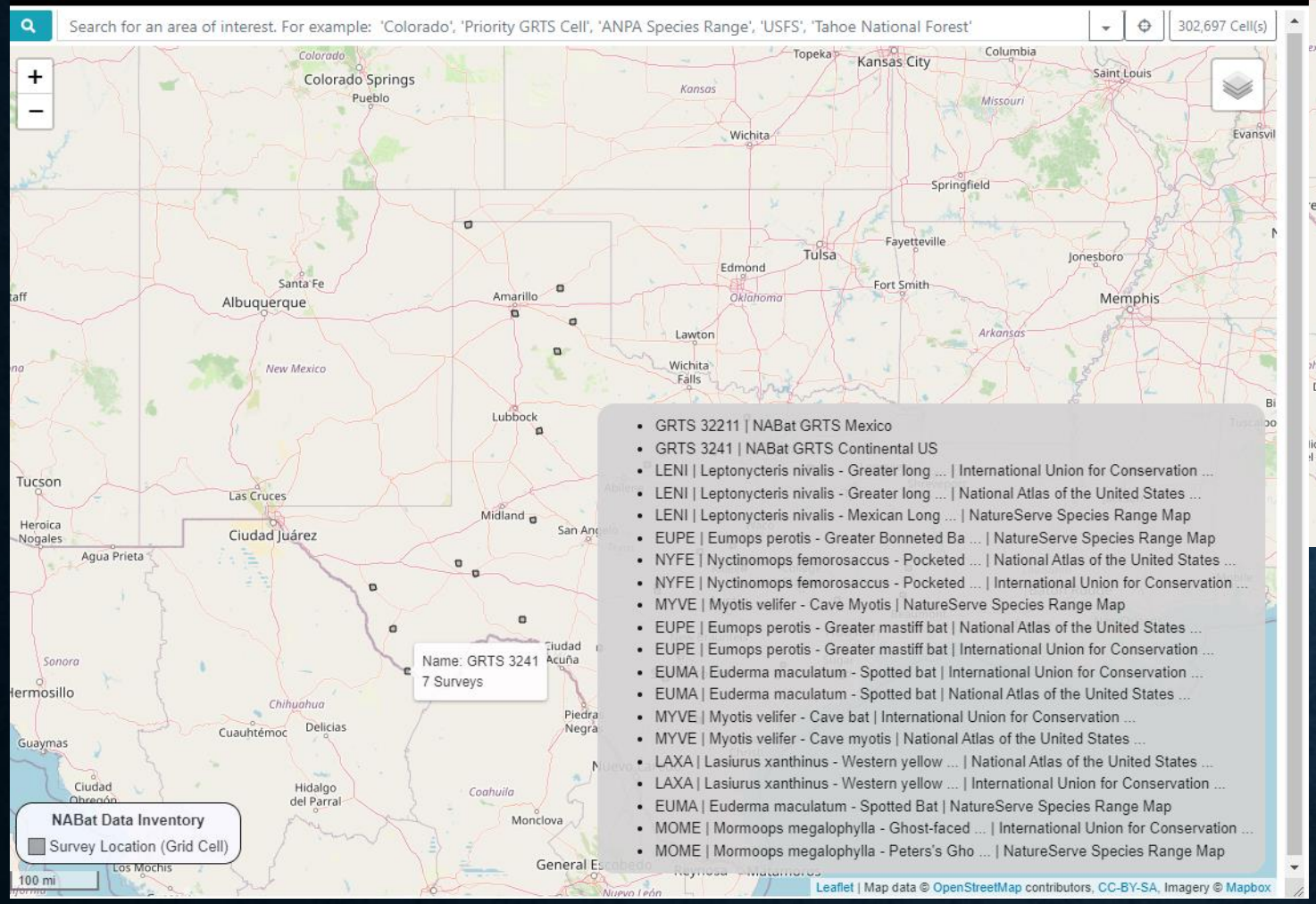


GRTS Cells

- Each GRTS cell is 10x10 km
- Four 5x5 km blocks within cell
- 2-4 detectors (one per block) within each cell, minimum of 5 km apart
- Each location is surveyed four nights
- Monitor is put out on a Monday, picked up on a Friday
- Surveyed one (minimum) to two times per year

Stationary Bat Acoustic Monitoring Results





Stationary Acoustic Monitoring Protocols Review

- Will use AudioMoths and Song Meter Mini Bat acoustic monitors/recorders
- One week survey (Monday-Friday)
- Conducted April-May-June (TBD)
- Maximize habitat types with GRTS cells
- One monitor within each GRTS quadrant
- Monitors placed at least 5 km from each other
- Will require strict recording of monitor locations
- Storage of data TBD
- Data will be shared with NABat, thus available to public
- To monitor on private land will require signing of TPWD agreement to share data or no participation
- Goal is to have a permanent data collection project through TPWD and TMN Program

Bat Acoustic moniToring (BAT) Roles for Master Naturalists

BAT Chapter Coordinator(s)/Leader(s)

Acoustic Monitor Field Deployment Volunteers

Data Review/Analysis Volunteers

Optional Role (TBD) Acoustic Monitor Programmer

BAT Chapter Coordinator(s)/Leader(s):

- Point of contact with TNT staff
- Receive and disseminate acoustic equipment
- Verify that data collection is done within timeframe
- Work with TNT staff to identify public lands for monitor deployment
- Make sure surveys are conducted within the established time period
- Collect monitors at end of field season for safe storage

Acoustic Monitor Field Deployment Volunteers

- With training, program acoustic monitor prior to deployment
- Determine location for monitor placement
- Deploy acoustic monitors on Monday-Friday schedule during survey time period
- Complete NABat Stationary Acoustic Monitoring Data Sheet
- Work with Coordinator to pass monitor to next volunteer

AudioMoth Acoustic Recorder

Wildlife Acoustics Bat-Mini Acoustic Recorder

Long-term Permanent Monitors

Placing Detectors on the Landscape

NABat Data Sheet for Each Stationary Point

NABat **North American Bat Monitoring Program**

Stationary Point Acoustic Monitoring Datasheet

Grid Cell ID:		Surveyor(s):		State:	
Land Unit Code:		Map Datum:		County:	

Deployment Data	Detector 1	Detector 2	Detector 3	Detector 4
Location Name:				
Latitude:				
Longitude:				
Survey Start Date:				
Survey Start Time:				
Survey End Date:				
Survey End Time:				
Microphone Orientation:				
Microphone Height:				
Habitat Type:				
Distance to Clutter:				
Type of Clutter:				
Percent Clutter:				
Distance to Water:				
Type of Water:				
Weatherproofing	☐ TRUE ☐ FALSE	☐ TRUE ☐ FALSE	☐ TRUE ☐ FALSE	☐ TRUE ☐ FALSE
Detector Settings				
Detector Model:				
Detector Serial Number:				
Microphone Model:				
Microphone Serial Number:				
Recording Mode:				
Trigger Window Length:				
Maximum File Length:				
Gain:				
Frequency Band Filters:				
Calibration Method:				

*NABat required fields are highlighted in yellow

NABat **North American Bat Monitoring Program**

Stationary Point Acoustic Monitoring Datasheet

Weather Data				
High/Low Nightly Temp (C)	**Detector 1**	**Detector 2**	**Detector 3**	**Detector 4**
Night 1:				
Night 2:				
Night 3:				
Night 4:				
High/Low Nightly Relative Humidity (%)				
Night 1:				
Night 2:				
Night 3:				
Night 4:				
High/Low Nightly Wind Speed (km/h)				
Night 1:				
Night 2:				
Night 3:				
Night 4:				
High/Low Nightly Cloud Cover (%)				
Night 1:				
Night 2:				
Night 3:				
Night 4:				
High/Low Nightly Weather Event				
Night 1:				
Night 2:				
Night 3:				
Night 4:				

Data Review/Analysis Volunteers

- These persons will receive on-line training through Wildlife Acoustics and NABat on how to use Kaleidoscope Pro software for machine analysis of data and possible manual analysis/data review in conjunction with TNT staff
- Responsible for proper labeling and storage of data collected by chapter
- This person or persons should have a head for computer software and a real desire to do this kind of detailed work.

Kaleidoscope Pro

File Help License

Bat Analysis Mode

Use 9/9 compute resources

Batch | Signal Params | Auto ID for Bats | Cluster Analysis | SPL Analysis | Acoustic Indices | Cloud | Db | SMART

INPUTS

Input directory:

F:\Data Browse

Drive label (nickname) for database (optional):

Include subdirectories

WAC files

WAV (and W4V) files

Auto Time expansion factor

ZC files

0.00000 Fuzz GPS to precision

Default Project Form

Default Project Form

This is the Kaleidoscope built-in default project form

Name your batch

You can give this batch job a nickname to make it easier to find again in the database

Batch label (nickname)

Notes

Note

OUTPUTS

Output directory:

Browse

Drive label (nickname) for database (optional):

Process all input channels Channel selection

None Create subdirectories

Split to max duration, seconds

WAV (or W4V) files

Split channels

None Compression

1 Time expansion factor

ZC files

8 Division Ratio

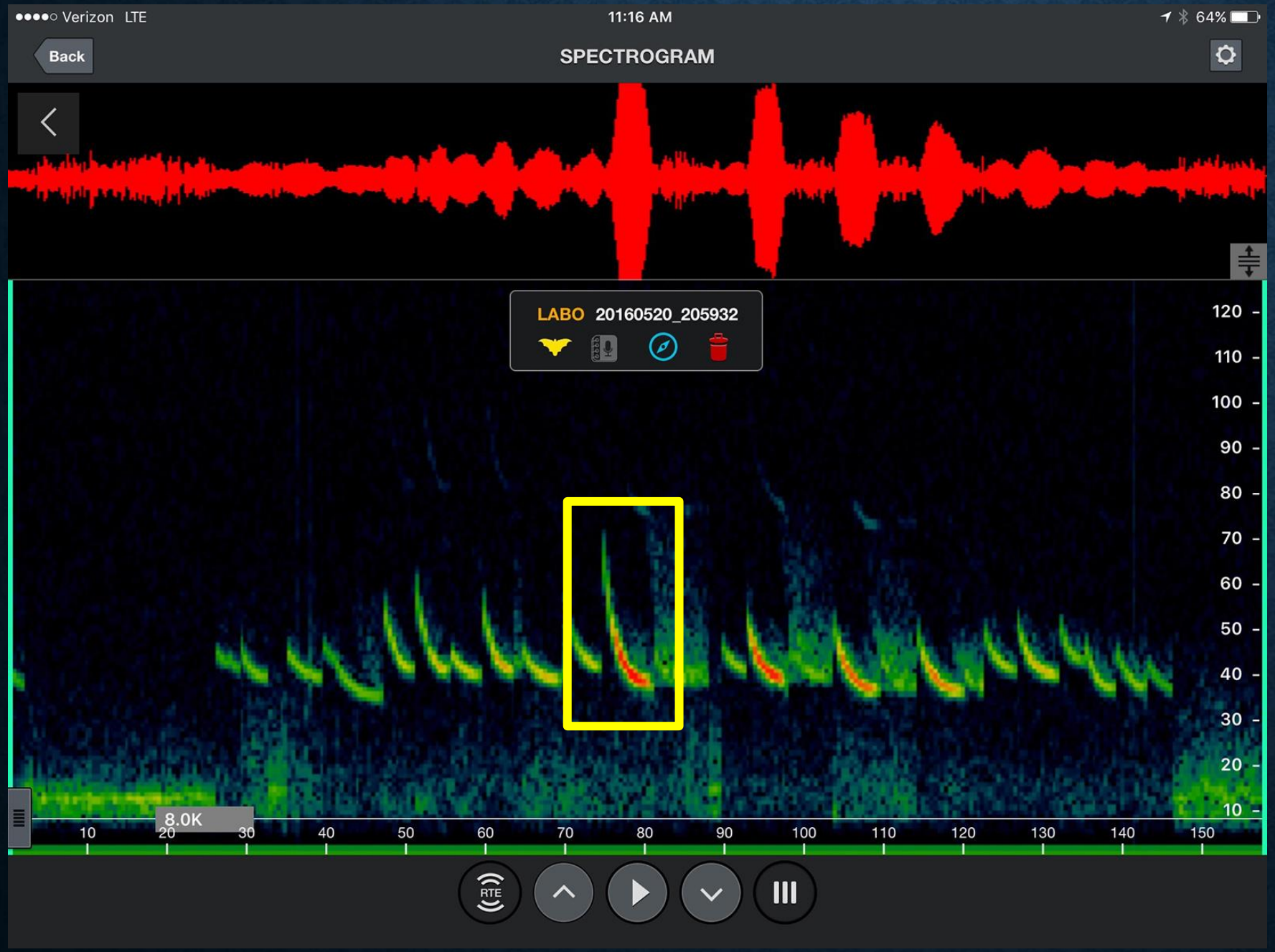
8.3 file names

Use .zc instead of .??#

Move noise files to NOISE subfolder

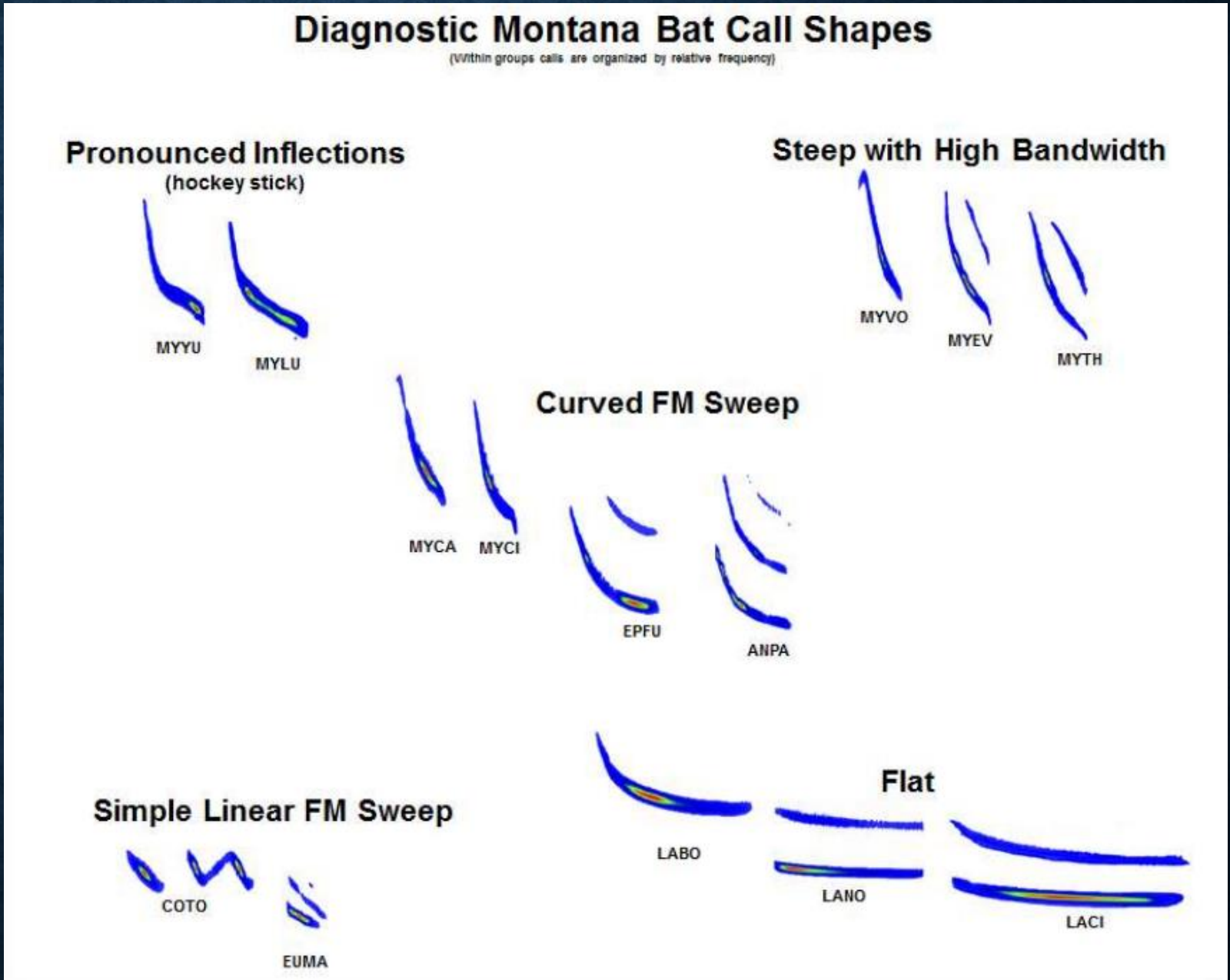
Extract GPS Disabled 60 secs

Please send us feedback! Video Tutorials Help Process Files



Oscillogram

Spectrogram



From: Montana Bat Call Identification Training

Table 6.2—Possible groupings and associated codes for species that are acoustically similar and can occur sympatrically

Common name	Scientific name	Code
Pallid bat Big brown bat	*Antrozous pallidus* *Eptesicus fuscus*	ANPA/EPFU
Big brown bat Silver-haired bat	*Eptesicus fuscus* *Lasionycteris noctivagans*	EPFU/LANO
Western red bat Canyon bat	*Lasiurus blossevillii* *Parastrellus hesperus*	LABL/PAHE
Eastern red bat Tri-colored bat	*Lasiurus borealis* *Perimyotis subflavus*	LABO/PESU
Eastern red bat Little brown myotis	*Lasiurus borealis* *Myotis lucifugus*	LABO/MYLU
Eastern red bat Seminole bat	*Lasiurus borealis* *Lasiurus seminolus*	LABO/LASE
California myotis Yuma myotis	*Myotis californicus* *Myotis yumanensis*	MYCA/MYYU
Long-eared myotis Keen's myotis Northern myotis	*Myotis evotis* *Myotis keenii* *Myotis septentrionalis*	LEMY (long-eared myotis)
User-defined categories		
User-defined	Various species with pulses that have a minimum frequency of approximately 25 kHz.	25kHz
User-defined	Various species with pulses that have a minimum frequency in the range of 35-40 kHz.	40kHz
User-defined	Various species with pulses having a minimum frequency lower than ~30 kHz.	LowF
User-defined	Various species with pulses having a minimum frequency higher than ~30 kHz.	HighF
User-defined	Various myotis species with pulses having a minimum frequency higher than ~30 kHz.	Myotis

Note: For "User-defined" categories, species in these categories will be listed for the recording area upon submission to the Bat Population Database.

Grouping/Couplet codes for species that are acoustically similar and can occur sympatrically.

Mobile Acoustic Monitoring Transects

- Another option being contemplated
- Involves driving routes between 25 and 48 km (15-29.8 miles)
- Initially, need to identify specific routes
- Parameters include type(s) of habitat transected, road speed, safety considerations, accessibility of road, road length
- More limited in data collection but better for population measurements over time

TMN roles would include:

- Identify potential routes
- Driving the route as a check
- Conducting the survey (two people minimum)

Timeline for Bat Monitoring Project

- **January:** Initial Training and sign up of interested chapters and volunteers
- **February:** Identify initial chapters based on SGCN species, level of interest and filling of roles; determine timeline for deployment and monitoring*; meet with chapter coordinators
- **March:** Program monitors; mail to chapter representatives; additional training for deployment volunteers; initial training for data review volunteers
- **April through May/June:** Monitoring of bats with detectors; continuing training of data review volunteers
- **July-August:** Retrieval of SD cards; initial data review with TNT staff
- **October-November:** If possible, submit initial data and write summary report

*this may vary depending on part of state and when species young become volant

Next Steps for you, the TMN Volunteer

1. Complete the Texas Nature Trackers – Bat Acoustic Monitoring Sign Up form on TMN Web Page

2. Review the NABat's "A Plan for the North American Bat Monitoring Program (NABat)" https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs208.pdf, including:

    1. Chapters 1-4 for background, sampling design and stationary point acoustic survey protocols
    2. Chapters 6 and 8-9 for those interesting in the data processing aspects

3. Begin determining where you might place acoustic monitors on the landscape

4. Check emails to stay in touch with TNT staff

Texas Nature Trackers – Bat Acoustic Monitoring Sign Up

Texas Master Naturalist Chapter

Texas Master Naturalist Chapter *(Required)*

Alamo Area Chapter

Chapter Shipping Address *(Required)*

Street Address

City

State

Texas

ZIP Code

Bat Acoutsic Monitoring Project Contact Persons

Chapter Coordinator(s)/Leader(s) *(Required)*

First

Last

Phone *(Required)*

Email *(Required)*

Acoustic Monitor Field Deployment Volunteers

First

Last

Phone

Email

Data Review/Analysis Volunteers

First

Last

Phone

Email

Project Survey

Why do you want to bring this project to your chapter?

What local state public properties do you have within your chapter's boundaries?

Did you view the BAM Project TNT Mini Series live or recorded?

Live

Recorded

Combination

Closing Thoughts:

1. This project has the potential to provide a great deal of insight into the distribution of bats across the Texas landscape

2. Texas Master Naturalists have an opportunity to make a major positive impact on filling data gaps which will lead to better conservation outcomes

3. Because this is being viewed as a long-term project, TMN Chapters will have the opportunity to participate for years to come

4. Year one will serve as a test to work out details, overcome challenges and help create a sustainable and successful effort, thanks in large part to your involvement

Thank you to Bat Conservation International for use photos.

Thanks also to TPWD's Nyta Brown of
Old Tunnel State Park for contributions to this presentation.

Thanks to former TPWD Bat Biologist Nathan Fuller for guidance and expertise

Lee Smith, Information Specialist for use of MFT video

TNT Biologist Wendy Anderson for advice and TNT/Bat Range maps

Much of the information for this presentation was gleaned from "Bats of Texas" by
L. Ammerman, C. Hice and D. Schmidly

Thanks to Brock Fenton, Tigga Kingston, George Smiley, and Mallori Hughes for
use of photographs, courtesy of Dr. Loren Ammerman

Thanks to the staff of North American Bat Conservation Program for their
resources and guidance

Thanks to Michelle Haggerty for her guidance, advice and support

Help Support Future Events Like This!

Scan this code to complete a short, **voluntary** survey so that we can continue to remain eligible for funding that helps pay for events like this.

Thank you for your participation!

TEXAS
PARKS &
WILDLIFE

THANK YOU! AND SEE YOU NEXT MONTH!

#TMNTuesday

The End