Targeted Acoustic and Roost Surveys for Spotted and Townsend's Big-Eared Bats in Clark County, Nevada

PRESENTED TO:

MOJAVEMAX.COM

desert conservation PROGRAM

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BACKGROUND - BAT SURVEYS FOR MODEL REFINEMENT

Spotted Bat

- The Clark County Desert Conservation Program is currently developing a proposed amendment to the MSHCP
- To aid in this effort, habitat suitability models were developed for species included in the amendment (Nussear and Simandle 2020; Nussear 2019)
- These models will be used to identify potential areas for conservation

BACKGROUND - BAT SURVEYS FOR MODEL REFINEMENT

Spotted Bat

- Two bat species proposed under MSHCP amendment: Spotted Bat (*Euderma maculatum*, or EUDMAC) and Townsend's Big-eared Bat (*Corynorhinus townsendii*, or CORTOW)
- Initial habitat modeling for both species indicated need for additional occurrence records to increase accuracy

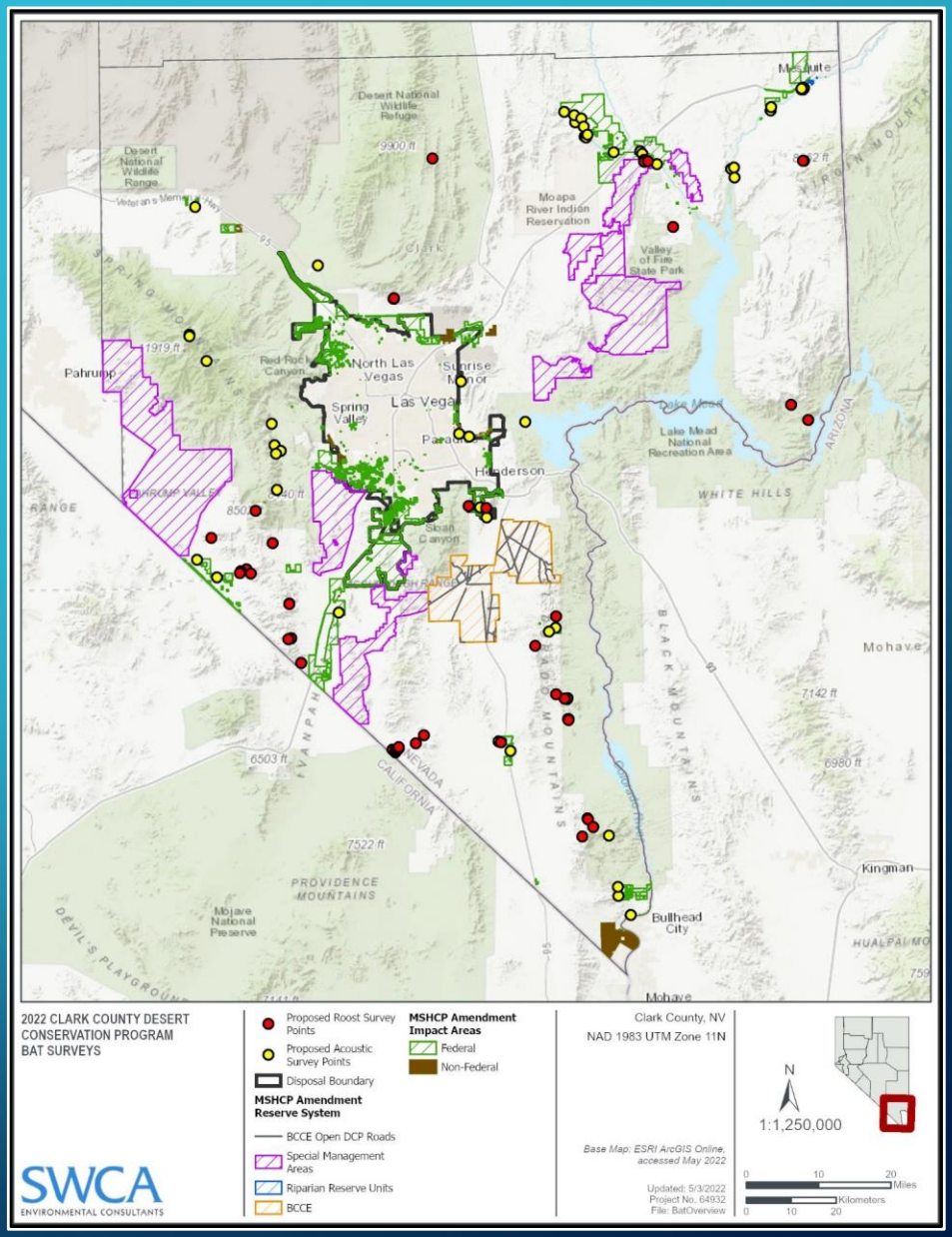
PROJECT OBJECTIVE

Townsend's Big-eared Bat

Increase detections for two target bat species across Clark County to update and refine habitat suitability models

METHODS – PASSIVE ACOUSTIC SURVEYS

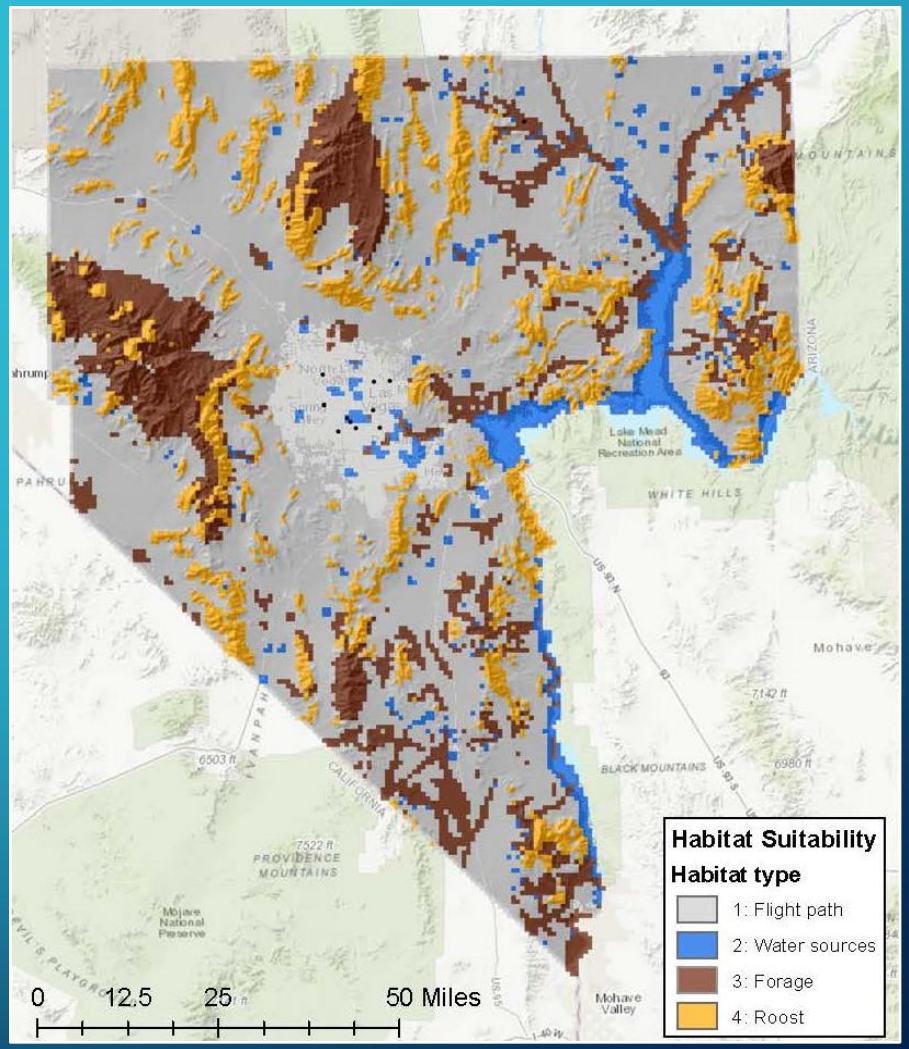
- Habitat suitability models used to select sites – preference for predicted habitat lacking detections
- 50 potential survey sites developed through desktop analysis
- Acoustic survey approach prioritized for EUDMAC detections
- Roost surveys targeted CORTOW



METHODS – PASSIVE ACOUSTIC SURVEYS

Selection of acoustic survey site locations based on several preferred criteria:

- Within "foraging" habitat class for EUDMAC
- Within a proposed MSHCP Amendment Impact Area or Reserve Area

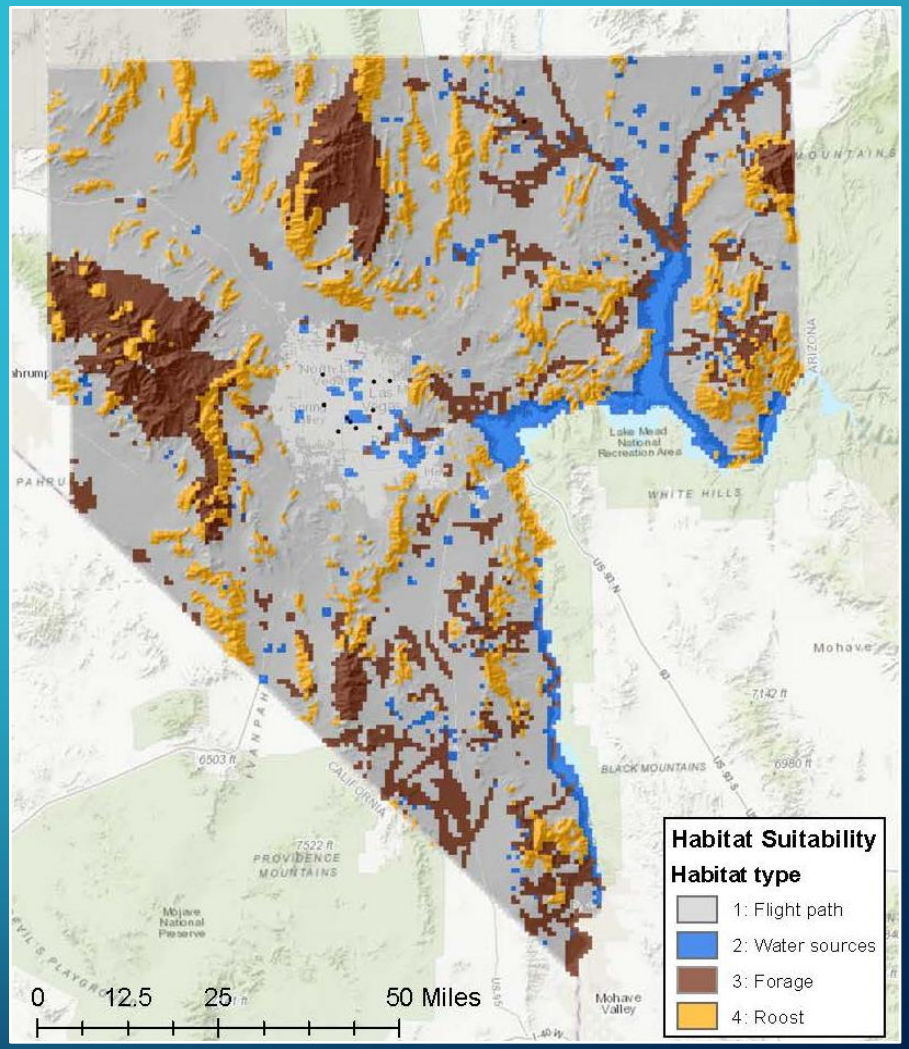


EUDMAC Habitat Suitability Model

METHODS – PASSIVE ACOUSTIC SURVEYS

Selection of acoustic survey site locations based on several preferred criteria:

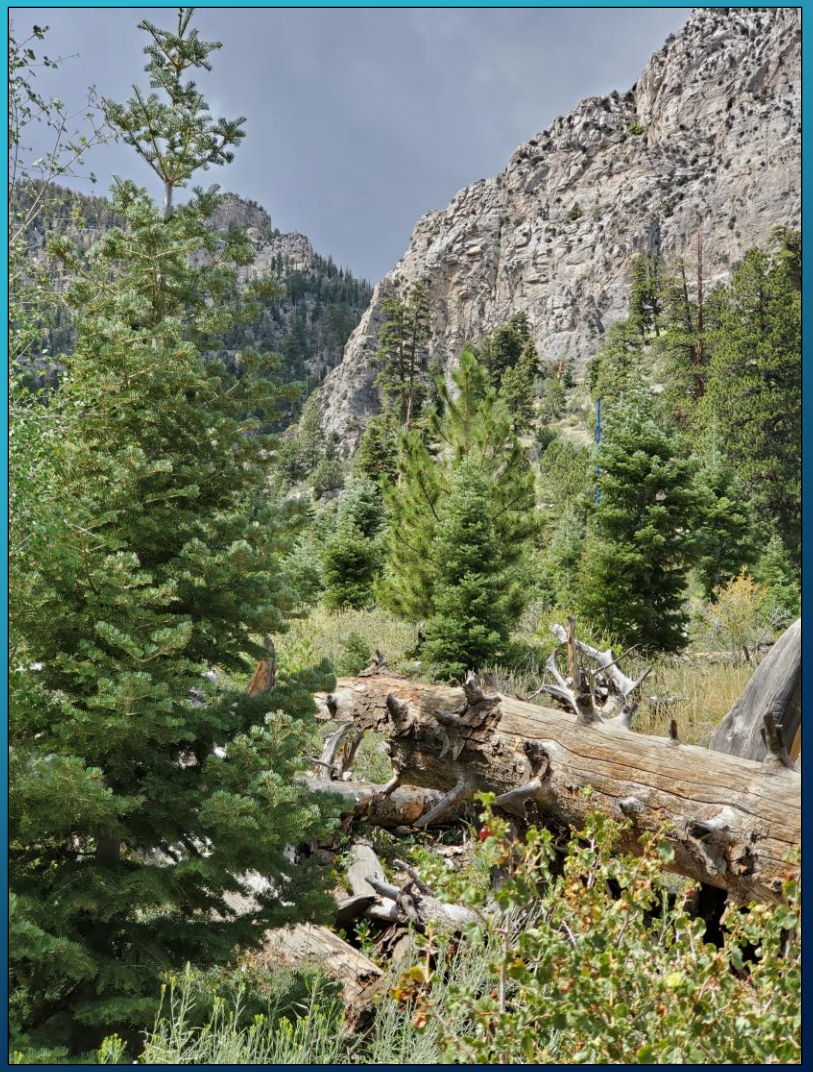
- Proximity to a road navigable with a truck (≤1 mile preferred)
- On public land



EUDMAC Habitat Suitability Model

METHODS – PASSIVE ACOUSTIC SURVEYS

- 30 acoustic survey locations visited in 2022
- Between June 3 and Sept 29, a detector was deployed once at each of 30 sites for 5-7 consecutive detector-nights



METHODS – PASSIVE ACOUSTIC SURVEYS

Equipment:

- Wildlife Acoustics SM4BAT-FS Full Spectrum Detector with an omnidirectional SMM-U1 microphone attached to an aluminum pole (3-7.5 meters above ground surface)

METHODS – PASSIVE ACOUSTIC SURVEYS

Equipment:

- Detector stored in plastic dry-storage ammo box and covered with plywood to reduce internal temperatures
- Microphone cable wrapped in split wire loom to reduce damage from rodents/UV

METHODS – PASSIVE ACOUSTIC SURVEYS

Detector Audio Settings:

Parameter	Setting
Gain	12 dB
16k high filter	Off
Sample rate	256khz
Min duration	1.5 ms
Max duration	50 ms
Minimum Trigger Frequency	8 khz
Trigger Level	12 db
Trigger Window	2 s
Maximum Length	15 s
Compression	none
Schedule	-30 sunset, +30 sunrise

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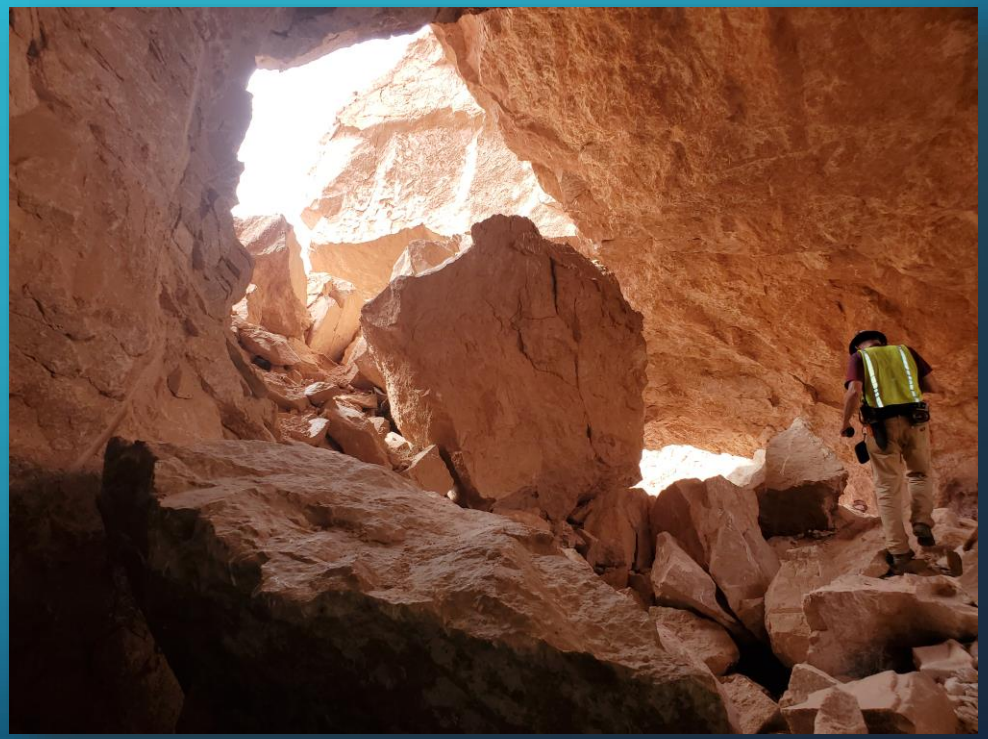
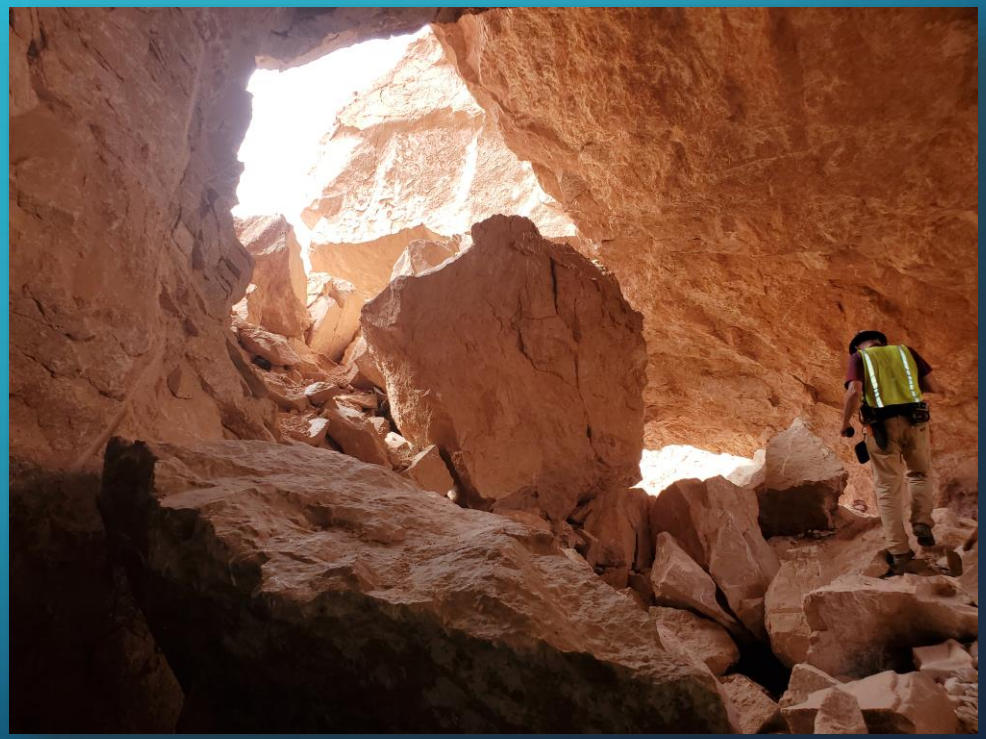
METHODS – ROOST SURVEYS

- Two roost survey periods (summer, winter) to document maternity, day and night roosting, and hibernaculum use
- 62 roost surveys: 32 AML sites in summer, 30 in winter
- Selected adits with extensive internal workings and no documented CORTOW presence < 1 mile from road



METHODS – ROOST SURVEYS

- Targeted known historical bat roosts and hibernacula
- Targeted areas within the proposed MSHCP Amendment Reserve System and Impact Area with a higher likelihood of containing undocumented roosts

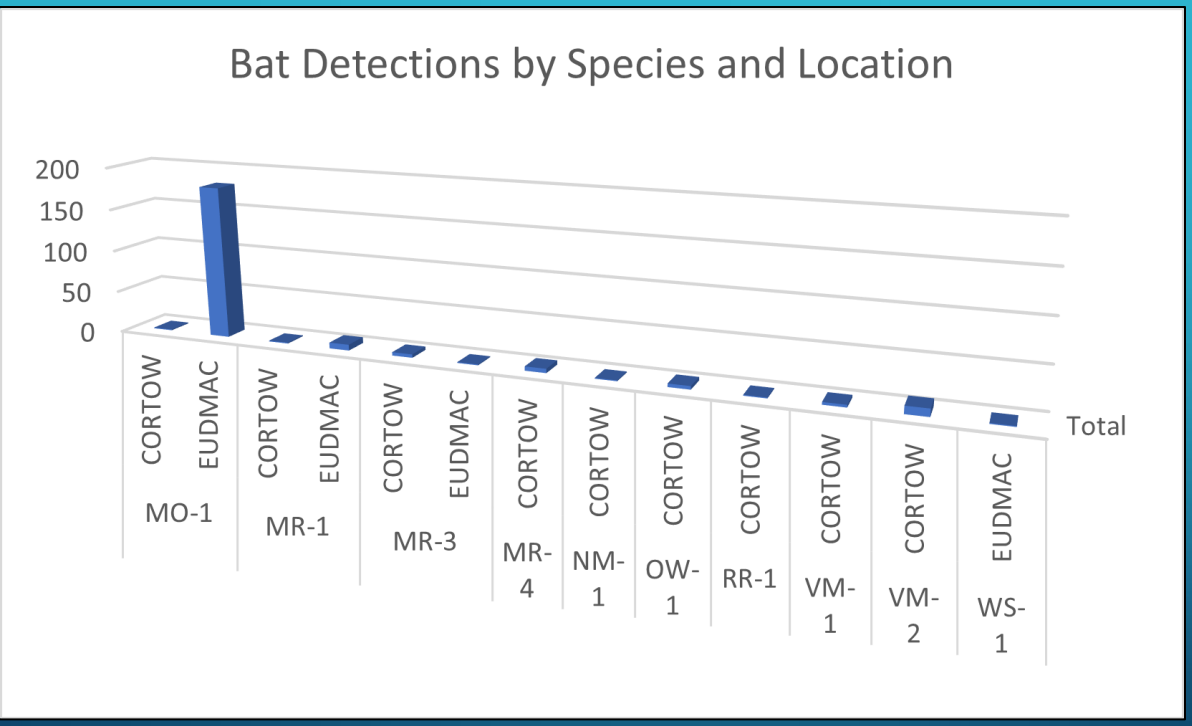


RESULTS – ACOUSTIC SURVEYS

Site_ID	Location	Species Code	No of Files
MO-1	Moapa	CORTOW	1
MR-1	Muddy River	CORTOW	1
MR-3	Muddy River	CORTOW	4
MR-4	Muddy River	CORTOW	5
NM-1	Newberry Mountains	CORTOW	1
OW-1	Overton WMA	CORTOW	4
RR-1	Red Rock NCA	CORTOW	1
VM-1	Virgin Mtns.	CORTOW	3
VM-2	Virgin Mtns.	CORTOW	9
MO-1	Moapa	EUDMAC	180
MR-1	Muddy River	EUDMAC	7
MR-3	Muddy River	EUDMAC	1
WS-1	Warm Springs Natural Area	EUDMAC	1
Total			**218**

- 218 acoustic files classified and vetted to target bat species
- 189 EUDMAC detections from 4 locations
- 29 CORTOW detections from 9 locations

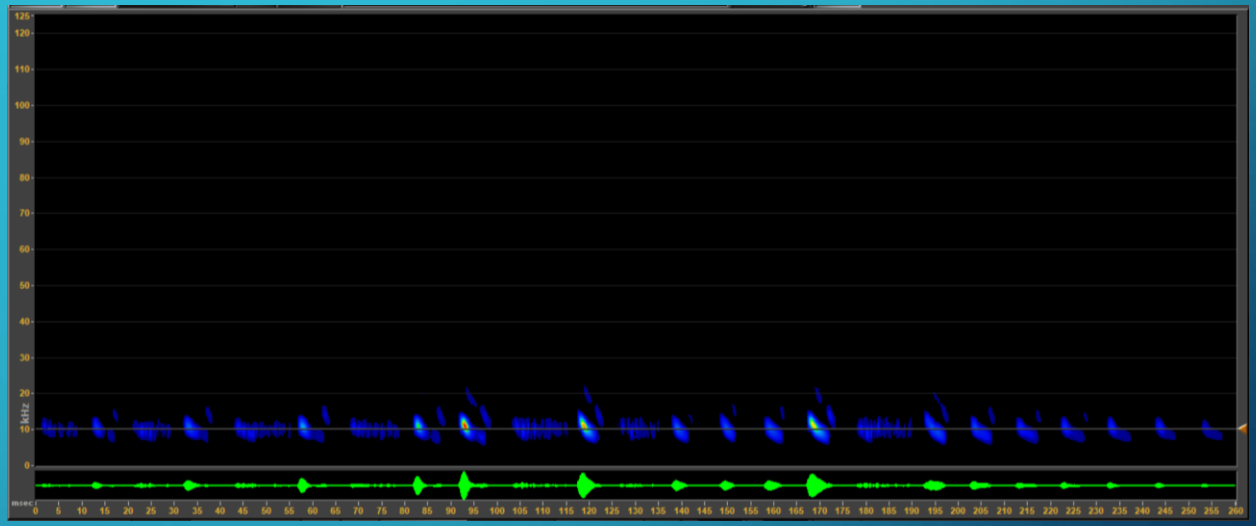
RESULTS – ACOUSTIC SURVEYS

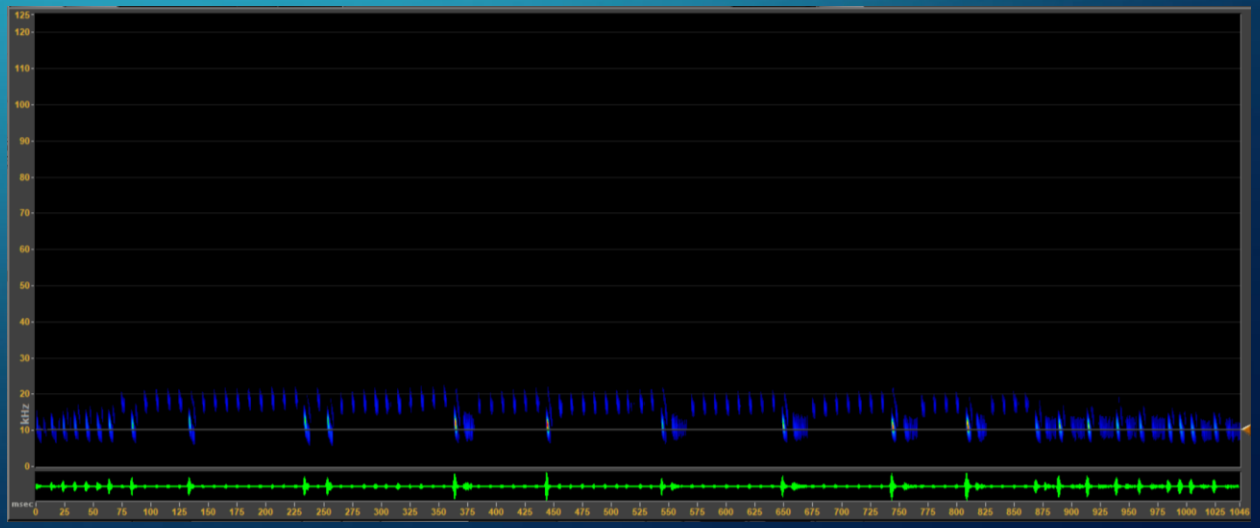


- 218 acoustic files classified and vetted to target bat species
- 189 EUDMAC detections from 4 locations
- 29 CORTOW detections from 9 locations
- High EUDMAC activity at MO-1, relatively low activity elsewhere

EUDMAC – ACOUSTIC DETECTIONS

- 189 acoustic files
- High- and fast-flying, also generally difficult to record acoustically, produces relatively lower magnitude calls
- Recorded at four locations within warm desert riparian habitat



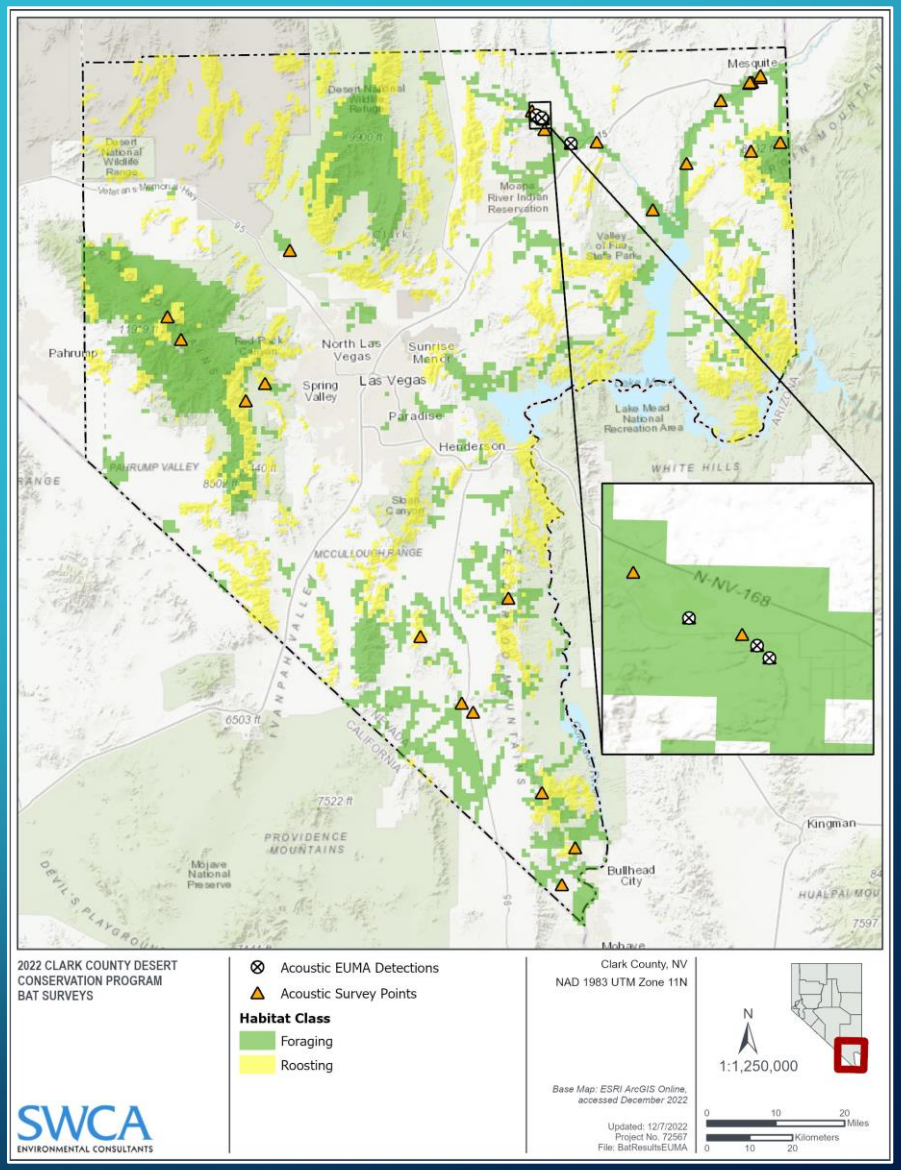


EUDMAC – ACOUSTIC DETECTIONS

- Acoustic Survey Site MO-01 located along Muddy River near the Town of Moapa, Nevada
- Site located on interface of agriculture, desert riparian, and desert scrub, and adjacent to suitable roosting habitat

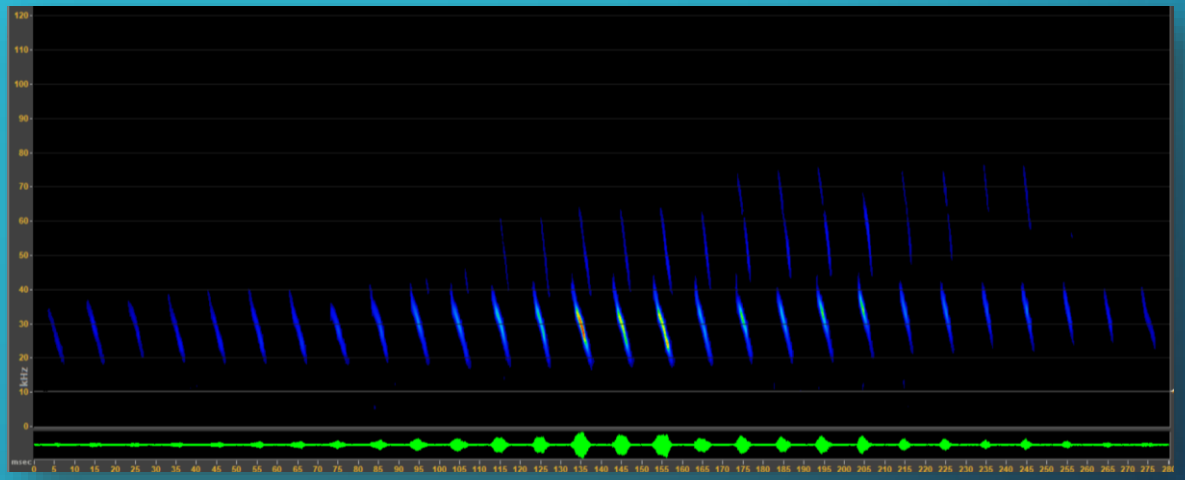
EUDMAC – ACOUSTIC DETECTIONS

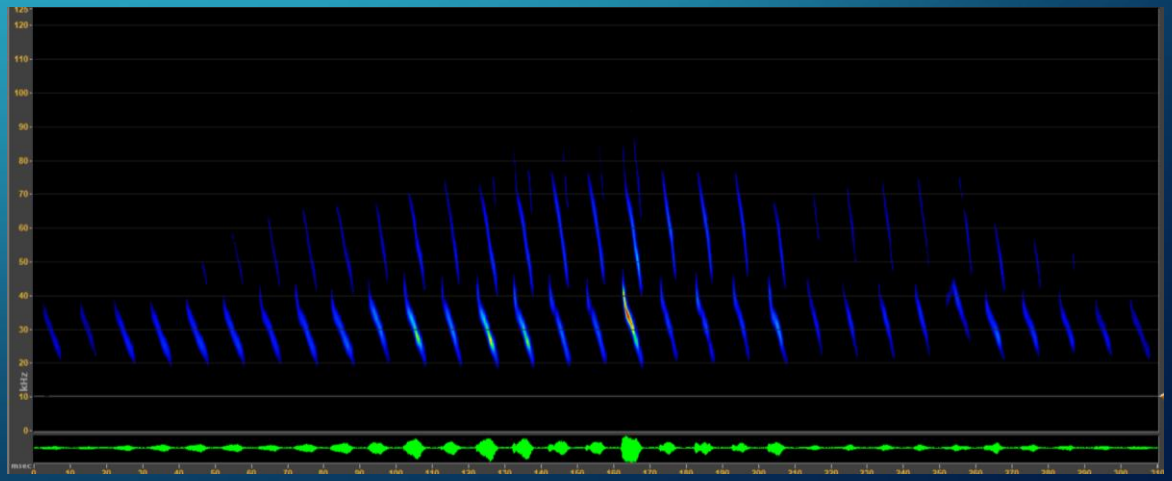
- Appears to be a good model fit for EUDMAC
- All detection locations within predicted foraging habitat



CORTOW – ACOUSTIC DETECTIONS

- 29 acoustic files
- “Whispering Bat”
- Generally difficult to record acoustically, produces relatively lower magnitude calls
- Recorded at a variety of warm desert riparian, mixed woodland and montane forest habitat features





RESULTS – ROOST SURVEYS

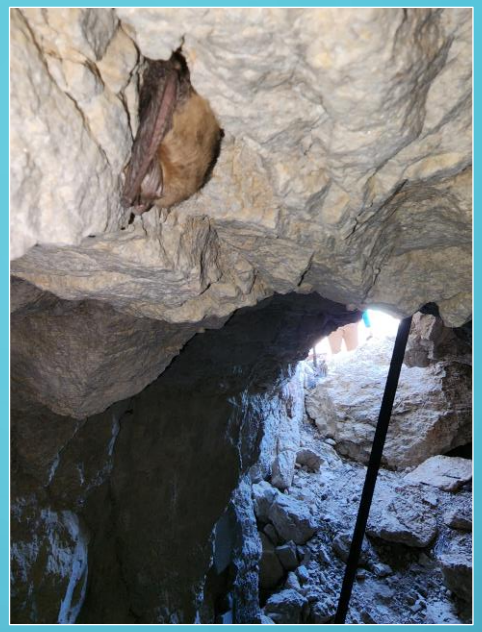
- 32 Summer roost surveys completed in August/Sept 2022
- CORTOW and/or their sign (guano) detected within 19 AMLs
- 1 CORTOW maternity colony observed
- Multiple AMLs exhibited CORTOW maternity use

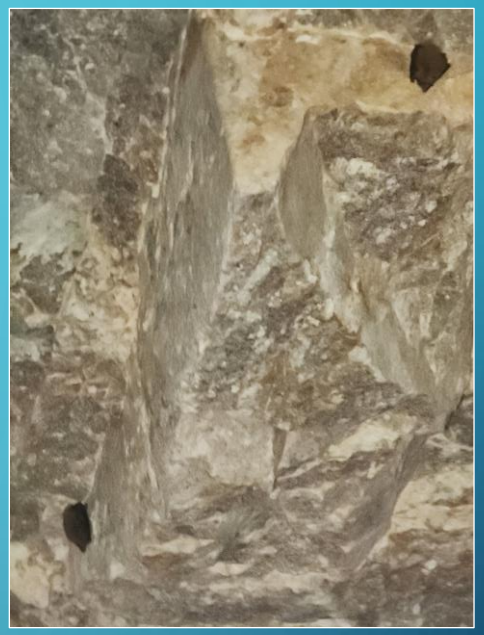
RESULTS – ROOST SURVEYS

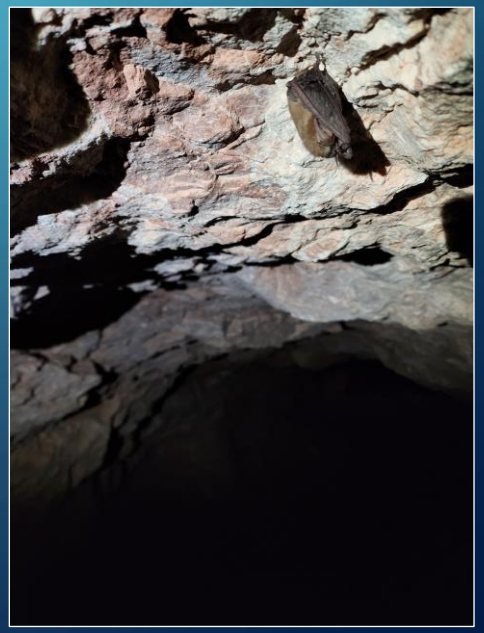
- 32 Winter roost surveys completed in February 2023
- CORTOW and/or their sign detected within 18 AMLs
- Late-fall and winter CORTOW activity included late-season, torpor, and hibernation use
- 12 AMLs exhibited both summer and winter CORTOW use

RESULTS – ROOST SURVEYS

- 32 Winter roost surveys completed in February 2023
- CORTOW and/or their sign detected within 18 AMLs
- Late-fall and winter CORTOW activity included late-season, torpor, and hibernation use
- 12 AMLs exhibited both summer and winter CORTOW use

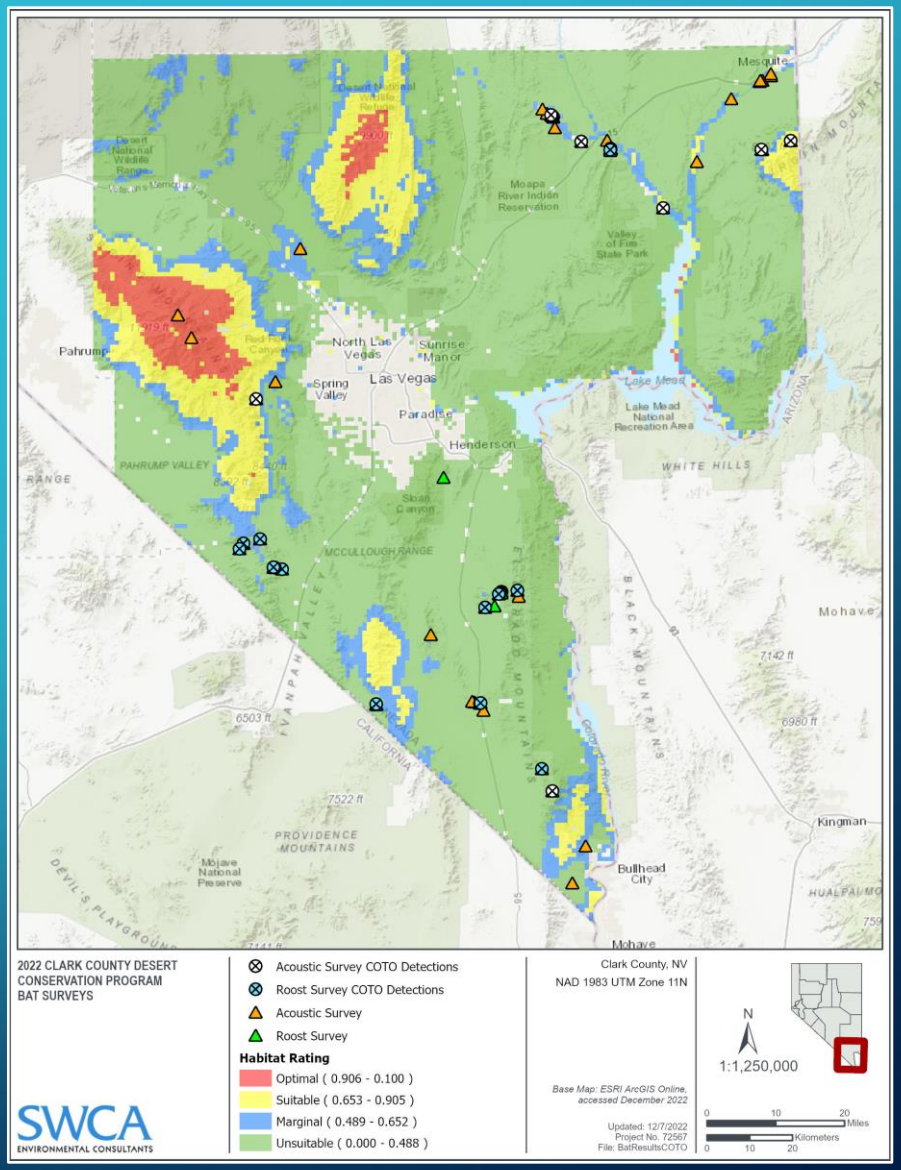






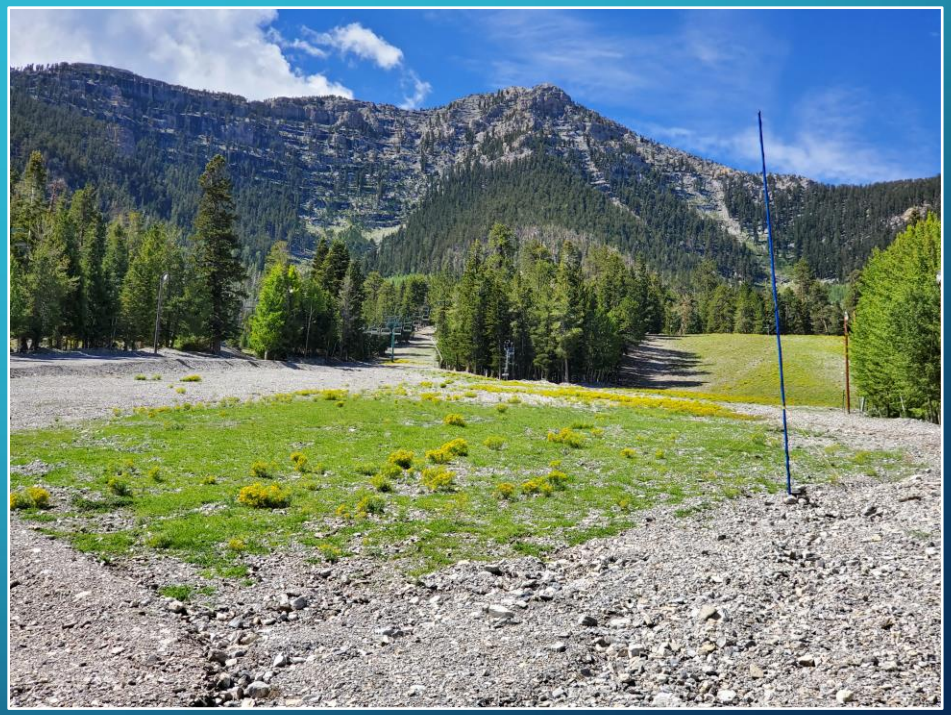
CORTOW – ROOST AND ACOUSTIC DETECTIONS

- Model appears to underestimate habitat within Clark County
- Most of the CORTOW detections were within areas modeled as unsuitable or marginal



CONCLUSIONS – MODEL REFINEMENT SURVEYS

- Both target species were recorded acoustically in 2022
- CORTOW sign detected within 26 AMLs
- Some models appear to be a better fit than others
- Additional detections will be input into the models to help refine predicted habitat



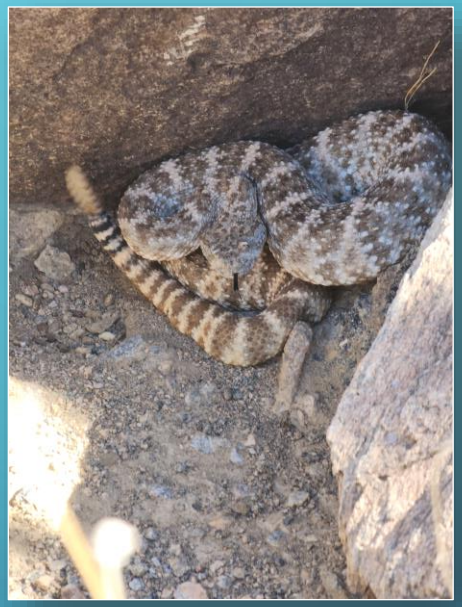
Acoustic Survey Site at the Lee Canyon Ski and Snowboard Resort, Spring Mountains (8731 meters amsl)

YEAR 2 – ROOST AND ACOUSTIC SURVEYS

- 33 potential bat roost sites surveyed in early August 2023
- CORTOW and/or their sign (guano) detected within 17 AMLs
- Winter roost surveys to be completed in February 2023
- Year 2 acoustic surveys May-September 2024

YEAR 2 – ROOST AND ACOUSTIC SURVEYS

- Incidental wildlife observed within mines included desert tortoise, various bat species, barn owl, and say's phoebe



Speckled Rattlesnake

Pallid bats roosting in drill hole

Mojave desert tortoise in mine

ACKNOWLEDGMENTS:

- Clark County Desert Conservation Program
- Bureau of Land Management-Southern Nevada District Office
- USDA Forest Service – Las Vegas
- Nevada Department of Wildlife
- Nevada Division of Minerals
- US Fish and Wildlife Service
- National Park Service
- Dr. Rick Sherwin – Holistic Wildlife Services, LLC
- Janet Tyburec – Bat Survey Solutions, LLC
- Jason Williams – Western EcoSystems Technology, Inc.

Room-and-Pillar mine complex with multi-species bat roost use