National Park Service
U.S. Department of the Interior
Mojave Desert Inventory & Monitoring Network

Bat Monitoring in National Parks of the Mojave Desert Network

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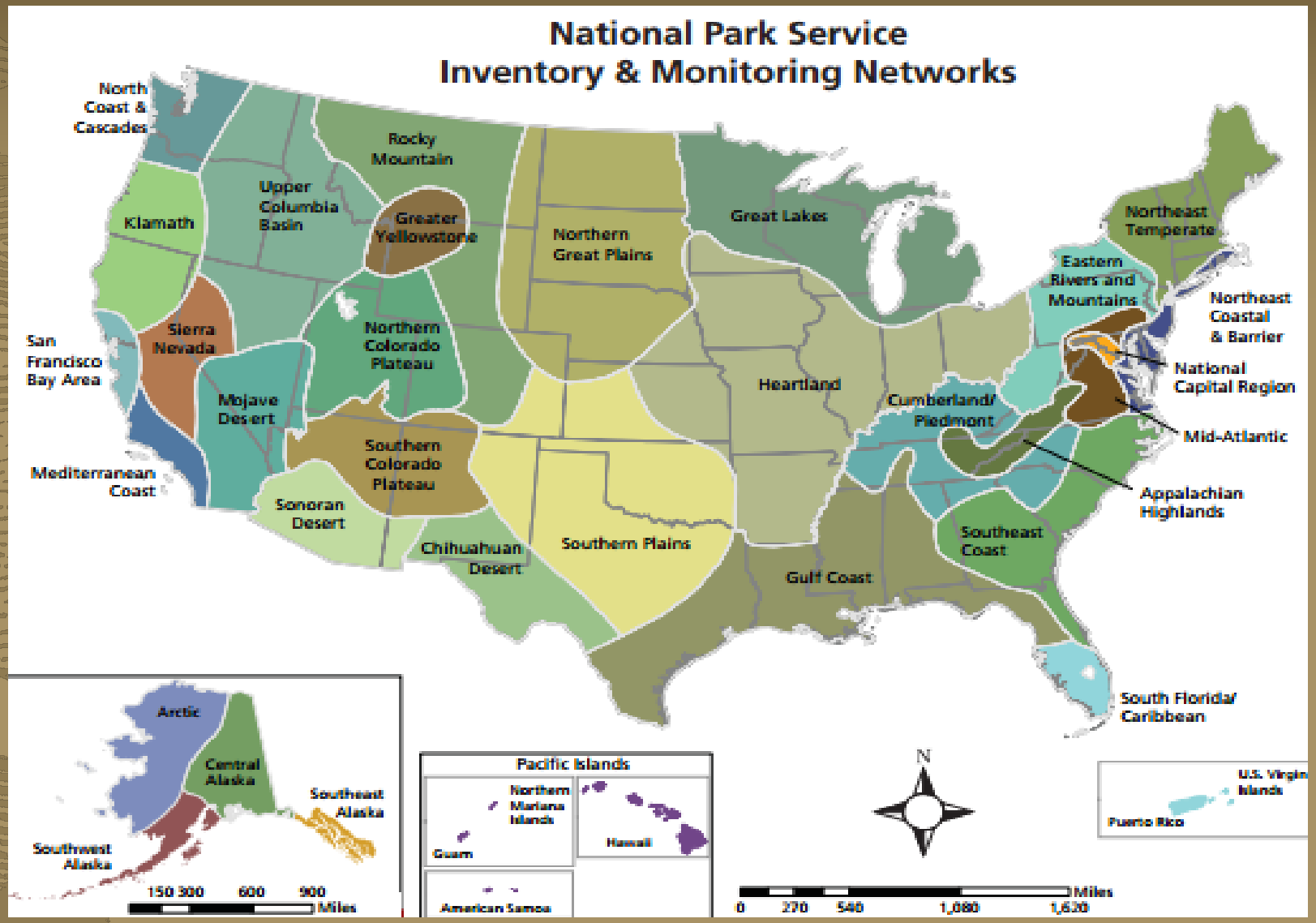
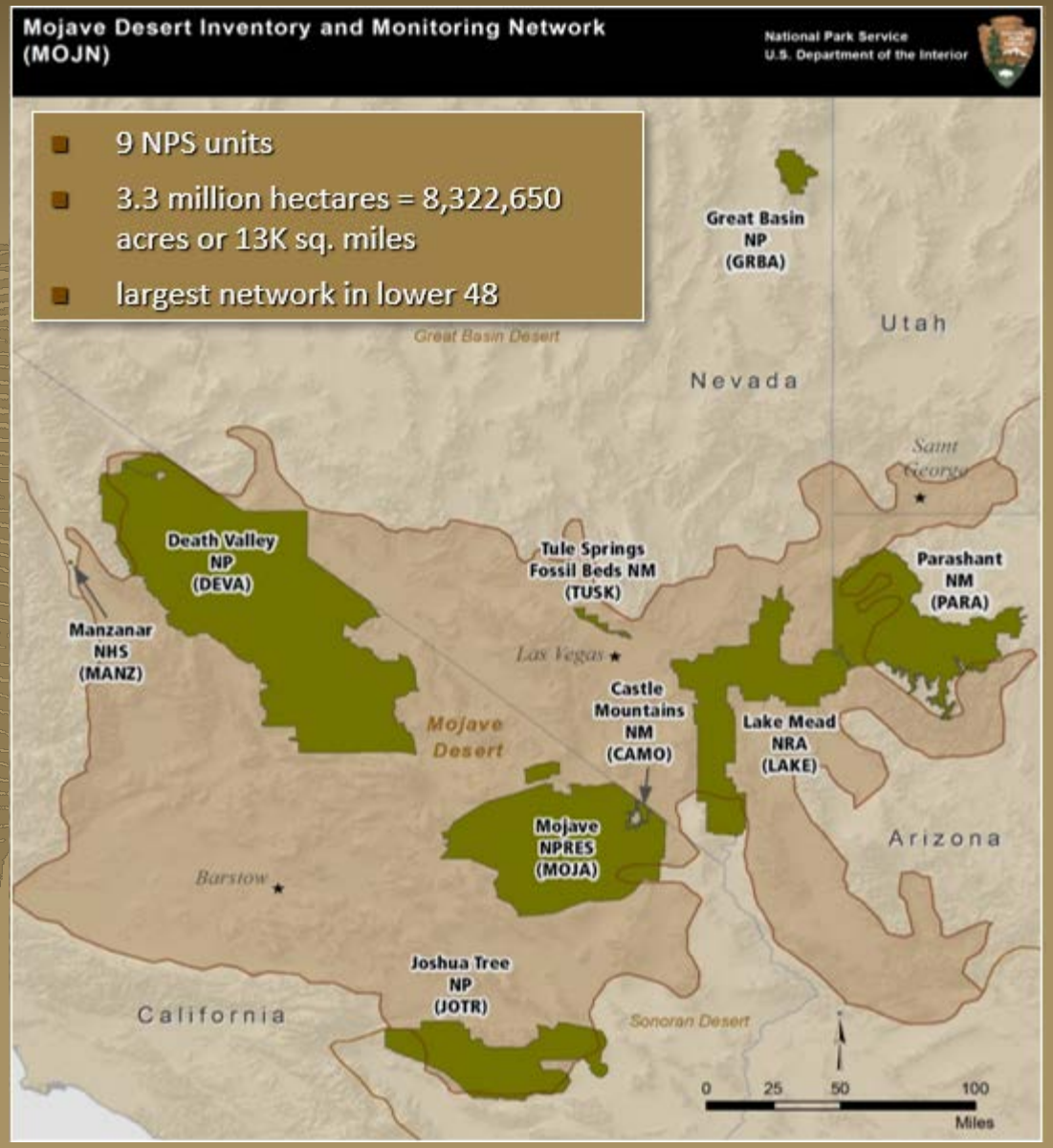
Background about the I&M Division

- Goal: To understand, measure, and improve our knowledge about park ecosystems & the health of the parks
- Designated separate funding, independent of parks, to help parks achieve this goal without additional costs



Mojave Desert I&M Network (MOJN)

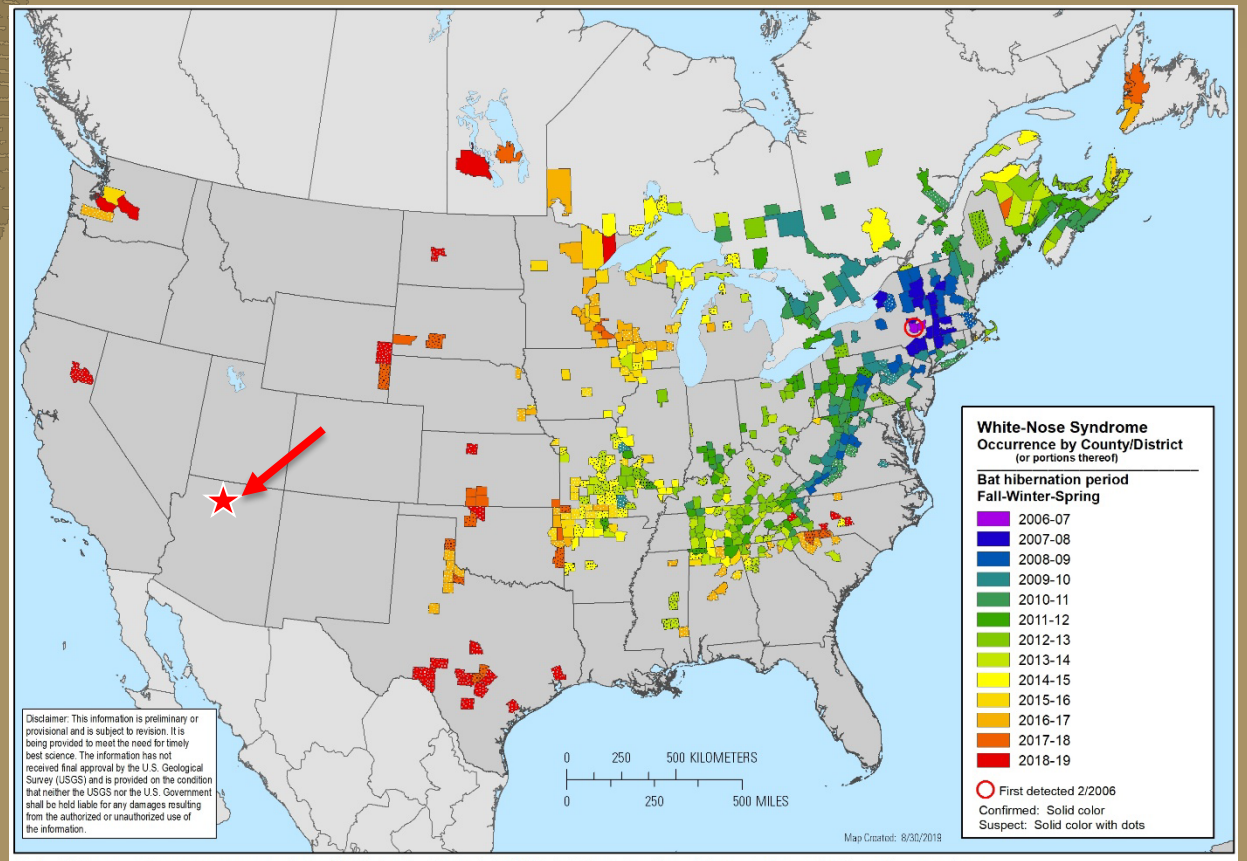
- We monitor specific "Vital Signs" that give park management clues to the health of the parks & their surrounding ecosystem
  - Think of vital signs like blood pressure, body temp, and white blood cell count that give doctors clues to your health



Background

Declining populations in some bat species due to disease and habitat degradation

- White-Nose Syndrome (WNS) continues to spread across North America

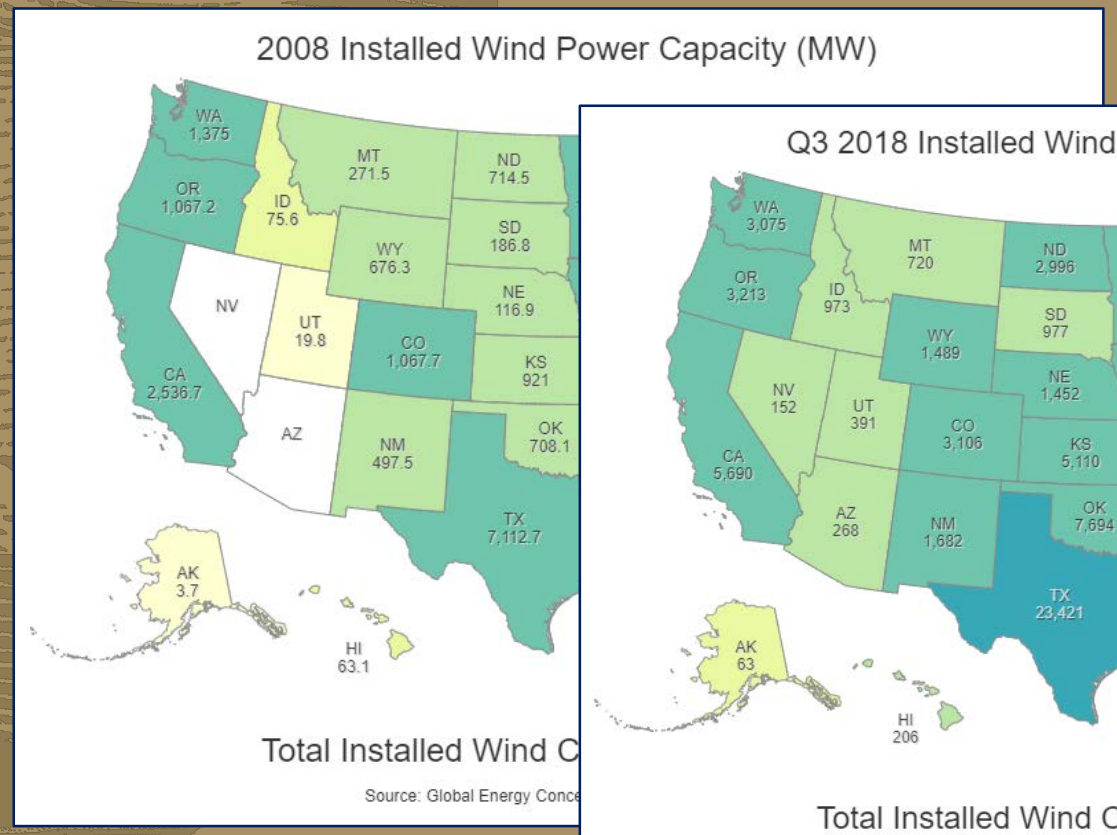


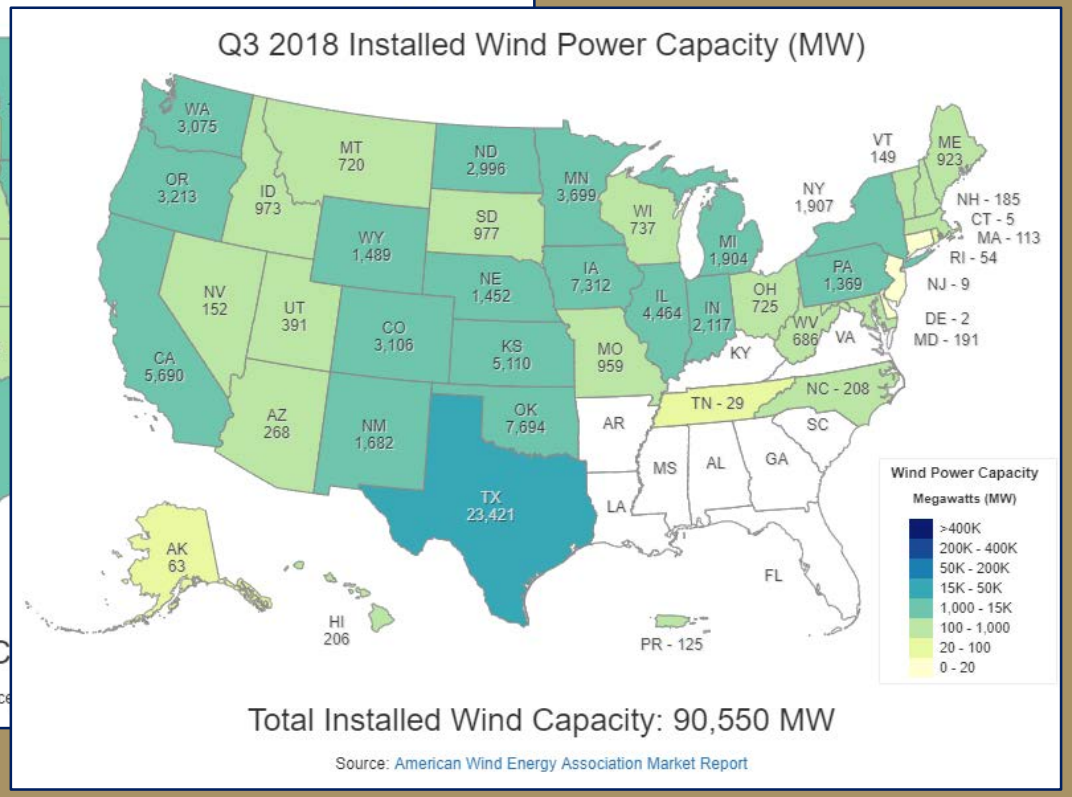
Citation: White-nose syndrome occurrence map - by year (2019). Data Last Updated: 8/30/2019. Available at: https://www.whitenosesyndrome.org/static-page/wns-spread-maps.

Background

Declining populations in some bat species due to disease and habitat degradation

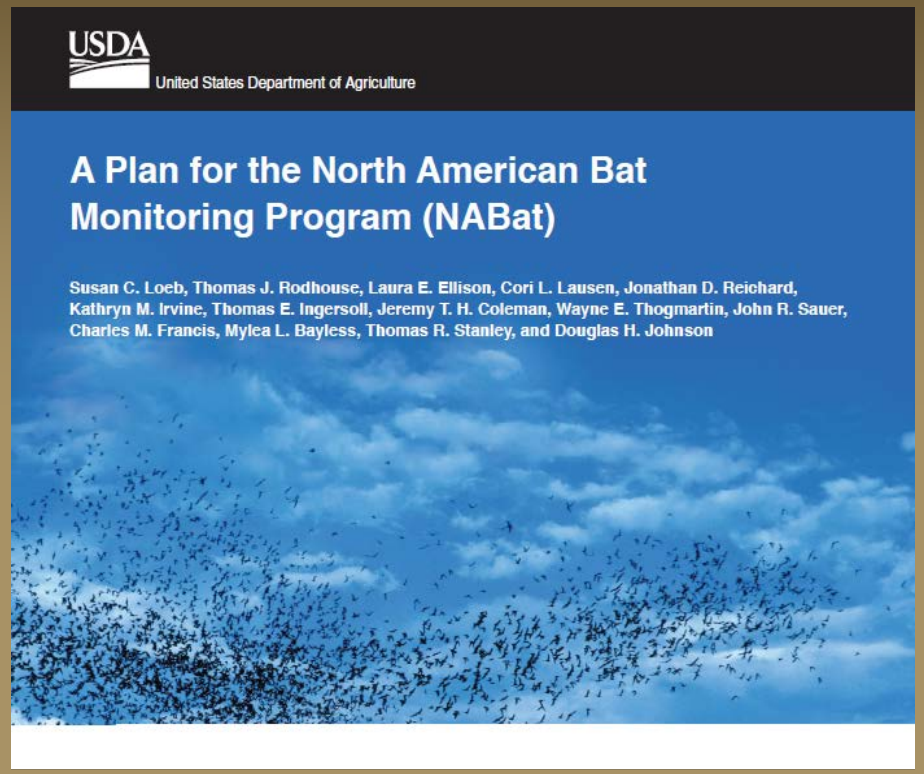
- Large scale wind energy development has continued to expand





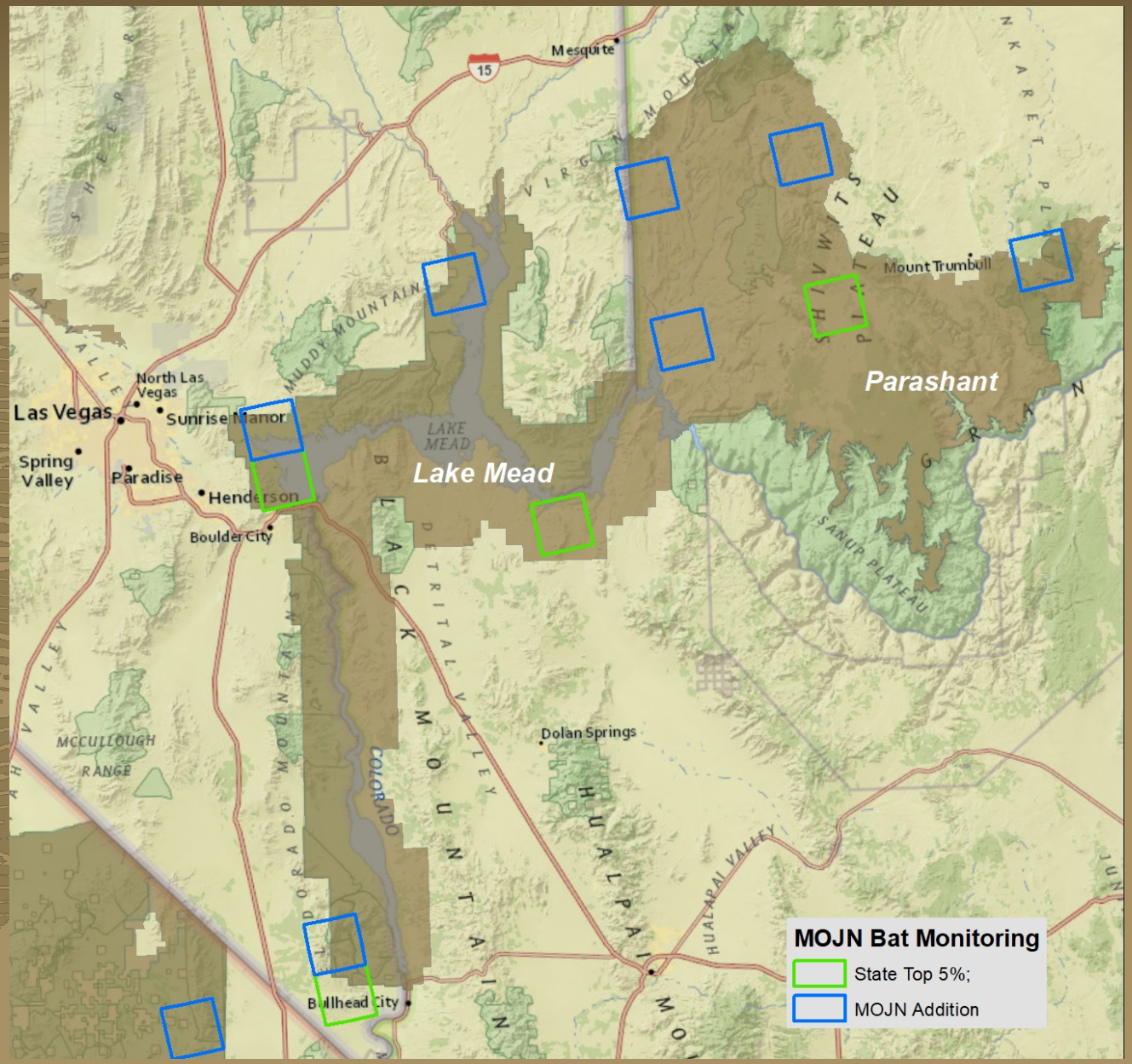
Background

- Due to the threats to bats, the North American Bat Monitoring Program (NABat) was established in 2015
- NABat focuses on acoustic surveys of bats at a continental scale
- A statistical sample of 10 km x 10 km cells across North America are used to track occupancy of bat species



From NABat to MOJN - Scaling Down

- High priority cells from the NABat sampling framework were first selected
- Then we selected additional cells in each park to provide greater coverage and where we suspected good bat activity



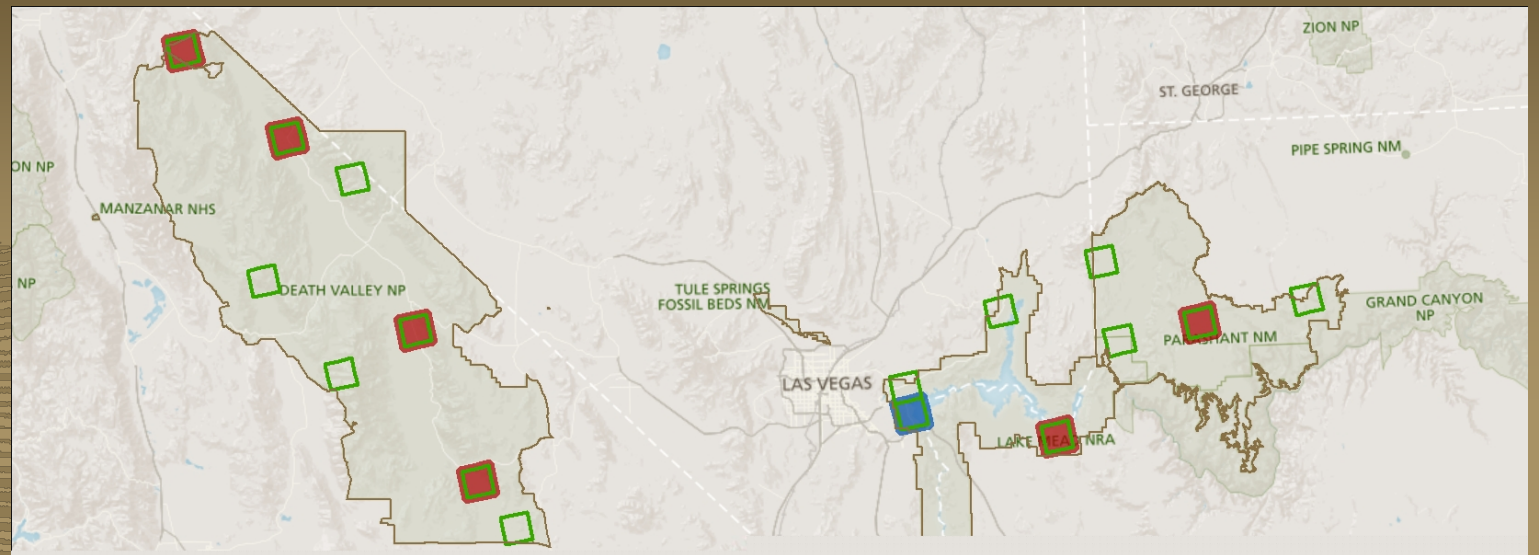
MOJN Site Selection

- We deploy 2 detectors (4 at GRBA) within each cell for a minimum of 4 nights focusing on areas that may attract bats such as water sources, areas of diverse vegetation, or potential travel corridors (canyons, washes etc.)

2018 Sampling

A total of 26 cells were sampled with 232 detector nights of data collected

Winter sampling will also be conducted when possible



Analysis

- Data is sent to the OSU Bat Hub species ID analysis

- All data will be sent to NABat for large scale analysis being done by USGS and also uploaded to the NPS Acoustic Bat database

- Bat presence and activity levels will be compared per cell as well as per park over time

- Due to the inclusion of non-random cells, no larger scale analysis across a network or region is planned (NABat will eventually be able to do this)

2018 Preliminary Results – 19 Species!

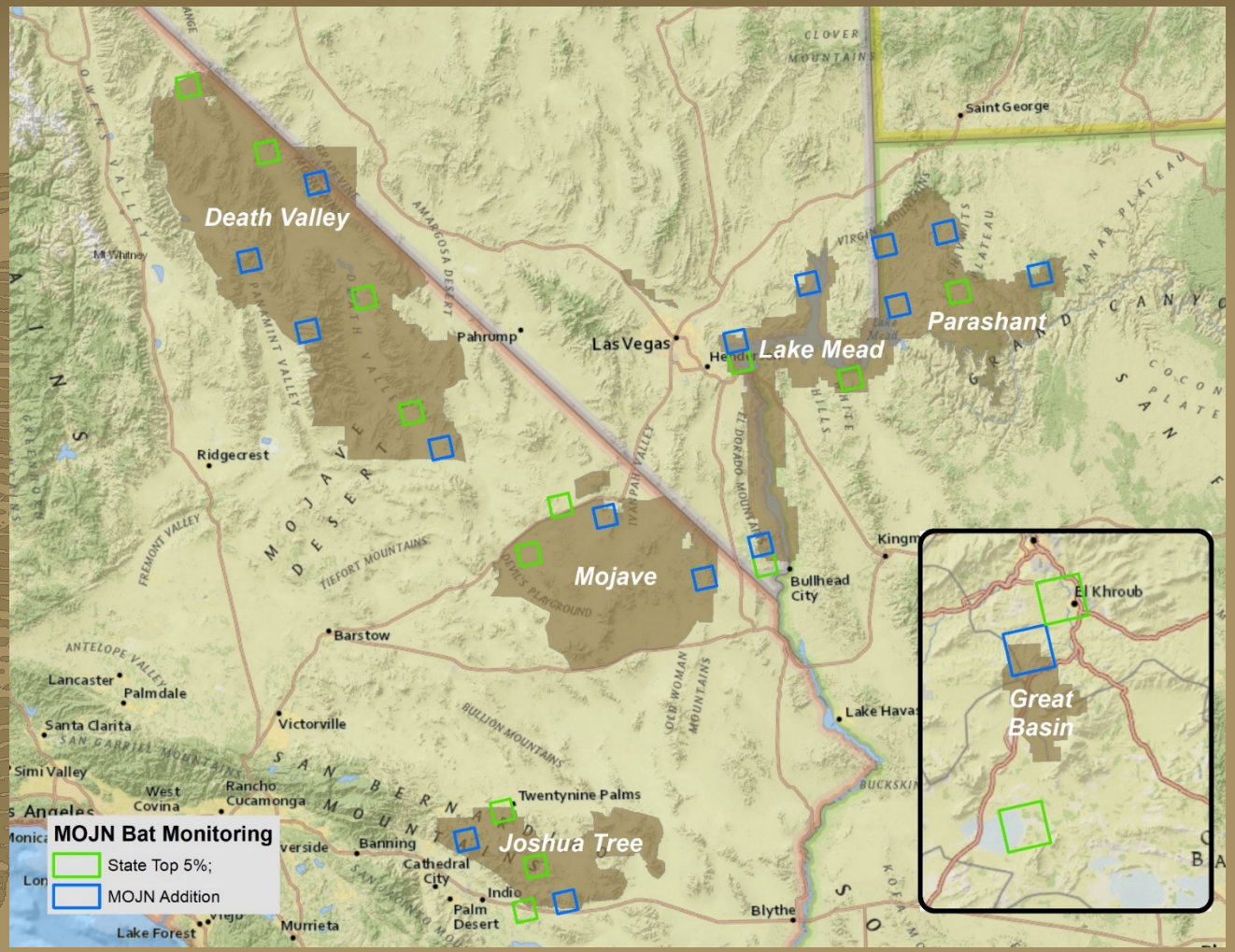
SPECIES	PARA *N=4	DEVA N=8	LAKE N=6	GRBA N=3	JOTR N=3	MOJA N=2
Pallid bat	X	X	X	X	X	X
Townsend's big-eared bat	X	X	X	X		
Big brown bat	X	X	X	X	X	
Spotted bat	X	X	X			
Western mastiff bat	X		X		X	
Allen's lappet-browed bat	X					
Hoary bat	X	X		X	X	
Western yellow bat					X	
Silver-haired bat	X		X	X		
California Myotis	X	X	X		X	X
Western small-footed Myotis	X	X		X		
Long-eared Myotis	X			X		
Little brown bat	X			X		
Fringed Myotis	X	X				
Long-legged Myotis	X	X		X		
Yuma Myotis	X	X	X			
Pocketed or big free-tailed bat	X				X	
Canyon bat	X	X	X		X	X
Mexican free-tailed bat	X	X	X	X	X	X

*N= Number of cells sampled per park

2019 Sampling

31 cells were sampled in the summer season, only 10 were sampled in the winter.

In 2020 we plan to add one more cell at MOJA which should then be full implementation



Winter 2019 Preliminary Results – 7 Species

- A limited number of cells were sampled during the winter season due to the government shutdown and weather

Species	PARA *N=2	DEVA N=2	LAKE N=4	JOTR N=2
Pallid bat				X
Western mastiff bat			X	X
Western yellow bat				X
California Myotis	X	X	X	X
Yuma Myotis			X	
Canyon bat		X		X
Mexican free-tailed bat		X	X	X

*N= number of cells sampled per park unit

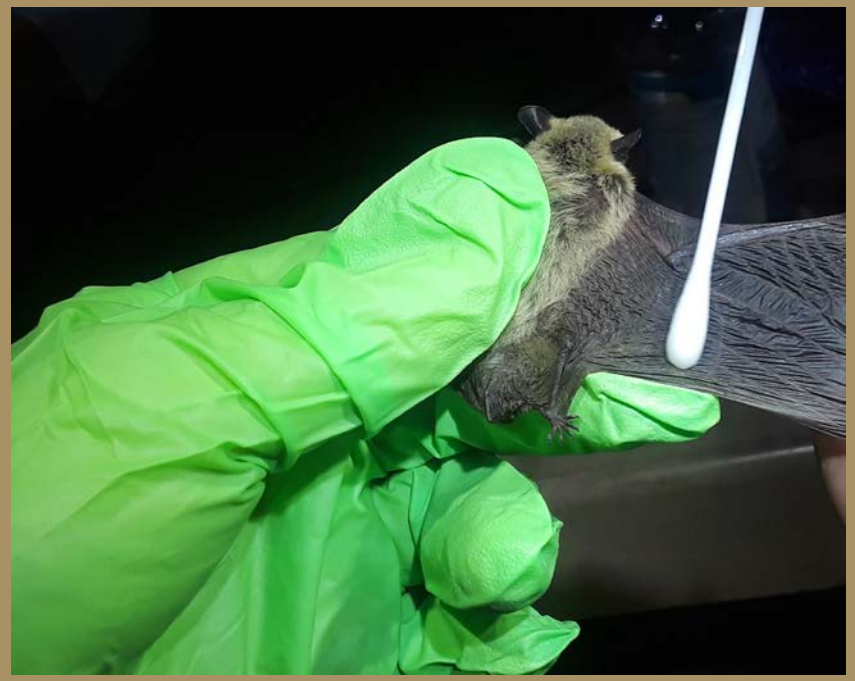
Summer 2019 Lake Mead Preliminary Results

Species	Bridge Canyon*	X-Mas Tree Pass	Greggs Hideout	Boulder Beach	LV Wash	Rogers/Blue Point Springs
Pallid bat	X	X	X	X	X	
Townsend's big-eared bat	X	X				
Big brown bat	X	X				X
Spotted bat					X	
Western mastiff bat	X	X				X
Hoary bat		X			X	
Western yellow bat					X	X
Silver-haired bat	X	X		X		
California Myotis	X	X	X	X	X	X
Yuma Myotis		X		X	X	X
Canyon bat	X	X	X	X	X	X
Mexican free-tailed bat	X	X	X	X	X	X
# of species detected/cell	8	10	4	6	8	7

*Bridge Canyon only had 1 detector location due to unit malfunction at other site.

WNS Surveillance Surveys

- No known hibernacula; however, the fungus is known to persist on bats at least into spring
- 79 bats were sampled from 4 parks; primarily in March 2019
- ALL samples came back negative for the fungus
- Surveys were attempted at MOJA but no bats were captured



Network Bat Blitzes!

Parashant National Monument

- 2017 @ PARA – Staff from 6 NPS units plus AZ Game and Fish participated. 162 bats captured with 15 of the 17 known species from the park detected.

Joshua Tree National Park

- 2018 @ JOTR – almost 30 staff from 7 NPS units plus CA Fish and Game and others participated. 286 bats of 11 species were captured and a total of 13 species confirmed

Great Basin National Park

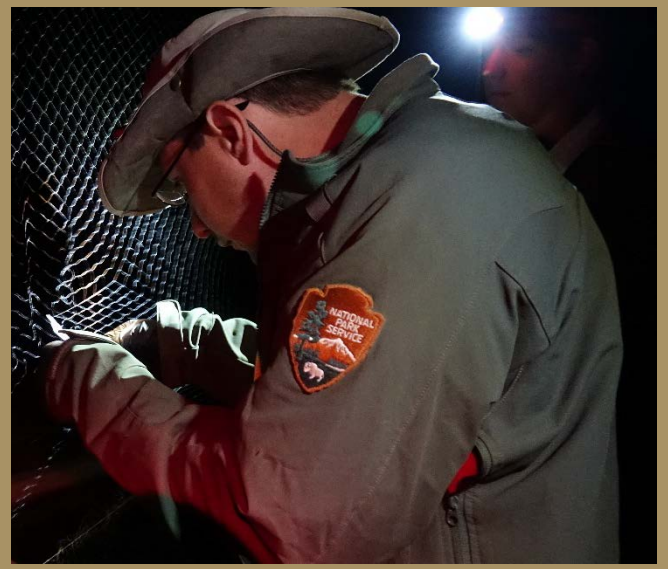
- 2019 @ GRBA - Almost 40 participants from 9 different parks (includes GRCA, PINN, LABE, ZION, and TIMP!) plus staff from MOJN, NV Dept of Wildlife, and the Bat Hub
- Captured 183 bats of 9 species from 16 sites and another 500 Mexican free-tailed bats from Rose Guano Cave

Park and MOJN Coordination

- Continued coordination and collaboration between I&M and park staff is essential to implement the network monitoring plan long term.
- While we have WNS funds, we will be able to utilize seasonal techs to provide greater assistance to parks
- 2020 Bat Blitz is planned for Death Valley, the largest park in the lower 48! Date TBD

Leveraging partnerships and resources

- Bat monitoring along the LCR could be increased by utilizing partnerships with other agencies
  - “adopt” NABat cells along the LCR working with AZGFD and FWS staff
  - CA leaf-nosed and Townsend’s big-eared bat colony counts could be reinitiated using partnerships (no population estimates since 2013)
  - Bat Blitzes could be initiated to re-start capture surveys; a different reach of the river could be done each year and rotated through cyclically



QUESTIONS??

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Mojave Desert Network
Inventory&Monitoring

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