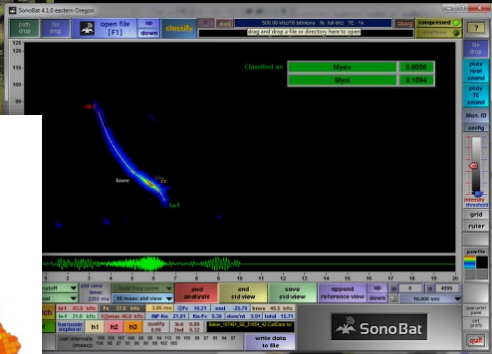
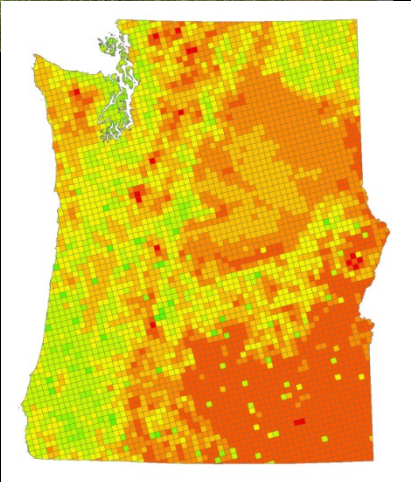
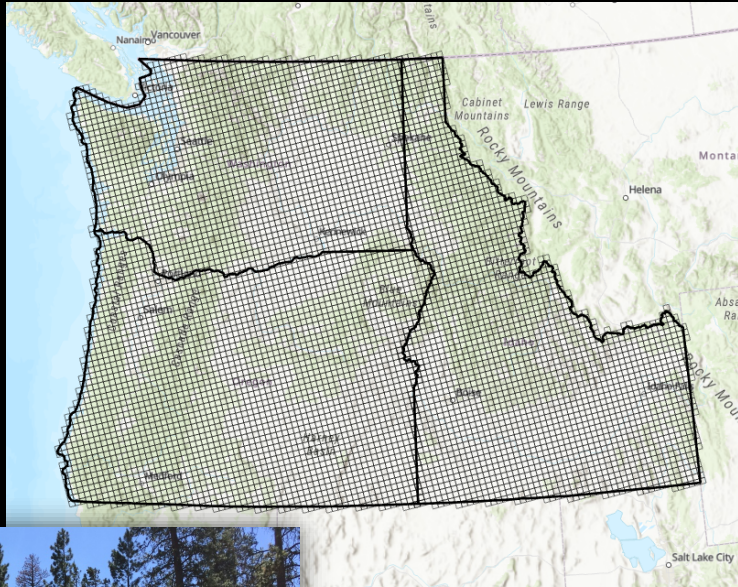


NW Bat Hub: Collaborative Monitoring for Bat Conservation in the Pacific Northwest

January 20, 2021

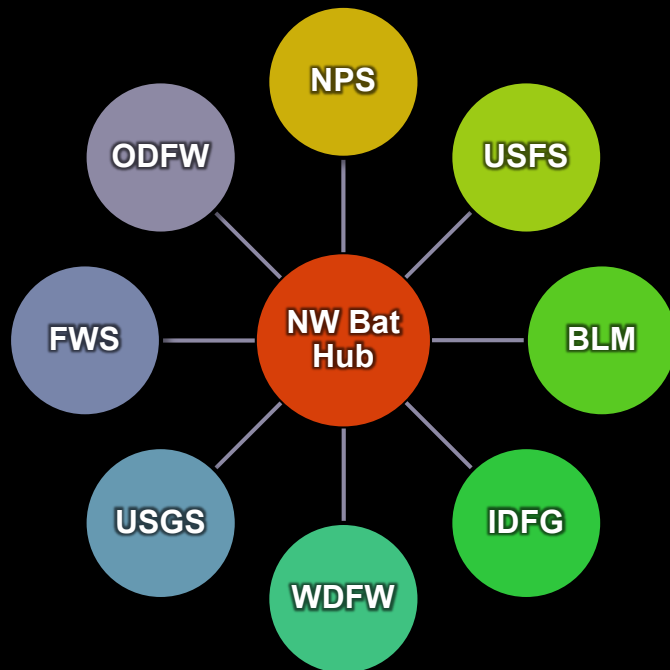
Roger Rodriguez

Bat Research & Monitoring Coordinator
HERS Lab, Northwestern Bat Hub



Vision & Mission

Vision: We serve as a center of gravity for **interagency collaboration** to pursue questions of common interest about **bat conservation** status and trends and inform **evidence-based conservation decision-making**.



an economy of scale...

...pooling of resources

Mission

- Facilitate and co-lead bat conservation in the region
- Co-produce science with partners to better inform evidence-based conservation decision-making

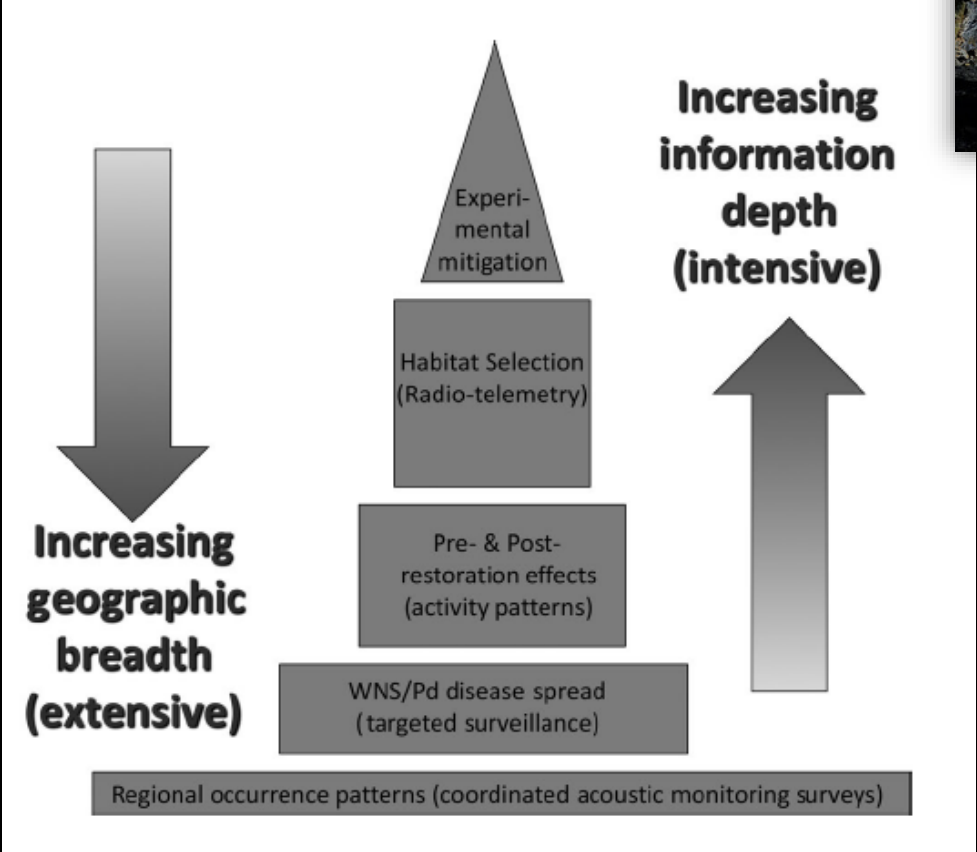




...program of study about bat population persistence and extinction risks...



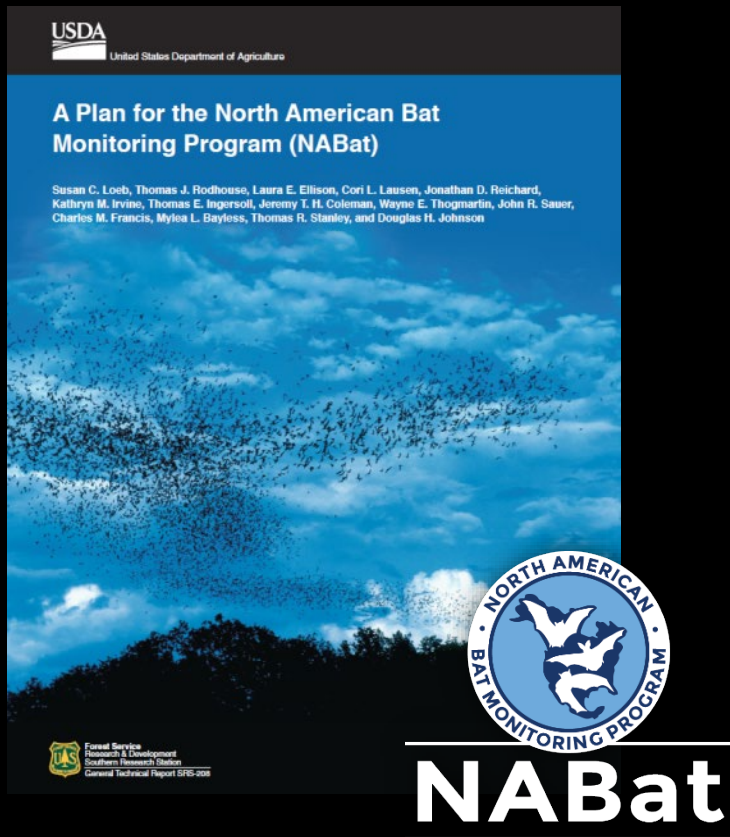
NABat



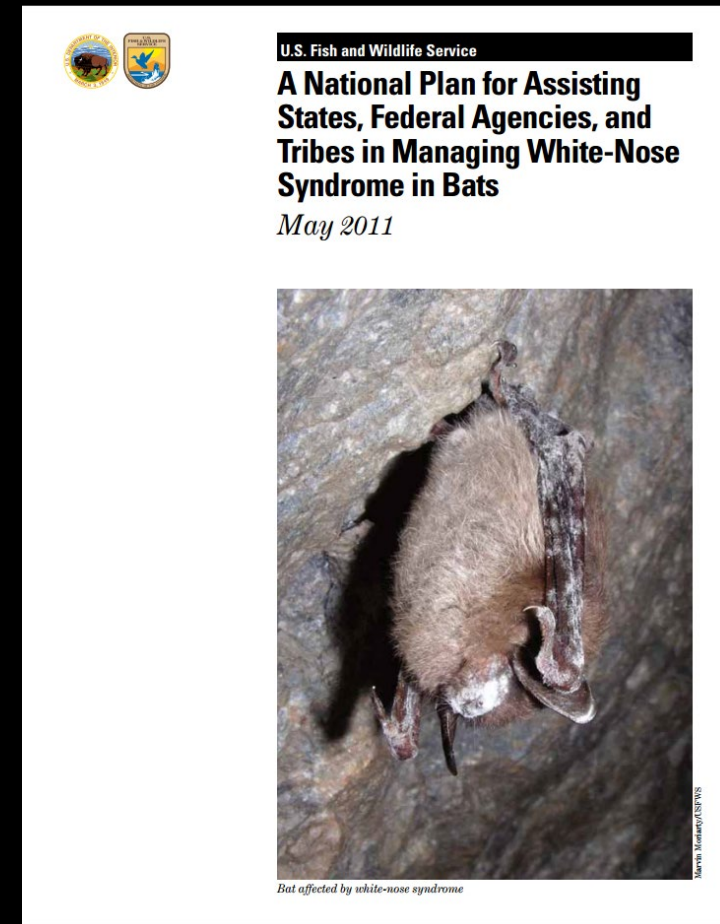
Rodhouse et al. (2019)



Need for standardized monitoring program across the continent

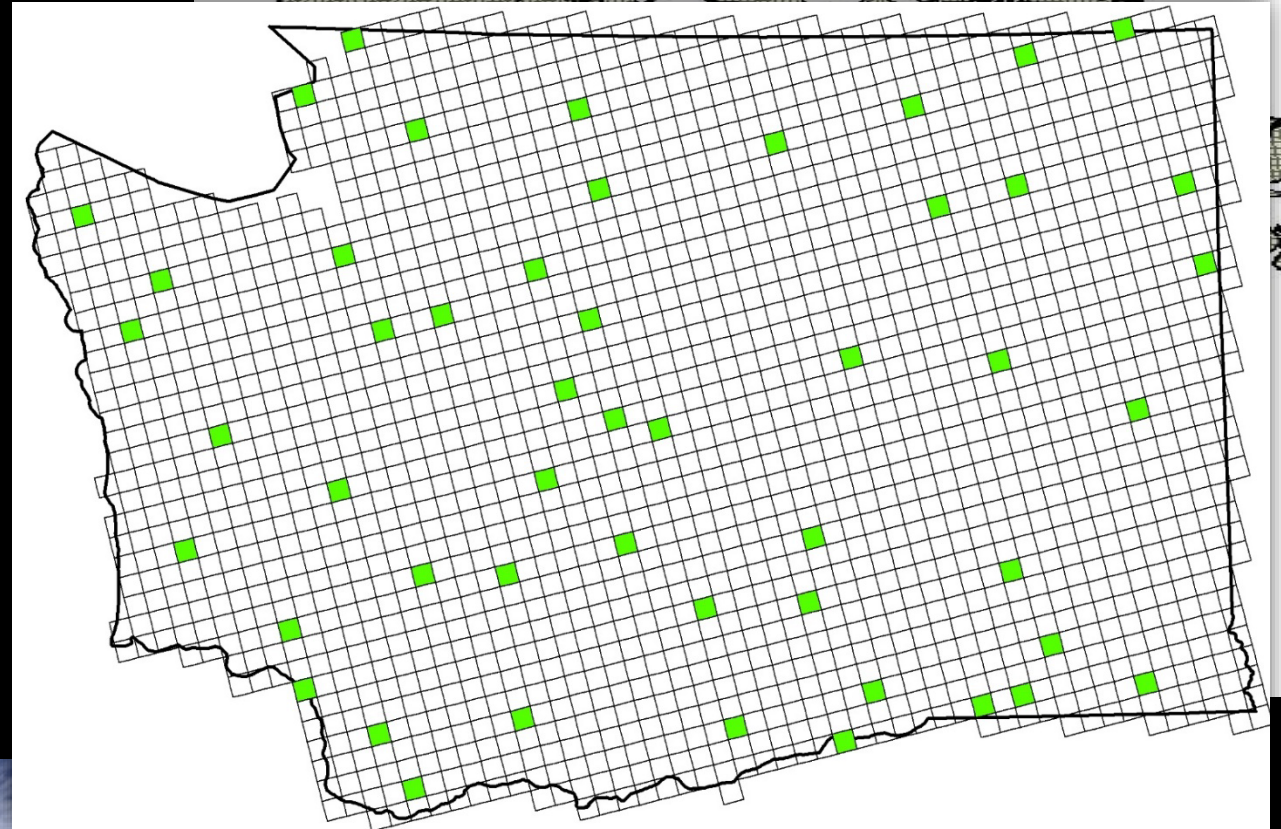


Provide reliable information to enable effective conservation decision-making to ensure long-term viability of North American bats.



NABat: Survey Design

- Acoustic Surveys
 - Mobile Transects
 - Stationary Points
- Colony Counts
 - Hibernacula
 - Maternity Colonies
 - Emergence



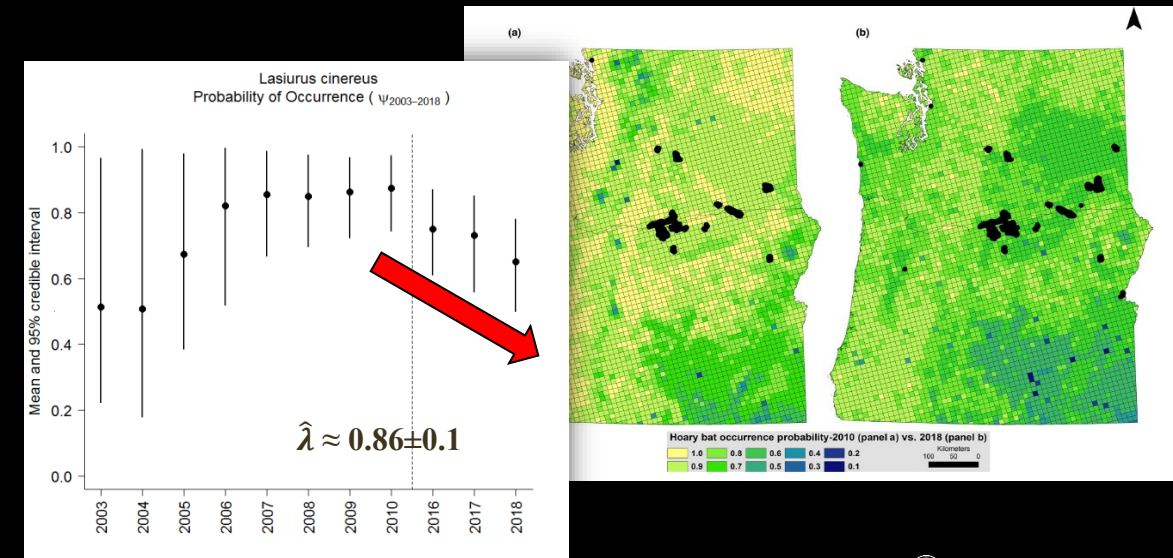
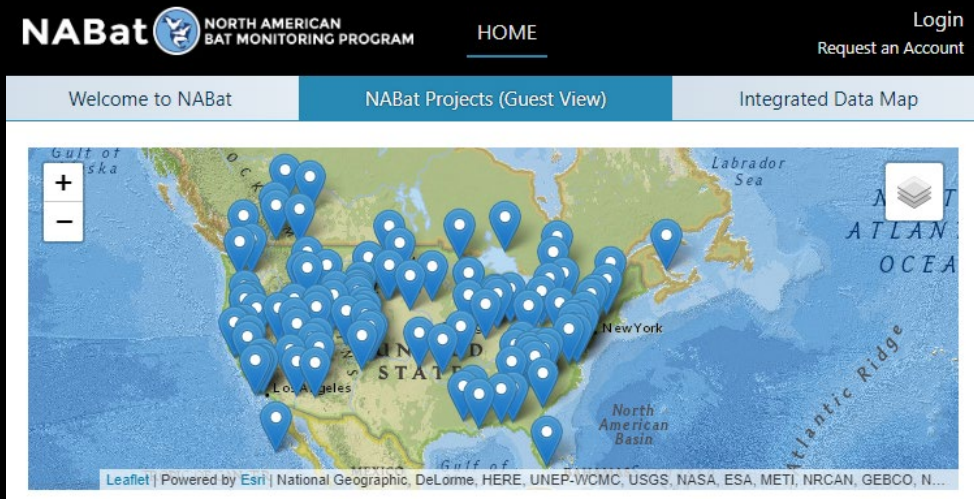
Sample Units (10 x 10 km)

Random sample –
ensures subsets are spatially-balanced,
unbiased samples



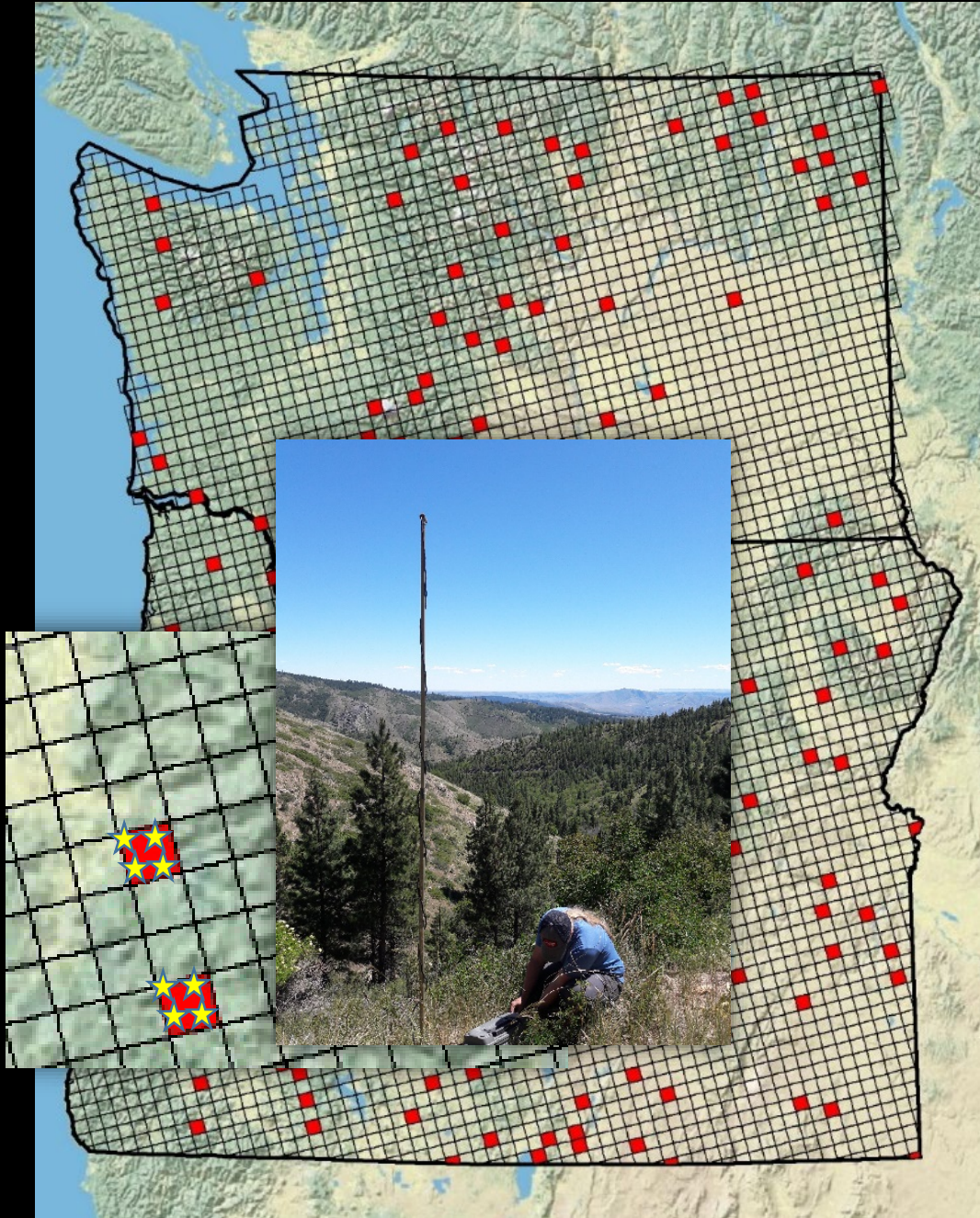
NW NABat: Purpose & Objectives

- Long-term project
- Multiple partners
- Monitor status & trends in PNW
- Contribute to continental NABat

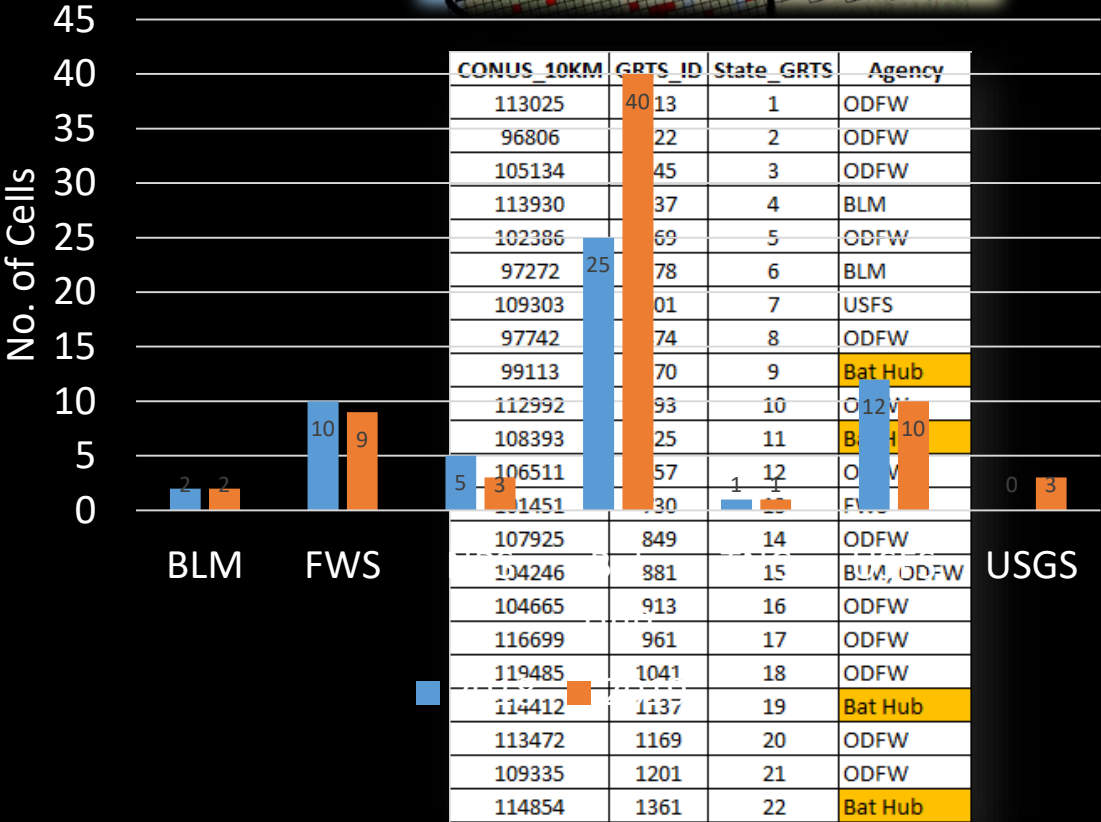
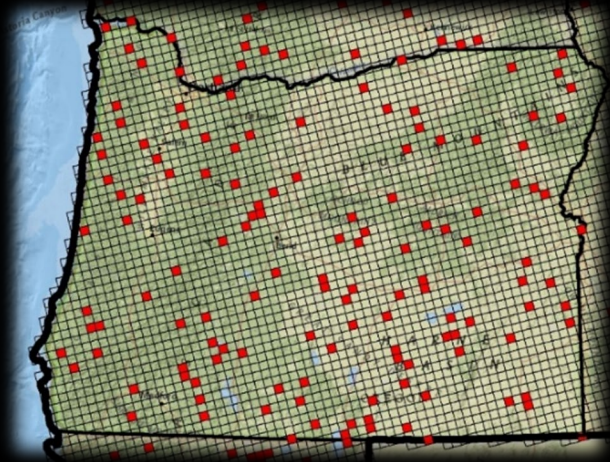


NW NABat

- Centrally coordinated summer, stationary acoustic surveys
- Multiple partners
 - State & federal agencies
 - NGOs
 - Tribes
- Bat Hub crews
- Variety of landownerships
- Equipment sharing
- Survey cooperation



Bat Hub “Clean up” Crews



Scaling up: Integrating Local & Regional



Crater Lake National Park

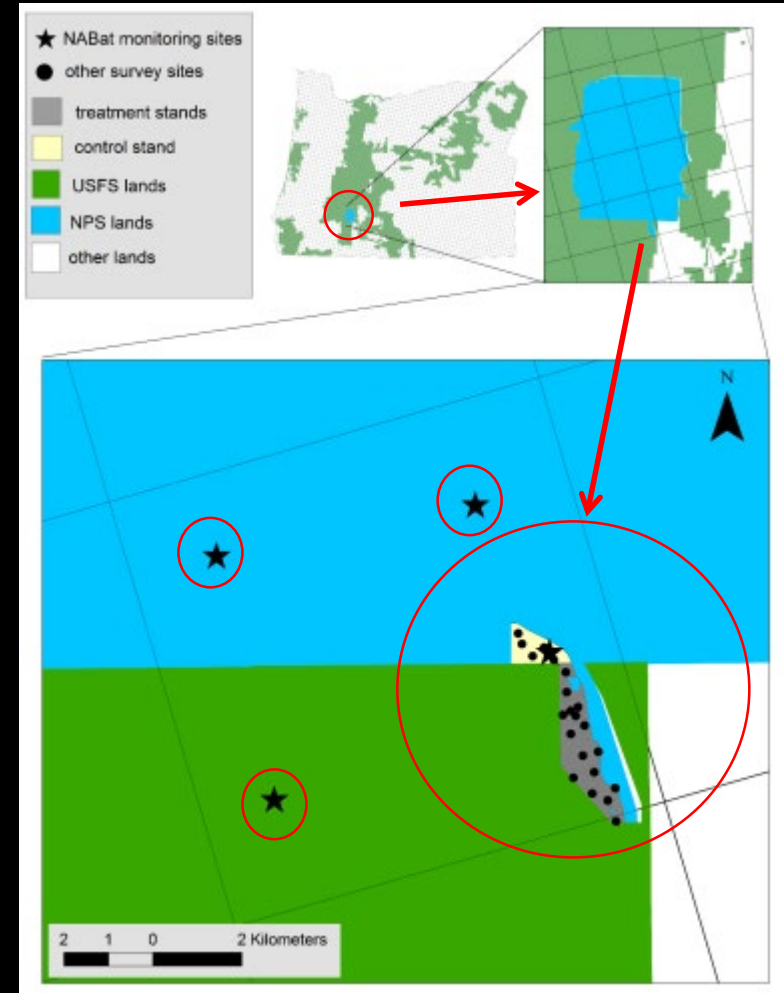


Local Objective:

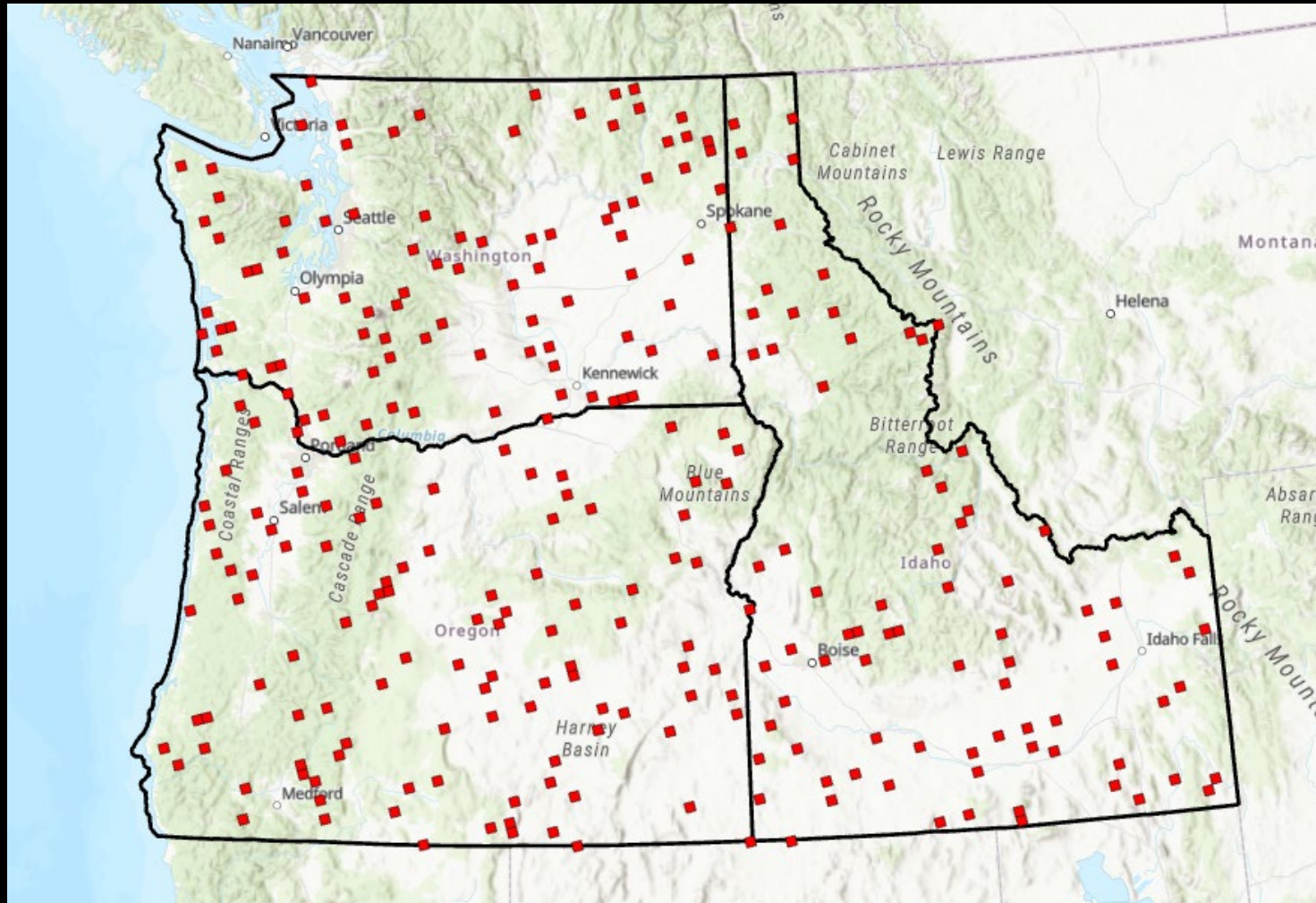
evaluating effects of forest fuel thinning

Landscape Objective:

contributing to regional understanding of status and trends



NW NABat 2020



Completed

280 Sample Units

104 Oregon

89 Washington

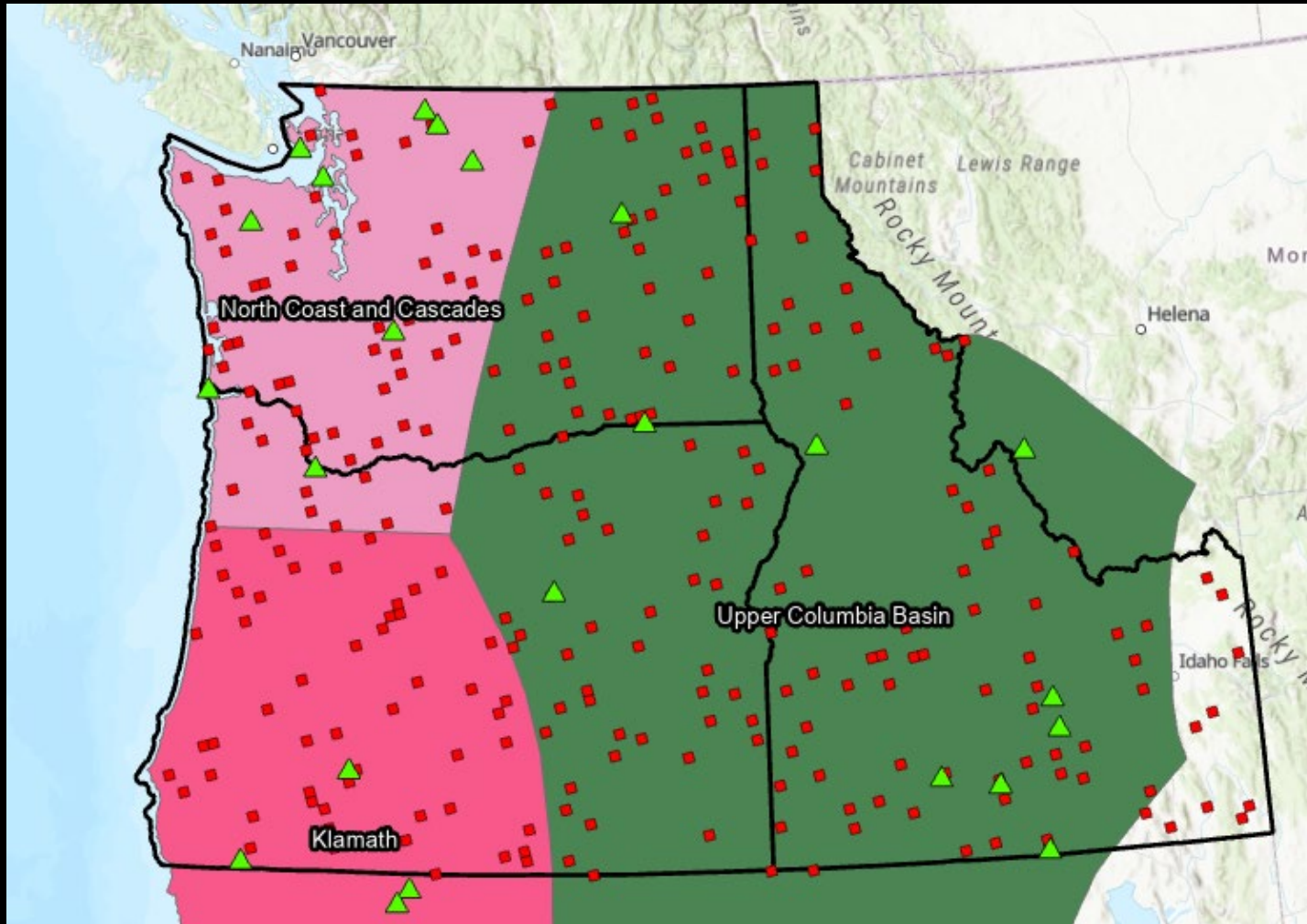
80 Idaho

4 OR/WA

2 OR/ID

1 WA/ID

NW NABat 2020

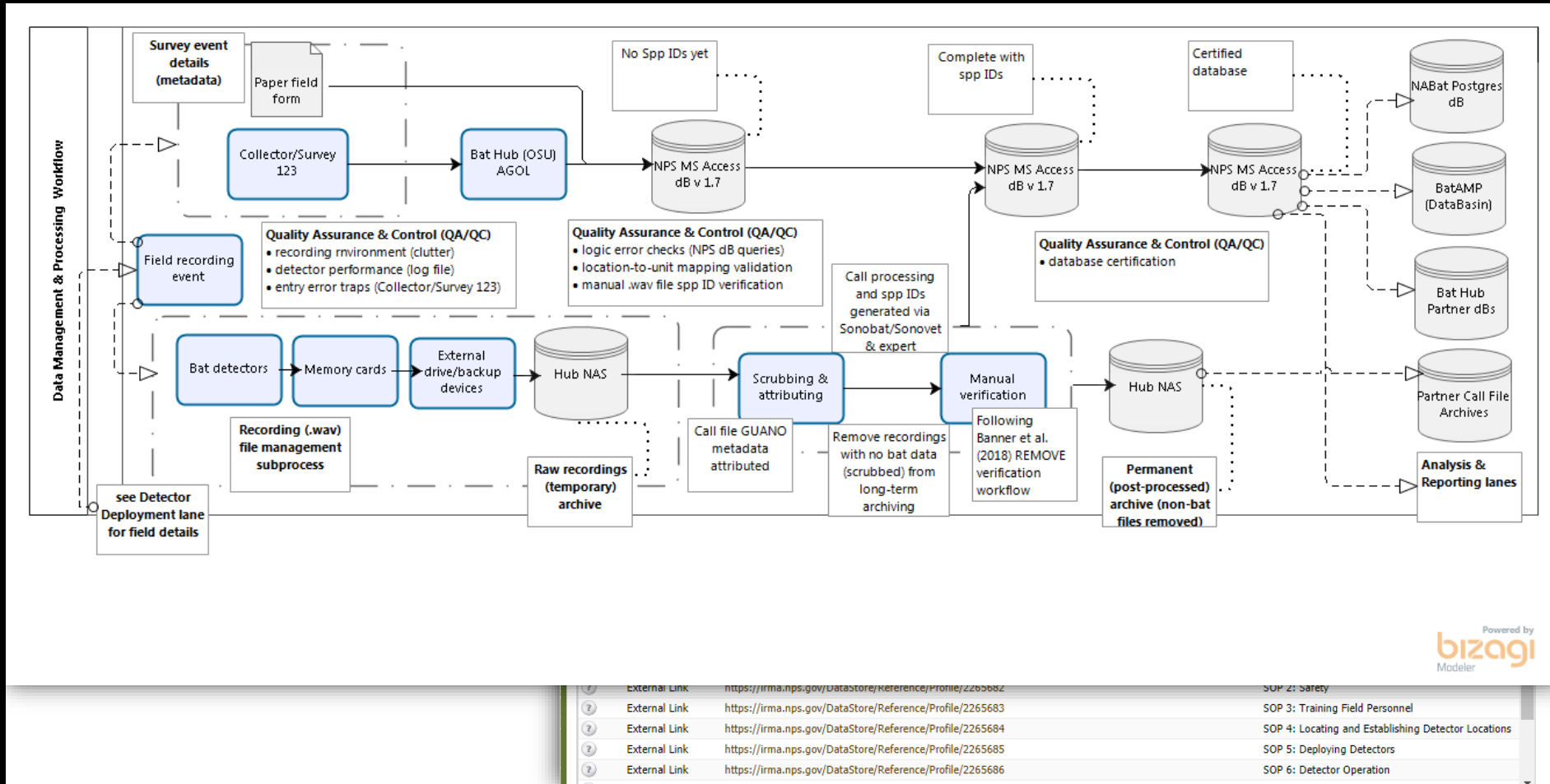


3 Networks
13 Parks



Methodological Development

Regional Protocol & SOPs:



Trends Assessment

What trends are we seeing in PNW bat populations over time?

Received: 2 May 2019 | Revised: 6 August 2019 | Accepted: 7 August 2019

DOI: 10.1002/ece3.5612

ORIGINAL RESEARCH

Ecology and Evolution
Open Access
WILEY

Evidence of region-wide bat population decline from long-term monitoring and Bayesian occupancy models with empirically informed priors

Thomas J. Rodhouse¹  | Rogelio M. Rodriguez² | Katharine M. Banner³  |
Patricia C. Ormsbee⁴ | Jenny Barnett⁵ | Kathryn M. Irvine⁶ 

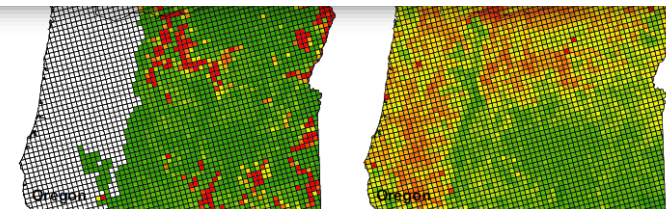
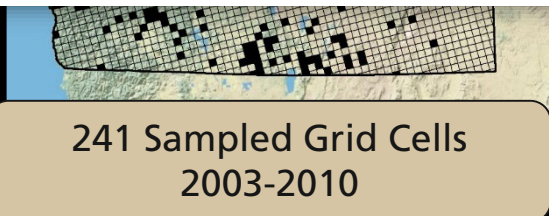
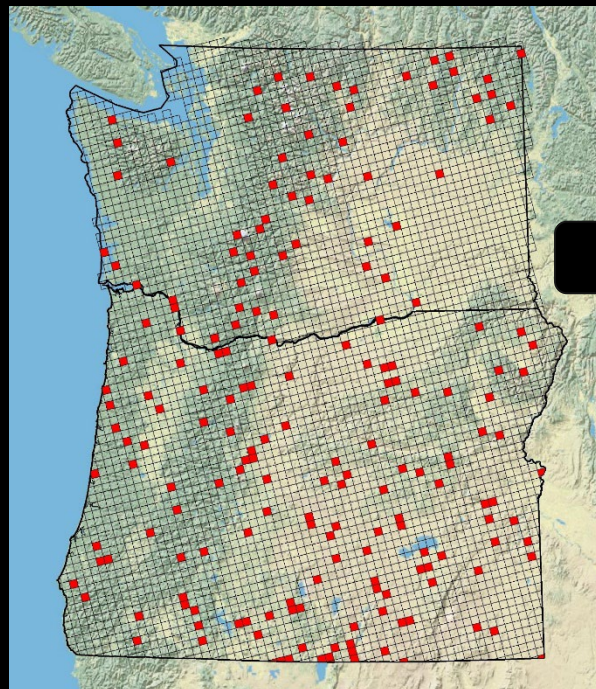


Figure 4 (a) Canyon bat predicted distribution map. Sample units outside the current geographic range of this species (eastside mask and canyon bat exclusion in Fig. 1) were removed from the dataset for this species. (b) Fringed myotis predicted distribution map.

Hub

What trends are we seeing in PNW bat populations over time?

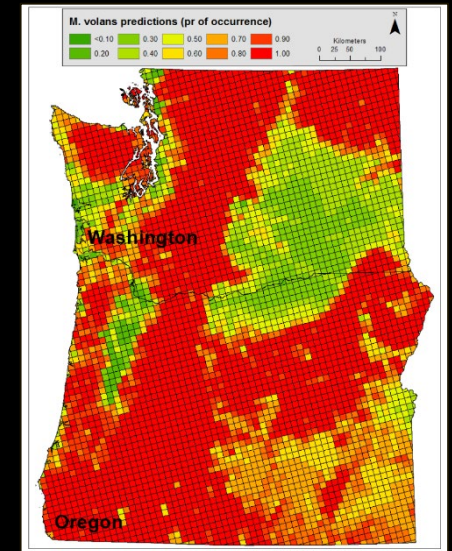
- Baseline Dataset: Bat Grid 2003-10
- New Dataset: NABat 2016-18



190 Sampled Grid Cells

What trends are we seeing in PNW bat populations over time?

- Baseline Dataset: Bat Grid 2003-10
- New Dataset: NABat 2016-18
- Analysis: dynamic Bayesian hierarchical distribution models (Rodhouse et al. 2015)
 - Environmental covariates



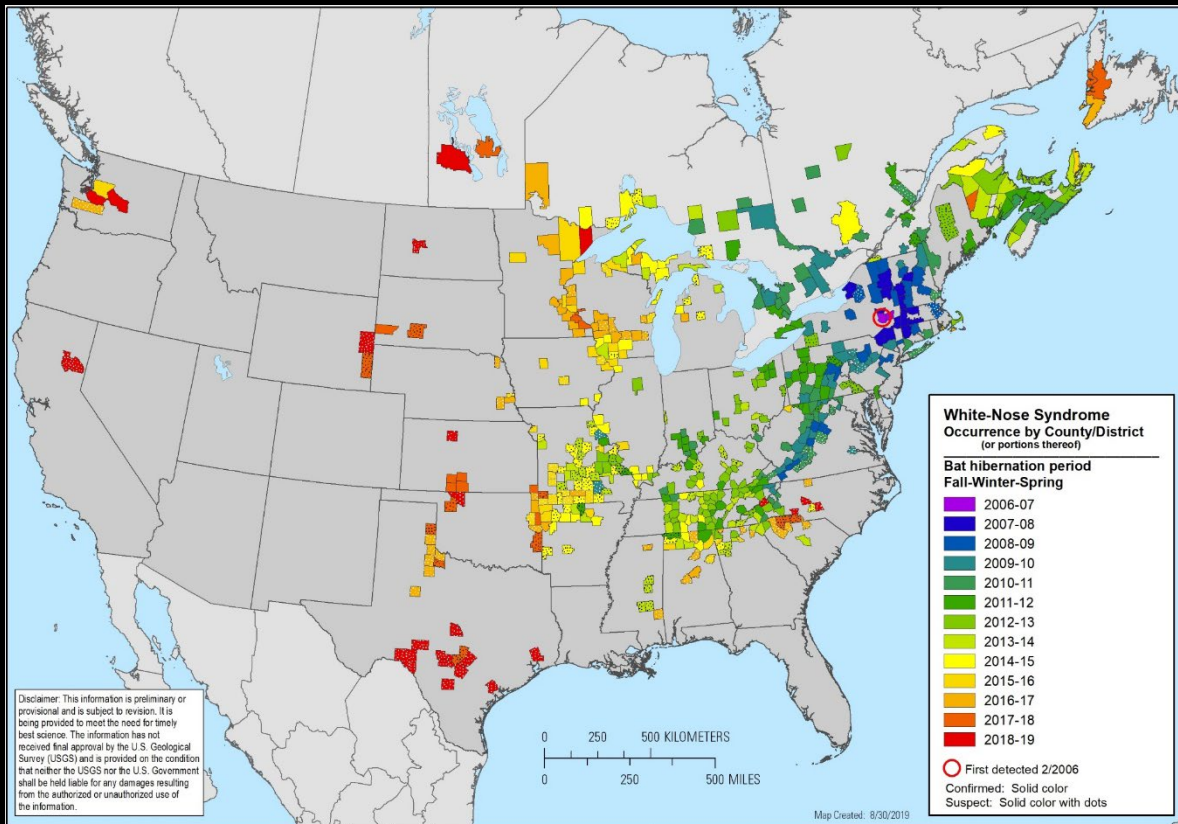
An Emerging Disease Causes Regional Population Collapse of a Common North American Bat Species

Winifred F. Frick,^{1,2*} Jacob F. Pollock,³ Alan C. Hicks,⁴ Kate E. Langwig,^{4,1} D. Scott Reynolds,^{5,1} Gregory G. Turner,⁶ Calvin M. Butchkoski,⁶ Thomas H. Kunz¹

little brown bat –
White-nose Syndrome



MerlinTuttle.org



biology
letters
Conservation biology

Biol. Lett. (2011) 7, 392–394
doi:10.1098/rsbl.2010.0859
Published online 24 November 2010

Going, going, gone: the impact of white-nose syndrome on the summer activity of the little brown bat (*Myotis lucifugus*)

Yvonne Dzal^{1,*}, Liam P. McGuire²,
Nina Veselka^{2,†} and M. Brock Fenton²

Northwestern Bat Hub



hoary bat – wind energy



Mammal Review

Mammal Review 155

REVIEW

Multiple mortality events in bats: a global review

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 Raina K. PLOWRIGHT Department of Microbiology and Immunology, Montana State University, Bozeman, MT 59717, USA. E-mail: raina.plowright@montana.edu
 Daniel G. STREICKER Institute of Biodiversity, Animal Health and Comparative Medicine, MRC-University of Glasgow Centre for Virus Research, University of Glasgow, G12 8QQ Scotland, UK. E-mail: daniel.streicker@glasgow.ac.uk

Chapter 21 Impacts of Wind Energy Development on Bats: Implications for Conservation

Edward B. Arnett and Erin F. Baerwald

Table 21.3 Estimates of cumulative fatalities of each species of bat from 2000 to 2011 for all regions combined in the USA and Canada

Scientific name	Common name	% of total fatalities	Lower range	Upper range
<i>Eptesicus fuscus</i>	Big brown bat	4	26,004	52,255
<i>Lasiurus blossevillei</i>	Western red bat	<0.01	69	143

<i>Lasiurus cinereus</i>	Hoary bat	38	247,040	633,822
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<i>Lasiurus cinereus semotus</i>	Hawaiian hoary bat	<0.01	69	143
<i>Lasiurus ega</i>	Southern yellow bat	<0.01	553	1,145
<i>Lasiurus intermedius</i>	Northern yellow bat	<0.01	148,839	308,322
<i>Lasionycteris noctivagans</i>	Silver-haired bat	18	1,106	2,290
<i>Lasiurus seminolus</i>	Seminole bat	<0.01	622	1,288
<i>Lasiurus xanthinus</i>	Western yellow bat	<0.01	3,731	7,730
<i>Myotis evotis</i>	Long-eared myotis	<0.01	51,617	106,925
<i>Myotis lucifugus</i>	Little brown myotis	6	1,175	2,433
<i>Myotis septentrionalis</i>	Northern myotis	<0.01	69	143
<i>Myotis sodalis</i>	Indiana bat	<0.01	69	143
<i>Myotis velifer</i>	Cave myotis	<0.01	69	143
<i>Myotis volans</i>	Long-legged myotis	<0.01	69	143
<i>Nyctinomops femorosacca</i>	Pocketed free-tailed bat	<0.01	69	143
<i>Nycticeius humeralis</i>	Evening bat	<0.01	1,589	3,292
<i>Perimyotis subflavus</i>	Tricolored bat	6	45,260	93,756
<i>Parastrellus hesperus</i>	Canyon bat	<0.01	69	143
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat	3	21,282	44,087
Unknown spp.	Unknown spp.	2	20,036	41,505
Total	Total		650,104	1,306,378

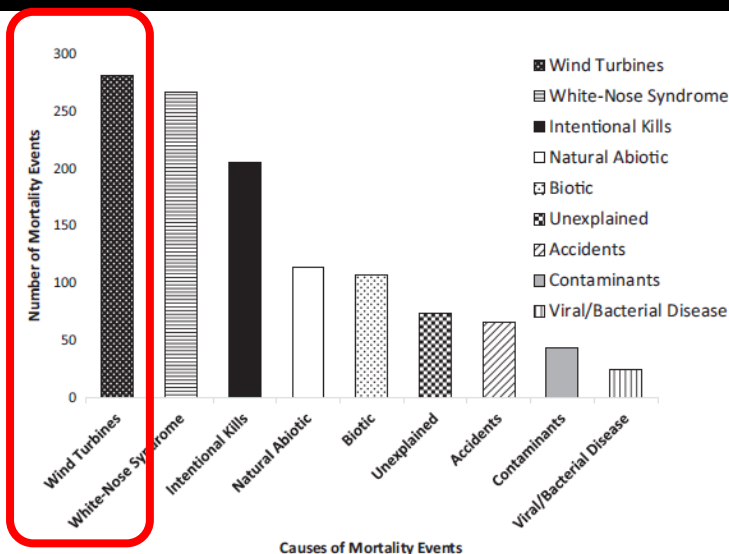


Fig. 2. Cumulative (1790–2015) frequencies of 1180 reported multiple mortality events in bats, by causal category.

Fatalities at wind turbines may threaten population viability of a migratory bat

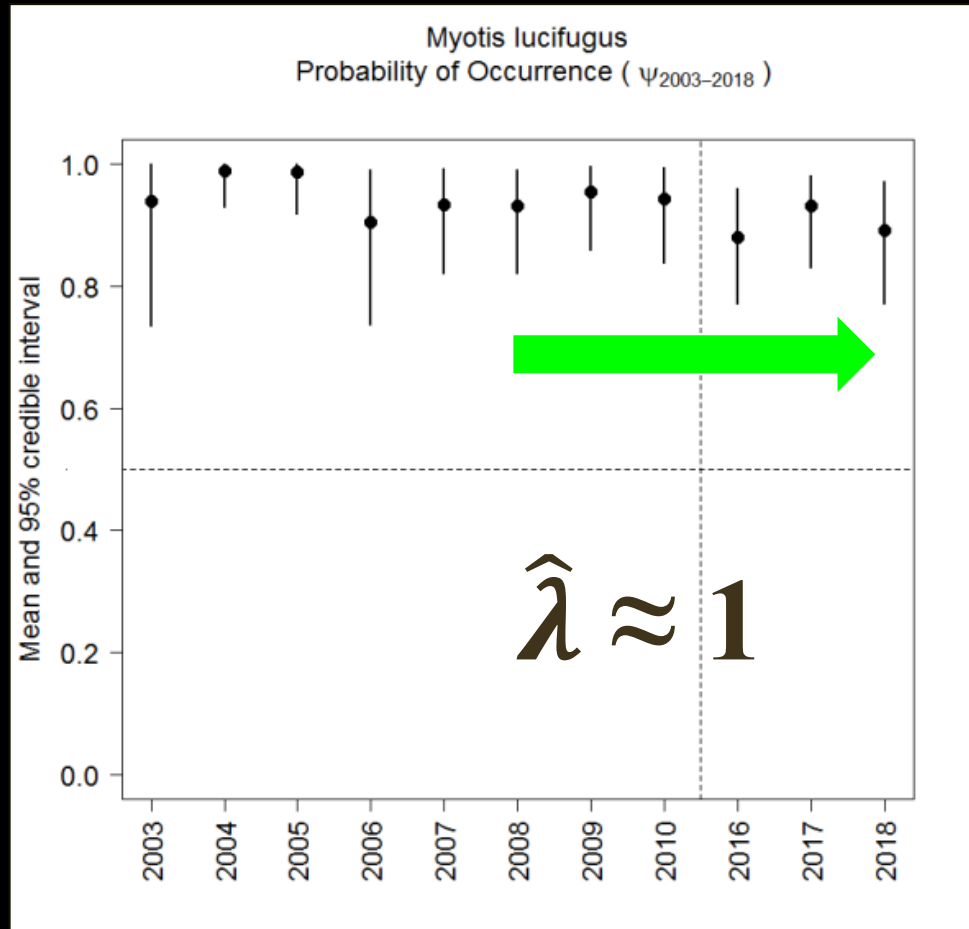


W.F. Frick ^{a,b,*}, E.F. Baerwald ^{c,d}, J.F. Pollock ^b, R.M.R. Barclay ^c, J.A. Szymanski ^e, T.J. Weller ^f, A.L. Russell ^g, S.C. Loeb ^h, R.A. Medellin ⁱ, L.P. McGuire ^j

Does new data reveal change in population trends?



Little Brown
Bat

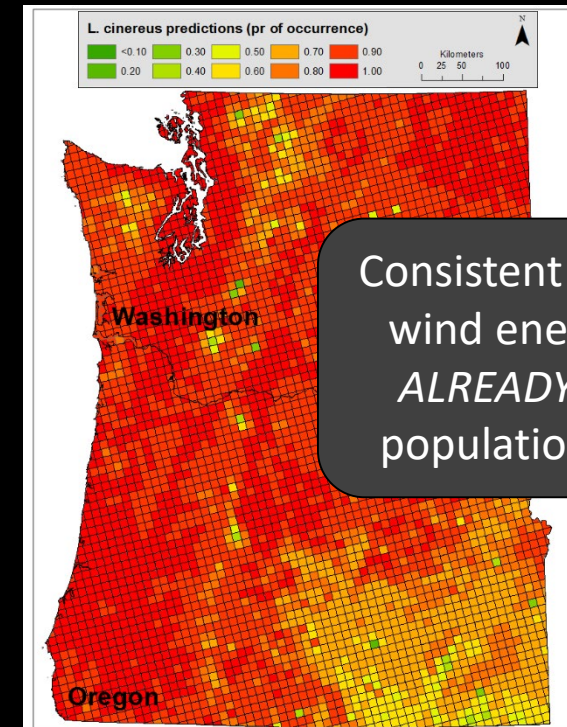
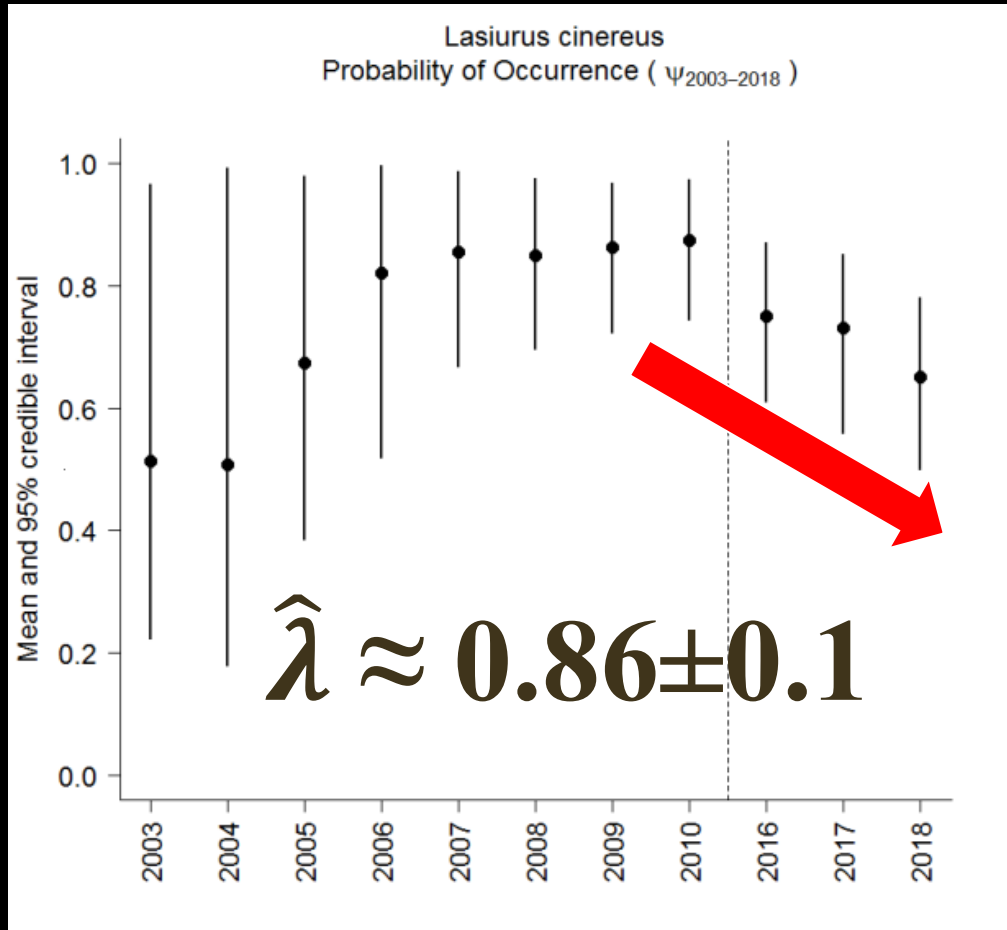


Consistent with a hypothesis that
WNS has not *YET* impacted little
brown bat population in
Northwestern US

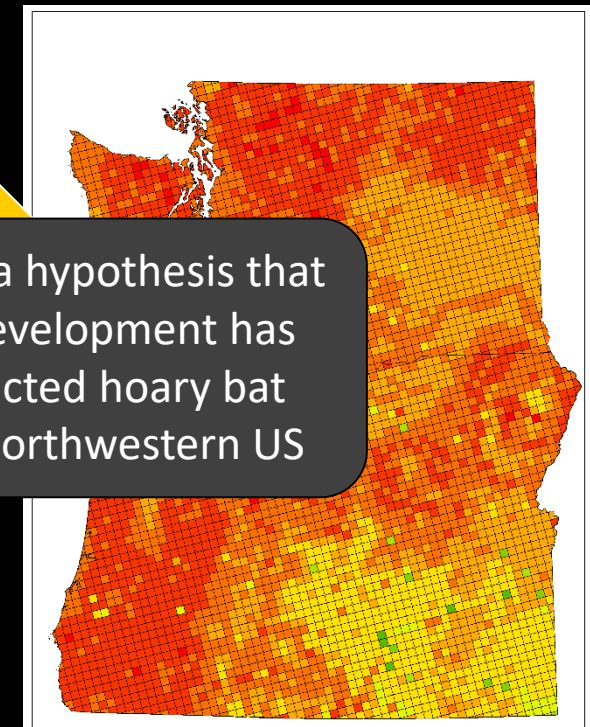
Does new data reveal change in population trends?



Hoary Bat



2010 Hoary Bat Predicted Probabilities of Occurrence

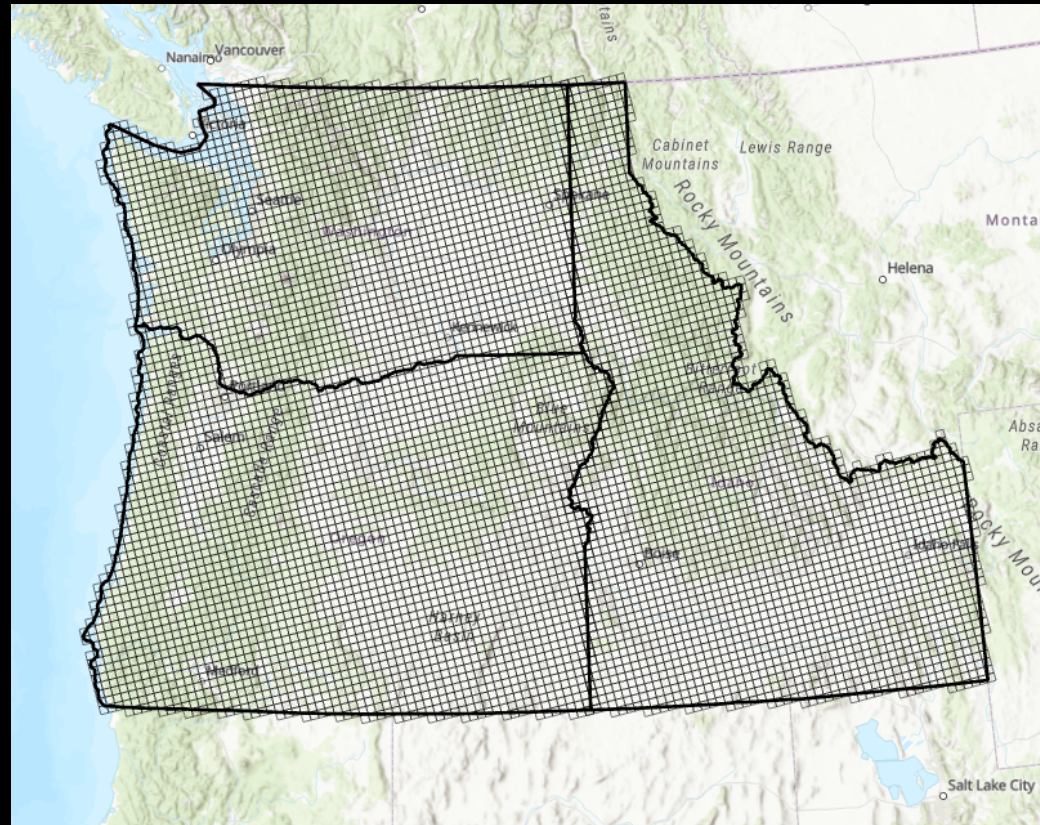
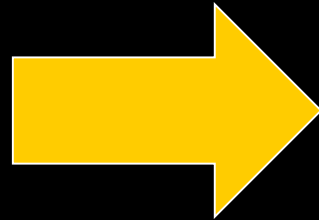
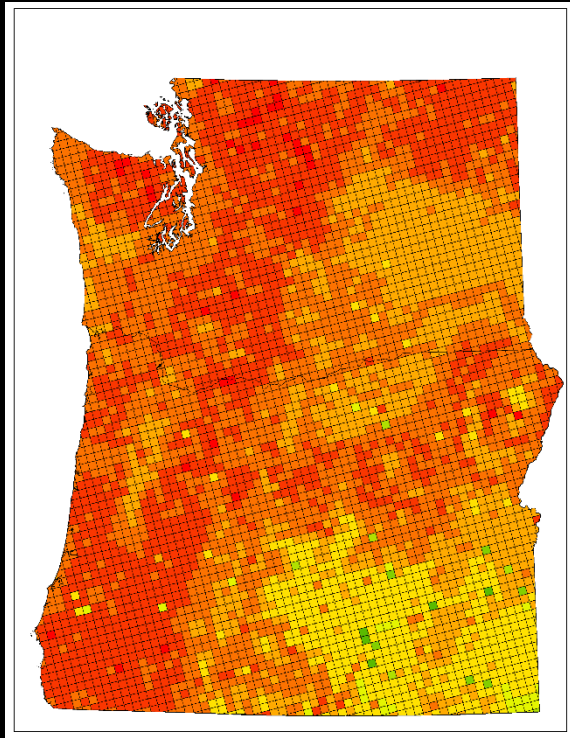


2018 Hoary Bat Predicted Probabilities of Occurrence

Consistent with a hypothesis that wind energy development has *ALREADY* impacted hoary bat population in Northwestern US

Trends Assessment

*How do trends in PNW bat populations change with increasing area?
...and over time?*



NABat

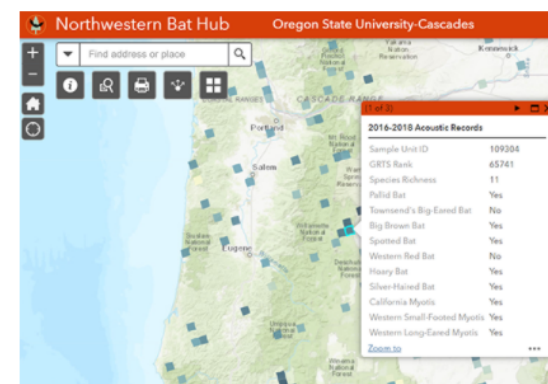
The North American Bat Monitoring Program in the Pacific Northwest

The Bat Hub coordinates the NABat monitoring effort in Oregon, Washington, and Idaho by working with state, federal, tribal, and other partners.

Welcome to the Northwestern Bat Hub Monitoring Results Viewer!

- This interactive map will be a useful tool for those who are looking for detailed lists of bat species composition in a given area in the Pacific Northwest or those who want to follow the results of our collaborative monitoring.
- The data in this tool combines our confirmed acoustic detections with historic range maps and predictive models. Use this viewer to explore findings and extract species lists and other results. For more information about our sources, [see below](#).

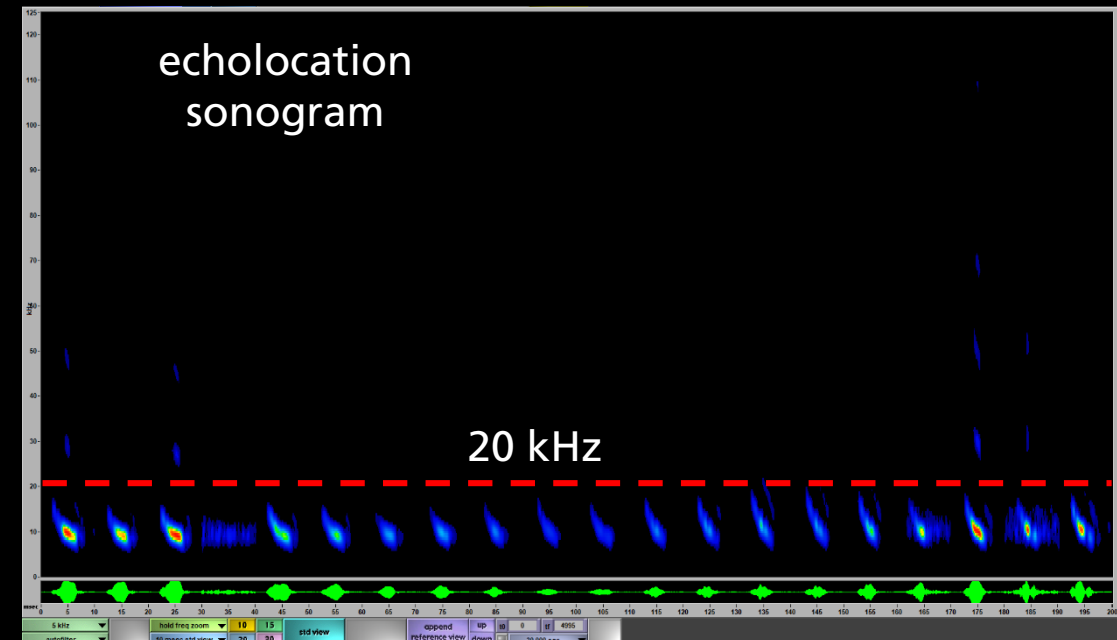
Access the Viewer



Sample Unit ID	109304
GRTS Rank	65741
Species Richness	11
Pallid Bat	Yes
Townsend's Big-Eared Bat	No
Big Brown Bat	Yes
Spotted Bat	Yes
Western Red Bat	No
Hairy Bat	Yes
Silver-Haired Bat	Yes
California Myotis	Yes
Western Small-Footed Myotis	Yes
Western Long-Eared Myotis	Yes

Spotted Bat Project

- Aural surveys
- Citizen science
- Trial within central Oregon



The Central Oregon Spotted Bat Project: An initiative to better understand an elusive species by incorporating citizen science

Human and Ecosystem Resiliency and Sustainability Lab, Oregon State University-Cascades

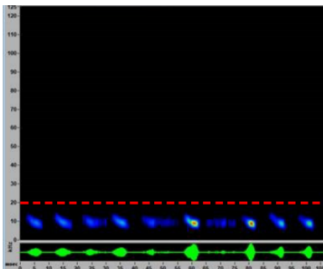
Highlights:

- * The spotted bat is a species found in the semi-arid deserts of North America and is extremely difficult to capture using traditional methods; however, they are one of few bat species we can actually hear without any equipment at all!
- * The Northwestern Bat Hub at OSU-Cascades is launching a citizen science based project to listen for spotted bats in central Oregon.
- * Volunteer commitments can be as short as a one-evening training session and one night of surveys.

Spotted bats (*Euderma maculatum*) are an elusive and widely distributed species throughout the semi-arid deserts of North America. They are known for roosting on sheer cliffs and can be identified by their large, pink ears and spotted pelage. While most species of bats native to central Oregon echolocate above the range of human hearing, spotted bats can be heard by humans without any equipment at all. For many years, the species was described as rare, because they are difficult to capture.



A spotted bat captured by Tom Rodhouse



A sonogram of a spotted bat call with the upper threshold of human hearing (20 kHz) denoted as a red line.

Recent studies, however, indicate spotted bats can be detected via listening surveys without the need for technical equipment, and their distribution appears to be broader than previously reported. The Northwestern Bat Hub at OSU-Cascades is launching a pilot study in summer 2019 using citizen science to complete listening surveys that will better our understanding of their distribution throughout central Oregon, and we need your help! For more information, please contact the volunteer coordinator, Trent, at trent.hawkins@osucascades.edu.



The Central Oregon Spotted Bat Project is on iNaturalist!

Feel like you just don't have the time to volunteer but still want to help? If so, iNaturalist is a great app that makes citizen science fun and easy. Whether you are out fishing or just on your evening hike and happen to hear a spotted bat, let us know! Just download the app and follow the QR-code or the link below to our page and click "Read More" for instructions!

<https://www.inaturalist.org/projects/the-central-oregon-spotted-bat-project>



iNaturalist.org



For more information, contact Trent Hawkins, trent.hawkins@osucascades.edu or visit <https://osucascades.edu/HERS/northwestern-bat-hub>

Citizen science
outreach and
recruitment flyer, NW
Bat Hub

NW Bat Hub audible
bats education and
outreach sign
temporarily in Great
Basin National Park
visitor center, 2019





New Year. New CitSci. Positive changes are coming soon.

Central Oregon Spotted Bat Project

30
members

46
observations

112
locations

353
measurements



 Side_view_of_spotted_bat_-
Euderma_maculatum-
by Paul Cryan

Central Oregon serves as a hotspot for both spotted bats (*Euderma maculatum*) and outdoor recreation. With this project, we seek to take advantage of the unique intersection of bat habitat and recreation opportunities. Spotted bats are one of the few bats that use echolocation frequencies low enough to be heard and identified by humans. They lead secretive lives, but we ...

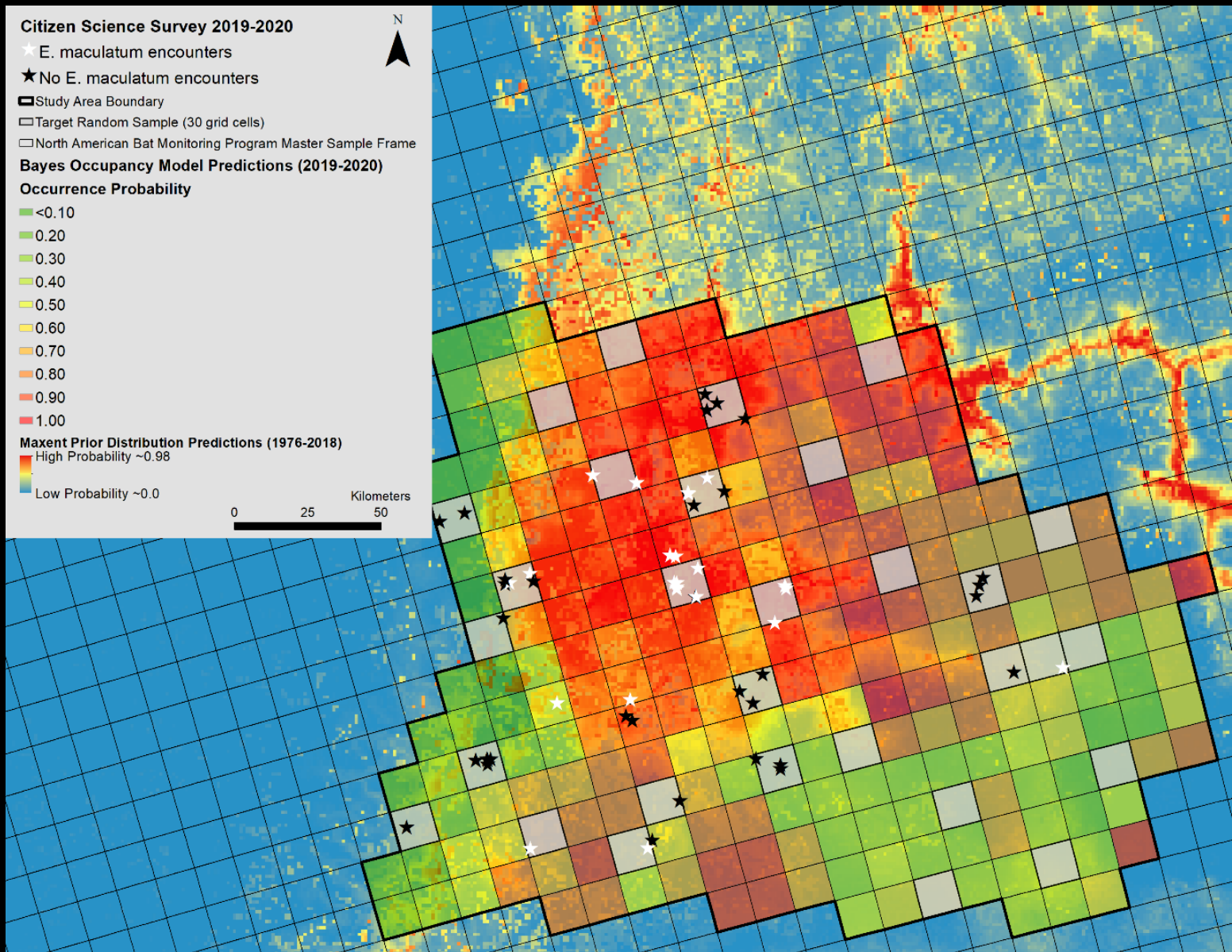
Manager: Sara Rose

Add Data

+ Ask to join

[+ Project Details](#) [+ Team Members](#)

Citizen Science Aural Surveys +
NABat frame = Enhances the
distribution of spotted bats in the
region



Acknowledgements



THANKS!

Bat Hub Coordinator

Roger.Rodriguez@osucascades.edu

<http://osucascades.edu/HERS/northwestern-bat-hub>

Northwestern Bat Hub