



Northern long-eared bat

(Myotis septentrionalis)



- Species information
- Area of influence in Wyoming
- White-nose syndrome
- Consultation
- Recommendations

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Northern long-eared bat

Species description

- Medium-sized bat
 - 3-3.7 inch body length
 - 9-10 inch wingspan
 - 6-9 grams weight ($\bar{x} = 7.5$ g)
- Fur medium to dark brown on back & tawny to pale brown on underside
- Distinguished from other *Myotis* by large ears & long, pointed tragus (projection of skin in front of the external ear)



<https://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html>

3/10/2017



Northern long-eared bat

Feeding & Diet

- Emerge at dusk to fly through the understory of forested hillsides & ridges
- Feed on moths, flies, leafhoppers, caddisflies, & beetles
- Catch in flight using echolocation or by gleaning from vegetation





Northern long-eared bat

Life history

Summer (April 1- September 30)

- Trees: male & reproductive female bats roost singly or in colonies in cracks, crevices, cavities, & under the bark of live & dead trees
- Caves & mines: other males & non-reproductive females can roost in cooler places like caves & mines
- Other places: Can also be found roosting in buildings & under bridges



- Birth of pups (1/female/year)
- Pups fly ~21 days to a month later



Northern long-eared bat

Life history

Fall (roughly August 15-October 15)

- Mating
- Foraging & storing fat for hibernation
- 5-20+ miles from hibernacula (in areas with known hibernacula)
- “Fall swarming”

Winter (October 1 – May 15)

- Hibernation in caves/mines (hibernacula)

Spring (roughly May 1 –June 15)

- Emergence
- “Spring staging”
- Forage
- Migrate to summer roosting habitat
- Fertilization/gestation



Northern long-eared bat

Life history

- Maternity habitat for the northern long-eared bat is extremely important
- Consists of summer habitat used by juveniles & reproductive (pregnant, lactating, or post-lactating) females.

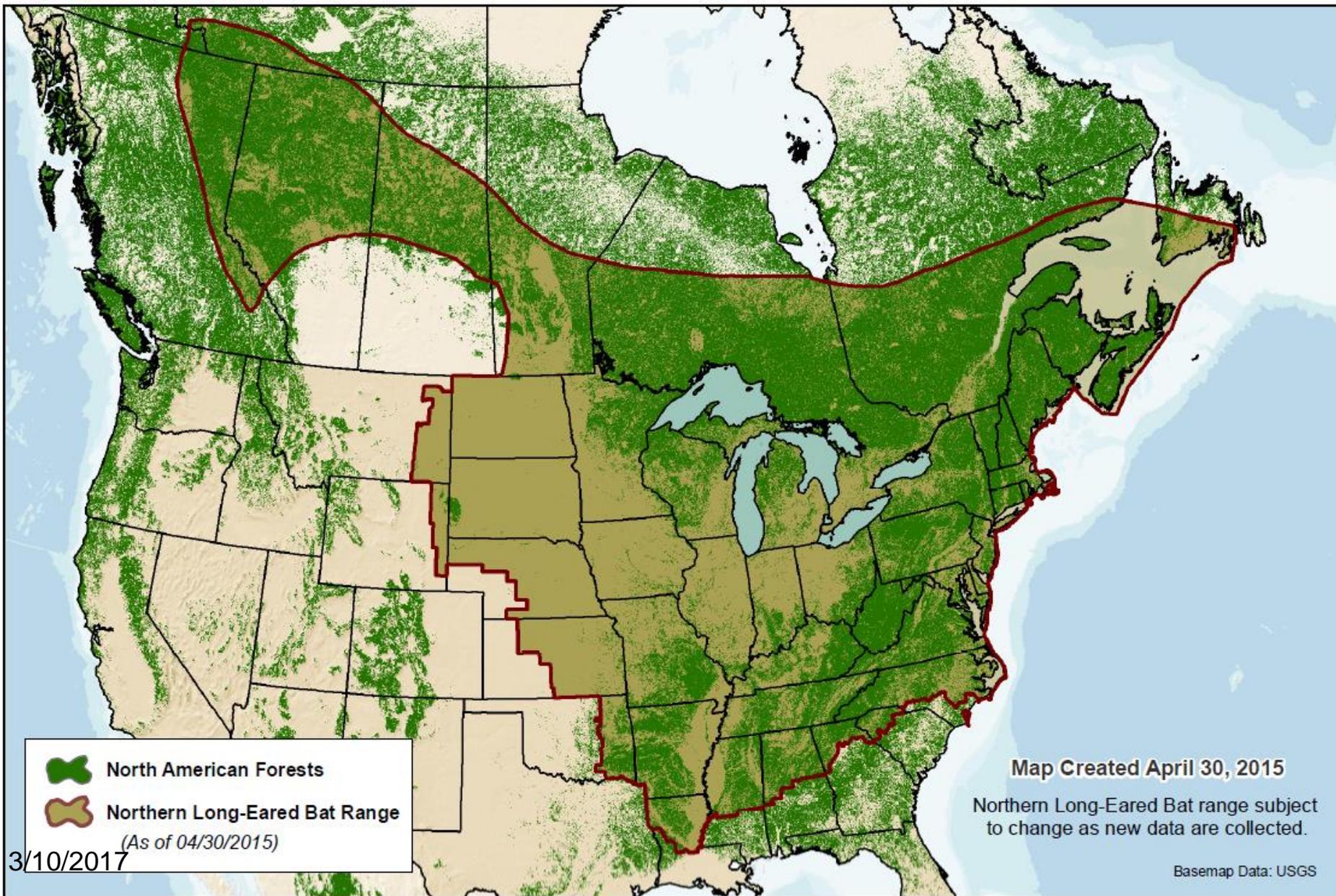




Wyoming Habitat



Northern Long-Eared Bat Range



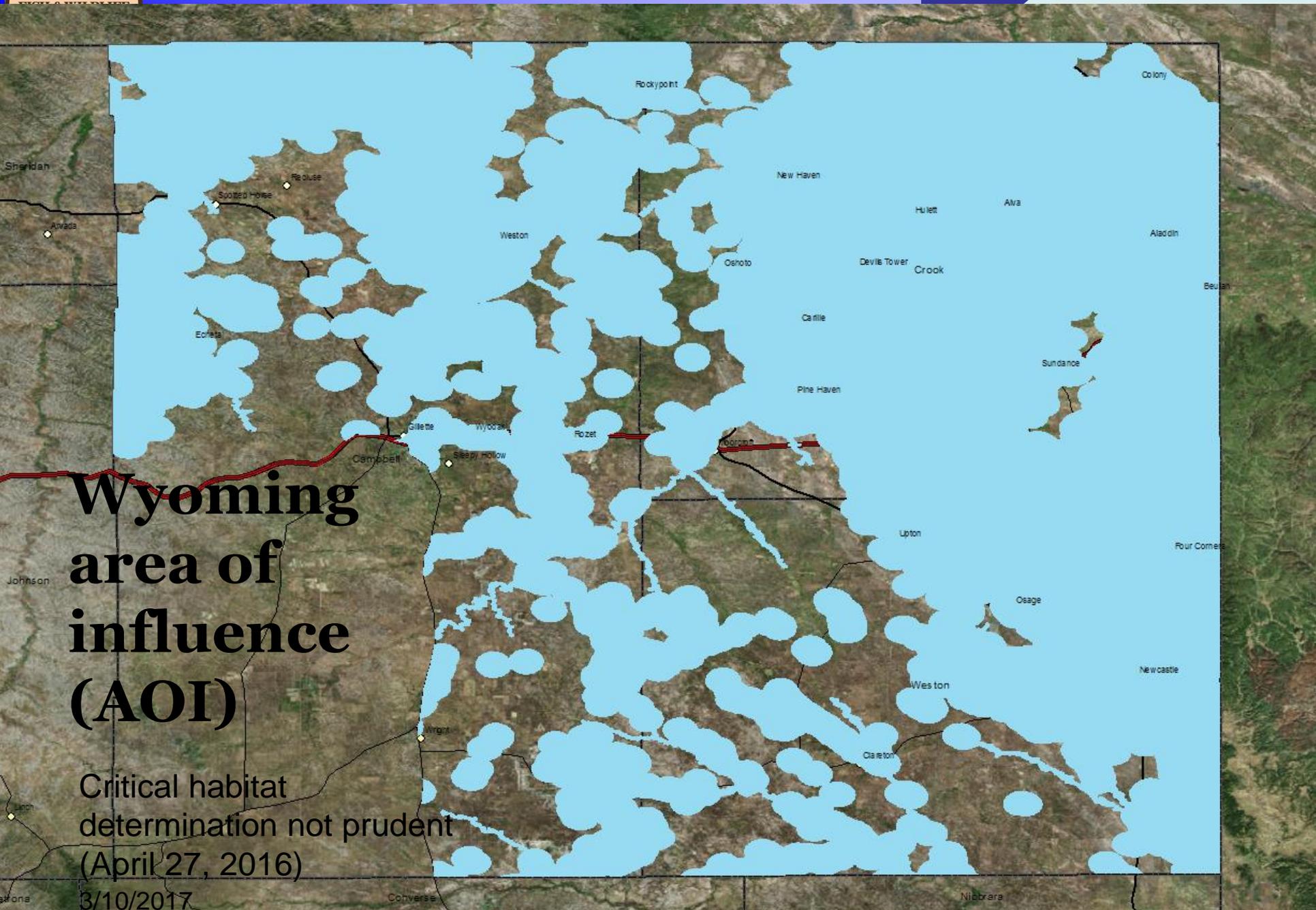
-  North American Forests
-  Northern Long-Eared Bat Range
(As of 04/30/2015)

Map Created April 30, 2015

Northern Long-Eared Bat range subject to change as new data are collected.

3/10/2017

Basemap Data: USGS



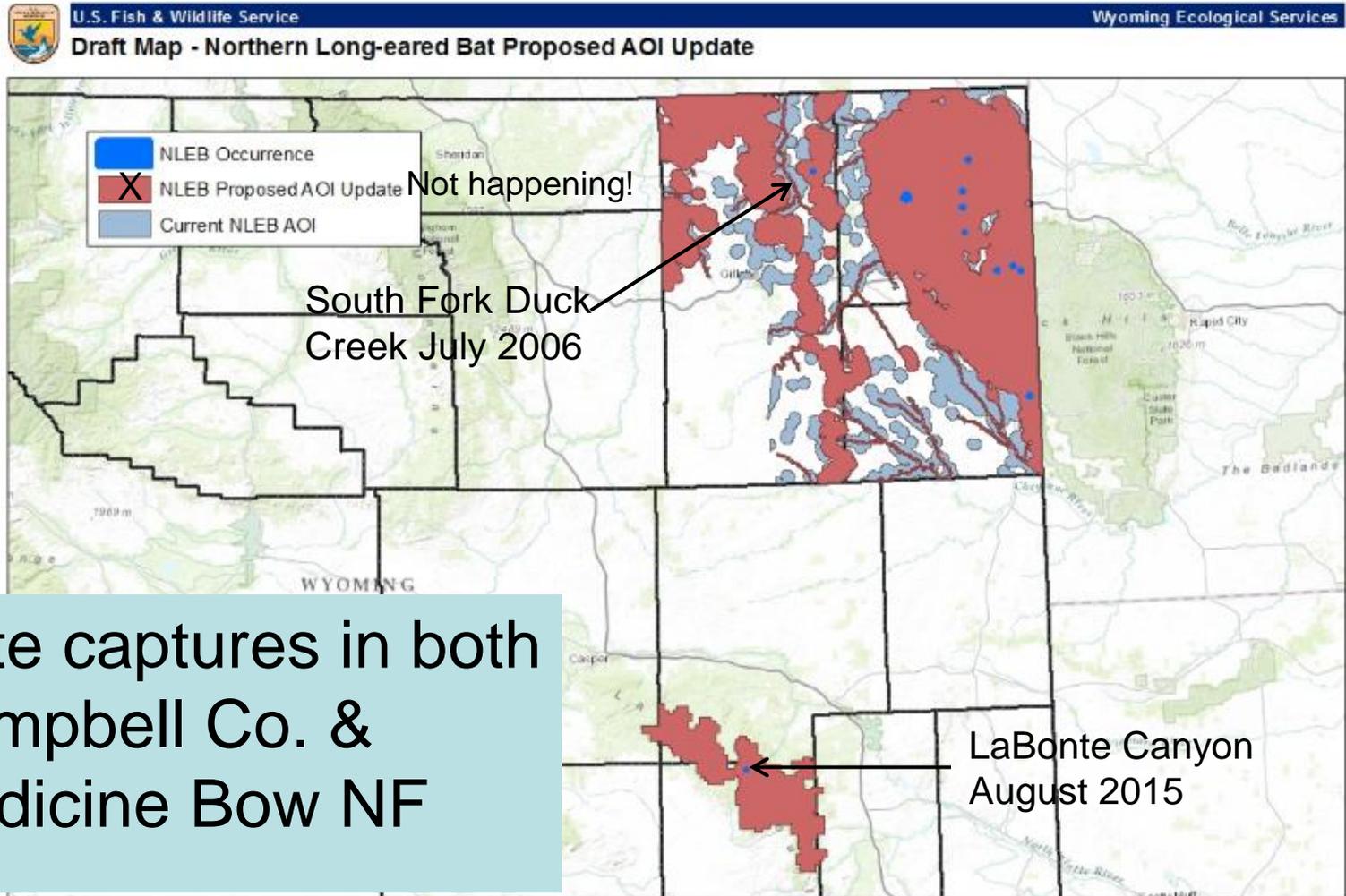
Wyoming area of influence (AOI)

Critical habitat
determination not prudent
(April 27, 2016)

3/10/2017



Captures of NLEB in Wyoming



Note captures in both
Campbell Co. &
Medicine Bow NF

3/10/2017

Created By: US FWS WYES
Map Date: 2/12/2016
Source: FWS | WYND | USFS | USGS | BOC
Base Data: Sentinel Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeBCo, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox India, © OpenStreetMap contributors, and the GIS User Community





Area of Influence for NLEB in WY

available here: <https://www.fws.gov/wyominges/Species/NLEBat.php>

Areas Of Influence (AOI) identify areas where any project located within should consider potential effects to the T,E, P, & C species & designated & proposed CH, in reference to Section 7 of the ESA. AOI typically encompass larger areas than simply where the species is known to exist because of direct & indirect effects to the species & their habitat. It is important to consider potential effects to the species & their habitat within these larger areas.

Survey data from the WGFD, WNDD, & the USFS identified the possible range for NLEB in WY to consist of Campbell, Cook, & Weston Counties in the northeast corner of WY. We do not expect the NLEB to occur elsewhere in WY. Therefore, efforts to refine the AOI were constrained to the 3 counties.

The existing survey data could not be used to refine the AOI to a finer scale, because the data do not provide sufficient spatial & temporal coverage across the 3 counties. Therefore, the AOI was refined based on literature & expert knowledge, which identified large tracts of upland forest & connecting riparian areas as habitats commonly used by the NLEB. Refinement of the AOI focused on identifying these habitats & applying criteria for delineating “known habitat” from the *USFWS Northern Long-eared Bat Interim Conference & Planning Guidance* (1/6/2014) document (<http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf>).



Area of Influence for NLEB in WY

continued

Development of the AOI also considered possible indirect effects from various project types including Wind. AOI data was checked against wind potential data & it was concluded that the AOI data captures concerns for NLEB & Wind Development. Due to a lack of information about the NLEB in WY, we used a cautious approach in delineating the AOI. We will update the AOI as new data & information become available, but decisions to reduce the AOI must consider conservation (& recovery) of the species.

Within the 3 counties determined to support NLEB, determined AOI through:

A) Identified large tracts of upland forest:

- 1) Extracted all areas of Forest and Woodland coverage from GAP data ("CN_LEVEL1" = 'Forest and woodland systems') except for classifications including Pinyon &/or Juniper (PJ is non-habitat)
- 2) Extracted all areas of Tree Dominated coverage from Landfire EVT data ("NVCSORDER" = 'Tree-dominated') except for those including Pinyon &/or Juniper (PJ is non-habitat)
- 3) Merged GAP & EVT data & dissolved polygons together to form Forest Areas
- 4) Calculated Acres for Forest Areas layer & removed all polygons less the 10 acres (NLEB prefers large areas of upland forest, so small fragments were considered unlikely to support this species)



Area of Influence for NLEB in WY

continued

5) Referred to the *USFWS Northern Long-eared Bat Interim Conference & Planning Guidance* document & applied criteria for delineating “Known habitat” found in Appendix C:

a) Buffered all Forest Areas by 1.5 miles based on the 1.5 mile roost tree buffer

With insufficient data to identify specific roost trees or areas of high probability of roost trees, all areas covered by the Forest Areas layer treated as possible areas for roost trees

b) Buffered Occurrence data (WYNDD/USFS) by 3 miles

c) Merged Occurrence buffers with Forest Area Buffers

d) Incorporated additional riparian corridor areas by buffering major streams & rivers, as these may support movement between large blocks of forest habitat

6) Extracted major streams/rivers (Order 4-7) for the 3 counties & buffered 1,000 feet to capture additional possible roost, forage, & travel corridors following *USFWS Northern Long-eared Bat Interim Conference & Planning Guidance*:

- Suitable summer habitat for NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, & travel
- Includes forests & woodlots containing potential roosts as well as linear features such as fencerows, riparian forests, & other wooded corridors.
- Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees & are within 1,000 feet of other forested/wooded habitat



Area of Influence for NLEB in WY

continued

7) Selected all areas classified as “Riparian and Wetland System” in GAP data that intersected the 1,000ft stream buffer & buffered those areas by 1,000ft

8) Merged riparian buffers into stream buffers

9) Unioned stream buffers with Forest Areas

B) Final Processing

10) Clipped everything to the 3 counties

11) Based on data & expert knowledge – removed everything south of I90 & west of Hwy 59 (as there are no positive survey results from these portions of Campbell County & forest areas become much more fragmented & patchy)

12) Dissolved all polygons together

13) Ran Eliminate Polygon Part Tool to remove all holes less than 1,000 acres



Northern long-eared bat

- Threats
- **White-nose syndrome** (WNS) is a disease caused by the cold-loving fungus, *Pseudogymnoascus destructans* (Pd)
- NLEB is one of bat species most affected by WNS
- Compounding threats
 - Impacts to hibernacula
 - Disturbance of hibernating bats
 - Mortality from wind projects
 - Forest conversion/loss



White-nose syndrome

USFWS

Clinical signs:

- White fungus evident on nose, ears, or wings
- Wing damage
- Depleted body fat

<https://www.whitenosesyndrome.org/>



Photo: Gina Nicholas

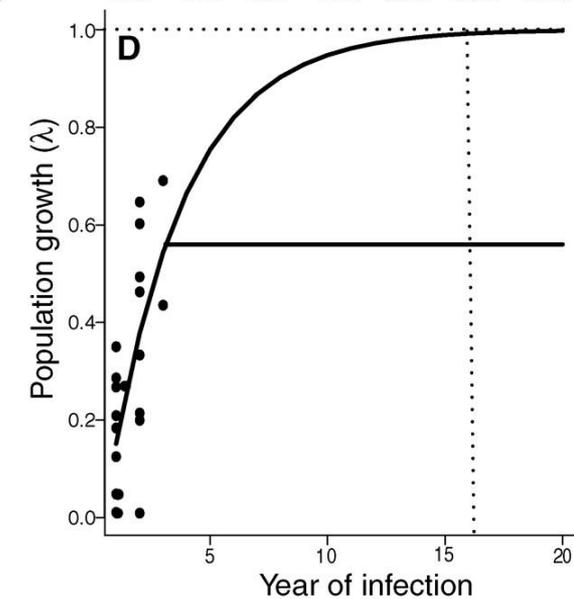
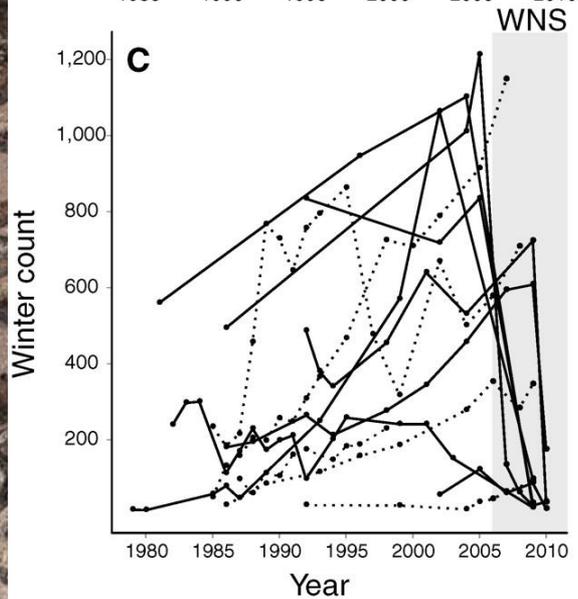
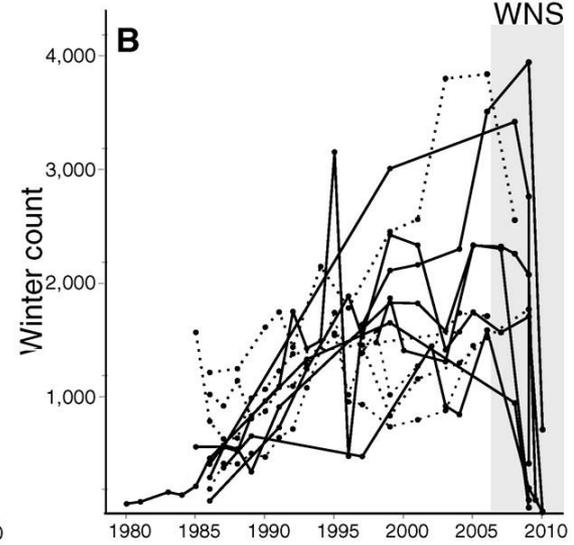
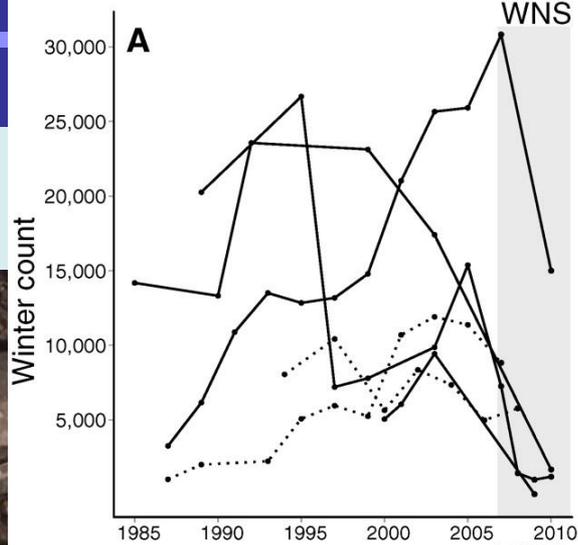
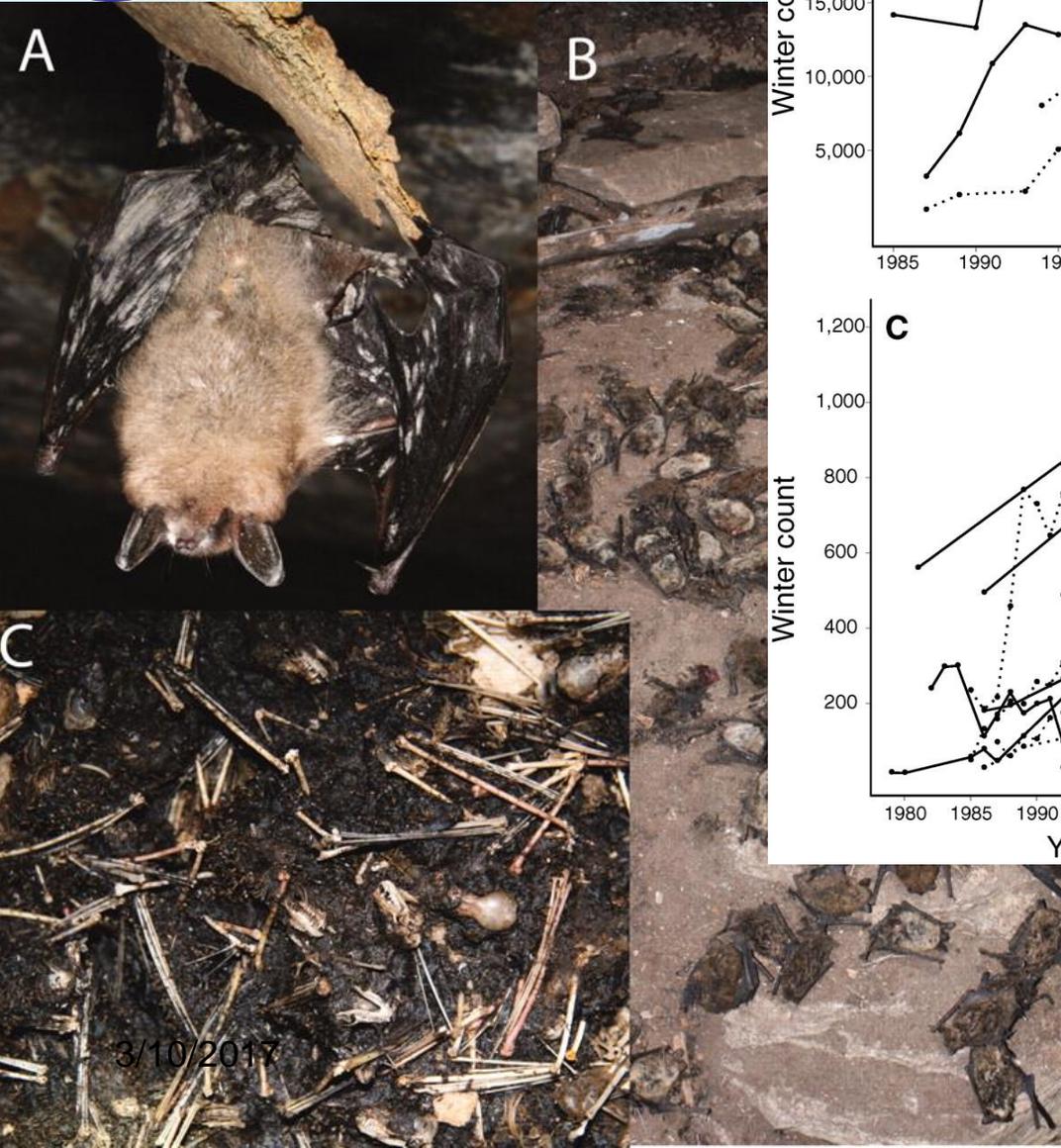
Behavioral signs:

- Bats flying outside hibernacula in daylight
- Bats clustering near cave entrances
- Dead bats near cave entrances or on landscape

3/10/2017



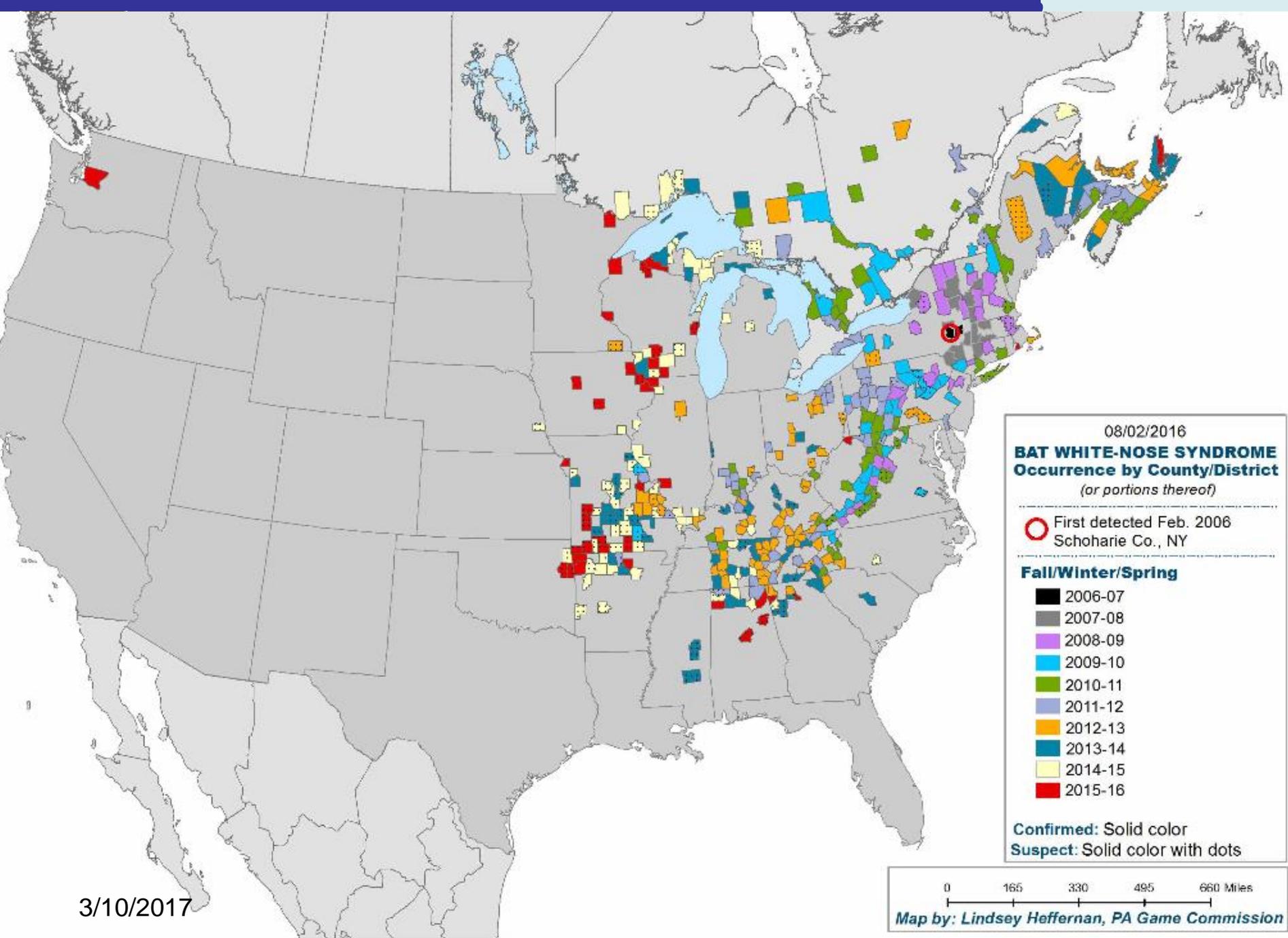
WNS



[http://science.sciencemag.org/
content/329/5992/679](http://science.sciencemag.org/content/329/5992/679)

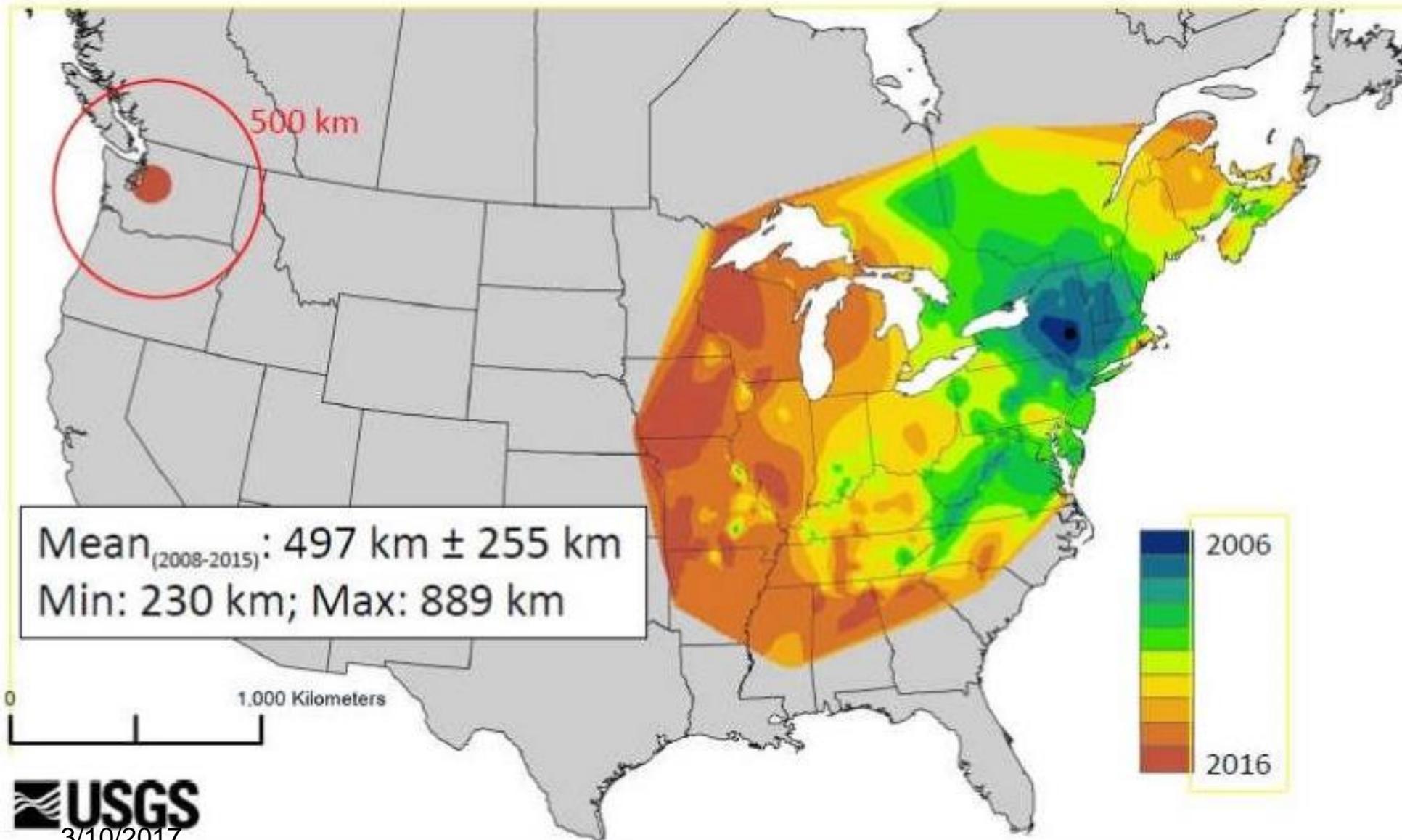
Frick *et al.* 2010

3/10/2017



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Annual Spread of Pd





Listing the NLEB

January 2010:

FWS petitioned to list NLEB

June 2011:

Substantial 90-day finding

October 2013:

Proposed rule to list NLEB as E;
6-month extension

January 2015:

Proposed rule to establish a 4(d) rule;
60-day comment period

April 2, 2015:

Final rule listing NLEB at T with interim 4(d) rule

July 2015:

Extended comment period on 4(d) rule closed

January 14, 2016:

Final 4(d) rule

April 27, 2016:

Critical habitat determined not prudent



4(d) rule for NLEB

What is a 4(d) rule?

- Modifies “take” prohibitions under ESA
 - Option for threatened species only
 - Service can issue regulations deemed “necessary & advisable to provide for the conservation of threatened species.”
 - Does not remove the need for federal agencies to consult on activities that “may affect”
- Because WNS is major threat to species, treated WNS areas different than non-WNS areas
 - Focuses protections on vulnerable periods within the bat’s life history within the WNS-affected area:
 - Females with young, where known
 - Spring staging & fall swarming
 - Hibernation

NLEB

<https://www.fws.gov/midwest/endangered/mammals/nleb/FAQs/interim4dRuleNLEB.html>



Definitions

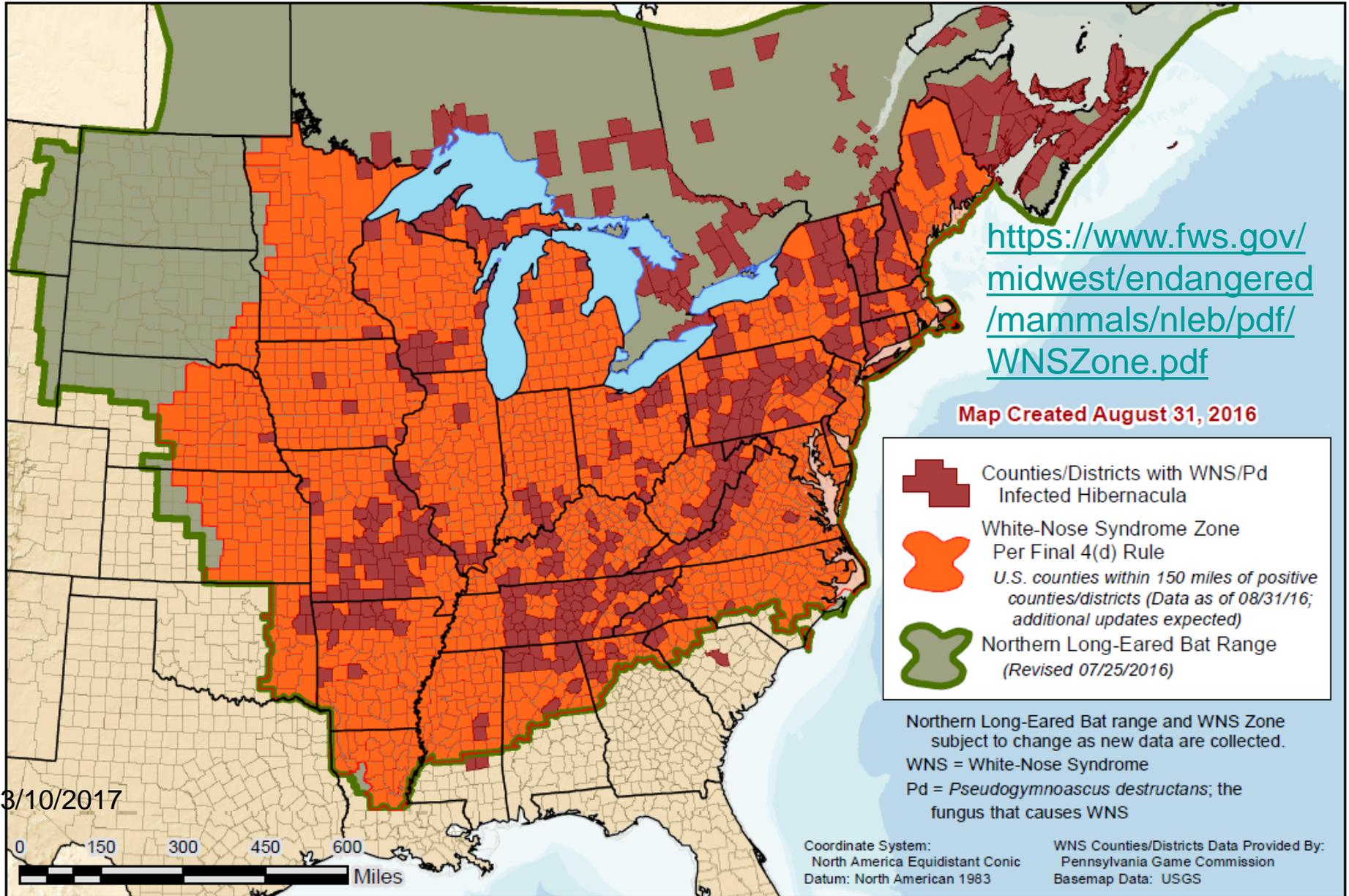
- **“Take”** - defined by the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect.”
- **“Purposeful take”** - when the reason for the activity or action is to conduct some form of take.
- **“Incidental take”** - take that is "incidental to, & not the purpose of, the carrying out of an otherwise lawful activity."



U.S. Fish & Wildlife Service

Northern Long-Eared Bat Final 4(d) Rule

White-Nose Syndrome Zone Around WNS/Pd Positive Counties/Districts





4(d) rule for NLEB

Entire Range of Bat:

- All “**purposeful take**” is prohibited, unless authorized by a permit, except under these circumstances:
 - Defense of human life (e.g., public health monitoring)
 - Removing hazardous trees
 - Removing bats from human structures
 - Limited research permit exemption through May 3, 2016



<https://www.fws.gov/midwest/endangered/mammals/nleb/>



4(d) rule for NLEB

Non-WNS areas (including Wyoming)

- No purposeful take allowed (without normal permitting/section 7 process) except:
 - Removal from human structures (in compliance with State regulations)
 - Take associated with research/monitoring with USFWS/State permit
- No “incidental take” prohibitions at all



4(d) rule for the NLEB

WNS areas (most of the range)

- No purposeful take (without normal permitting/section 7 process) except:
 - Removal from human structures (in compliance with State regulations)
 - Take associated with research/monitoring with USFWS/State permit
- All “incidental take” prohibitions apply except those specifically addressed in the rule:
 - Incidental take associated with these activities as long as conservation measures are followed:
 - Forest management
 - Prairie management
 - Minimal tree removal (≤ 1 acre)
 - ROW maintenance & expansion within 100 feet of existing ROW
 - Incidental take associated with
 - Hazardous tree removal (no conservation measures required)



4(d) rule for the NLEB

Conservation measures

- (i) Occur more than 0.25 mile (0.4 km) from a known, occupied hibernaculum (any time of year);
- (ii) Avoid cutting or destroying known, occupied maternity roost trees during the pup season (June 1 – July 31)
- (iii) Avoid clearcuts (or similar treatments) within 0.25 mile (0.4 km) of known, occupied maternity roost trees during the pup season (June 1 – July 31)



4(d) rule for the NLEB

- Does not “exempt” activities, instead exempts/excepts “take” associated with certain activities
- Does not say that “take” is always likely with the listed activities
- 4(d) conservation measures ≠ no “take” or not likely to adversely affect
- 4(d) conservation measures will minimize “take”
- “Take not addressed in 4(d) would need to be authorized through section 7/section 10 processes
- Does not remove the need for federal agencies to consult on activities that “may affect” NLEB
- Can proactively do more than what is in the 4(d)
 - Consider conservation measures that result in no adverse effects or “no take”



Support for the 4(d) rule

- WNS is only range-wide threat
- Populations are healthy pre-WNS & outside WNS zone
- Extensive range
- Uses variety of habitat types
- Small percent of habitat impacted each year
- Tolerant of human activities
- Broad habitat protections are impractical
 - Uses a variety of habitat types
 - species distribution is patchy
 - low relative exposure to non-WNS threats
- Post-WNS fewer bats exposed to human activities
- Until we can address WNS, regulatory prohibitions are not practical tools for conserving bats. Minimizing prohibitions will help foster partnerships for recovery



Programmatic BO for 4(d) rule

Programmatic intra-Service consultation for final 4(d) rule:

- Federal agencies can use this BO & framework to fulfill their project-specific section 7(a)(2) responsibilities
- Federal agency makes a determination that action “may affect” but will not cause prohibited take
- Framework is efficient means for FWS to verify federal agency determinations



Step A

- Agency determines action “may affect” the NLEB



Step B

- Agency determines that potential incidental take is not prohibited under 4(d) rule & documents this



Step C

- Federal agency provides written notification to Wyoming ES FO



Step D

- Service concurrence not required
- If Service does not respond within 30 days, presume determination is correct & proceed
- WY ES FO plans to respond to all requests within 30 days

<https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html>



Consulting on NLEB

Specific steps

1*) Use IPaC to draw project action area

<https://ecos.fws.gov/ipac/>

1a) Is the project within the area of influence (AOI) of the NLEB?

1b) Is the project within the WNS buffer?

1c) Any known roosts, captures, or detections in or near the project area?

Will need to conduct surveys when within WNS 150-mile buffer instead of just saying “no” because no survey effort

2) Does the project contain suitable habitat for NLEB?

Trees ≥ 3 inches dbh, cracks, crevices, cavities, loose bark

Bridges & other structures



Consulting on NLEB

3) Is the project likely to impact NLEB &/or their habitat?

Tree removal/trimming

Noise

Lighting

Smoke

Bridge work

4) What conservation measures can be included?

Winter work

Avoid/minimize tree removal

Avoid impacting known roosts or foraging areas

Focus lighting away from suitable habitat

Etc.



Consulting on NLEB

5) Coordinate with:

Involved federal agencies

USFWS Field Office (me)

State agencies



©S. Johnson



Streamlining using PBO for 4(d) rule

Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

Information to Determine 4(d) Rule Compliance:	YES	NO
1. Does the project occur wholly outside of the WNS Zone ¹ ?	<input type="checkbox"/>	<input type="checkbox"/>
2. Have you contacted the appropriate agency ² to determine if your project is near known hibernacula or maternity roost trees?	<input type="checkbox"/>	<input type="checkbox"/>
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	<input type="checkbox"/>	<input type="checkbox"/>
4. Could the project alter the entrance or interior environment of a known hibernaculum?	<input type="checkbox"/>	<input type="checkbox"/>
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	<input type="checkbox"/>	<input type="checkbox"/>
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	<input type="checkbox"/>	<input type="checkbox"/>

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

Agency and Applicant³ (Name, Email, Phone No.):

Project Name:

Project Location (include coordinates if known):

Basic Project Description (provide narrative below or attach additional information):

General Project Information	YES	NO
Does the project occur within 0.25 miles of a known hibernaculum?	<input type="checkbox"/>	<input type="checkbox"/>
Does the project occur within 150 feet of a known maternity roost tree?	<input type="checkbox"/>	<input type="checkbox"/>
Does the project include forest conversion ⁴ ? (if yes, report acreage below)	<input type="checkbox"/>	<input type="checkbox"/>
Estimated total acres of forest conversion		
If known, estimated acres ⁵ of forest conversion from April 1 to October 31		
If known, estimated acres of forest conversion from June 1 to July 31 ⁶		
Does the project include timber harvest? (if yes, report acreage below)	<input type="checkbox"/>	<input type="checkbox"/>
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	<input type="checkbox"/>	<input type="checkbox"/>
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	<input type="checkbox"/>	<input type="checkbox"/>
Estimated wind capacity (MW)		

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature: _____

Date Submitted: _____



Example projects in Wyoming

Example 1: Federal project within NLEB AOI.

No suitable habitat (winter or summer)
or Negative acoustic or mist-net surveys

- Federal agency determination: No effect
- Federal agency request: No request to Service needed as long as they document “no effect” in their records
- USFWS response: No response required. If a letter is submitted, we can respond with a “no concern” stamp or letter



Example projects in Wyoming

Example 2: Federal project within NLEB AOI, suitable summer habitat, no documented roosts or foraging areas impacted, assuming presence, small amount of winter tree removal, 10 miles from hibernacula

- Federal agency determination: May affect, but not likely to adversely affect (insignificant &/or discountable effects)
- Federal agency request: Consult on “may affect” using 4(d) rule programmatic consultation streamlined form (submit project information & timing, signed by supervisor)
- USFWS Response: Send 4(d) rule programmatic consultation response if we concur, or non-concurrence letter if we do not concur (in which we would recommend formal consultation or minor project change)



Example projects in Wyoming

Example 3: Federal project within NLEB AOI, suitable summer habitat, assuming presence, May forest management, unknown distance from hibernacula

- Federal agency determination: May affect, likely to adversely affect, all take excepted by 4(d) & included in PBO
- Federal agency action: Consult on “may affect” using 4(d) rule programmatic consultation streamlined form (submit project information & timing, signed by supervisor)
- USFWS response: Send 4(d) rule programmatic consultation response if we concur, or non-concurrence letter if we do not concur (in which we would recommend formal consultation or minor project change)



Example projects in Wyoming

Example 4: Non-federal project within NLEB AOI, suitable summer habitat, assuming presence, May forest management, unknown distance from hibernacula. No purposeful take.

- Private individual: No requirement to consult under 7(a)(2) of ESA.
- USFWS response: Based on 4(d) rule, incidental take is not prohibited in areas outside WNS buffer zone. You may proceed with your activity, you do not need a permit, & you do not need to contact USFWS.



Example projects in Wyoming

Example 5: Non-federal project within NLEB AOI, suitable summer habitat, assuming presence, May forest management, unknown distance from hibernacula. No purposeful take. WNS has moved closer to Wyoming & we are now within the WNS buffer zone.

- Private individual: No requirement to consult under 7(a)(2) of ESA. Expect no project impacts to hibernacula or near its entrance.
- USFWS response: Based on 4(d) rule, incidental take from tree removal activities is not prohibited unless it results from removing a known occupied maternity roost tree or from tree removal activities within 150 feet of a known occupied maternity roost tree from June 1 through July 31 or results from tree removal activities within 0.25 mile of a hibernaculum at any time. You may proceed with your activity, you do not need a permit & you do not need to contact the USFWS.



Avoidance & minimization measures

All AMMs from the: *December 2016 Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), & Federal Transit Administration (FTA) Range-wide Programmatic Consultation for Indiana Bat & Northern Long-eared Bat*

General AMM 1: Ensure all operators, employees, & contractors working in areas of known or presumed habitat are aware of all environmental commitments.

Lighting AMM 1: Direct temporary lighting away from suitable habitat during the active season.

Lighting AMM2: Use downward-facing, full cut-off lens lights, & direct lighting away from suitable habitat when installing new or replacing existing permanent lights.

<https://www.fws.gov/midwest/endangered/section7/fhwa/index.html>



Avoidance & minimization measures

Tree removal AMM 1: Modify all phases/aspects of project to the extent practicable to avoid tree removal in excess of what is required to implement the project safely.

Tree removal AMM 2: Apply time of year restrictions for tree removal when bats are not likely to be present.

Tree removal AMM 3: Ensure tree removal is limited to that specific in project plans. Install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits. Ensure that contractors understand clearing limits & how they are marked in the field.

Tree removal AMM 4: Do not cut down documented roosts (still suitable for roosting) or trees within 0.25 miles of roosts, or documented foraging habitat at any time of year.



Bridge AMM 1: To completely avoid direct effects to roosting bats, perform any bridge repair, retrofit, maintenance, &/or rehabilitation work during the winter hibernation period. Also follow Bridge AMM 5.

Bridge AMM 2: If construction activity is planned during the active season, perform a bridge assessment for presence of bats.

Bridge AMM 3: If bridge assessment for bats suggests presence of bats, ensure activity will not disturb bats. The following types of work can be conducted with the presence of bats:

- Above deck work that does not drill down to the underside of deck or include percussives (vibration) or noise levels above general traffic (e.g. road paving, wing-wall work, work above that does not drill down to the underside of deck).
- Below deck work that is conducted away from roosting bats & does not involve percussives or noise levels above general traffic (e.g. some abutment, beam end, scour, or pier repair). Also follow Lighting AMM 1.

Bridge AMM 4: If bridge assessment for bats suggests presence of a small # of bats, conduct bridge repair, retrofit, maintenance, &/or rehabilitation work outside of pup season (June 1-July 31) & keep light localized in the evening when bats are feeding, starting one hour after sunset & ending one hour before daylight, excluding the hours between 10pm & midnight.

Bridge AMM 5: Ensure suitable roosting sites remain after any bridge work. Suitable roosting sites may be incorporated into the design of a new bridge.



Avoidance & minimization measures

Structure AMM 1: If the goal of the project is to exclude bats, coordinate with local USFWS Field Office & follow “Acceptable Management Practices for Bat Control Activities in Structures” guidance document (WNS Conservation & Recovery Working Group 2015).

Structure AMM 2: Perform any maintenance &/or repair work during the winter hibernation period unless a hibernating colony of bats is present.

Structure AMM 3: If maintenance &/or repair work will be performed outside of the winter hibernation period, determine if work will occur in an area with roosting bats. If there is observed bat activity, conduct maintenance activity or similar structure alteration when bats are not present (i.e. foraging) or in a manner that will not disturb them.

Structure AMM 4: If roosting bats or signs of roosting bats are observed, avoid removing the structure.

- NOTE: If there are concerns about human health/safety/property coordinate with a nuisance wildlife control officer & the local USFWS Field Office.



Avoidance & minimization measures

Hibernaculum AMM 1: For projects located within karst areas, on-site personnel will use best management practices, secondary containment measures, or other standard spill prevention & countermeasures to avoid impacts to possible hibernacula.

- Where practicable, a 300-foot buffer will be employed to separate fueling areas & other major containment risk activities from caves, sinkholes, losing streams, & springs in karst topography.



Planning



Version 2 anticipated May 2017

https://www.whitenosesyndrome.org/sites/default/files/resource/wns_wy_strategicplan_v1_1_11_262012.pdf

3/10/2017

A Strategic Plan for White-nose Syndrome in Wyoming



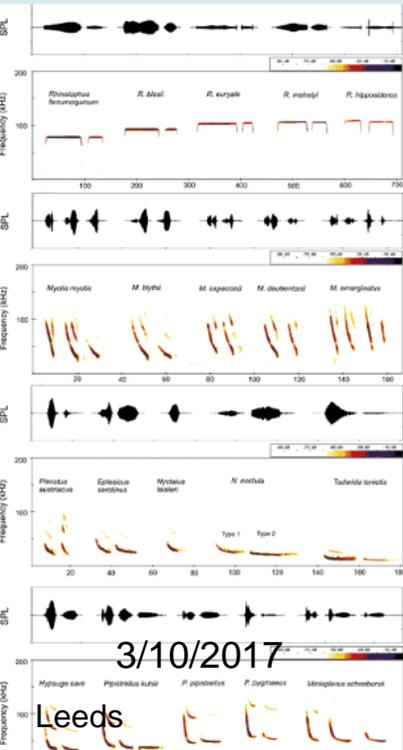
Hibernating Townsend's big-eared bat, Washakie County, Wyoming. Photo by S. Johnson. 2009.

Becky Abel and Martin Grenier



Surveying for NLEB

<https://www.fws.gov/midwest/Endangered/mammals/inba/surveys/pdf/2016IndianaBatSummerSurveyGuidelines11April2016.pdf>



USFWS



USNPS



Surveillance for Pd & WNS

Sampling Strategies

- Surveillance (active):
 - Hibernating or trapped bats (Dec-May)
 - Wing/muzzle swab, \pm wing biopsy, \pm guano sample
 - Environmental samples-
 - hibernaculum(all year), "summer" roosts (Apr-May)
 - Soil/guano sample or substrate swab
- Surveillance (passive):
 - carcasses of sick or dead bats (Nov-Jun)
 - Public reports, Rabies lab



Sampling Methods by Surveillance Strategy

- **Hibernaculum surveys**
 - Wing/muzzle swab
 - Soil or environmental swab
- **Summer roost surveys** (maternity colonies, night roosts, etc.)
 - Wing/muzzle swab
 - Environmental swab
 - Guano (from bat, substrate?)
- **Landscape trapping surveys**
 - Wing/muzzle swab
 - Guano (from bat)

Target sample size
15-25 bats per site*
30 enviro per site
?? guano per site

*Reduce if clinical signs
present





Implications for surveillance



- Surveillance in leading edge & western states using active & passive methods
- Early detection of Pd achieved by sampling bats
 - hibernaculum best source
- Small winter bat populations ≠ no Pd introduction

Keeping stressors in perspective

- **Bats have low reproductive potential**
- **Populations with stable or declining baselines cannot sustain repeated losses**
- **We have limited options to quickly increase survival/reproduction**
- **Avoiding impacts (conservation measures) are our best option whenever possible**