Indiana Bat and Northern Long-eared Bat Conservation Research/Monitoring Needs

May 2016

The following is a list of research/monitoring needs for the Indiana bat and northern long-eared bat (NLEB). This was developed for transportation agencies to consider funding or otherwise supporting as part of the rangewide consultation on Indiana bats and NLEB. This list should be updated periodically.

1. **Conduct research to help refine effects analyses for transportation projects.**
    a. *Evaluate bridge use by NLEB and/or Indiana bats*
        i. Several studies ongoing
    b. *What kinds of disturbance cause impacts to bats roosting under bridges?*
    c. *What situations are likely to result in the greatest risks of road mortality to NLEB and/or Indiana bats?*
    d. *Road designs to allow safe passage of bats (e.g., bat underpasses)*
    e. *Bat friendly bridge designs that provide favorable roosting habitat while minimizing impact on bridge maintenance/repair*

2. **Promote research to address information gaps related to summer and winter habitat and migration.**
    a. *NLEB*
        i. Spring
            1. What is the timing of spring emergence?
                a. Conduct acoustic monitoring.
                b. Conduct visual emergence surveys.
            2. How far are NLEB migrating from hibernacula to summer habitat?
            3. Are NLEB following any landscape features during migration?
            4. Do NLEB come from multiple hibernacula to form their maternity colonies?
        ii. Summer
            1. What is the current summer distribution of NLEB?
            2. What is the minimum patch size for roosting?
            3. What is the minimum percent forest cover within summer home range?
            4. How far away from forest patches will NLEB travel to use roosts (at what distance are potential roosts considered not suitable/isolated)?
            5. How frequently do NLEB roost in structures in summer?
            6. Determine value/use of bat boxes by NLEB.
        iii. Fall
            1. What is the timing of hibernation?
                a. Conduct harp trapping.

b. Conduct acoustic monitoring.

2. How far do NLEB swarm from hibernacula?
    a. Conduct fall telemetry.

iv. Winter

1. Where are NLEB hibernating?
    a. Develop/implement new presence/probable absence techniques for hibernacula including use of passive acoustics and beam break technologies.
    b. Conduct fall telemetry to locate hibernacula.
    c. Conduct fall acoustics to determine activity levels in late fall in specific areas.
2. What are NLEB hibernating population sizes?
3. How frequently do NLEB roost in structures in winter?

b. Indiana bat –

i. Summer habitat mitigation effectiveness monitoring.

1. Are Indiana bats using mitigation lands?
2. Is size and/or productivity of colony enhanced by mitigation.

ii. Winter

1. Analysis of distribution of Indiana bats in hibernacula post-WNS. Characteristics (e.g., microclimate) of hibernacula with stable populations (or those with less decline).

iii. Summer

1. What is the current summer distribution of Indiana bats (see 3.a.)?
2. What is the minimum patch size for roosting?
3. What is the minimum percent forest cover within summer home range?
4. How far away from forest patches will Indiana bats travel to use roosts (at what distance are potential roosts considered not suitable/isolated)?
5. How frequently do Indiana bats roost in structures in summer?
6. Determine value/use of bat boxes by Indiana bats.

3. Provide guidance on prioritizing occupied summer and winter habitat for protection and restoration at range-wide and state levels (e.g., travel corridors, historic maternity grounds, hibernacula).

a. Where are remaining Indiana bat and NLEB maternity colonies in WNS-affected areas? Is the distribution the same and bats in lower numbers and/or smaller colonies, or are Indiana bats and/or NLEB concentrated (coalescing colonies)?

i. Support acoustic and netting efforts for Indiana bat and NLEB
    1. Target large landholders
    2. Target prior colony locations
ii. Support netting efforts where Indiana bats/NLEB have recently been documented to look for maternity colonies
iii. Support spring emergence projects to locate remaining colonies
iv. Conduct follow-up emergence surveys, other monitoring to estimate reproductive rates

b. Determine and prioritize caves and abandoned mines occupied by federally listed species that need gating

4. Monitor bat populations

a. Implement inter-agency population monitoring program (NABat)
i. acoustic monitoring
    1. points
    2. Transects
ii. colony counts
    1. winter
    2. summer
iii. Fund analysis of data

b. Monitor survival/reproduction
i. Monitor known winter and summer colonies (see above)
ii. Support research related to WNS impacts on NLEB and/or Indiana bats
    1. Determine if, where and who is surviving WNS? Reproducing?
    2. Why are we having survivors? What about them?
iii. Support research related to WNS treatments for NLEB and/or Indiana bats
    1. Develop tools for assisting with practical management decisions to determine if treatments are a feasible and practical option for either species
    2. If so, support treatment trials for these species.