U.S. Fish & Wildlife Service

Land-based Wind Energy Voluntary Avoidance Guidance for the Tricolored Bat (*Perimyotis subflavus*)

Last updated March 25, 2024

BACKGROUND

On September 13, 2022, the U.S. Fish and Wildlife Service (Service) published a proposed rule to list the tricolored bat (*Perimyotis subflavus*) as endangered under the Endangered Species Act (ESA). Many wind energy projects already exist within the range of tricolored bats, and more are anticipated (USFWS 2021, Appendix 5). Tricolored bat fatalities from collisions with wind turbine blades have been documented at various projects throughout the species' range (USFWS 2021, p. 38-40). However, wind projects can be operated in ways that reduce or avoid the risk of collisions. This guidance articulates how (new or existing) land-based wind energy projects can site and operate in a manner in which incidental take of tricolored bat is not "reasonably certain to occur" [1] and conduct standard postconstruction monitoring to validate the effectiveness of the guidance at individual wind projects. Implementation of the guidance and the Service's conclusion on whether incidental take of tricolored bats is reasonably certain to occur is memorialized through the use of a technical assistance letter (TAL). Refer to the Tricolored Bat (TCB) Wind Guidance Frequently Asked Questions (TCB Wind Guidance FAQs) document for additional background information and how this guidance could be applicable to your project.

This guidance was developed to be generally applicable, but risk may vary across the range. Wind energy facilities that operate differently than explained in this guidance are not automatically considered to be at risk of take of tricolored bat under the ESA. As explained below, wind facilities can also use their own project-specific information and data to determine risk to TCBs. We recommend coordinating with local Field Offices. Ultimately, it is the facility or associated company's decision whether to pursue a take permit

DIRECTION AND ELIGIBILITY

1. Siting

   As a general bat conservation measure, we recommend all turbines be sited away from suitable roosting habitat (USFWS 2021, pgs. 17-18). Specifically, we recommend Projects use at least a 1,000-foot (ft; 0.3 kilometer (km)) buffer, as measured from a distance from closest suitable roosting habitat to the edge of the turbine rotor-swept area. However, note

[1] The reasonable certainty standard is explained in 80 FR 26832 and Section 3.1 of the Service's Habitat Conservation Planning and Incidental Take Permit Processing Handbook.

that implementing the 1,000-ft setback does not constitute avoidance of summer risk (see #2 below).

2. Determining Species Presence
   Coordinate with the local Field Office to determine if your project or action area (50 CFR § 402.02) contains confirmed presence of a tricolored bat summer occurrence[2] during the summer survey dates provided in the most current version of the Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines (https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines), or is located within 3.0 mi (4.83 km) of recent summer occurrence (i.e., a record during the summer survey dates) records. Please coordinate with your local Field Office to determine if additional surveys are recommended to better understand seasonal risk to TCB. If presence/probable absence (P/A) surveys will be conducted, projects (new and existing) should follow the most current version of the Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines and have survey study plans approved by the local Field Office before implementing. If project proponents have previously completed preconstruction P/A bat surveys using the minimum level-of-effort (LOE) required for other listed bat species (e.g., Indiana bat or northern long-eared bat) at the time of the surveys, results should be submitted to the local Field Office along with the request for the TAL. Field Offices may choose to accept these survey data collected prior to 2023 but may also request additional surveys that specifically target tricolored bats[3]. Note: we assume the presence[4] of migrating tricolored bats throughout the range of the species because bats may use the airspace affected by wind turbines while migrating, even if the species is not detected onsite during summer surveys.
3. Optional Approaches
   Operate using one or a combination of the three following options. Please coordinate with your local Field Office to discuss which avoidance strategy your project will implement.
   a. **Option 1:** Projects can use the blanket curtailment approach outlined below or a more protective streamlined approach[5].

[2] White-nose syndrome (WNS) is a threat to tricolored bats, and the disease has not yet reached parts of the species' range, although it is expected to in the future. Therefore, the local Field Office will determine what qualifies as "confirmed presence," which may change over time. For most of the tricolored bat range, recent records are those collected during the established (5 to 7 years after the arrival of *Pseudogymnoascus destructans* [Pd]) and endemic (7 to 8+ years post-*Pd*) phases of WNS as described in the Tricolored Bat Species Status Assessment (USFWS 2021, pg. 34).

[3] TCB were not included in summer survey guidance before 2023; however, negative surveys may be valid if acoustic detectors were used before 2023. See 2023 Indiana Bat and Northern Long-eared Bat Summer Survey Guidelines FAQs (fws.gov), questions 1 and 5.

[4] Companies can use project-specific information and data to determine tricolored bat risk.

[5] The streamlined approach is an option for projects that want to reduce the number of curtailment threshold modifications over a given year. The streamlined approach would require projects to feather turbines below 12.3 mph (5.5 m/s) from March 15 to July 14, 15.4 mph (6.9 m/s) from July 15 to September 30, and 5.0 m/s from October 1 to November 15. The specific timing of curtailment will be dependent on the project location (see appendix A). If a project does not have summer risk, it can operate at the manufacturer's cut-in speed from May 15 to July 14. Projects in year-round active zones will need to use a curtailment speed of 6.9 m/s from November 16 to March 14.

i. For all projects, curtail turbines starting 30 minutes before sunset to 30 minutes after sunrise and when temperatures are above 40 degrees Fahrenheit[6] (ºF; 4.44 degrees Celsius (°C)). See appendix A for a table that outlines this curtailment approach based on the project location (i.e., state and zone).

ii. For all projects, during peak migration periods, feather turbines below 12.3 mph (5.5 m/s) from May 1 to 14, below 13.4 mph (6.0 m/s) from July 15 to July 31[7], and below 15.4 mph (6.9 m/s) from August 1 to September 30.

iii. For projects that have demonstrated probable absence of tricolored bats in the summer (see #2, above), feather turbines below the manufacturer's cut-in speed[8] from May 15 to July 14.

iv. For projects that have not demonstrated probable absence of tricolored bats in the summer (see #2, above), feather turbines below 12.3 mph (5.5 m/s) from May 15 to May 31 and below 11.2 mph (5 m/s) from June 1 to July 14.

v. For projects that have year-round tricolored bat activity[9], feather turbines below 15.4 mph (6.9 m/s) when temperatures are above 40ºF; 4.44 °C) from November 16 to March 14. Projects should feather turbines below the manufacturer's cut-in speeds during this time when temperatures are below 40°F[10].

vi. For all projects, feather turbines below 11.2 mph (5.0 m/s) during the active season outside of specific dates and curtailment speeds provided above (i.e., #3.a.i – iv).

b. **Option 2:** Projects can use an algorithm-based informed curtailment (ABIC) approach that is at least equally protective as Option 1 (i.e., demonstrate that turbines were feathered during all periods when TCB calls were detected, at minimum, under the conditions [season, temperature, wind speed, etc.] specified in Option 1, described above). See appendix B for additional details and sideboards for implementation, monitoring, and reporting using this option.

i. In Year 1, operate using Option 1 (outlined above) and simultaneously collect bat acoustic data for the entirety of the bat active season[11]. For example, for a

[6] Temperatures should be measured at the nacelle and can be specific to individual turbines on a project. For example, if the temperature at the turbine's nacelle falls below 40°F then the turbine does not need to be curtailed as long as the temperature at the nacelle is below 40°F. We based this temperature threshold on data collected at a wind project in Missouri and data from Jordan (2020).

[7] The increased windspeed during this time is based on data demonstrating increased tricolored bat fatalities during fall migration. See FAQ # 3 and 4.

[8] Manufacturer's cut-in speed is defined as the cut-in speed at which the turbine begins to generate power as it rotates and is determined for each specific turbine model by the manufacturer (i.e., Vestas, GE Renewable Energy, PacWind, etc.).

[9] Year-round zones are identified in Appendix L of the Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines | FWS.gov.

[10] Manufacturer's cut-in speed is defined as the cut-in speed at which the turbine begins to generate power as it rotates and is determined for each specific turbine model by the manufacturer (i.e., Vestas, GE Renewable Energy, PacWind, etc.).

[11] Peterson (2021) highlights the importance of collecting acoustic data for the entirety of the active season to understand seasonal trends of bat activity and exposure.

project in a zone with year-round activity, collect acoustic data for a full year to complete Year 1. Alternatively, for a project in the hibernating range, collect acoustic data only during the active season to complete the data collection for Year 1.

ii. Place acoustic detectors on a minimum of 15 percent[12] of all turbines on the nacelle. If a project would like to place additional detectors on turbine towers or on the ground, that is acceptable if it is in addition to the minimum proportion of nacelle-mounted acoustic detectors. See appendix B for additional sideboards about acoustic detector placement.

iii. At the end of Year 1, process the data to model a site-specific ABIC approach that is at least equally protective of tricolored bats as Option 1 (described above). Coordinate with the local Field Office on the ABIC approach proposed for the project and the implementation schedule. See appendix B for additional sideboards. We recommend obtaining a TAL from the local Field Office.

iv. Starting Year 2, implement ABIC at all turbines.

v. The project may continue to collect acoustic data after Year 1 to fine-tune its ABIC approach[13]. If the project would like to make modifications to its ABIC approach, follow b. ii. through b. iv. as outlined above.

c. **Option 3:** Projects can use a real-time acoustic-activated smart curtailment approach that is at least equally protective as Option 1 (i.e., turbines feathered during all periods when bat calls were detected, at minimum, under the conditions [season, temperature, wind speed, etc.] specified in Option 1). See appendix B for additional details and sideboards for implementation, monitoring, and reporting using this option.

i. Coordinate closely with the local Field Office before implementing Option 3 regarding the layout of turbines equipped with real-time smart curtailment technology and the associated zones (i.e., turbines that will turn on or off in conjunction with a particular turbine fitted with the real-time technology when a bat is detected). We recommend obtaining a TAL from the local Field Office[14].

ii. Place acoustic detectors associated with real-time technology on a minimum of 10 percent of project turbines on the nacelle.

iii. Submit annual reports to the local Field Office by January 31 each year to confirm that the smart curtailment technology is operating as expected. See appendix B for more details on what information is expected.

[12] This level of effort minimum is necessary to allow for the project to collect enough acoustic data to generate an avoidance ABIC approach that can be implemented in Year 2, as we assume some detectors will malfunction during data collection. Project proponents may choose to place more detectors in order to increase the sample size of call files (see Appendix B)"

[13] This is optional as the general activity trends tend to be consistent between survey years (Peterson 2021).

[14] No delay in Option 3 implementation, compared to Option 2 because data is collected and instantly used by the curtailment system to feather turbines.

iv. Use all bat calls as the trigger for the real-time acoustic smart curtailment strategy.

v. Implement a maintenance schedule to ensure that equipment is operating correctly and to replace old or malfunctioning equipment (i.e., microphones and acoustic detectors).

4. Standardized Post-Construction Mortality Monitoring

*a. Projects implementing **Option 1** or **Option 3***

Conduct 1 year of postconstruction mortality monitoring (PCMM)[15] during the entire active season. For projects within the year-round active zones, monitor throughout the year when temperatures are above 40°F (4.44 °C). In coordination with the local Field Office, design and implement a postconstruction mortality monitoring plan to reach a detection probability (g-value) of at least 0.2 using Evidence of Absence (EoA) (Dalthorp et al. 2017) or design an alternative sampling design for ridgelines or mountains where the landscape precludes the search area needed to reach a g-value of at least 0.2. Companies with existing post-construction fatality monitoring data can submit the data to the Field Office for determination of sufficiency. Field Offices that receive requests for different minimum g-values or existing data will coordinate with Regional Offices for consistency.

b. *Projects implementing **Option 2***

i. In Year 1, while collecting ABIC data, conduct (PCMM)[16] during the entire active bat season. For projects within the year-round active zones, monitor throughout the year when temperatures are above 40°F. In coordination with the local Field Office, design and implement a PCMM plan to reach a g-value of at least 0.08 using EoA or design an alternative sampling design for ridgelines or mountains where the landscape precludes the search area needed to reach a g-value of at least 0.08.

ii. In Year 2, while implementing ABIC, conduct 1 year of more intensive PCMM during the entire active season (or when temperatures are above 40°F for projects within year-round active zones). In Year 2, design and implement a PCMM plan to reach a g-value of at least 0.2 using EoA or design an alternative sampling design for ridgelines or mountains where the landscape precludes the search area needed to reach a g-value of at least 0.2. Field Offices that receive requests for different minimum g-values or existing data will coordinate with Regional Offices for consistency.

c. *Monitoring Reports*

[15] The Service is currently developing a monitoring framework for wind projects with a low risk of taking listed bat species. We intend to use the new framework in place of these monitoring requirements when completed.

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Annual report(s) will be sent to the Field Office by January 31st. Annual reports will also reaffirm that operational commitments were implemented (i.e., operating at cut-in wind speeds and implementing PCMM as designed[17]). Annual reports with PCMM will include compiled bat fatality data for all bat species using this Reporting form (Region 3 Wind Post-Construction Monitoring Bat Reporting Form | FWS.gov), unless another format is requested by the local Field Office outside of Region 3. The Service will provide an email confirming if the TAL is still valid 90 days after a report is received.

d. Bat Identification

Bats found during PCMM must be identified by a qualified biologist. However, initial fatality searches may be carried out by nonqualified biologists. In this context, a qualified biologist is one who has demonstrated experience correctly identifying bat species that occur in the area where the surveys are occurring and possesses or is authorized by a valid ESA section 10(a)(1)(A) permit. If potential bat remains cannot be visually ruled out as tricolored bat (or another federally listed species), a tissue sample should be taken and submitted to a qualified lab for generic determination of the individual's species identification.

e. *Modifying PCMM*

If no tricolored bats are found during the first year (or in Year 2 for projects using **Option 2**) of PCMM, and PCMM was implemented as designed even if the g-value was not achieved, the PCMM can be further reduced to once every 7 years[18] during the entire active bat season at a minimum g of 0.08 or otherwise agreed-upon alternative sampling design approved by the local Field Office and Regional Office. Note, projects utilizing smart curtailment, specifically Option 3, may use acoustic data as a proxy for fatality searches if approved by the local Field Office[19]. Long-term interval PCMM is necessary because risk can change as environmental variables change over time. Coordinate with your local Field Office on the sampling design for these surveys using EoA or alternative tools.

5. Reporting Take

If any tricolored bat or other federally listed species carcasses are found during mortality monitoring, the company must report the fatality within 24 hours of discovery to the local Field Office and the USFWS Office of Law Enforcement (OLE). It is not possible to absolve individuals or companies from liability for unpermitted take of listed species, even if such take occurs despite the implementation of appropriate minimization strategies to which take

[17] The Service will accept the monitoring results if the report demonstrates that post-construction mortality monitoring was implemented as designed, even if targeted g-values fell short due to unavoidable circumstances).
[18] The Service is currently developing a monitoring framework for wind projects having a low risk of taking listed bat species. We intend to use the new framework in place of these monitoring requirements when completed.
[19] This will be dependent on the monitoring framework and guidance related to the use of acoustics (Options 2 or 3) as a proxy for post-construction fatality searches. We intend to implement the new framework's recommendations once completed. In the meantime, these projects should submit the following requested data as described in appendix B annually to the local Field Office.

is not reasonably certain to occur, such as described in this guidance. However, the OLE focuses its enforcement resources on individuals and companies that take listed species without identifying and implementing all reasonable, prudent, and effective measures to the level that take is not reasonably certain to occur. To be in compliance with the take prohibitions of the ESA, the project must work with the Field Office to implement avoidance measures (e.g., not operating at night during periods of risk) and consider either applying for an Incidental Take Permit under section 10(a)(1)(B) or reinitiate consultation under section 7(a)(2) of the ESA.

SUPPORTING DOCUMENTS

Land-based Wind Energy Avoidance Guidance for the Tricolored Bat: FAQ Supplement
Technical Assistance Letter Template using Option 1 for the Tricolored Bat
Technical Assistance Letter Template using Option 2 for the Tricolored Bat
Technical Assistance Letter Template using Option 3 for the Tricolored Bat
Appendix A. Curtailment Strategy for Option 1 by Location and Date
Appendix B. Sideboards for Smart Technology Strategies to Achieve Avoidance for Tricolored Bats

LITERATURE CITED

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