

1 **USFWS Wind Turbine FAC Recommendations**
2 **January 27-29, 2009**

3
4 **Executive Summary:** (to be written)

5
6 **Chapter 1: Introduction**

7
8 A. Background

9 1. Statement of U.S. Fish and Wildlife Service (the Service) mission:

10 *“Working with others to conserve, protect, and enhance fish, wildlife, and plants and their*
11 *habitats for the continuing benefit of the American people.”*

12
13 2. Purpose of the document and recommendations for its use by the Secretary

14
15 The Wind Turbine Guidelines Advisory Committee (the Committee) transmits to the Secretary in
16 this document our advice and recommendations on effective measures to avoid or minimize
17 impacts to wildlife and their habitats related to land-based wind energy facilities. The purpose of
18 this document is to present the results of our deliberations and judgments regarding assessment,
19 mitigation, and monitoring of wind energy and wildlife interactions; the most effective, feasible
20 and appropriate approaches that are available to the Department of the Interior to address impacts
21 that a wind energy project may have on wildlife based upon our deliberations and experience; and
22 the Committee’s recommendations to the Secretary of the Interior on how to design and establish a
23 national protocol to address the Service’s responsibilities to protect wildlife resources while
24 encouraging the responsible siting of wind energy projects.

25
26 3. Description of context and need for Recommendations

27
28 As of the end of 2007, the United States has the second highest cumulative wind capacity
29 globally. Wind development in the United States was expected to increase by 25-30% in 2007; it
30 increased by 46%. (NREL – add citation) This rate of development is expected to continue, and
31 perhaps to accelerate, as United States energy policy emphasizes independence from foreign oil.
32 The Service recognizes that wind-generated electrical energy is renewable, produces no
33 emissions, and is considered to be generally environmentally-friendly technology. At the same
34 time, the Service is aware of the potential for wind energy facilities to adversely impact wildlife,
35 especially birds and bats, and their habitats. The potential harm to wildlife populations from
36 direct mortality and from habitat disturbance and fragmentation makes careful evaluation of
37 proposed facilities essential.

38
39 The Service released voluntary, interim guidelines in July of 2003. The interim guidelines were
40 opened to public comment to help inform the revision process. In March of 2007, the Service
41 published a notice in the *Federal Register* to announce the establishment of a Wind Turbine
42 Guidelines Advisory Committee to provide advice and recommendations on developing effective
43 measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind
44 energy facilities. The Committee’s advice and recommendations will be used by the Secretary to
45 develop final national recommendations.

317 Passive AM is the typical application of AM to wind energy development, and it can be readily
318 integrated into the proposed decision-framework because the tiered-approach is an adaptive
319 process. In the pre-construction environment, analysis and interpretation of information gathered
320 at a particular tier influences the decision to proceed further with the project or the project
321 assessment. If the project is constructed, information gathered in the pre-construction
322 assessment guides possible project modifications, or the need for and design of post-construction
323 studies. Analysis of the results of post construction studies tests design modifications and
324 operational activities to determine their effectiveness in avoiding, minimizing, and mitigating
325 impact.

326
327 For passive AM to work there must be agreement to adjust management and/or mitigation
328 measures if the goals are not met. The agreement should include timeline for periodic reviews
329 and adjustments as well as a mechanism to consider and implement additional mitigation
330 measures as necessary after the project is developed.

331
332 5. Confidentiality of site evaluation process as appropriate
333 Some aspects of the initial pre-construction risk assessment including preliminary screening and
334 site characterization occur early in the development process, when land or other competitive
335 issues limit developers’ willingness to share information on the project with the public and
336 competitors. Any consultation should include confidentiality agreements as described earlier in
337 the Recommendations.

338

339 **Chapter 3: Recommendations for Wildlife Assessment and Siting Decisions**

340

341 The first three tiers describe studies in the pre-construction phase, and at each of the three tiers a
342 set of questions is listed that we recommend developers attempt to answer for predicting the risk
343 of a potential project. Some of these questions are repeated at each tier. Given the nature of the
344 tiered approach, each additional tier represents a greater investment in data collection, which
345 may be required to answer certain questions. For example, while Tier 1 and 2 investigations may
346 discover some existing information on federally listed species and their use of the proposed
347 development site, it may be necessary to collect empirical data in Tier 3 studies to determine the
348 presence of federally or state-listed species.

349

350 A. Tier 1: Preliminary *wildlife and habitat* screening of potential wind development site or
351 sites

352 1. Questions/Issues Formulation

353

354 As a first step in this process prospective developers, as well as entities with jurisdiction over the
355 project area should gather information intended to make decisions on how to proceed:

356

357 a. Does the native landscape affected directly and indirectly by the proposed wind
358 energy project contain ecological communities in a continuous block that would
359 be fragmented by the proposed project, with respect to species with needs for
360 large contiguous blocks of habitat?

361 b. Does the landscape contain any areas of special designation, including, but not

- 362 limited to, 'area of scientific importance'; 'of significant value'; federally-
363 designated critical habitat; high-priority area for non-government organization; or
364 other local, state, regional, federal, tribal, or international categorization that may
365 preclude energy development?
- 366 c. Is there habitat available for 'area or large-landscape sensitive species', which
367 may be sensitive to anthropogenic activity'?
 - 368 d. Are there any threatened, endangered, federal "sensitive" or state-listed or other
369 species of concern present on the proposed site, and/or is habitat available for
370 these species?
 - 371 e. Are there known critical areas of wildlife congregation, including, but not limited
372 to, maternity roosts, hibernacula, staging areas, winter ranges, nesting sites,
373 brood-rearing areas, migration stopovers or corridors, leks, or other areas of
374 seasonal importance, that would be directly lost or indirectly affected resulting
375 from construction and operation of a facility and can these impacts be avoided,
376 minimized, or mitigated?
 - 377 f. Are adequate and current data available to answer the above questions, or is
378 additional data collection necessary?

379
380 2. Preliminary regional evaluation of potential site(s):

- 381 a. Places to avoid or places to review further
- 382 b. Use publicly available resources
- 383 c. *May include* contact with local wildlife experts/agencies

384
385 3. Interpret Tier 1 data and continue with site evaluation as appropriate

386 A prospective developer can determine from the analysis of Tier 1 data that either no suitable
387 sites are available within the region, that suitable sites are available and have been identified and
388 no further analysis is needed, or that suitable sites are available and additional information is
389 needed for more complete risk assessment of the potential sites. If it is the last case, then the
390 developer would proceed to Tier 2 for additional site assessment and analysis.

391
392 B. Tier 2: Site evaluation and selection

393 In Tier 2, developers will focus on the one or more sites remaining for potential development
394 after the Tier 1 assessment is completed. In addition to a thorough review of the existing site-
395 specific information a site visit will normally be conducted to confirm the presence of habitat
396 suitable for species of special interest (e.g., Federal and state listed species, species of
397 conservation concern, species considered at high risk to collisions, etc.). The Tier 2 analysis
398 should evaluate the existing and new data sufficient to make decisions on how to proceed:
399

400 1. Question/issue formulation

- 401
- 402 a. Are there any threatened, endangered, federal "sensitive", state listed
403 species, or other species of concern present on or likely to use the
404 proposed site?
- 405 b. Which species of birds and bats are likely to use a proposed site based
406 on an assessment of site attributes?

- 407 c. Are areas of congregation, including, but not limited to, maternity
408 roosts, hibernacula, staging areas, migration stopovers and corridors,
409 winter ranges, nesting sites, or leks, located on the proposed site(s)?
410 d. Are flora and fauna data current, complete, relevant, and adequate to
411 evaluate risk of the proposed project to wildlife, including, but not limited
412 to, temporal and spatial variability, presence and abundance data available
413 for all bird species during all seasons, existing data on impacts to the same
414 or similar species from an existing facility or is more detailed data
415 collection necessary?
416 e. What are the potential impacts to individuals, local populations,
417 metapopulations, or entire species, and their habitats, and can the impacts
418 be avoided, minimized, or mitigated?
419 i. Determine information needs
420 ii. Determine options as outlined in Ch. 2. D. 2.
421 iii. Determine whether to proceed to Tier 2 studies
422

423 2. Site characterization

424 Site characterization should utilize existing information from wind projects located in proximity
425 to the proposed project when available and in comparable cover types. A site visit should be
426 conducted that includes a basic characterization of cover types and topographic features of the
427 project study area. Presence of shorelines, ridges, wetlands, landfills, caves, mines, and large and
428 intact grasslands or shrublands and other features known to increase wildlife use should also be
429 noted.
430

431 3. Contact will be made with FWS and state wildlife agencies

432 Consult with existing data sources and/or meet with qualified experts, and meet with relevant
433 agencies and tribes, and as possible, NGOs, to identify potential environmental concerns and to
434 determine whether these overlap with the general project study region.
435

436 4. Consult local experts, as appropriate

437 5. Develop project siting alternatives

438 6. Interpret Tier 2 data and continue evaluation and/or project as appropriate

439 Site characterization should utilize existing information from wind projects located in proximity
440 to the proposed project when available and in comparable cover types. A site visit should be
441 conducted that includes a basic characterization of cover types and topographic features of the
442 project study area. Presence of shorelines, ridges, wetlands, landfills, caves, mines and other
443 features known to increase wildlife use should also be noted.
444

445 Consult with existing data sources and/or meet with qualified experts, and meet with relevant
446 agencies and tribes, and as possible, NGOs, to identify potential environmental concerns and to
447 determine whether these overlap with the general project study region.
448

449 As described previously, the information collected should be assessed to determine whether they
450 are sufficient to estimate risk to wildlife if the project were to proceed. If information is
451 sufficient for risk assessment, a decision may be made to abandon the project or if the predicted

452 risk is considered within acceptable limits, the project may proceed to site design and permitting
453 (if relevant). If the data are not sufficient to complete a risk assessment then the developer
454 should proceed to a Tier 3 level of analysis.

455

456 C. Tier 3: Quantitative metrics for predicting risk and estimating impact

457 Tier 3 field studies focus on the site selected for consideration for further development. The
458 extent of these studies depends on the level of existing information for the site and amount of
459 uncertainty regarding how the site can be developed to minimize potential impacts. The design
460 of field studies should consider any post-construction data needs for evaluation of risk and
461 impact prediction (Tier 5 studies).

462

463 1. Questions/issue formulation

464 Field studies required for pre-construction risk assessment at Tier 3 should be designed to answer
465 the following questions:

466

a. Are there any threatened, endangered, federal "sensitive", state listed
467 species, or other species of concern present on or likely to use the
468 proposed site?

469

b. Is the vegetative community at the site continuous or fragmented,
470 widespread or unique, or have any special designation?

471

c. What is the distribution and relative abundance of avian and bat species
472 within the area potentially affected by the proposed wind energy project
473 site and how is their use of the site related to site characteristics?

474

d. How do the distribution, relative abundance, and behavior of birds and
475 bats using the site expose them to risk from the proposed wind power
476 project?

477

e. Are flora and fauna data current, relevant, and adequate to evaluate risk
478 of the proposed project to wildlife, including, but not limited to, temporal
479 and spatial variability, presence and abundance data available for all bird
480 species during all seasons, existing data on impacts to the same or similar
481 species from an existing facility or is more detailed data collection
482 necessary?

483

f. What are the potential risks of impacts to individuals, local populations,
484 metapopulations, or entire species, and their habitats, and can the impacts
485 be avoided, minimized, or mitigated?

486

g. Are there studies that should be initiated in Tier 3 that would be
487 continued in either Tier 4 or Tier 5?

488

i. Determine information needs

489

ii. Determine options as outlined in Ch. 2. D. 2.

490

iii. Determine whether to proceed to Tier 3 studies

491

492 2. Conduct field surveys/models for prediction/estimation of risk or impact

493 a Tier 3 studies should collect data enabling an assessment of the potential for direct and indirect
494 effects for those species likely to be present at the site at any time of the year. Direct impacts
495 include loss of habitat or collision strikes for birds and bats. Indirect effects include
496 displacement due to disturbance from the project or effects of habitat fragmentation.

497 A variety of methods exist for measuring avian and bat activity, and those chosen should have
498 reasonable expectation of accurately estimating avian and bat use of the site according to the
499 expected type of activity (e.g., nocturnal activity, migration, nesting, lekking, etc.) or species
500 presence. Techniques for sampling nocturnal distribution, abundance, and behavior of birds and
501 bats for purposes of estimating risk exposure are detailed in Kunz et al. 2007. Additional
502 techniques can be found in a recent report from the National Academy of Sciences (NRC 2007).
503 A detailed description of Methods and Metrics for evaluating wildlife impacts of wind energy
504 development (Anderson, et al. 1999) is under revision and expected completion of this revision is
505 in 2009. All of these sources should be consulted. We strongly encourage the use of consistent
506 methods and metrics as described in these resources recognizing that methods and metrics will
507 evolve over time.

508 Sampling at the proposed site should occur in all seasons of the year where avian and bat
509 activity are expected unless sufficient data are available from other studies for other projects in
510 comparable, nearby areas. One year of sampling should be adequate, but sampling at least one
511 additional year may be necessary if: 1) the preliminary assessment (Tier 1 or 2) or first year of
512 Tier 3 data collection shows the potential risk to individuals or populations as moderate to high
513 compared to other sites, and there is likely to be moderate to high variation in year to year
514 activity at the site; 2) the species is believed to be particularly at risk from the project; or, 3)
515 activity is low and there is biological justification for predicting that activity may vary
516 significantly and the species is listed or otherwise of concern. Decisions to sample for more than
517 one year should be based on a well-supported rationale.

518 Information about vegetation and land cover types, wildlife habitat, extent of noxious weeds, and
519 physical characteristics within and surrounding the project site should be collected and compiled.
520 All cover types within the project site should be mapped into specific, clearly defined area, such
521 as forested ridge, native prairie, grassland, shrub-steppe, cultivated agriculture, and USDA
522 Conservation Reserve Program areas.

523
524 Displacement of wildlife may occur because the wind project reduces the functionality or
525 suitability of a species' habitat. Displacement may affect both resident and/or migratory species,
526 and may be temporary or permanent. Displacement effects should be considered when
527 quantifying habitat loss resulting from the proposed project.

528
529 D. Analysis and siting decision

- 530
531 1. Interpretation of data collected at all Tiers as appropriate
532 2. Determine options as outlined in Ch.2.D.2 (no text has been drafted yet)
533 3. If proceeding with project
534 a. Design modifications (site specific/project specific considerations) to
535 avoid or minimize predicted impacts as necessary
536 b. Mitigation/compensation considerations
537 c. Continue to site construction, if appropriate

538
539 E. Site construction - site development and construction best management practices (BMP)

540 During site development, significant attention should be given to reducing risk of adverse
541 impacts to wildlife from turbines and associated infrastructure through careful site selection and
542 facility design. The following best management practices can assist a developer in the planning
543 process to reduce potential wildlife impacts. Use of these BMPs should ensure that the potential
544 adverse impacts to most wildlife and habitat present at many wind development sites would be
545 reduced, although additional mitigation often will be required as defined at a project level to
546 address site-specific concerns and pre-construction study results.

547
548 The BMPs will evolve over time as additional experience, learning, monitoring and research
549 becomes available on how to best minimize wildlife and habitat impacts from wind facilities.
550 The Service will work with the industry, stakeholders, and the states to evaluate, revise, and
551 update these best management practices on a continual basis and maintain a readily available
552 publication of recommended, generally accepted best practices.

- 553
- 554 1. Minimize, to the extent practicable, the area disturbed by pre-construction site
555 monitoring and testing activities and installations.
 - 556
557 2. Avoid locations identified to have the potential for high risk to birds and bats
558
 - 559 3. Avoid using or degrading high value or large intact habitat areas, as identified in state
560 wildlife action plans, etc..
561
 - 562 4. Use maps that show the location of sensitive resources and the results of Tier 3
563 studies to establish the layout of roads, fences, and other infrastructure. Avoid using
564 invasive species to the area for seeding or planting.
565
 - 566 5. To reduce avian collisions, place low and medium voltage connecting power lines
567 associated with the wind energy development underground, to the extent possible,
568 unless burial of the lines is prohibitively expensive (i.e., where shallow bedrock
569 exists), or where greater impacts to biological resources would result.
570
 - 571 a. Overhead lines may be acceptable if sited away from high bird crossing
572 locations such as between roosting and feeding areas, or between lakes, rivers
573 and nesting areas.
 - 574 b. Overhead lines may be used when they parallel tree lines, employ bird flight
575 diverters, or are otherwise screened so that collision risk is reduced.
 - 576 c. Above-ground low and medium voltage lines, transformers and conductors
577 should comply with the Avian Power Line Interaction Committee (APLIC)
578 “Suggested Practices for Avian Protection on Power Lines.”
579
 - 580 6. Communication towers and permanent meteorological towers should not be guyed at
581 turbine sites. If guy wires are necessary, bird flight diverters or high visibility
582 marking devices should be used.
583
 - 584 7. Use construction and management practices to minimize activities that may attract
585 prey and predators to the wind turbine site.

- 586 8. FAA visibility lighting of wind turbines should employ only red or dual red and white
587 flashing lights, not steady burning lights.
588
- 589 9. Keep lighting at both operation and maintenance facilities and substations located
590 within ½ mile of the turbines to the minimum required to meet FAA guidelines and
591 safety and security needs.
592
- 593 a. Use lights with sensors and switches to keep lights off when not required.
594 b. Lights should be hooded and directed to minimize horizontal and skyward
595 illumination.
596 c. Minimize use of high intensity lighting, steady-burning, or bright lights such
597 as sodium vapor or spotlights.
598
- 599 10. Establish non-disturbance buffer zones to protect raptor nests, bat roosts, areas of
600 high bird or bat use, or specials-status species habitat identified in pre-construction
601 studies. Determine the extent of the buffer zone in consultation with USFWS and
602 state, local and tribal wildlife biologists, and land management agencies (e.g., BLM).
603
- 604 11. Locate turbines to avoid separating birds and bats from their daily roosting, feeding,
605 or nesting sites if documented that the turbines’ presence poses a risk to species.
606
- 607 12. Use tubular towers (as opposed to lattice towers) or best available technology to
608 reduce ability of birds to perch and to reduce risk of collision.
609
- 610 13. Minimize the number and length of access roads, use existing roads when feasible..
611
- 612 14. Where high impacts are expected or sensitive species will be impacted beyond a level
613 of significance, develop a project-specific habitat conservation or restoration plan to
614 avoid or minimize negative impacts on vulnerable wildlife while maintaining or
615 enhancing habitat values for other species.
616
- 617 F. Site operation - conduct Tier 4 and Tier 5 studies, as appropriate
- 618 1. Tier 4 studies – fatality studies: Question/issue formulation. Fatality assessments should be
619 designed as follows:
- 620 a. What is the bird and bat fatality rate for the project? Have data been collected
621 to assess:
- 622 i. Measurement bias (including, but not limited to, searcher efficiency and
623 carcass removal);
624 ii. Variation in fatality rate among turbines searched;
625 iii. Whether fatality rates vary with facility and site characteristics; and
626
- 627 b. Fatality data should be gathered in a consistent manner across projects and
628 regions and should be publicly available to enable evaluation of the following
629 questions. This is not a project specific requirement.

- 630 i. Do fatality rates differ among regions of the country and among land
631 cover types (forest, grasslands, agricultural lands) within and among a
632 region?
633 ii. What are the specific conditions that result in different fatality rates and
634 can fatality rates be used to predict potential impacts at future proposed
635 sites and/or suggest ways that potential impacts can be avoided,
636 minimized or mitigated?
637 iii. What is the relationship between bat and bird fatalities and climatic
638 variables (including, but not limited to, wind speed, temperature, weather
639 events, and wake turbulence), and can high risk periods be predicted?
640

641 c. Determine methods

642 d. Data management and evaluation/interpretation

643 The project developer should again refer to NRC (2007) and Anderson, et al 1999. (*in revision*)
644 for the appropriate techniques for estimating collision mortality.
645

646 2. Tier 5 studies will not be conducted at most projects, but when applicable would
647 include continuation of studies begun in Tier 3 using appropriate designs and new studies
648 that test predictions of impact or effects of mitigation measures.
649

- 650 a. Question/issue formulation
651 b. Do preconstruction or Tier 4 studies indicate need for Tier 5 studies?
652 c. Determine methods
653 d. Data management and evaluation/interpretation
654 e. Sample Tier 5 questions (will be fleshed out in subsequent draft)
655

656 The establishment and use of a Technical Advisory Committee may be useful in some
657 circumstances to review results of monitoring data and making suggestions to the federal, state,
658 local agencies and tribes regarding the need to adjust mitigation and monitoring requirements
659 based on results of monitoring data and available data from other projects. The range of possible
660 adjustments to the monitoring and mitigation requirements should be clearly stated in the pre and
661 post-construction study designs and the mitigation plan. Adjustments should be made if
662 unanticipated impacts become apparent from monitoring data. Examples of such changes may
663 include additional monitoring or research focused to understand the identified impacts.
664

665 G. Modification or expansion of wind facility

- 666 1. Questions/Issue Formulation
667 2. Evaluate Tier 4 and Tier 5 studies as relevant
668 3. Repeat pre-construction tiered process if deemed appropriate
669

670 H. Retrofit and Repowering – Retrofitting is defined as replacing portions of existing wind
671 turbines or project facilities so that at least part of the original turbine, tower, electrical
672 infrastructure or foundation is being utilized.

- 673 1. Retrofitting of turbines should use installation techniques that minimize new site
674 disturbance, soil erosion, and removal of vegetation of habitat value
- 675 2. Retrofits should employ shielded, separated or insulated electrical conductors that
676 minimize electrocution risk to avian wildlife
- 677 3. Retrofit designs should prevent nests or bird perches from being established in or on
678 the wind turbine or tower
- 679 4. FAA visibility lighting of wind turbines should employ only red or dual red and white
680 flashing lights, not steady burning lights.
- 681 5. Lighting at operation and maintenance facilities and substations located within ½ mile
682 of the turbines should be kept to the minimum required to meet FAA guidelines and
683 safety and security needs. Use lights with sensors and switches to keep lights off
684 when not required. Lights should be hooded and directed to minimize horizontal and
685 skyward illumination. Minimize use of high intensity lighting, steady-burning, or
686 bright lights such as sodium vapor or spotlights.
- 687 6. Remove wind turbines when they are no longer cost effective to retrofit so they
688 cannot present a collision hazard to birds and bats.
- 689
- 690 I. Repowering Existing Wind Projects
- 691 1. To the greatest extent practicable, existing roads, disturbed areas and turbine strings
692 should be re-used in repower layouts.
- 693 2. Roads and facilities that are no longer needed should be stabilized and re-seeded with
694 native plants appropriate for the soil conditions and adjacent habitat and of local seed
695 sources where feasible, per landowner requirements and commitments.
- 696 3. Existing substations and ancillary facilities should be re-used in repowering projects
697 to the extent practicable.
- 698 4. Existing overhead lines may be acceptable if located away from high bird crossing
699 locations such as between roosting and feeding areas, or between lakes, rivers and
700 nesting areas. Overhead lines may be used when they parallel tree lines, employ bird
701 flight diverters, or are otherwise screened so that collision risk is reduced.
- 702 5. Above-ground low and medium voltage lines, transformers and conductors should
703 comply with the Avian Power Line Interaction Committee (APLIC) “Suggested
704 Practices for Avian Protection on Power Lines.”
- 705 6. Guyed structures should be avoided unless guy wires are treated with bird flight
706 diverters or high visibility marking devices, or are located where known low bird use
707 will occur.
- 708 7. FAA visibility lighting of wind turbines should employ only red or dual red and white
709 flashing lights, not steady burning lights.
- 710 8. Lighting at operation and maintenance facilities and substations located within ½ mile
711 of the turbines should be kept to the minimum required to meet FAA guidelines and
712 safety and security needs. Use lights with sensors and switches to keep lights off
713 when not required. Lights should be hooded and directed to minimize horizontal and
714 skyward illumination. Minimize use of high intensity lighting, steady-burning, or
715 bright lights such as sodium vapor or spotlights.
- 716
- 717 J. Decommissioning

- 718 1. Decommissioning methods should minimize new site disturbance and removal of
719 native vegetation, to the greatest extent practicable.
720 2. Foundations should be removed to a depth of 2 feet below surrounding grade or
721 covered with soil, stabilized and re-vegetated with native plants appropriate for the
722 soil conditions and adjacent habitat and of local seed sources where feasible, per
723 landowner requirements and commitments.
724 3. Overhead pole lines that are no longer needed should be removed.
725 4. After decommissioning erosion control measures should be installed in all
726 disturbance areas where potential for erosion exists.
727 5. Fencing should be removed unless the land owner will be utilizing the fence
728 6. Petroleum product leaks and chemical releases that constitute a Recognized
729 Environmental Condition should be remediated prior to completion of
730 decommissioning.

731

732 **Chapter 4: Mitigation**

733 The objectives of mitigation are to avoid or minimize impacts to fish, wildlife and their habitats,
734 and, if necessary, to compensate for those impacts not avoided or minimized.

735 A. Impact Avoidance and Minimization

736 State and federal wildlife laws and policies focus on avoidance and minimization of project
737 impacts. Impact avoidance and minimization is often best achieved early in the project planning
738 and design process, during pre-site selection planning (macro-siting) and during site layout
739 planning (micro-siting). However, if these measures are demonstrated to be insufficient in
740 avoiding or minimizing impacts, then additional measures such as adaptive management or
741 compensation may be needed.

742

743 B. Compensation

744 A project developer should ensure that appropriate measures are incorporated into the planning
745 and construction, and operation of a project to avoid and minimize impacts as much as possible.
746 If these measures are insufficient to avoid or minimize estimated impacts to birds, bats and
747 habitat, however, compensation may be one of the appropriate strategies to mitigate or offset
748 such impacts, including cumulative impacts.

749

750 Development of effective compensation measures and recommendations should consider
751 USFWS recommendations under its mitigation policy and involve consultation with the
752 appropriate state agencies. Because a project’s operational fatalities cannot be forecast with
753 precision, it may not be feasible to make compensation decisions until monitoring data is
754 collected. However, the application, general terms, and commitments for potential future
755 compensatory mitigation and the triggers or thresholds for implementing such compensation
756 should be determined before a project goes forward. If operational impacts exceed the expected
757 levels, adaptive management strategies or additional compensatory mitigation may be necessary.
758 However, additional compensatory mitigation and potential adaptive management strategies
759 beyond that recommended prior to project construction should be well defined and feasible to
760 implement, so that the developer will have an understanding of any potential future mitigation
761 requirements.

762

763 The following potential compensation options may appropriate for consideration:

- 764 • Offsite and on-site conservation and protection of habitat
- 765 • Offsite and on-site conservation and habitat restoration
- 766 • Offsite and on-site habitat enhancement

767
768 Regardless of the form of compensatory mitigation, there should be a nexus between the level of
769 impact and the amount of compensation. Any compensation should be biologically based and
770 reasonable.

771
772 C. Mitigation Plans

773 Development of a formal mitigation plan should be an integral part of a wind energy facility
774 project and completed prior to project construction. Mitigation plans are not necessary for low-
775 risk projects or common species. A mitigation plan should include some or all of the following
776 elements: mitigation measures, goals and objectives, implementation plan, performance
777 standards, operation and maintenance plans, monitoring and evaluation plans, and plans for
778 adaptive management. Mitigation plans directed at birds and bats may be in the form of an Avian
779 and Bat Protection Plan (ABPP) designed to address project impacts to birds, bats, and their
780 habitats. A sample ABPP can be found in Appendix.

781

782 **Chapter 5. Advancing Cooperation, Use, and Effective Implementation of the**
783 **Recommendations**

784 The Committee recommends that the Service, in coordination with the appropriate federal action
785 agencies, establish agreements and guidance as is appropriate to create consistency and certainty
786 in the federal permitting process, to apply consistent and complementary guidance in the siting
787 of wind energy projects across agencies, to develop and adopt an interagency repository of best
788 management practices, and to ensure that data collection requirements are consistent in
789 methodology and reporting. This guidance should also be capable of being stepped-down and
790 applicable to the state and local government levels.

791

792 A. Federal-federal coordination and cooperation (*e.g.*, FWS and BLM)

793 In order to provide the wind industry with a level of certainty in regard to the federal permitting
794 process to aid in planning an efficient timeline for the development of wind energy projects, and
795 also to allow for greater benefits to fish and wildlife by assuring sufficient time to provide input,
796 the Committee makes the following recommendations to streamline the federal permitting
797 process:

- 798 • Identify redundancies, points in the process where delays occur, and other inefficiencies
799 in the federal permitting process
- 800 • Establish a working group or advisory committee to provide recommendations on
801 addressing these inefficiencies

802

803 1. Providing Consistent and Complementary Guidance

804

805 The Committee recommends that the USFWS work with its federal partners to ensure that its
806 guidance is consistent with other federal regulation and guidance across geographic regions, and
807 that its guidance complements other guidance, regulations, and other processes currently in
808 practice.

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- Provide incentives for adoption and use of FWS Guidance.
- Encourage early coordination with FWS for projects that may potentially impact fish and wildlife resources.
- Continue interagency meetings to encourage open communication between agencies on guidelines and practices and promote consistency between approaches.

2, Developing and Adopting Interagency Best Management Practices

Currently, several federal agencies may have developed best management practices for the same type of activity, with varying recommendations according to the priorities of the agency. The Committee recommends the development, and continued maintenance and updating in accordance with the state of the science, of a national repository of best management practices. This repository may potentially include individual BMPs for a specific activity, or a single location or resource of multiple BMPs addressing certain aspects of a specific activity. A single repository where this information could reliably be accessed would help to increase efficiency and interagency coordination, would and could serve as a useful and compact resource for wind energy developers.

3. Consistency in Data Collection and Sharing of Relevant Data

The Committee recommends that the USFWS coordinate with other agencies that require collection of data at a wind energy site to promote consistency methodology and reporting requirements. (not sure which agencies may require data collection, what type of data, etc...placeholder?)

B. Federal-state coordination and cooperation

To successfully implement the national guidance, the Service should proactively seek to enlist local and state governments in partnerships to advance the objective of minimizing wildlife impacts from wind projects.

Given the relative roles and responsibilities of the state, local governments, and the USFWS in protecting wildlife and their habitats from the risks posed by wind power facilities, it is important that the Service coordinate and collaborate with willing state and local governments to clearly communicate program management responsibilities to address wind/wildlife issues. To that end, the Service should reach out to and work with state and local governments in advancing the development of guidance, policies, protocols, and programs at the state and local level that are consistent with the Service’s national policy and obligations under federal wildlife laws.

The USFWS has a limited regulatory role in addressing wind power development, with its regulatory role applying only to projects that occur on federal lands or those that have some form of federal involvement. However, the USFWS has a significant non-regulatory role under the Fish and Wildlife Coordination Act. Since most wind power development to date has occurred on non-federal lands, regulating wind power is largely a state and local government

854 responsibility. Therefore, the Service should work with states as much as possible to implement
855 the national guidance as the states are the primary actors in regulating wind projects.

856
857 The Service also should recognize, however, that state and local regulations and guidelines
858 relating to wind power are still quite limited and rapidly evolving as local governments and
859 states realize that their existing provisions are often not applicable to wind power. Many state
860 and local regulatory agencies have little experience in addressing wildlife impacts from wind
861 power. Therefore, the USFWS also should strive to use the national program to encourage more
862 states to proactively address potential conflicts between wind projects and wildlife, through
863 establishment of clear and predictable local guidance, rules, programs, and policies that are
864 consistent with the federal policy.

865
866 The ESA, MBTA, and BGEPA do not require the USFWS to pursue formal consultation with
867 state and local agencies. However, state or local entities that regulate wind power sometimes
868 consult with FWS staff for information on protected species or advice on how to ensure that
869 wind projects will not harm wildlife. This type of state/federal consultation should be
870 encouraged and formalized, when possible, by USFWS. If state and local regulators do not
871 consult with FWS, it will be difficult for the Service to encourage actions that could reduce
872 wildlife mortality and habitat loss before wind facilities are sited. Therefore, the USFWS should
873 work to create formal consultation arrangements with interested states to ensure use of the
874 national guidance and of Service expertise.

875
876 Finally, given the Service’s resource constraints, the USFWS should enlist states and local
877 agencies to assist as appropriate in implementing the national guidance (or equivalent state
878 approaches) to leverage limited federal staffing resources. The USFWS has limited staff, given
879 other workload responsibilities and the much greater threats to migratory species posed by other
880 activities, to implement a comprehensive compliance program to review wind power projects for
881 potential wildlife impacts. Since USFWS staff is able to spend relatively limited time assessing
882 wildlife impacts from wind power, the Service should work with the states whenever possible.

883
884 For all these reasons, the Committee recommends as one option that the USFWS establish a
885 cooperative agreement program to advance working partnerships between USFWS and states for
886 cooperative review of wind projects under both federal and state wildlife laws and regulations.
887 The following are the primary objectives of this state/USFWS partnership:

- 888
889 1. Establish joint communication and cooperation arrangements with states to ensure wind
890 project compliance with state and federal wildlife laws.
891 2. Foster uniformity between state and federal policies and guidelines to address
892 wind/wildlife interactions.
893 3. Coordinate with states and local governments on review and compliance actions to
894 address wind/wildlife issues.
895 4. Improve coordination between federal and state regulatory and enforcement programs
896 addressing wind projects and wildlife interactions.
897 5. Work together to resolve major problems that may arise at wind projects.
898 6. Advance cooperative state/federal/industry research relating to wind project-wildlife
899 interactions.

900 7. Improve targeting of state/federal roles and resources by tailoring the federal program to
901 meet the local needs and concerns of each State to the maximum extent feasible in
902 consideration of national program consistency.

903 8. Provide more efficient use of resources through coordination with State offices and
904 personnel.

905

906 Both the USFWS and the State would perform different roles in this partnership framework:

907

908 **USFWS Role**

- 909 • Provide funding to assist states through cooperative agreements
- 910 • Provide national guidance and strategies to address wind/wildlife issues with a particular
911 national focus on cumulative effects, adaptive management strategies, and priority
912 national research
- 913 • Provide training to states
- 914 • Support and manage a national database for reporting of mortality data on a consistent
915 basis
- 916 • Establish and revise national “best management practices” for wind project siting and
917 operation based on project experience and learning
- 918 • Establish and revise recommended guidance on study protocols, study techniques, and
919 measures and metrics for use by all jurisdictions
- 920 • Allow states to take primary responsibility for reviewing and ensuring wind project
921 compliance with wildlife laws

922

923 **States (and Local Government) Role**

- 924 • Take the lead to implement and ensure compliance with national guidance and/or
925 equivalent state-specific guidance addressing wind/wildlife issues
- 926 • Initiate state compliance actions for significant violations of wildlife laws at wind
927 projects
- 928 • Facilitate communication and cooperation with USFWS and other federal agencies to
929 identify and address significant wind/wildlife issues and knowledge gaps
- 930 • Report project monitoring data and results to national database at USFWS
- 931 • Refer significant, unresolved violations of wildlife laws to USFWS

932

933 **Recommended Actions:**

934

935 The following recommended actions and measures are designed to foster state/federal
936 partnerships and to advance coordination and consultation between federal, state, and local
937 jurisdictions:

938

939 The USFWS program should be implemented to complement rather than duplicate state-level
940 programs in addressing wind/wildlife issues. To that end, USFWS should use early notification
941 protocols, joint agency reviews, coordination activities, memoranda of understanding, and other
942 appropriate measures to reduce duplication and increase coordination between state and local
943 agencies and USFWS in reviewing wind projects.

944

945 The Service should pursue agreements with state and local agencies to establish complementary
946 roles and coordinated review of wind energy projects by the state and USFWS.

947
948 In each state, the USFWS should seek to identify a lead state agency designee responsible to
949 work with the USFWS regional office to coordinate review of proposed wind activities under
950 wildlife laws.

951
952 The USFWS should seek to establish state-federal cooperative arrangements for early
953 consultation and coordination in resolving wind/wildlife issues.

954
955 The Service should pursue agreements with state and local agencies to advance establishment of
956 uniform and consistent guidance and best practices on how best to avoid, minimize, and/or
957 mitigate adverse impacts to wildlife resources.

958
959 The USFWS should establish communication protocols with interested States to ensure that the
960 party first obtaining the information about a prospective wind project will notify the other party
961 to enable joint planning on how to coordinate review of the project.

962
963 The USFWS should work with states to establish consistent and predictable protocols and study
964 requirements that can be used by all agencies to satisfy statutory and regulatory requirements.

965
966 The USFWS should designate a management contact in each regional office (or nationally) to
967 work with states and local agencies to resolve significant wildlife-related issues that may arise at
968 wind energy projects.

969
970 The USFWS should establish a “step-down” process to allow interested states to coordinate
971 effectively in review and compliance activities for ensuring wind project compatibility with
972 wildlife laws. Under this voluntary, negotiated framework, the Service would agree to defer to
973 the State as the lead or “front line” agency to review and ensure wind energy compliance with
974 wildlife laws, upon a finding that (1) a State’s wind/wildlife guidance or program is consistent
975 with or more stringent than the USFWS national guidance and sets forth reasonable measures to
976 achieve the avoidance, minimization and mitigation of potential adverse wildlife impacts from
977 wind energy projects, and (2) the State agrees to implement the state program with a good faith
978 effort and adequate resources. However, the USFWS would still retain the full authority to
979 initiate review and/or enforcement actions, as appropriate.

980
981 POSSIBLE PLACEHOLDER: (From Mark Sinclair), “Memorandum of Understanding Between
982 USFWS and State”

983
984 C. Federal-tribal coordination and cooperation

985
986 D. Agency (federal state and/or local)-developer coordination and cooperation (*e.g.*, ABPP,
987 HCP, MOUs)

988 The Committee recommends that the Service establish several specific mechanisms to promote
989 developer and industry use of the voluntary Wind Turbine Recommendations, wherein
990 assurances would be provided by the USFWS to a developer that diligent actions to implement

991 the Wind Turbine Recommendations, and minimize wildlife impacts from wind projects, will
992 reduce the likelihood of enforcement under the ESA, BGEPA, and MBTA. see footnote 51 The
993 USFWS therefore should develop and implement a multi-faceted strategy to encourage
994 developers to increase their efforts to follow the recommendations in the Wind Turbine
995 Recommendations. The following strategies are recommended and described:

996 1. Promote Developer Agreements

997 Developers should be provided the opportunity to enter into voluntary agreements with the
998 USFWS under certain terms that ensure implementation of appropriate and reasonable measures
999 to prevent injury and harm to birds and bats. The purpose of such agreements are to (a) provide
1000 a timely, stable, and predictable means for developers to seek review by and consultation with
1001 the USFWS to ensure good faith compliance with the ESA, BGEPA and MBTA, and (b) provide
1002 the developer with some assurances that compliance with the Wind Turbine Recommendations
1003 will result in reduced threat of enforcement under wildlife laws. Promoting coordination and
1004 cooperation between the Service and a developer – through the use of project-specific
1005 agreements – is critical to ensuring that the national guidance is used and endorsed by the
1006 industry.

1007
1008 While each agreement should be tailored to the particular project, situation, and developer’s
1009 commitments, an agreement should include the following elements:

- 1010 • A USFWS commitment to provide timely review of the site and any relevant wildlife and
1011 habitat information to the developer, upon notification of a proposed project.
- 1012 • A developer commitment to share all relevant information concerning the wildlife
1013 resources under the jurisdiction of the USFWS in the project area and the potential
1014 impacts to these wildlife resources. Shared information should include all known,
1015 publicly available data and pre- and post construction study results related to the
1016 proposed project.
- 1017 • A developer commitment to use due diligence to comply with the suggested
1018 requirements, protocols, and best practices of the Wind Turbine Recommendations (or
1019 equivalent state or local requirements or guidance), subject to appropriate modification
1020 and flexible application based on the characteristics of the proposed project site, and
1021 based upon technical feedback from, or formal consultation with, the USFWS, as
1022 appropriate.
- 1023 • A developer commitment to employ feasible, effective and applicable best management
1024 practices for siting of wind energy projects relevant to protection of wildlife and habitat
1025 resources, as identified by the USFWS. The applicable BMPs would be established in the
1026 Wind Turbine Recommendations, and revised from time to time in consultation with
1027 wind industry, state, USFWS and NGO representatives, and based on project experience.
- 1028 • (Needs FWS input) A USFWS commitment from the Office of Law Enforcement to use
1029 its enforcement discretion and focus on those individuals, companies, or agencies that
1030 take migratory birds without regard for their actions and the law, especially when
1031 conservation measures have been developed but not implemented, provided that the
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1037 developer remains in compliance with the terms and conditions of the agreement, and the
1038 developer has made a good faith effort to avoid and minimize potential adverse impacts
1039 by way of implementing best management practices and complying with the Wind
1040 Turbine Recommendations (or state or local equivalent guidance).

- 1041
- 1042 • A developer commitment to provide coordinated access, upon prior notice, to the wind
1043 energy project as requested by USFWS staff in other to ensure compliance with the
1044 agreement, provided that such access was coordinated in advance as much as possible
1045 and subject to normal safety precautions implemented by the developer/project owner.
- 1046

1047 2. Use of Avian and Bat Protection Plan

1048 The Committee also recommends that the USFWS encourage the use of an Avian and Bat
1049 Protection Plans (ABPP). An ABPP is defined as a voluntary project or company-specific
1050 program of best management practices designed to protect and conserve birds and bats.

1051 A company’s ABPP should include a suite of practices and processes intended to minimize
1052 impacts to birds and bats from wind projects. The goal of an ABPP is to implement a series of
1053 best practices that ensure project siting and operation occurs in a manner designed to avoid or
1054 minimize risk to birds, bats, and their habitats.

1055 The concept of an ABPP recognizes that the Enforcement Branch of the USFWS has MBTA
1056 enforcement discretion. Therefore, a company or developer operating under an ABPP should be
1057 allowed to implement its wind project or program without the need for a formal agreement by
1058 USFWS on every project or action that has potential to affect migratory birds and bats.

1059 The ABPP would not constitute an incidental take permit, nor would it result in a permit. Rather,
1060 an approved ABPP would represent a wind developer’s commitment and demonstration that it is
1061 doing its best to fulfill the intent of the MBTA and to minimize impacts to migratory birds and
1062 bats. As a condition of compliance with an approved ABPP, the Service will use its enforcement
1063 discretion and focus on those individuals, companies, or agencies that take migratory birds
1064 without regard for their actions and the law, especially when conservation measures have been
1065 developed but not implemented.

1066 An ABPP can be either a company-specific or project-specific document. In either context, the
1067 ABPP delineates a program designed to reduce the risks that result from avian interactions with
1068 proposed and existing wind facilities.

1069 A company-wide ABPP provides an opportunity for a company to address migratory bird and bat
1070 issues on a broader scale than afforded by a project by project approach. It would establish
1071 company policies and processes that will help the company ensure compliance with federal and
1072 state wildlife statutes.

1073 A project ABPP, on the other hand, provides more site-specific measures to minimize impacts to
1074 wildlife resources. A project-specific ABPP may or may not tier off a company ABPP.
1075 Recommended elements for a ABBP and a sample ABBP can be found in Appendix D.

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1082

1083 There are a variety of non-governmental organizations that have an interest in improving siting
1084 procedures for wind energy projects. Some groups, such as industry trade organizations, support
1085 expanded wind energy development, and other groups have primary interest in reducing wildlife
1086 impacts of wind energy development – these groups are not mutually exclusive
1087

1088 3. Other (to be written)

1089

1090 E. NGO Actions (to be written)

1091 1. Industry/AWEA

1092 2. Conservation organizations

1093 3. AWWI

1094 4. NWCC

1095 5. Others

1096

1097 F. Other Incentives (to be written)

1098

1099 **Chapter 6: Benefits** (to be written)

1100 A. Reduced ecological impacts

1101 B. Increased compliance

1102 C. Reduced regulatory risk

1103 D. Improved predictability of wildlife and habitat impact

1104 E. Cost savings

1105 F. Improved likelihood of project financing

1106

1107 **Chapter 7: Revisions to Recommendations** (to be written)

1108 A. Incorporating feedback

1109 B. Design and schedule mechanisms for revision

1110

1111 **Chapter 8: Recommendations for Effective USFWS Administration of**
1112 **Recommendations** (to be written)

1113 A. Training

1114 B. Staff support

1115 C. Consistent application

1116

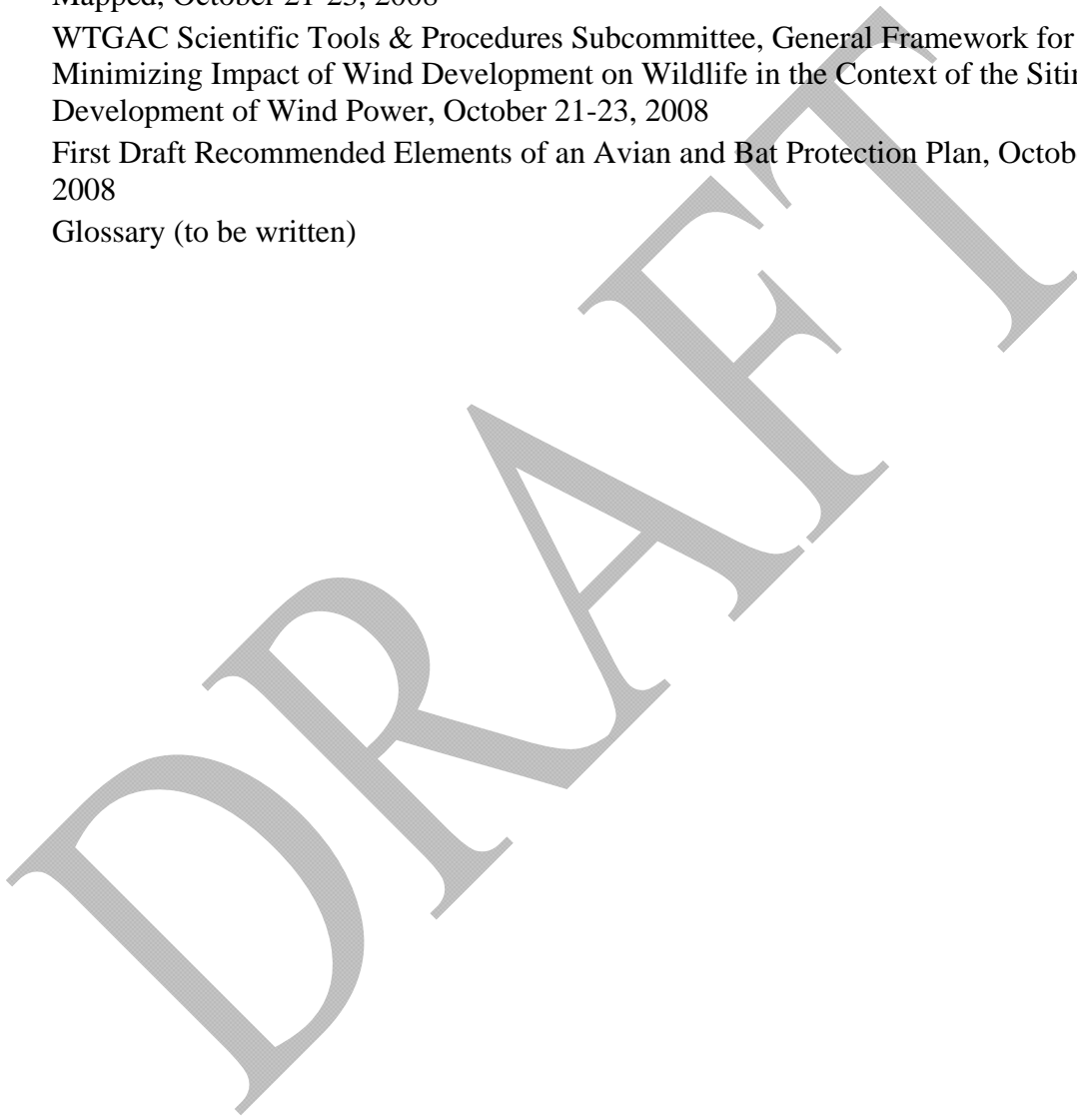
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1119 **List of Appendices**

- 1120 A. Department of the Interior (DoI) Wind Turbine Guidelines Advisory Committee
- 1121 (WTGAC) Other Models Subcommittee Matrix October 21-23, 2008 (will be attached)
- 1122 B. WTGAC Legal Subcommittee White Paper October 21-23, 2008(will be attached)
- 1123 C. WTGAC Landscape/Habitat Subcommittee, “Mapping Tools Case Studies” October 21-
- 1124 23, 2008 (will be attached)
- 1125 D. WTGAC Landscape/Habitat Subcommittee, Summary of Metadata for Data Layers
- 1126 Mapped, October 21-23, 2008
- 1127 E. WTGAC Scientific Tools & Procedures Subcommittee, General Framework for
- 1128 Minimizing Impact of Wind Development on Wildlife in the Context of the Siting and
- 1129 Development of Wind Power, October 21-23, 2008
- 1130 F. First Draft Recommended Elements of an Avian and Bat Protection Plan, October 21-23,
- 1131 2008
- 1132 G. Glossary (to be written)

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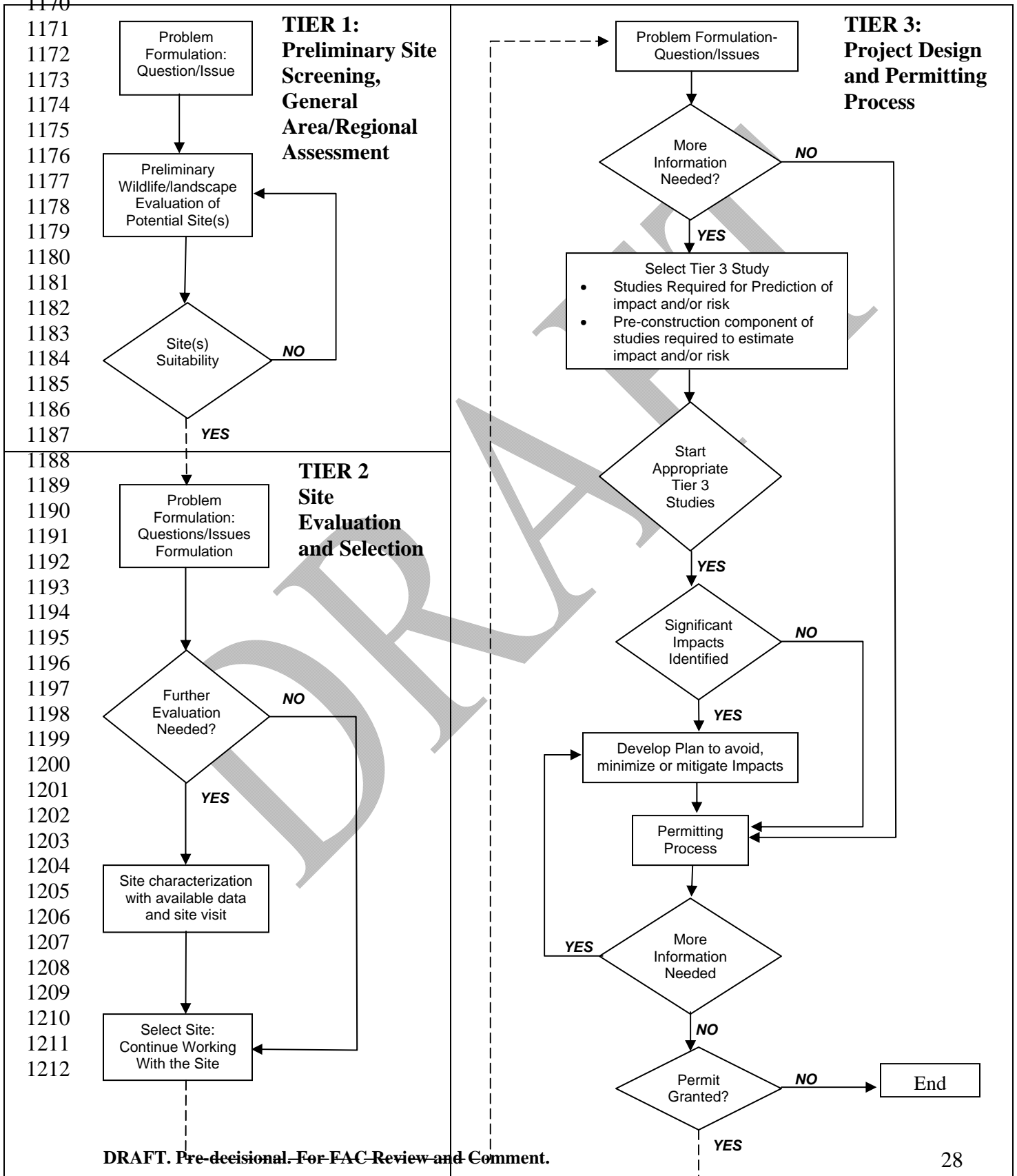


Pre-decisional Draft. First Release Draft of the “One-Text” from USFWS Wind Turbine Recommendations for Discussion by FAC January 27-29, 2009. APPENDICES UNDER REVIEW BY SYNTHESIS WORKGROUP.

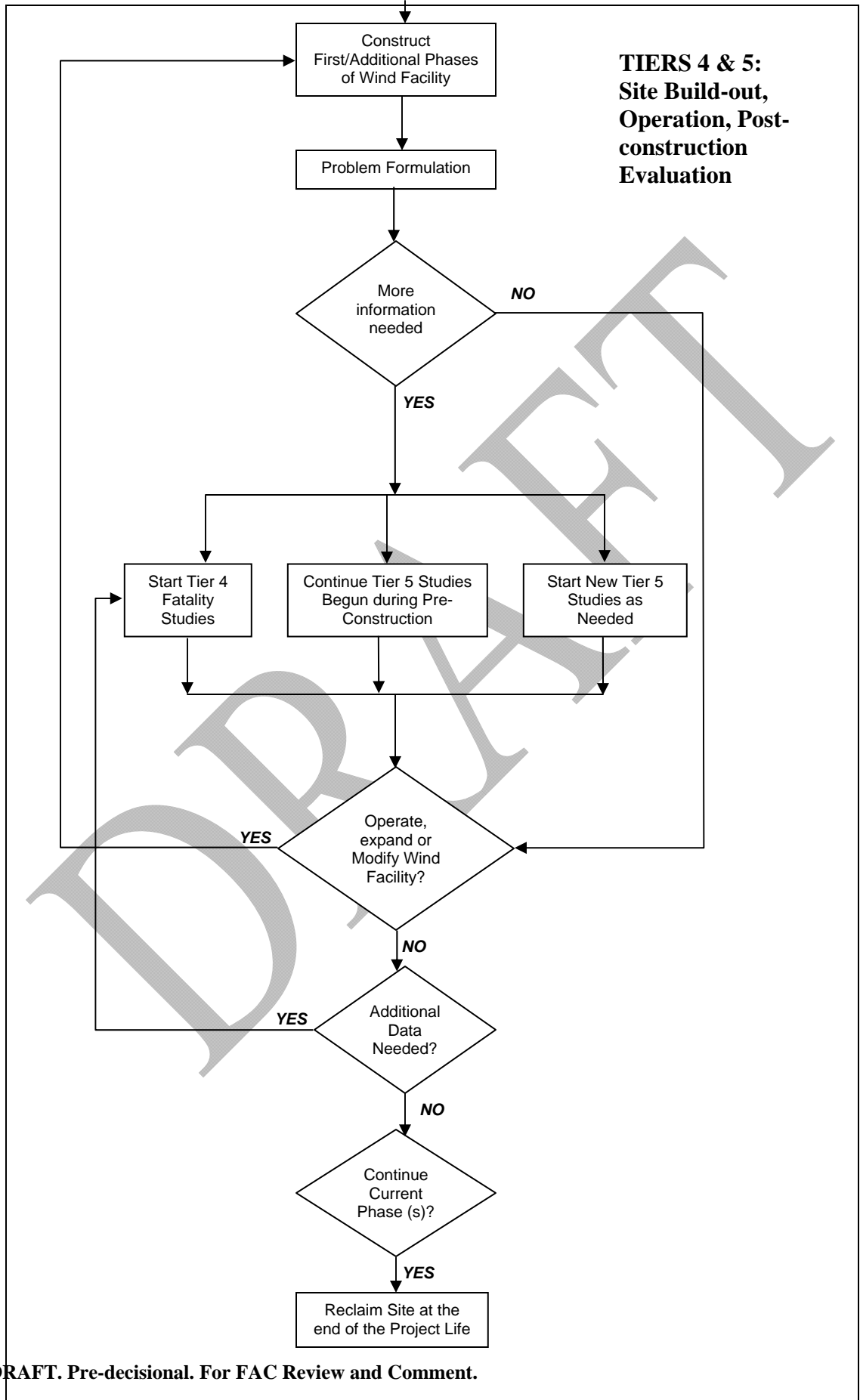
1164 Appendix D. WTGAC Landscape/Habitat Subcommittee, Summary of Metadata for Data Layers
 1165 Mapped, October 21-23, 2008
 1166

Organization Managing File(s)	Map/Database Title
Existing information	
The Nature Conservancy	Portfolio Sites
The Nature Conservancy	Great Plains Untilled Landscapes
Platt/DOE/Local transmission councils	Current and Proposed Transmission
Unknown	Current and Proposed Wind Farms
National Atlas	Bat Distributions
National Audubon Society	Important Bird Areas
Natural Resources Conservation Service	Natural Resources Inventory (NRI)
Fish and Wildlife Service	Environmental Conservation Online System (ECOS)
Fish and Wildlife Service	Habitat and Population Evaluation Team (HAPET) modeling
Fish and Wildlife Service	Preliminary topographic and wildlife feature GIS screening
The Nature Conservancy	Wind & wildlife resource maps - Great Plains
Forthcoming:	
Western Governors Association	Wind-wildlife transmission maps
Audubon/NRDC	Western resources maps
North American Grouse Partnership	Prairie grouse habitats
The Nature Conservancy	Wind & wildlife resource maps - balance of US
Am. Wind & Wildlife Institute	Wind & wildlife resource maps
Playa Lake Joint Venture	Playas
Prairie Pothole Joint Venture	Prairie Pothole habitats

1167 Appendix E. WTGAC Scientific Tools & Procedures Subcommittee, General Framework for
 1168 Minimizing Impact of Wind Development on Wildlife in the Context of the Siting and
 1169 Development of Wind Power, October 21-23, 2008



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1256 Appendix F. First Draft Recommended Elements of an Avian and Bat Protection Plan, October
1257 21-23, 2008

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1259 The following are key elements that should be considered in developing an ABPP that are
1260 designed to ensure that the plan merits USFWS assurances regarding prosecutorial discretion.
1261 Not all of the recommended elements would need to be included in every ABPP because of the
1262 specific circumstances of a project or geographical area, and the adequacy of the ABPP should
1263 be determined by the site conditions or actual project performance with respect to wildlife
1264 impacts.

1265 1. Corporate Policy

1266 In the ABPP, a company should provide a commitment to develop and implement a specific
1267 company policy to address wind/wildlife issues. An ABPP should include a statement of
1268 company policy confirming a commitment to work cooperatively with state and federal agencies
1269 towards the protection of relevant avian species. The ABPP should institute clear and consistent
1270 procedures to minimize impacts to relevant avian species and their habitats, and to address
1271 impacts where they are identified. The ABPP should include commitments to:

- 1272 • Implement and comply with the ABPP
- 1273 • Ensure company actions comply with the Wind Turbine Recommendations and
1274 applicable wildlife laws
- 1275 • Monitor and document bird and bat mortalities and injuries in order to assess project
1276 performance and implement adaptive management actions if warranted
- 1277 • Provide training and information to staff on the ABPP and its implementation
- 1278 • Take reasonable and appropriate efforts to construct and alter infrastructure and
1279 project operations to reduce the incidence of avian and bat mortality.

1280

1281 2. Compliance with Wildlife Laws & Permits

1282

1283 An ABPP should identify and implement a process under which a company will obtain and
1284 ensure compliance with applicable federal, state and tribal laws related to wildlife.

1285

1286 a. Risk Assessment Methodology, Site Selection, and Preconstruction Studies

1287

1288 In an ABPP, a company should agree to implement a rigorous method for evaluating avian and
1289 bat risks and to use an effective risk assessment methodology in making siting decisions. The
1290 risk assessment methodology should be used to identify sites where wind power development
1291 would pose high mortality risks or fragmentation of important habitats, and these sites should be
1292 avoided. A company should agree to assess risk to birds and bats from development at a wind
1293 project site(s) in order to avoid, minimize, and mitigate adverse impacts.

1294

1295 As a general matter, an ABPP should include a method for evaluating the risks posed to birds
1296 and bats in a manner that identifies areas and issues of particular concern. A risk assessment
1297 study should begin with a preliminary site assessment. The process then should include pre-
1298 construction surveys for avian and bat use, according to protocols and time frames recommended
1299 by states and national guidance. Finally, an avian and bat mortality reporting system should be
1300 an integral component of the risk assessment methodology.

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b. Site Design and Development Practices

In the ABPP, a developer should agree to implement best site design, construction and management practices as identified by states and the USFWS. As appropriate to the project, the company should consider avian and bat interactions in micro-siting, design and installation of new facilities, as well as in the operation and maintenance of existing facilities. The company also should agree to use all reasonable and feasible generally accepted best management practices during construction and operation of the facility.

c. Consultation & Information Sharing

In the ABPP, a company should agree to share relevant non-proprietary site and study data and to work cooperatively with USFWS or relevant state wildlife agencies. Specifically, the company should agree to share relevant, non-proprietary information concerning wildlife resources in and around a wind project area and the potential adverse impacts to those resources. Shared information should include publicly available data from monitoring efforts and pre and post-construction study results relative to the project area. In the ABPP, a company should agree to work cooperatively with the USFWS or relevant state wildlife agencies in the future to avoid and minimize impacts to wildlife resources as new relevant project information becomes available.

d. Post-construction Monitoring and Avian/Bat Reporting System

In the ABPP, a company should commit to establish post-construction monitoring and a mortality reporting system. A company should agree to voluntarily monitor relevant avian and bat interactions, including mortalities, through the development of a formal avian and bat fatality reporting system. For example, the ABPP could identify thresholds of fatalities above which responses to reduce rates of avian fatalities would be implemented. A company also should agree to make the data reasonably available to the USFWS and the states, as much as possible in a compatible format to advance adaptive management, and site/regional comparison. The company also would commit to make specimens collected on site reasonably available to the state and/or USFWS. An ABPP should provide for the development of such a reporting system, which can help a company pinpoint areas of concern by tracking both the specific locations where mortalities may be occurring and the extent of such mortalities. Data collected by company personnel should include avian and bat mortalities or injuries, as well as remedial actions taken.

e. Mortality Reduction Measures and Mitigation

In the ABPP, a company should agree to use the results of a risk assessment to revise siting decisions and identify and undertake appropriate mitigation. A company also should commit to review and provide post-construction mortality monitoring data and to work cooperatively with the states and the USFWS to take action if the data indicate a significant problem. In an ABPP, a company should commit to identify appropriate adaptive management mortality reduction or mitigation measures when an operating project results in unexpectedly high mortality or unexpected impacts to protected species or their habitats.

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f. Quality Control & Adaptive Management

I
In the ABPP, a company should provide for future revisions or updating as new scientific methods and techniques become available. An ABPP should include a mechanism to provide periodic review of existing practices, ensuring quality control and effective management.

g. Sample ABBP



Appendix G. Glossary (to be written)

DRAFT