

**STATE OF CALIFORNIA  
ENERGY RESOURCES CONSERVATION  
AND DEVELOPMENT COMMISSION**

<b>DOCKET</b>	
<b>06-OII-1</b>	
<b>DATE</b>	<b>MAY 14 2007</b>
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Development of Statewide Guidelines for	)	Docket No. 06-OII-1
Reducing Wildlife Impacts from Wind	)	Developing Statewide Avian
Energy Development	)	Guidelines

**COMMENTS OF THE  
CALIFORNIA WIND ENERGY ASSOCIATION  
ON REVISED STAFF DRAFT GUIDELINES**

The California Wind Energy Association ("CalWEA") appreciates this opportunity to provide written comments on the April 2007 revised staff draft report, "California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development" ("Revised Staff Draft"). The importance to wildlife of achieving the state's greenhouse-gas reduction goals makes it vitally important that these Guidelines not impose arbitrary or unnecessary review requirements on wind projects. Rather, the Guidelines should promote the appropriate level of review for each wind project – sometimes minimal, sometimes extensive -- depending on the characteristics of the site and project in question. These comments are aimed at assisting the Commission's Renewables Committee in achieving that end.

Included with this overview of our comments are our detailed comments within the Revised Staff Draft document, which, as requested by the Committee, propose specific text deletions and insertions. The substance of these text changes, if accepted, should be extended through additional edits to these same sections and should be carried over to other relevant parts of the document. We believe that substantial additional detailed discussion at a workshop is still warranted prior to issuing the next draft, based on our comments and other parties' comments that may be submitted on this draft.

Please note that, despite the extra three weeks of time provided for comment, CalWEA members (who are very busy with project developments) have not been able to thoroughly review these comments as submitted and we may therefore offer further or

refined comments at a later date. We also note that all of our concerns and proposals have been elaborated upon in previous comments.

## **I. General Comments**

The Revised Staff Draft is a substantial improvement over the initial staff draft, in a number of ways, including:

- a. its organization is dramatically improved,
- b. one of the most problematic aspects of the first staff draft -- the project-specific Science Advisory Committee concept -- has been largely removed,
- c. there is less infringement on the authority of the local lead agency,
- d. there are fewer rigid statements about what studies and what data are appropriate for use in most all situations, despite a wide variety of site-specific circumstances,
- e. similarly, there is greater recognition, compared to the last draft, that there are ways other than intensive field sampling -- for example, scientifically valid correlations -- to characterize and estimate impacts.

While we appreciate that significant improvements have been made, however, we must conclude again that this document's emphasis on a single prescribed course of study puts it at odds with the state's interest in soundly promoting clean energy to help avert the devastating environmental and human health impacts that we can expect from climate change. Whereas the first document was too far from a reasonable document to even attempt to edit it, though, it is possible to make an initial attempt to correct the problems in the Revised Staff Draft. Our attached edits seek to make such an attempt, but much work remains to be done beyond our editing.

## **II. Specific Comments**

As an overview and a guide to the specific edits we have made in the attached document, we have sorted references to these edits within several topics of concern to us in the Revised Staff Draft. However, time and resource constraints limit the focus of our comments primarily to the first 35 pages (through Chapter 2) of the document. The substance of these comments, if accepted, should be reflected more extensively through

additional edits to these same sections and should be carried over to other relevant parts of the document.

Following are brief discussions of the areas of concern to us, along with references to the specific line numbers where we have proposed edits to address the concerns.

#### **A. The Guidelines Should Guide Local Agencies to the Appropriate Level of Review for Each Project**

The draft sets forth some “exceptions” to one standard “step-by-step” course of study, but these exceptions are too limited and narrow to guide each project to the course of study that is appropriate given the particular circumstances of its site and the existing information that may be available about that site. These circumstances – which may warrant a greater or lesser level of study than the standard, as applied to the particular issue of concern -- include differences in climate, topography, habitat, proximity to migration routes, bird and bat species present at the site, and existing, scientifically credible information that may already be available to inform decisions at the site. Different circumstances will appropriately lead to different levels of review, study methods, and time periods and durations of study.

The Revised Staff Draft advises the “consistent” application of the Guidelines. Because of the wide variety of circumstances that warrant different study methods, however, what should be “consistent” is not particular studies and methods used, but the *process* for considering which methods are appropriate at a given site. Consistency is also in order for any particular method once it is selected for use (e.g., sampling techniques).

And, yet, the document suggests that the particular methods recommended in the Step-by-Step approach must be followed in order to demonstrate a “good faith effort to develop ... projects ... consistent with the intent of local, state, and federal laws.” (See Revised Staff Draft at lines 340-342). If the particular recommended methods are not followed – even if they are not necessary or appropriate in a given situation – the lead agency and project proponent could face an increased exposure to litigation. This is because a project proponent will be presumed NOT to have made a good faith effort to

comply with state and federal laws if he does not use the particular study methods set forth in the Guidelines. As we have noted before, the fact that these Guidelines are stamped “voluntary” is not meaningful because they carry the authoritative weight of the state.

For these reasons, the document’s rigid prescriptions are a critical flaw in the document. They turn what could be helpful guidelines into a litigation opportunity for project opponents – who are more likely to be NIMBYs and real estate developers than avian advocates. The document should instead be based on principles and appropriate steps, which will greatly increase the “shelf life” of the document and greatly reduce the chance that it will impose costs with little benefit gained or, in some cases, result in too little or the wrong type of study.

To remedy this problem, and to illustrate a more reasonable process for determining what level of study is appropriate, we have developed a framework of three general categories suggesting different levels of review, along with a category where project development is not advised. (See table in Appendix 1 to these comments.) This framework draws out (for Category 3) an idea that seems to be implicit in the draft (see lines 760, 1346 and 3080): the notion that, where avian impacts can be predicted to fall within the low- to average-range of impacts for wind projects across the state and nation, the intensity and duration of required studies can be reduced. The framework also incorporates an idea we have previously proposed: that certain low-impact or well-studied project areas should be eligible for streamlined environmental review.

This framework is a beginning point only. Within each category, there would be a “decision tree” type of approach to guide each project to the type of studies and methods appropriate to the conditions at hand. We would be glad to assist the Commission in further developing this approach.

In addition to referencing the addition of our Table within the Revised Staff Draft, we made many additional edits to reflect the above approach, rather than the one-size-fits-all-with-limited-exceptions approach in the draft. Substantial further editing would, however, be necessary in combination with a discussion of a decision-tree approach.

Our edits addressing this topic can be found at lines 72, 97-104, 109, 162-167, 187-192, 199, 205-206, 227-228, 248-253, 291, 293-298 (adding proposed streamlined

review for low-impact areas), 338, 358-363, 380-381, 401-404, 410-411, 484 (and subsequent edits to that section), 664, 676, 747 (and subsequent edits to that section), and 779-783. Additionally, some of the edits referenced below also affect this topic area. (Further edits are also included in Chapters 3-5, but not as extensively as in the earlier sections.)

**B. The Guidelines Should Recognize that Compliance with the Letter of Wildlife Laws is Not Possible, and Aim Studies at the Level of Information that is Needed to Inform Siting Decisions under CEQA**

The document implies that “compliance” with wildlife laws is possible, and that lots of studies and mitigation can bring a project into compliance despite the fact that compliance is not possible with many of these laws because one bird kill is an inexcusable violation. In conflating CEQA and the rigid wildlife laws, this draft -- like the last one -- attempts to turn the permitting process into an exercise of very extensive and expensive information gathering that will not be necessary or justified for every project, nor is it likely to significantly reduce avian mortality for most projects.

In exchange for imposing unnecessary levels of review, the document contains one sentence that suggests (lines 110-113) that developers might be shielded from state and federal prosecution if a wildlife law is inadvertently violated at some point over the project’s lifetime. But the statement falls far short of a guarantee and, in any case, the state cannot give guarantees about federal enforcement. The document also includes overly broad statements about wildlife laws that are not supported by citations to any provision of law.

Because compliance with rigid wildlife laws is not possible, and because this document cannot offer protection from prosecution, the Guidelines should not prescribe particular courses of study because, as we noted above, a project proponent will be presumed not to have made a good faith effort to comply with state and federal laws if the proponent does not use the particular study methods described. Rather, the guidelines should emphasize the *information that is needed* in a given situation to understand risk *to the degree of specificity that is required to make siting decisions*.

While compliance with state and federal wildlife laws is an obvious concern to developers, the Guidelines should be consistent with, and focus primarily on, compliance

with the state law that governs the siting and permitting of wind projects along with local land use laws: CEQA. In describing how CEQA defines a significant biological impact, the Guidelines purport to quote the CEQA Guidelines [section 15065(a)(1)] but omit an important provision defining a significant impact as one which "substantially reduces the number or restricts the range of an endangered species." The fact is, CEQA does not necessarily consider the loss of a single individual of an endangered species to constitute a significant environmental impact. To be significant under CEQA, the impact must "substantially" reduce the number of a species.

Therefore, the primary objective in predicting impacts at a proposed development site is to determine whether the project will have a significant adverse impact on avian species. The initial focus in pre-permitting assessment should be to determine whether there is enough information to make that determination. The guidelines should address what kind of information is needed to make that determination including species presence, abundance and behavior in the Wind Resource Area (WRA).

If existing information and analysis clearly show that the project will not have a significant adverse impact on a species of concern, then further studies (e.g., more detailed field studies) to more precisely quantify abundance and flight behavior are not necessary. If existing information and analysis are inadequate to show that a project will not have a significant adverse impact on a species of concern, then more detailed field studies may be appropriate to fill in information gaps so that an impact determination can be made.

The edits that we propose in section II.A, above, remedy these problems in part, because they aim to guide each project to an appropriate level of study. These additional edits further address the problems relating to inappropriate prescriptions and references to wildlife laws.

See edits to lines 67, 106-107, 110-111, 157-158, 162-167, 234-235, 291, 302, 304, 310, 311, 313-317, 327, 342, 390-396, 411, 526, 527, 534, 550, 554, 560, 573, 575, 637, 784, 1126, and 1158. See also edits throughout Chapter 2.

### **C. The Draft Does Not Sufficiently Recognize The Variety Of Ways That Sufficient Credible Evidence About Impacts Can Be Gathered**

In a number of places, the Revised Staff Draft is overly prescriptive about the specific methods that are “recommended” for use. (As we have said many times, whatever is “recommended” in these “voluntary” guidelines will become de facto requirements at the local level.) The final Guidelines should recognize that a variety of methods can be used to provide scientifically credible information on various issues of interest. For example:

- although the Step-by-Step approach recommends that bird use counts and acoustical monitoring be used to determine abundance, there are other methods that may be as or more appropriate at a given site (which is recognized in Chapter 3), and some of these studies may not be appropriate at all;
- there is no explicit recognition in the main text that scientifically valid correlations can be made for sites that are not “nearby” – even though, buried in Appendix H, data is presented that shows that using correlated use and mortality data from sites across the country is valid for raptors;
- there is no recognition that scientifically valid extrapolations can be made from seasonal data.<sup>1</sup>

It is very important that these Guidelines recognize the validity of correlation and extrapolation because the ability to use this sound and low-cost technique will increase as more and more comparable data is gathered and compiled across the state, as is envisioned in these Guidelines.

The guidelines should also recognize that certain information that is central to making determinations (e.g., migratory pathways, nesting, flight patterns, relative abundance, etc.) can be obtained from many possible sources: published studies, governmental databases, conservation groups and existing mortality surveys, as well as

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<sup>1</sup> See, e.g., “Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments,” prepared for the Bonneville Power Administration by WEST, Inc., December 2002. This document, while included in the References section, should be discussed in the Guidelines along with the correlation techniques it addresses.

site-specific field studies. These studies can range from simple site reconnaissance to detailed field studies, possibly including acoustical and radar studies.

These problems are addressed with our edits at the following line locations: 99, 377-379, 431, and 495.

#### **D. Mitigation Should Apply Only to Significant Impacts**

The guidelines should recognize that mitigation should apply only to significant impacts. Since some mortality will occur, applicants should not, for example, be required to mitigate for mortality to non-listed MBTA species whose populations will not be significantly affected by the predicted mortality.

Associated edits can be found at the following line locations (and some of those above): 133, 146, 194, and 195.

#### **E. The Post-Construction Monitoring Requirements Are Excessive**

In addition to two years of post-construction mortality monitoring (that is, carcass searches), the draft calls for two years of point counts and acoustical monitoring, which adds a huge additional cost with very little benefit.

These and other excessive study requirements are aimed in part at collecting data that will further the understanding of wind impacts on birds and bats. (See, e.g., Revised Staff Draft lines 189-192.) Of course, this is a laudable objective, but imposing costly study requirements on every project is not the appropriate way to obtain this information, nor is it necessary, and it will interfere with the achievement of California's clean energy goals. Instead, this information should be obtained through research at the state and national levels.

This problem is largely addressed through edits listed above, but we call out in particular edits at lines 676, 702, 739, and 747 along with other edits in that section.

#### **F. The Guidelines Should Not Invite the Possibility of Open-Ended Mitigation and the Risk of Monitoring over the Life of a Project**

If the Guidelines succeed in directing project developers and lead permitting agencies to the level of study that is appropriate for each site, it should be possible to predict non-significant avian mortality with a reasonable degree of accuracy, or to predict



any significant impacts along with well-defined avoidance and mitigation measures to be incorporated into the project permit. If, despite these reasonable efforts, open-ended mitigation and monitoring provisions are included in the permit, the associated open-ended risk will raise project financing costs or make financing untenable – especially given the already high cost of doing business in California generally.

For the same reason, any “triggers” for additional mitigation, if used at all, should be bounded by a range of possible anticipated impacts to provide developers with upfront certainty regarding project costs. Triggers should not be linked inflexibly to specific actions because that can prevent other means of effective remediation besides the prescribed remedy. Triggers also should not be linked to single events because such events can be one-time, freak occurrences.

Likewise, the adaptive management concept is still in its infancy for use in wind projects, and there are no guidelines or accepted methods for such an approach – which is by its nature open-ended -- for wind projects. Adaptive management for wind projects should therefore be discouraged at this time. I

In particular, the Guidelines should stay away from discussing seasonal shutdowns and turbine relocation as mitigation options. First, seasonal shutdowns have been implemented in just one area – the Altamont – and results regarding effectiveness are not yet in. Second, and more importantly, seasonal shutdowns are highly unlikely to be a feasible mitigation measure. The technique is being tried in the Altamont due to avian fatality levels that are higher than anywhere else in the nation and because energy production is relatively very low in the winter shutdown months, a condition that is fairly unique to that site. The commission should be mindful that even having shutdowns on the table as a potential mitigation option can upset project financing due to the extremely high risk exposure it places on a project. The whole point of the Guidelines is to ensure that projects are not located at sites where avian fatalities are so high that shutdowns would be warranted.

Therefore, all references to open-ended mitigation, monitoring, adaptive management, shutdowns, and unbounded “triggers” should be removed and replaced with text that encourages lead agencies to establish permit terms that provide certainty to developers regarding potential future mitigation and monitoring obligations. Edits

addressing these ends can be found at the following line locations: 351-353, 581, 576, and 635, and in other places referenced elsewhere.

#### **G. Too Little Is Known About Bats to Warrant Extensive Studies and Mitigation**

Apart from several listed species of bats, bats are not protected by state or federal laws in the same way as certain species of birds. Some bat species appear to be more susceptible to mortality than birds and other bat species, however little is known to explain this. Therefore, it is likely to be impossible to determine whether a particular wind project will significantly affect bat species until a great deal more research on factors contributing their susceptibility is conducted. Currently, there is no reasonable basis to suspect significant impacts on bat species that would justify mitigation. Wind projects should not be required to mitigate impacts to individual bats in such situations involving non-protected bat species especially if prudent and feasible measures to minimize impacts to other wildlife have been incorporated into site selection and design of a wind project.

Requiring extensive monitoring of bats at all sites to provide information for research purposes is a costly and ineffective substitute for properly designed research efforts. Therefore, the Commission should strike references to extensive bat monitoring and separately promote research into understanding bat populations, behavior and mortality, seeking industry contributions and participation as necessary.

See edits at lines 365-369, 461-465, and 743-744.

#### **H. The Guidelines Should Allow for More Decommissioning Options**

The Revised Staff Draft suggests that developers provide financial assurance that decommissioning will occur. However, this assurance can be provided by placing the obligation on property owners, as Kern County requires, which does not entail upfront financial commitments and enables the property owner and the developer to address the issue in their lease arrangement. Associated edits can be found at line 2311.

## **I. Science Advisory Committee**

As stated in section I, we are pleased to see the concept of project-specific Science Advisory Committees eliminated from the Revised Staff Draft. CalWEA has indicated that there may be some merit in the development of a Statewide Science Advisory Committee. However, the role and make-up of such a committee requires considerable thought. As the concept of a statewide SAC is in its infancy, and is in any case unlikely to exist by the time the Guidelines are adopted, it is premature to reference a conceptual SAC in these initial Guidelines.

We therefore suggest striking all references to this entity. Discussions with all stakeholders around the concept should occur after these Guidelines are adopted. Related edits can be found at lines 780 and 1036.

## **J. The Guidelines Should Not Reference Discredited Reports**

The Guidelines continue to reference the 2004 Smallwood-Thelander report despite the conclusions of three independent reviews conducted by the Commission (and three others by CalWEA) that the study is seriously flawed and its conclusions are not supported by the analysis.<sup>2</sup> By citing this study without caveat, the Commission is promoting the use of a study that its own reviewers have established as not credible.

If the reference on line 178 to Energy Commission “products to inform the siting of new wind projects” is solely to this report, or to other efforts that use this report as a foundation, the reference should be eliminated.

## **K. Additional Comments**

Additional comments and edits relating to specific methods and permitting procedures are provided within the text. These comments and edits provide further explanation of why attempting to prescribe particular methods can be quite inappropriate. See comments at lines 415, 433-434, 442, 444, 453-454, 461, 484 (and subsequent edits to that section), 553, 565, 573, 575, 590, 591, 595, 601, 604, 608, 612, 613, 615, 617,

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<sup>2</sup> See Energy Commission publication # CEC-500-2006-114, posted December 15, 2006, located at: [http://www.energy.ca.gov/pier/final\\_project\\_reports/500-04-052.html](http://www.energy.ca.gov/pier/final_project_reports/500-04-052.html).

619, 702, 709, 723, 739, and 743-744. Additional detailed edits can be found in Chapters 3-5.

We look forward to continuing to engage in this effort to ensure that the adopted product achieves the Commission's goal of promoting environmentally sound wind energy development in California.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Nancy Rader", with a small flourish or initial at the end.

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Nancy Rader  
Executive Director  
California Wind Energy Association  
2560 Ninth Street, Suite 213-A  
Berkeley, CA 94710  
(510) 845-5077  
[nrader@calwea.org](mailto:nrader@calwea.org)

May 14, 2007

**CALWEA APPENDIX A:  
GENERAL FRAMEWORK  
FOR DETERMINING APPROPRIATE AVIAN AND BAT STUDY PROTOCOLS**

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	Category 2	Category 3	Category 4
<b>General Conditions</b>	Federal, state and local parks, wildlife preserves	Site is known to contain or has a high potential to contain federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources, e.g. a migratory bird flyway across the site, or site is adjacent to a Category 1 Site	Sites without or with a low chance of presence of federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources and not in proximity to Category 1.	Same as Category 3 sites, but are either existing wind farms that have the opportunity to re-power or adjacent to existing wind farms that have the opportunity to, expand or infill and which have had a low incidence of bird and bat mortality.
<b>Siting Acceptability for Wind Projects</b>	Not advised	Acceptable if significant impacts are avoided or mitigated	Acceptable if significant impacts are avoided or mitigated	Acceptable if any significant impacts are avoided or mitigated
<b>PROJECT EVALUATION PHASES</b>	<b>Category 1</b>	<b>Category 2</b>	<b>Category 3</b>	<b>Category 4</b>
<b>Overall Protocol Characteristics</b> (See Note 1)		Require more intensive or detailed or species-specific studies than Category 3 site to understand potential impacts to federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources.	Require less detailed studies than Category 2 sites. Focus on species-specific studies.	Additional studies, if necessary, focus on any information gaps and specific species known to be of concern, if any. Project may be eligible for streamlined environmental review.
<b>Preliminary Screening Phase</b>	Based on land ownership information identify the presence of land where wind development is not advised.	1) Based on existing information including range maps, element occurrences <sup>2</sup> , and other existing information determine the likelihood of	1) Same as Category 2. 2) Same as Category 2. 3) Based on 1 & 2, confirm	If not already in a developed portion of the WRA, evaluate whether habitat and species present in area to be expanded are

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	Category 2	Category 3	Category 4
		<p>federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources occurring on or adjacent to project site.</p> <p>2) Validate likelihood of occurrence with site visit(s) to evaluate habitat suitability for federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources.</p> <p>3) Based on 1 &amp; 2, confirm Category 2 classification or place in Category 3</p>	Category 3 classification or place in Category 2	consistent with habitat of existing facilities, or nearby adjacent facilities.
<b>Pre-permitting Assessment Phase</b>		<p>1) Depending on specific species possibly present as identified in screening phase, conduct site surveys of appropriate type and duration (up to and possibly exceeding one year) to determine bird and/or bat usage and abundance and significant resources.</p> <p>2) Studies will be used to characterize and predict impacts and identify possible mitigation.</p>	<p>1) Depending on specific species possibly present as identified in screening phase, conduct appropriate site surveys one year or less focusing only on specific species of concern to determine bird and/or bat usage and abundance and significant resources.</p> <p>2) Studies will be used to characterize and predict impacts and identify possible mitigation. For CEQA purposes, consider project approval on the basis of a negative</p>	<p>1) Determine whether project and site is consistent with designated low-impact area.</p> <p>2) Sites with identified sensitivities focus studies on addressing the information gaps for the species of interest, building upon existing studies of those species in the WRA to characterize and predict impacts, and identify possible mitigation.</p> <p>In both cases, for CEQA purposes, consider project</p>

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	Category 2	Category 3	Category 4
			declaration or a mitigated negative declaration.	approval on the basis of a categorical exemption for replacement of existing facilities, or a negative mitigation or a mitigated negative declaration.
<b>Operational Monitoring Phase</b>		<p>1) Based on pre-permitting monitoring results, conduct 1-year mortality monitoring and bird and bat usage monitoring to characterize annual conditions.</p> <p>2) If 1-year monitoring results confirm pre-permitting predictions, and/or show mortality to special status species be within the range of mortality to other non-Altamont California projects, reduce second-year bird and/or bat use mortality monitoring to selected species and seasons where there is still concern, or to areas of continuing concern, e.g. significant avian or bat habitats, or segments of turbine alignments with higher than expected mortality, etc.</p> <p>3) If 1-year results are above</p>	<p>1) Based on pre-permitting monitoring results, conduct 1 year of mortality monitoring and bird and bat usage monitoring for identified species of concern to characterize annual conditions.</p> <p>Mortality monitoring may be necessary only during particular seasons of concern, such as spring/fall migration periods, during nesting season if the bird and bat species are resident and/or breeding.</p> <p>2) If 1-year monitoring results show mortality to be within the range of mortality to special status species to other non-Altamont California projects and within acceptable margins of the pre-permitting</p>	<p>For projects with identified sensitivities, conduct operational monitoring based on pre-permitting monitoring results and applicable operational monitoring data, if available, Conduct 1-year mortality monitoring in selected areas during anticipated high risk seasons and/or habitats.</p> <p>Monitoring results will be used to confirm pre-permitting impact predictions and to inform necessary mitigation within pre-determined range.</p>

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	Category 2	Category 3	Category 4
		<p>predicted levels continue operational monitoring for second year to better understand factors contributing to risks.</p> <p>4) Monitoring results will be used to confirm pre-permitting impact predictions and to inform necessary mitigation within pre-determined range.</p>	<p>predictions, and no significant avian or bat resources; a second year of bird and/or bat use monitoring is not necessary.</p> <p>3) If 1-year results are above predicted levels continue operational monitoring for second year to better understand factors contributing to risks.</p> <p>4) Monitoring results will be used to confirm pre-permitting impact predictions and to inform necessary mitigation within pre-determined range.</p>	

Note 1. See Guidelines for specific descriptions of standardized monitoring protocols

Note 2. Element occurrences - reported locations of federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources from California Natural Diversity Database (CNDDB)



**CALIFORNIA GUIDELINES FOR REDUCING  
IMPACTS TO BIRDS AND BATS FROM  
WIND ENERGY DEVELOPMENT**

**DRAFT STAFF REPORT**

**Summary of Comments on California  
Guidelines for Reducing Impacts to Birds  
and Bats from Wind Energy Development -  
DRAFT REPORT**

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CALWEA COMMENTS, APPENDIX B: MARK-UP

April 2007  
CEC-700-2007-008-SD



Arnold Schwarzenegger, Governor

## EXECUTIVE SUMMARY

Wind energy is expected to play a vital role in meeting California's renewable energy goals, which require that 20 percent of the electricity sold in California come from renewable energy resources by 2010. The California Energy Commission's 2004 *Integrated Energy Policy Report Update* recommends a longer-term goal of 33 percent renewable energy by 2020. At the same time California moves to achieve its renewable energy commitments, it must also maintain and protect the state's wildlife resources. Specifically, wind energy development projects in California must avoid, minimize, and mitigate potential impacts to bird and bat populations. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (Guidelines)* was developed to address these coexisting and sometimes conflicting objectives: to encourage the development of wind energy in the state while minimizing and mitigating harm to birds and bats. Following the *Guidelines* is voluntary, and the document is intended for use throughout the state.

This document is a collaboration of the California Energy Commission (Energy Commission) and the California Department of Fish and Game (CDFG). In its 2005 *Integrated Energy Policy Report*, the Energy Commission recommended the development of statewide protocols to address avian impacts from wind development. In 2006, many stakeholder participants at a workshop, "*Understanding and Resolving Bird and Bat Impacts*," collectively requested such guidance. The resulting document provides a science-based approach for assessing the potential impacts that a wind energy project may have on bird and bat species and includes suggested measures to avoid, minimize, and mitigate identified impacts. CDFG and the Energy Commission encourage the use of the *Guidelines* for the biological assessment, mitigation, and monitoring of wind energy development projects and wind turbine repowering projects in California.

The objective of the *Guidelines* is to provide information and protocols for assessing, evaluating, and determining the level of project effects on bird and bat species. The document is organized into five basic steps:

1. Gather preliminary information and conduct site screening.
2. Consider the California Environmental Quality Act (CEQA), wildlife protection laws, and permitting requirements.
3. Collect pre-permitting data using standardized monitoring protocol.
4. Identify potential impacts and mitigation.
5. Collect operations monitoring data using the standardized monitoring protocol.

Information in the *Guidelines* was specifically designed to be flexible to accommodate local and regional concerns. The standardized protocols in the document are adaptable to address the specifics of each site such as frequency and type of bird and bat use, terrain, and availability of scientifically accepted data from nearby sources. Under most circumstances, one year of pre-permitting surveys and two years of operations monitoring data collection

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as a resource for agencies that issue land use permits for wind facilities

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The protocols in the document should be adapted to address the specific conditions at each site, such as frequency and type of bird and bat use, type of terrain, and availability of any existing scientifically credible data, as determined by the lead agency. A general framework of site categories is used to guide project developers and lead agencies to the appropriate level of review at each unique site. Site-specific decisions regarding necessary pre-permitting assessment surveys, operations monitoring, and reporting should be made locally by the project developer and CEQA lead agency in consultation with CDFG, U.S. Fish and Wildlife Service, and local conservation groups.

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101 are recommended. However, depending on decisions made locally in consultation with the  
102 CEQA lead agency, CDFG, U.S. Fish and Wildlife Service, and local conservation groups,  
103 the data collection efforts may be either abbreviated or expanded to address specific  
104 conditions at a project site.

105  
106 *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* does  
107 not duplicate or supersede California Endangered Species Act statutes or other legal  
108 requirements. This document does not alter a lead agency's obligations under CEQA, nor  
109 does it limit the types of studies, mitigation, or alternatives that an agency may decide to  
110 require. Because this document complements existing guidance, following these Guidelines  
111 is important for compliance with CEQA and other local, state, and federal wildlife laws and  
112 will facilitate the issuance of required permits for a project, providing a measure of  
113 regulatory certainty for wind energy developers.

114  
115 This document reflects close coordination of the Energy Commission and California  
116 Department of Fish and Game and advice from scientists and legal experts, as well as public  
117 input from wind energy development companies, counties, conservation groups and other  
118 non-governmental organizations, and private citizens. The Energy Commission and CDFG  
119 thank all those who participated in the development of these Guidelines and encourage lead  
120 agencies and all parties interested in the development of California's wind energy resources  
121 to use the Guidelines as a resource on all future wind energy projects.

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T As a purely advisory guidance document,

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## INTRODUCTION

Californians have high expectations for their state's renewable energy programs. On September 26, 2006, Governor Schwarzenegger signed Senate Bill 107 (Simitian and Perata) Chapter 464, Statutes of 2006, requiring that 20 percent of the electricity sold in California come from renewable energy resources by 2010.<sup>1</sup> Additionally, the California Energy Commission's 2004 *Integrated Energy Policy Report Update* recommends a longer-term goal of 33 percent renewable energy by 2020. Wind energy is expected to play a vital role in meeting both goals.

Californians have equally high expectations for protection of the state's diverse bird and bat populations. Optimal development of the state's wind energy resources requires adequate measures to avoid, minimize, and mitigate potential impacts to these populations. The voluntary draft *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (Guidelines)* has been developed to help meet both of these expectations and to encourage the development of wind energy in the state while minimizing impacts to birds and bats.

In its 2005 *Integrated Energy Policy Report*, the California Energy Commission (Energy Commission) recommended the development of statewide protocols to address avian impacts from wind development. The *Guidelines* effort originated in January of 2006 at the "Understanding and Resolving Bird and Bat Impacts" conference in Los Angeles. Many participants at the conference encouraged the Energy Commission and the California Department of Fish and Game (CDFG) to collaborate, with input from all interested parties, to establish voluntary statewide guidelines to promote the development of wind energy in the state, while minimizing impacts to birds and bats.

On May 24, 2006, the Energy Commission adopted an Order Instituting Informational proceeding that assigned the task to the Energy Commission's Renewables Committee.<sup>2</sup> To assist Energy Commission and CDFG staff in this endeavor, the Renewables Committee established a science advisory committee and solicited suggestions from stakeholders on how to incorporate public input into the guidelines development process. As a result, the Energy Commission has hosted numerous public workshops

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<sup>1</sup> The Renewable Portfolio Standard was originally placed in statute in 2002 with the passage of Senate Bill 1078 (Sher) Chapter 516, Statutes of 2002, calling for 20 percent renewable energy by 2017. The *Energy Action Plan*, adopted by the California Public Utilities Commission and the California Energy Commission, accelerated the Renewable Portfolio Standard target to achieve 20 percent renewable energy by 2010.

<sup>2</sup> California Energy Commission Docket 06-011-1. Interested parties can find details on the Order Instituting Informational, the science advisory committee, and summaries of past workshops and comments on the Energy Commission Web site, <[www.energy.ca.gov/renewables/06-011-1/](http://www.energy.ca.gov/renewables/06-011-1/)>.

throughout the state and solicited written comments on draft *Guidelines* to make sure all interested parties have input on development of this document.

## Securing Wind Energy Development Permits

~~In California, development of wind energy projects requires land use permits, and state and federal laws and local ordinances regulate the siting and operation of these projects.~~ The California Environmental Quality Act (CEQA), the Planning and Zoning Law, the California Endangered Species Act, Federal Endangered Species Act, and state and federal wildlife protection laws are the primary laws and regulations that govern the process. ~~This document is a tool to facilitate compliance with relevant laws and regulations by recommending methods for conducting site specific, scientifically sound biological evaluations. Much of the information required to satisfy CEQA is also needed to comply with other state and federal wildlife laws; using the Guidelines for standardized guidance on how to collect information on potential bird and bat impacts will facilitate compliance with all of these laws.~~

## Status of Wind Energy Research

Bird and bat interactions with wind turbines is an area of active research in this country and internationally. The National Wind Coordinating Committee (NWCC) <[www.nationalwind.org](http://www.nationalwind.org)>, a diverse collaborative that includes representatives from developers, utilities, environmental and consumer groups, and state and federal government, provides a forum for this research with its Wildlife Workgroup. In California, the Energy Commission's Public Interest Energy Research (PIER) Program supports energy research, development, and demonstration projects to advance science and technology that provide environmentally sound, efficient, and reliable energy sources <[www.energy.ca.gov/pier/environmental/index.html](http://www.energy.ca.gov/pier/environmental/index.html)>. The Energy Commission has undertaken research efforts that will develop products to inform the siting of new wind energy projects; improve methods to assess impacts of wind development on birds and bats; and evaluate the effectiveness of impact avoidance, minimization, or mitigation measures. Elsewhere in the United States, numerous other private-public research partnerships are underway that will also provide new findings on how to reduce the impacts of wind development on wildlife, including the National Research Energy Laboratory, <[www.nrel.gov/wind](http://www.nrel.gov/wind)>, and the Bat and Wind Energy Collaborative (refer to <[www.nationalwind.org](http://www.nationalwind.org)> for more information).

## Purpose of This Document

~~Both wind energy proponents and bird and bat populations will benefit from the consistent application of the Guidelines by the counties, cities, and other agencies that permit wind energy projects. This document offers consistent methods to assess bird and bat activity at proposed wind energy sites, design pre- and post-construction monitoring plans, and develop and implement impact avoidance, minimization, and mitigation measures. Using the protocols outlined in the Guidelines will promote~~

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**In California, development of wind energy projects requires land use permits. Local ordinances regulate the siting and operation of these projects. State and federal laws regulate certain aspects of these projects, including their impacts on special status species.**

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This document provides guidance to the project developer and local lead agency in determining the appropriate level of environmental review at a particular site relative to birds and bats. The Guidelines also recommend the use of standardized methods for the particular types of studies that may be conducted, depending on the type of information that is needed, to ensure scientifically sound biological evaluations and to promote comparability of data. Appropriate analysis will provide the information required to inform decision-making under CEQA and state and federal wildlife laws.

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Both wind energy proponents and bird and bat populations will benefit from a level of review that is appropriate for each proposed site. This document offers counties, cities, and other agencies that permit wind energy projects guidance in what to consider when determining, for each site, appropriate pre- and post-construction environmental assessments, monitoring plans and, when necessary, mitigation measures that address significant impacts. The variables include climate, topography, habitats, migration routes, and presence of particular bird and bat species. These variables will lead to different approaches to understanding and addressing the impacts at each site. Appropriate analysis will, in turn, provide the information required to inform decision-making under CEQA and state and federal wildlife laws.

These Guidelines are also intended to promote consistency between particular studies, when they are conducted, so that the results of these studies will be

193 scientifically sound, cost-effective study designs; produce comparable data among  
194 studies within California; allow for analyses of trends and patterns of impacts at  
195 multiple sites; and ultimately improve the ability to predict and resolve impacts locally  
196 and regionally.

## 197 **Organization of the Document**

198 The *Guidelines* opens with a step-by-step implementation guide that highlights the  
199 recommended process and protocols for successfully securing a permit. The following  
200 chapters provide greater detail as well as the scientific background and rationale for the  
201 steps necessary in assessing a potential wind energy site, successfully securing  
202 permitting for development, and continuing to monitor impacts to birds and bats once  
203 the project has launched.

- 204 • Chapter 1, "Preliminary Site Screening," discusses the initial actions a developer  
205 must take to assess the relative sensitivity of a potential wind energy project site  
206 and to determine the kinds of studies that will be required to adequately evaluate  
207 the impacts such a project could have on birds and bats.
- 208 • Chapter 2, "CEQA, Wildlife Protection Laws, and Permitting Requirements," offers  
209 information on impacts and mitigation that can apply both to CEQA and to other  
210 wildlife protection laws and makes recommendations to facilitate completion of  
211 important milestones throughout the permit application process and the life of the  
212 project.
- 213 • Chapter 3, "Pre-Permitting Assessment," offers standardized survey methods,  
214 protocols, and recommendations for conducting the studies and surveys deemed  
215 necessary by preliminary site screening, both for new projects and for repowering.
- 216 • Chapter 4, "Assessing Impacts and Selecting Measures for Mitigation," discusses  
217 how to assess impact findings discovered during the pre-permitting phase and  
218 suggests avoidance and minimization measures to incorporate into the planning  
219 and construction of the wind energy development. It also discusses adaptive  
220 management and compensatory mitigation.
- 221 • Chapter 5, "Operations Monitoring and Reporting," recommends standardized  
222 techniques for collecting, interpreting, and reporting bird and bat fatalities and use  
223 data once a project has begun operation.

## 224 **The Future of This Document**

225 This document reflects the current state of knowledge about the interactions of wind  
226 turbines with birds and bats. Ongoing and future research and actual experience in  
227 constructing and operating wind energy projects inevitably will expand and alter that  
228 knowledge and prompt periodic revisions to the *Guidelines*. For questions about this  
229 document or to contribute information to the current body of knowledge, please contact  
230 Rick York, Senior Biologist at the Energy Commission, <ryork@energy.state.ca.us>.

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T<sub>A</sub> preliminary site screening, pre-permitting assessment and operations monitoring inevitably will refine, expand and/or alter that knowledge and appropriate application of these *Guidelines*. As additional information on bird and bat interaction with wind turbines becomes available, periodic revisions to the *Guidelines* may be developed.

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## A STEP-BY-STEP APPROACH TO IMPLEMENTING THE *GUIDELINES*

This step-by-step guide summarizes the actions project developers should take to assess the impacts a typical wind energy project may have on birds and bats, ~~and to avoid, minimize, and mitigate these impacts~~. The section focuses on:

- Preliminary site screening
- Permitting requirements and compliance with laws
- Pre-permitting assessment methods
- Impact analysis and mitigation
- Operations monitoring

Whereas the other chapters of the *Guidelines* present scientific research and rationale for recommended actions, this section takes a “how to” approach, with the steps arranged in the order they are likely to occur. Each step corresponds to a chapter that provides additional details and background information.

### Step 1: Gather Preliminary Information and Conduct Site Screening

Site screening is the first step to assess biological resource issues associated with wind development at a proposed site and to develop a “pre-permitting” study plan. Site screening consists of a reconnaissance field survey and a desktop effort to collect data about the site from databases, reports from nearby projects, agencies, and local experts, ~~to evaluate the site’s sensitivity and to determine the kinds of studies the developer will have to conduct during the pre-permitting assessment to adequately evaluate a wind energy project’s potential impacts to birds and bats.~~ Consultation with the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and other appropriate stakeholders is an important step during this process, yielding valuable information and establishing contacts with key individuals and organizations.

Consider the following questions when assessing the potential for birds and bats (including special-status species) to occur at the site, when making a preliminary evaluation of collision risk, and in designing the pre-permitting studies discussed in Chapter 3.

1. Are any of the following species known or likely to occur on or near the proposed project site (“near” refers to a distance that is within the area used by an animal in the course of its normal movements and activities.):
  - Species listed as federal or state “Threatened” or “Endangered” (or candidates for such listing)?

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T to take reasonable steps to avoid and minimize impacts, and to mitigate any significant impacts.

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T and potential impacts

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T experts. Based on the site reconnaissance and review of existing data regarding the site, a preliminary list of species-specific impact questions can be developed, including what species occur at the site and which ones are likely to be affected by the project. The site’s sensitivity will serve as the basis for determining what kind of species specific data needs to be collected. Identification of specific data needs will then be used to determine the kinds of studies the developer will need

- 269       ▪ Special-status birds or bats?
- 270       ▪ Fully protected birds?
- 271       2. Is the site near a raptor nest, or are large numbers of raptors known or likely to
- 272       occur at or near the site during portions of the year?
- 273       3. Is the site near important staging or wintering areas for waterfowl, shorebirds, or
- 274       raptors?
- 275       4. Are colonially breeding species (for example, herons, shorebirds, seabirds)
- 276       known or likely to nest near the site?
- 277       5. Is the site likely to be used by birds whose behaviors include flight displays (for
- 278       example, common nighthawks, horned larks) or by species whose foraging
- 279       tactics put them at risk of collision (for example, contour hunting by golden
- 280       eagles)?
- 281       6. Does the site or do adjacent areas include habitat features (for example, riparian
- 282       habitat, water bodies) that might attract birds or bats for foraging, roosting,
- 283       breeding, or cover?
- 284       7. Is the site near a known or potential bat roost?
- 285       8. Does the site contain topographical features that could concentrate bird or bat
- 286       movements (for example, ridges, peninsulas, or other landforms that might
- 287       funnel bird or bat movement)? Is the site near a known or likely migrant
- 288       stopover site?
- 289       9. Is the site regularly characterized by seasonal weather conditions such as dense
- 290       fog or low cloud cover that might increase collision risks to birds and bats, and
- 291       do these events occur at times when birds might be concentrated?
- 292

293 The preliminary information gathering phase leads to a critical decision point in project

294 site screening: whether or not a project has the potential for irresolvable problems with

295 bird or bat fatalities. If a project moves forward despite indications that substantial bird

296 or bat fatalities might occur, avoidance and minimization options to reduce the impacts

297 are limited, and the project may require costly, ongoing reassessment of impacts and

298 adjustment of mitigation.

## 299 Step 2: Consider CEQA, Wildlife Protection Laws, and

## 300 Permitting Requirements

301 Permitting for wind energy projects is primarily handled by lead agencies (mostly

302 counties and cities) in accordance with the California Environmental Quality Act

303 (CEQA). In addition to complying with CEQA, lead agencies and project developers

304 ~~must~~ consider the state and federal wildlife protection laws discussed below in assessing

305 and mitigating impacts to birds and bats. The following list of laws includes those most

306 commonly addressed on a wind energy project.

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10. Based on the answers to questions 1 through 5, identify which of these species have been shown to be susceptible to collisions or habitat effects from wind turbines.
11. Identify any of the features (Questions 6 to 10) that might increase the likelihood of increased susceptibility or potential susceptibility to those species that are identified to be susceptible or potentially susceptible to impacts from wind turbines.
12. Identify what specific data needs to be collected to evaluate the susceptibility for each species considered susceptible or potentially susceptible.
13. Identify the appropriate methods (See Step 3) that will provide the specific data needs.

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The preliminary information gathering phase will help developers make initial assessments about the sensitivity of the site, and the likely categorization of the project based on Table A (insert Table A - CalWEA's proposed matrix). Projects in Category 1 are not advisable. Projects in Category 2 have a greater potential for significant bird or bat fatalities and developers will need to determine whether to pursue the site with the expectation that greater study will be required with possible impact mitigation. Projects in Category 3 have a lower potential for significant impact and will thus require less detailed studies with a focus on species-specific studies. With Category 4 projects, studies will be done only to fill information gaps, if they exist, relating to specific species of concern.

Counties with large low-impact (Category 4) areas should consider taking proactive steps to streamline permitting, as follows:

1. First, make a determination that a designated area has been shown to have less-than-significant impact based on scientifically defensible information on species occurrence and abundance and exposure conditions, including findings from any post-construction monitoring that may have taken place.
2. Second, require site-specific reconnaissance by a qualified biologist to confirm that each proposed project is appropriately placed in the low-impact category.
3. Third, if the proposed site is consistent with the designated low-impact area (and other non-avian issues do not trigger the need for a full EIR), the county could proceed to review it under either an exemption from CEQA, a negative declaration or a mitigation negative declaration. If the site evaluation identifies sensitivities not consistent with the designated low-impact area, or if other unusual circumstances exist that warrant greater scrutiny, the necessary preconstruction studies should be focused on addressing the information gaps for the species of interest and should build upon existing studies of those species in the WRA.

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Certain information that is central to making impact determinations (e.g., migratory pathways, nesting, flight patterns, relative abundance, etc.) can be obtained from many possible sources: published studies, governmental databases, conservation groups and existing mortality surveys, as well as site-specific field studies. [This should be expanded into a discussion of useful information sources.]

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- 269       ▪ Special-status birds or bats?
- 270       ▪ Fully protected birds?
- 271       2. Is the site near a raptor nest, or are large numbers of raptors known or likely to
- 272       occur at or near the site during portions of the year?
- 273       3. Is the site near important staging or wintering areas for waterfowl, shorebirds, or
- 274       raptors?
- 275       4. Are colonially breeding species (for example, herons, shorebirds, seabirds)
- 276       known or likely to nest near the site?
- 277       5. Is the site likely to be used by birds whose behaviors include flight displays (for
- 278       example, common nighthawks, horned larks) or by species whose foraging
- 279       tactics put them at risk of collision (for example, contour hunting by golden
- 280       eagles)?
- 281       6. Does the site or do adjacent areas include habitat features (for example, riparian
- 282       habitat, water bodies) that might attract birds or bats for foraging, roosting,
- 283       breeding, or cover?
- 284       7. Is the site near a known or potential bat roost?
- 285       8. Does the site contain topographical features that could concentrate bird or bat
- 286       movements (for example, ridges, peninsulas, or other landforms that might
- 287       funnel bird or bat movement)? Is the site near a known or likely migrant
- 288       stopover site?
- 289       9. Is the site regularly characterized by seasonal weather conditions such as dense
- 290       fog or low cloud cover that might increase collision risks to birds and bats, and
- 291       do these events occur at times when birds might be concentrated?
- 292

293       The preliminary information gathering phase leads to a critical decision point in project

294       site screening: whether or not a project has the potential for irresolvable problems with

295       bird or bat fatalities. If a project moves forward despite indications that substantial bird

296       or bat fatalities might occur, avoidance and minimization options to reduce the impacts

297       are limited, and the project may require costly, ongoing reassessment of impacts and

298       adjustment of mitigation.

## 299       **Step 2: Consider CEQA, Wildlife Protection Laws, and**

## 300       **Permitting Requirements**

301       Permitting for wind energy projects is primarily handled by lead agencies (mostly

302       counties and cities) in accordance with the California Environmental Quality Act

303       (CEQA). In addition to complying with CEQA, lead agencies and project developers

304       must consider the state and federal wildlife protection laws discussed below in assessing

305       and mitigating impacts to birds and bats. The following list of laws includes those most

306       commonly addressed on a wind energy project.

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## State Laws

### California Environmental Quality Act

- The California Environmental Quality Act governs how California counties, cities, and other government entities evaluate environmental impacts to make discretionary permitting decisions for wind energy development.

### Fish and Game Code Wildlife Protection Laws

In the broadest sense, CEQA and Fish and Game Code wildlife protection laws require that government agencies develop standards and procedures necessary to maintain, protect, restore, and enhance environmental quality, including fish and wildlife populations and plant and animal communities, and to ensure that projects comply with these laws. Several California Fish and Game Code sections that relate to protection of avian wildlife resources and are relevant to wind energy projects are described below.

- California Endangered Species Act (CESA), 1984 – Fish and Game Code section 2050 et seq.
- Fully Protected Species, Fish and Game Code sections 3511, 4700, 5050, and 5515.
- Migratory Birds, Fish and Game Code section 3513.
- Birds of Prey and Their Eggs, Fish and Game Code section 3503.5.
- Unlawful Sale or Purchase of Exotic Birds, Fish and Game Code section 3505.
- Nongame Birds, Fish and Game Code section 3800 (a).

### Federal Laws

The following federal laws apply to protecting wildlife from impacts from wind energy:

- National Environmental Policy Act.
- Federal Endangered Species Act (FESA), 1973, Title 16, U.S. Code section 1531.
- Migratory Bird Treaty Act (MBTA), 1918, Title 16, U.S. Code sections 703 to 712.
- Bald and Golden Eagle Protection Act, 1940, Title 16, U.S. Code section 668.

While CEQA compliance will be the primary focus of the impact assessment for a wind energy project, focusing on CEQA significance alone may not address all of the species and issues that need evaluation and mitigation; impacts prohibited by state and federal wildlife protection laws must be assessed and minimized throughout project construction and operation, whether or not such impacts rise to the level of CEQA significance. Wind energy developers who use the methods described in the Guidelines will secure information on impact assessment and mitigation that will apply both to CEQA and to the other wildlife protection laws and will demonstrate a good faith effort

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(new bulle!) CEQA is concerned with significant adverse impact, defined in part as one that "substantially reduces the number or restricts the range of an endangered species." CEQA does not necessarily consider the loss of a single individual of an endangered species to constitute a significant environmental impact.

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T approach to impact assessment described in the Guidelines, applied appropriately to each site in consultation with the lead agency, and who use recommended protocols for any necessary studies undertaken.

341 to develop and operate their projects in a fashion that is consistent with the intent of  
342 local, state, and federal laws.

344 Contact land owners, local environmental groups, and state and federal wildlife  
345 management agencies such as CDFG and USFWS early in the permitting process to  
346 secure critical information on which to base site development decisions and to assess the  
347 type and timing of necessary surveys. Agency consultations, issuance of take permits,  
348 and securing lands or easements for compensatory mitigation can be lengthy processes;  
349 initiating agency contacts early in the permitting process can avoid delays.

351 ~~Structure permit conditions to clearly define the obligations of the operator and to~~  
352 ~~solidly establish triggers for additional mitigation beyond that required upon project~~  
353 ~~approval. Consistent compliance with all terms and conditions of the permit should~~  
354 occur throughout operations monitoring and in fulfilling avoidance, minimization, and  
355 mitigation measures.

### 356 Step 3: Collect "Pre-Permitting" Data Using 357 Standardized Monitoring Protocols

358 Conduct pre-permitting monitoring for a minimum of one full year to capture seasonal  
359 bird composition and relative abundance during all four seasons. The standardized data  
360 collection method for diurnal birds is the bird use count, and most projects will also  
361 need raptor nest searches. Depending on characteristics of a proposed project site and  
362 the bird species potentially affected by the project, additional pre-permitting study  
363 methods may be necessary.

365 ~~For bats, the standardized recommended method is one year of acoustic monitoring~~  
366 ~~with specialized acoustic systems (for example, AnaBat®, SonoBat®) to determine the~~  
367 ~~presence and activity levels of resident and migratory bats at proposed project sites.~~  
368 ~~Other bat research tools are available to complement the information from acoustic~~  
369 ~~surveys but are not recommended on every project.~~

371 For nocturnal migratory birds, conduct additional studies as needed if a project  
372 potentially poses a risk of collision to migrating songbirds and other species. This  
373 document discusses some of the primary tools available to study nocturnal birds (radar,  
374 acoustic monitoring, visual monitoring) but does not provide standardized  
375 recommendations on duration or frequency of sampling or study design.

377 Pre-permitting data collection efforts may be reduced if scientifically defensible and  
378 applicable data are available from nearby projects or may be expanded if necessary to  
379 address particular concerns at a project site. ~~Early consultation with the lead agency and~~  
380 ~~contacts with CDFG, USFWS, local environmental groups, and any other stakeholders~~  
381 ~~with an interest in the project is a crucial step in designing pre-permitting studies and~~

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Such good faith efforts will be considered by CDFG before taking any enforcement action in the event of a potential violation of a California wildlife protection law.

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Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 3:37:11 PM  
This entire paragraph does not belong in this section; it belongs at the end of Step 4.] Structure permit conditions to clearly define the obligations of the operator and, if significant impacts are predicted, to establish mitigation measures. A range of mitigation measures linked to a range of potential impacts could be included, but the range of mitigation should be clearly bounded to provide developers with cost certainty.

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 3:41:16 PM  
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Author: Nancy  
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Date: 5/12/2007 3:49:00 PM  
Table 1 summarizes the pre-permitting assessment phase for sites in various categories depending on the type of project and the biological sensitivity of the site. [Elaborate based on Table.]

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 2:58:18 PM  
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Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 2:58:09 PM  
✚

Author: karenh  
Subject: Inserted Text  
Date: 5/12/2007 2:58:00 PM  
For bats, as little is known about bat populations and their behaviors, and as the value of pre-construction surveys is currently limited, site-specific pre-construction bat studies are presently not recommended. Further research on these issues is needed.

Author: Nancy  
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Author: Nancy  
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Date: 5/12/2007 4:01:44 PM

~~T~~ data and information is available, as determined by the lead agency, to inform decision making (e.g., data from other sites that can be correlated to the proposed site with statistical validity. (See, e.g., Erickson et al, 2002.)

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 4:07:40 PM  
~~T~~

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 7:19:38 PM  
~~T~~

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 7:19:31 PM  
~~T~~ biological impacts of the project can be an important

to develop and operate their projects in a fashion that is consistent with the intent of local, state, and federal laws.

Contact land owners, local environmental groups, and state and federal wildlife management agencies such as CDFG and USFWS early in the permitting process to secure critical information on which to base site development decisions and to assess the type and timing of necessary surveys. Agency consultations, issuance of take permits, and securing lands or easements for compensatory mitigation can be lengthy processes; initiating agency contacts early in the permitting process can avoid delays.

~~Structure permit conditions to clearly define the obligations of the operator and to solidly establish triggers for additional mitigation beyond that required upon project approval.~~ Consistent compliance with all terms and conditions of the permit should occur throughout operations monitoring and in fulfilling avoidance, minimization, and mitigation measures.

### Step 3: Collect "Pre-Permitting" Data Using Standardized Monitoring Protocols

~~Conduct pre-permitting monitoring for a minimum of one full year to capture seasonal bird composition and relative abundance during all four seasons. The standardized data collection method for diurnal birds is the bird use count, and most projects will also need raptor nest searches. Depending on characteristics of a proposed project site and the bird species potentially affected by the project, additional pre-permitting study methods may be necessary.~~

~~For bats, the standardized recommended method is one year of acoustic monitoring with specialized acoustic systems (for example, AnaBat®, SonoBat®) to determine the presence and activity levels of resident and migratory bats at proposed project sites. Other bat research tools are available to complement the information from acoustic surveys but are not recommended on every project.~~

For nocturnal migratory birds, conduct additional studies as needed if a project potentially poses a risk of collision to migrating songbirds and other species. This document discusses some of the primary tools available to study nocturnal birds (radar, acoustic monitoring, visual monitoring) but does not provide standardized recommendations on duration or frequency of sampling or study design.

Pre-permitting data collection efforts may be reduced if scientifically defensible and applicable data are available from nearby projects or may be expanded if necessary to address particular concerns at a project site. Early consultation with the lead agency and contacts with CDFG, USFWS, local environmental groups, and any other stakeholders with an interest in the project is a crucial step in designing pre-permitting studies and

382 deciding whether or not modifications to the standardized methods are warranted. The  
383 Energy Commission, in consultation with CDFG, proposes to establish a statewide  
384 standing science advisory committee that could also provide information to lead  
385 agencies seeking additional scientific expertise.

### 386 **Study Objectives and Design**

387 Development of a pre-permitting study begins with a clear statement of the questions to  
388 be answered. Study objectives will vary from site to site, but key issues on most wind  
389 energy projects in California will typically include at least the following questions:

- 390 • Which species of birds and bats use the project area, and what is their relative  
391 abundance throughout the year?
- 392 • How much time do birds and bats spend in the risk zone (rotor swept area), and  
393 does this vary by season?
- 394 • What is the estimated range of bird and bat fatalities from the project, and how  
395 does bird/bat use of the site compare to use data from other wind power sites  
396 that also have fatality information?
- 397 • What design and mitigation measures could reduce impacts?

### 398 **Repowering**

399 Repowering refers to modernizing an existing wind resource area by removing old  
400 turbines and replacing them with new turbines that are generally larger, taller, and more  
401 efficient than the old ones. Pre-permitting studies for repowering involves the same  
402 methods as for new projects; however, for repowering projects, data may be available  
403 from nearby existing wind projects. If these data are credible, scientifically defensible,  
404 and applicable to the repowering site, developers may use the data to reduce the extent  
405 of new field studies needed to assess impacts and develop mitigation measures.  
406 Evaluate the applicability of the existing data in light of design and operational  
407 differences between the old and replacement turbines. Determine the adequacy of this  
408 information in consultation with the lead agency, USFWS, CDFG, and other appropriate  
409 stakeholders (such as a conservation organization representative).

### 410 **Birds—Standardized Pre-Permitting Monitoring Protocol**

411 Answering questions about diurnal bird use of a site involves bird use counts to assess  
412 bird species composition, seasonal relative abundance, and potential collision risk. This  
413 method has been used for many wind energy projects throughout the United States,  
414 making it a well-tested technique useful for comparative purposes.

### 415 **Bird Use Counts**

416 The bird use count (BUC) is a modified point count that involves an observer recording  
417 bird detections from a single vantage point for a specified time period.

Page: 23

Author: Nancy  
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Date: 5/12/2007 7:25:58 PM  
T

Author: Jim  
Subject: Inserted Text  
Date: 5/12/2007 7:25:46 PM  
T that use the project area are potentially susceptible

Author: Jim  
Subject: Inserted Text  
Date: 5/12/2007 7:24:37 PM  
T What are the specific impact questions that need to be addressed for this site?  
Do these impact questions need be addressed qualitatively and/or quantitatively?

Author: Jim  
Subject: Inserted Text  
Date: 5/4/2007 7:11:59 AM  
T these

Author: Jim  
Subject: Inserted Text  
Date: 5/4/2007 7:16:26 AM  
T How does bird/bat use of the site compare to use data from other wind power sites  
that also have fatality information?

Author: Jim  
Subject: Cross-Out  
Date: 5/4/2007 7:18:34 AM  
T

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 7:30:05 PM  
T

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 7:35:36 PM  
T Studies should be developed in accordance with the General Framework, Category 4.

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 7:30:19 PM  
T Data for repower projects

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 7:30:46 PM  
T or from the project to be repowered.

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 7:33:58 PM

382 deciding whether or not modifications to the standardized methods are warranted. The  
383 Energy Commission, in consultation with CDFG, proposes to establish a statewide  
384 standing science advisory committee that could also provide information to lead  
385 agencies seeking additional scientific expertise.

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388 be answered. Study objectives will vary from site to site, but key issues on most wind  
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- 390 • Which species of birds and bats use the project area, and what is their relative  
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- 392 • How much time do birds and bats spend in the risk zone (rotor-swept area), and  
393 does this vary by season?
- 394 • What is the estimated range of bird and bat fatalities from the project, and how  
395 does bird/bat use of the site compare to use data from other wind power sites  
396 that also have fatality information?
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401 efficient than the old ones. Pre-permitting studies for repowering involves the same  
402 methods as for new projects; however, for repowering projects, data may be available  
403 from nearby existing wind projects. If these data are credible, scientifically defensible,  
404 and applicable to the repowering site, developers may use the data to reduce the extent  
405 of new field studies needed to assess impacts and develop mitigation measures.  
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407 differences between the old and replacement turbines. Determine the adequacy of this  
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414 making it a well-tested technique useful for comparative purposes.

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416 The bird use count (BUC) is a modified point count that involves an observer recording  
417 bird detections from a single vantage point for a specified time period.

**T** as determined by the lead agency.

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 7:37:36 PM  
**T**

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 7:48:17 PM  
**T**

Author: Jim  
Subject: Inserted Text  
Date: 5/12/2007 7:48:55 PM  
**T** The site screening process will determine the site-specific impact questions and data that needs to be collected to answer those questions (see Step 1). If species-specific diurnal bird use information is needed, then bird use counts can be used

Author: Jim  
Subject: Inserted Text  
Date: 5/12/2007 7:49:34 PM  
**T** If comparable information is not available.

Author: karenh  
Subject: Inserted Text  
Date: 5/14/2007 2:19:11 PM  
**T** (The method of modifying BUC from the standard point counts, by reducing the number of points necessary to get a good statistical analysis from the standard (250) to one per section and increasing the time from 5 or ten minutes to 30 minutes will not result in sound bird use data. Even on a wind farm six square miles in size, that is only six points. Consequently, although increased time is spent at the fewer number of points, increased time does not make up for not having enough points to obtain statistically adequate data (i.e., data adequate from which to draw conclusions). If after such lengthy sampling, conclusions cannot be drawn, the data is not useful. Furthermore, the complexity of annual climate variations, population variations, variations in migration routes and nesting locations (e.g., tri-colored black birds all don't always go to the same place every year), and the off site impacts, such as adverse effects to birds in northern hemisphere or southern hemisphere nesting locations, it would be difficult to impossible to determine the effects of wind farms on any particular species. The complexity of cumulative impact analyses are incredible, particularly when with such few points, the Guidelines are requiring that the sampling be done in different weather and different times of day. With small sample sizes, the purpose of such intensive monitoring efforts with the required added variables becomes meaningless, as the data cannot be analyzed conclusively. The actual needs become those of research and experimentation, which go beyond the level of CEQA and NEPA requirements in many cases, as it could take virtually years to obtain enough data. Federal Endangered Species Act and California Endangered Species Act usually require only the "best available data".)

418 **Sampling Duration/Frequency.** Conduct BUCs for 30 minutes once a week for one year,  
419 covering all daylight hours and weather conditions.  
420

421 **Number/Distribution of Sample Points.** Select BUC sample sites at vantage points that  
422 offer unobstructed views of the surrounding terrain and that are at least 5,200 feet (1,600  
423 meters) apart, coinciding with proposed turbine sites. Establish sufficient sample points  
424 to achieve an average minimum density of 1 to 1.5 sample points every 1 square mile  
425 (2.6 square kilometers). Distribute sample points to cover areas of the project site where  
426 turbines will be located.  
427

428 **Variables.** Record number and species of birds observed, distance from bird to observer,  
429 flight height above ground, and environmental variables (for example, wind speed). The  
430 surveyor should record locations and behavior at short intervals (for example, 30  
431 seconds), noting behavior such as soaring, contour hunting, and flapping flight.  
432

433 **Metrics.** Record bird use of rotor-swept area height per 30-minute count and bird use  
434 per 30-minute count per a defined area.

#### 435 **Raptor Nest Searches**

436 Raptor nest searches provide information for micro-siting decisions, to establish an  
437 appropriately sized non-disturbance buffer around the nesting territory, and to develop  
438 compensatory mitigation measures, if needed. Consult with the USFWS, CDFG, raptor  
439 biologists, and appropriate stakeholders to establish which species to search for and to  
440 develop the site-specific survey protocol.  
441

442 **Search Area.** Conduct searches for raptor nests or raptor breeding territories on projects  
443 with potential for impacts to raptors in suitable habitat during the breeding season  
444 within a range of 0.5 to 3 miles (0.8 to 4.8 kilometers) from proposed turbine locations.  
445 Use the larger search radii for wide-ranging species such as bald or golden eagles if they  
446 are known or likely to nest within 3 miles (4.8 kilometers) or for known or likely red-  
447 tailed hawk nests within 2 miles (3.2 kilometers) of the proposed turbine sites. Reduce  
448 the search area for species with smaller home ranges (for example, American kestrel) or  
449 for species that generally stay within the forest canopy and are unlikely to venture far  
450 into the open terrain of a wind resource area (for example, Coopers' hawk, spotted owl,  
451 and some species of small owls).  
452

453 **Search Protocol.** Conduct nest surveys from the ground or air, using helicopters if  
454 possible for large and inaccessible areas and in open country such as grassland or desert.  
455 Avoid approaching the nest too closely to minimize disturbance, particularly when  
456 surveying from helicopters. Use existing survey protocol (refer to  
457 <[www.dfg.ca.gov/hcpb/species/stds\\_gdl/survmotr.shtml](http://www.dfg.ca.gov/hcpb/species/stds_gdl/survmotr.shtml)>) for special-status raptor  
458 species, including Swainson's hawk, northern goshawk, bald eagle, burrowing owl, and  
459 northern spotted owl.

## Page: 24

Author: Jim

Subject: Inserted Text

Date: 5/1/2007 9:23:19 AM

Often time this information can be obtained from the literature. It may be more appropriate to group species by habits e.g. ground nesting, etc.

Author: Jim

Subject: Cross-Out

Date: 5/1/2007 9:21:03 AM

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Author: Jim

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Date: 5/1/2007 9:20:56 AM

proposed

Author: Jim

Subject: Inserted Text

Date: 5/1/2007 9:21:12 AM

within the

Author: Nancy

Subject: Inserted Text

Date: 5/12/2007 6:27:31 PM

Meaningful comparisons of rotor-swept data can best be obtained if data are stratified according to height of the turbine and rotor diameter, topographical location, level, sloping, and ridgetop.

Author: karenh

Subject: Inserted Text

Date: 5/12/2007 8:39:25 PM

We concur that raptor nest searches should be done on the project site or along public roadways. However, extensive limitations exist to searching for raptor nests off the project site when the projects are largely on private property and surrounded by private property. Unless a particular species is colonial nesting or the project site is near extensive cliffs or riparian areas which avail good raptor nesting habitat, the number of nests nearby is not necessarily an indication of risk unless the project site is within a migratory route. Aerial surveys are suggested, but it is believed that finding ground nesting raptors in the desert would be difficult. Furthermore, flight elevation limitations exist on and near wind farms to prevent accidents; consequently, aerial surveying methods have their limitations.]

Author: Nancy

Subject: Cross-Out

Date: 5/12/2007 8:38:35 PM

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Author: Nancy

Subject: Inserted Text

Date: 5/12/2007 8:39:09 PM

as determined by the lead agency.

Author: Nancy

Subject: Cross-Out

Date: 5/12/2007 8:41:19 PM

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Author: Nancy

**Sampling Duration/Frequency.** Conduct BUCs for 30 minutes once a week for one year, covering all daylight hours and weather conditions.

**Number/Distribution of Sample Points.** Select BUC sample sites at vantage points that offer unobstructed views of the surrounding terrain and that are at least 5,200 feet (1,600 meters) apart, coinciding with proposed turbine sites. Establish sufficient sample points to achieve an average minimum density of 1 to 1.5 sample points every 1 square mile (2.6 square kilometers). Distribute sample points to cover areas of the project site where turbines will be located.

**Variables.** Record number and species of birds observed, distance from bird to observer, flight height above ground, and environmental variables (for example, wind speed). The surveyor should record locations and behavior at short intervals (for example, 30 seconds), noting behavior such as soaring, contour hunting, and flapping flight.

**Metrics.** Record bird use of rotor-swept area height per 30-minute count and bird use per 30-minute count per a defined area.

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Raptor nest searches provide information for micro-siting decisions, to establish an appropriately sized non-disturbance buffer around the nesting territory, and to develop compensatory mitigation measures, if needed. Consult with the USFWS, CDFG, raptor biologists, and appropriate stakeholders to establish which species to search for and to develop the site-specific survey protocol.

**Search Area.** Conduct searches for raptor nests or raptor breeding territories on projects with potential for impacts to raptors in suitable habitat during the breeding season within a range of 0.5 to 3 miles (0.8 to 4.8 kilometers) from proposed turbine locations. Use the larger search radii for wide-ranging species such as bald or golden eagles if they are known or likely to nest within 3 miles (4.8 kilometers) or for known or likely red-tailed hawk nests within 2 miles (3.2 kilometers) of the proposed turbine sites. Reduce the search area for species with smaller home ranges (for example, American kestrel) or for species that generally stay within the forest canopy and are unlikely to venture far into the open terrain of a wind resource area (for example, Coopers' hawk, spotted owl, and some species of small owls).

**Search Protocol.** Conduct nest surveys from the ground or air, using helicopters if possible for large and inaccessible areas and in open country such as grassland or desert. Avoid approaching the nest too closely to minimize disturbance, particularly when surveying from helicopters. Use existing survey protocol (refer to <[www.dfg.ca.gov/hcpb/species/stds\\_gdl/survmonitr.shtml](http://www.dfg.ca.gov/hcpb/species/stds_gdl/survmonitr.shtml)>) for special-status raptor species, including Swainson's hawk, northern goshawk, bald eagle, burrowing owl, and northern spotted owl.



460 **Bats—Standardized Pre-Permitting Monitoring Protocol**

461 **Duration of Monitoring.** Conduct acoustic monitoring at all sites for one year, except in  
462 areas characterized by cold winters where bats are absent during the coldest months  
463 (higher elevations and portions of northern California). Consult with bat experts, CDFG,  
464 and USFWS before reducing acoustic monitoring during any portion of the one-year  
465 monitoring period.

466  
467 **Number and Distribution of Monitoring Stations.** Place bat detection systems at 100  
468 feet (30 meters) above the ground and at ground level. Establish stations to cover the  
469 project area as completely as possible and to encompass diverse terrain and habitats. Try  
470 to maintain a density of at least 1 to 1.5 acoustic monitoring stations every 1 square mile  
471 (2.5 square kilometers). Logistical constraints (location of existing meteorological towers  
472 and roads) will limit the number of potential monitoring sites, so this density of  
473 monitoring stations may not be achievable on all projects.

474  
475 **Data Collection and Analysis.** Monitor all night and at dusk and dawn. Conduct  
476 analysis of the data on a subset of the recordings by screening data to look for spikes of  
477 activity, with the remainder stored for later analysis if warranted. Consult with a bat  
478 biologist with experience in acoustic analysis and with CDFG and USFWS before  
479 making decisions on the level of effort needed for screening and analyzing the pre-  
480 permitting acoustic data.

481  
482 **Metrics.** Record total bat passes and mean passes per detector night and per detector  
483 hour (excluding nights with measurable precipitation).

484 **Exceptions to Standardized Pre-Permitting Monitoring**  
485 **Protocols—Birds and Bats**

486 Certain situations warrant exceptions to the standardized monitoring protocol; the  
487 burden of proving that an exception is appropriate and applicable is on the stakeholder  
488 attempting to justify the exception. Justify birds and bats separately when considering  
489 an exception. When deciding whether or not to deviate from the standardized protocols,  
490 consult with the CEQA lead agency, USFWS, CDFG, biologists with specific expertise,  
491 and other appropriate stakeholders (such as conservation organization representatives)  
492 for consideration of the appropriate deviation.

493 **When Less Monitoring May Be Appropriate**

494 Less monitoring may be appropriate if scientifically defensible data from previous  
495 monitoring activities are already available from nearby, similar projects. Factors to  
496 consider in assessing those data include:

- 497 • Whether the field data were collected using a credible sample design.  
498 • Whether the data were collected in relation to the proposed site.

Page: 25

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 8:47:03 PM  
T

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 8:46:58 PM  
T based on the presence of bat species of concern at the site, in consultation with the lead agency. Acoustic monitoring may not be needed

Author: karenh  
Subject: Inserted Text  
Date: 5/12/2007 8:46:42 PM  
T [A year's length of monitoring for bats is extensive for a large wind farm. First, before intensive monitoring is implemented, some determination of the potential presence of bat species of concern should be conducted.]

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 8:47:48 PM  
T

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 8:49:30 PM  
T In rare instances when acoustic monitoring is used, the protocol below may be considered.

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 8:58:28 PM  
T

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 9:04:05 PM  
T Different Levels of

Author: Nancy  
Subject: Inserted Text  
Date: 5/13/2007 10:53:25 PM  
T [The concept of "exceptions" should be removed throughout the document in favor of a category approach, and a decision-tree analysis of information needs within each category. Scientifically valid reasons, practical and feasibility reasons, site-specific conditions, either physical or biological, are among the many valid reasons that could exist for modifying the proposed guideline protocols. Consequently, while we have attempted to partially salvage this section, the entire section should be reconceived.]

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 9:07:55 PM  
T

Author: Jim  
Subject: Cross-Out  
Date: 5/4/2007 7:25:41 AM  
T

460 **Bats—Standardized Pre-Permitting Monitoring Protocol**

461 **Duration of Monitoring.** Conduct acoustic monitoring ~~at all sites for one year, except in~~  
462 ~~areas characterized by cold winters where bats are absent during the coldest months~~  
463 ~~(higher elevations and portions of northern California). Consult with bat experts, CDFG,~~  
464 ~~and USFWS before reducing acoustic monitoring during any portion of the one-year~~  
465 ~~monitoring period.~~

466  
467 **Number and Distribution of Monitoring Stations.** Place bat detection systems at 100  
468 feet (30 meters) above the ground and at ground level. Establish stations to cover the  
469 project area as completely as possible and to encompass diverse terrain and habitats. Try  
470 to maintain a density of at least 1 to 1.5 acoustic monitoring stations every 1 square mile  
471 (2.5 square kilometers). Logistical constraints (location of existing meteorological towers  
472 and roads) will limit the number of potential monitoring sites, so this density of  
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478 biologist with experience in acoustic analysis and with CDFG and USFWS before  
479 making decisions on the level of effort needed for screening and analyzing the pre-  
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486 ~~Certain situations warrant exceptions to the standardized monitoring protocol; the~~  
487 ~~burden of proving that an exception is appropriate and applicable is on the stakeholder~~  
488 ~~attempting to justify the exception. Justify birds and bats separately when considering~~  
489 ~~an exception. When deciding whether or not to deviate from the standardized protocols,~~  
490 ~~consult with the CEQA lead agency, USFWS, CDFG, biologists with specific expertise,~~  
491 ~~and other appropriate stakeholders (such as conservation organization representatives)~~  
492 ~~for consideration of the appropriate deviation.~~

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494 Less monitoring may be appropriate if scientifically defensible data from previous  
495 monitoring activities are already available from nearby, similar projects. Factors to  
496 consider in assessing those data include:

- 497 • ~~Whether the field data were collected using a credible sample design~~  
498 • ~~Where the data were collected in relation to the proposed site.~~

Author: Jim  
Subject: Inserted Text  
Date: 5/12/2007 9:09:53 PM  
T Depending upon the type of site and site-specific conditions, the impact questions to be considered, and the availability of existing acceptable data or information on bird use, more or less than a full year of monitoring may be appropriate.

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 9:12:59 PM  
T

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 9:08:12 PM  
T

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 9:12:29 PM  
T information needs and methods to obtain that information. In doing so,

Author: Jim  
Subject: Inserted Text  
Date: 5/1/2007 9:24:05 AM  
T for

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 9:13:14 PM  
T

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 9:13:45 PM  
T methods

Author: Jim  
Subject: Inserted Text  
Date: 5/12/2007 9:16:09 PM  
T e.g. with Category 3 projects,

Author: Jim  
Subject: Inserted Text  
Date: 5/4/2007 7:35:00 AM  
T locations or

Author: Nancy  
Subject: Inserted Text  
Date: 5/12/2007 9:28:25 PM  
T or from the same site that is to be repowered

Author: Jim  
Subject: Inserted Text  
Date: 5/12/2007 9:17:18 PM  
T Will this data answer the impact questions associated with the species of interest found at the site?

Author: Nancy  
Subject: Cross-Out  
Date: 5/12/2007 9:20:30 PM  
T

## **Bats—Standardized Pre-Permitting Monitoring Protocol**

**Duration of Monitoring.** Conduct acoustic monitoring at all sites for one year, except in areas characterized by cold winters where bats are absent during the coldest months (higher elevations and portions of northern California). Consult with bat experts, CDFG, and USFWS before reducing acoustic monitoring during any portion of the one-year monitoring period.

**Number and Distribution of Monitoring Stations.** Place bat detection systems at 100 feet (30 meters) above the ground and at ground level. Establish stations to cover the project area as completely as possible and to encompass diverse terrain and habitats. Try to maintain a density of at least 1 to 1.5 acoustic monitoring stations every 1 square mile (2.5 square kilometers). Logistical constraints (location of existing meteorological towers and roads) will limit the number of potential monitoring sites, so this density of monitoring stations may not be achievable on all projects.

**Data Collection and Analysis.** Monitor all night and at dusk and dawn. Conduct analysis of the data on a subset of the recordings by screening data to look for spikes of activity, with the remainder stored for later analysis if warranted. Consult with a bat biologist with experience in acoustic analysis and with CDFG and USFWS before making decisions on the level of effort needed for screening and analyzing the pre-permitting acoustic data.

**Metrics.** Record total bat passes and mean passes per detector night and per detector hour (excluding nights with measurable precipitation).

## **Exceptions to Standardized Pre-Permitting Monitoring Protocols—Birds and Bats**

Certain situations warrant exceptions to the standardized monitoring protocol; the burden of proving that an exception is appropriate and applicable is on the stakeholder attempting to justify the exception. Justify birds and bats separately when considering an exception. When deciding whether or not to deviate from the standardized protocols, consult with the CEQA lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as conservation organization representatives) for consideration of the appropriate deviation.

### **When Less Monitoring May Be Appropriate**

Less monitoring may be appropriate if scientifically defensible data from previous monitoring activities are already available from nearby, similar projects. Factors to consider in assessing those data include:

- Whether the field data were collected using a credible sample design.
- Where the data were collected in relation to the proposed site.

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T at a site with conditions similar

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T Whether

499 • If the existing data reflect comparable turbine type, layout, habitat, physical  
500 features, and winds.

501 • Whether the data are scientifically defensible and still relevant.

502  
503 For example, reduced pre-permitting monitoring might be appropriate for a project  
504 surrounded by or near an existing wind development project that had been studied  
505 sufficiently and for which there is little uncertainty as to the level of impact. Such  
506 decisions require expert biological input because short distances and slight  
507 topographical, wind, or habitat changes within or adjacent to the project can make  
508 important differences regarding bird and bat impacts, as can the types of turbines.  
509 Consultation with the lead agency, USFWS, CDFG, biologists with specific expertise,  
510 and other appropriate stakeholders (such as a conservation organization representative)  
511 is recommended when considering whether existing data are adequate. This  
512 consultation will help identify potentially overlooked issues that could cause delays in  
513 project development.

#### 514 When More Monitoring May Be Appropriate

515 High levels of bird and/or bat use or large uncertainties regarding bird and bat use of  
516 the proposed site may need additional study beyond one year to help understand and  
517 formulate ways to reduce the number of fatalities. For example, an unstudied area  
518 destined to be a new, large wind resource area might warrant more than one year of pre-  
519 permitting monitoring. A site with high potential for impacts to special-status species  
520 such as a new wind project proposed within critical habitat for the Threatened marbled  
521 murrelet— might warrant multi-year studies. Sites with high raptor use may require  
522 more than one year of monitoring to more clearly understand raptor use of the site and  
523 determine the potential to reduce impacts through micro-siting.

#### 524 Step 4: Assess Impacts and Select Mitigation

525 To comply with CEQA, lead and responsible agencies make estimates of potential  
526 fatalities and risk to individual species and populations to determine “significance” and  
527 to develop avoidance, minimization, and mitigation requirements. Address the  
528 following three categories of impacts to conduct an adequate CEQA analysis of impacts.

529  
530 “Direct” impacts refer to bird and bat collisions with wind turbine blades,  
531 meteorological towers, and guy wires. Determine direct impacts by reviewing all of the  
532 pre-permitting data to evaluate which species might collide with turbines and which  
533 non-biological factors (such as topographic, weather, and turbine design features) might  
534 contribute to this risk. Make a risk assessment to determine whether overall avian and  
535 bat fatality rates are low, moderate, or high relative to other projects. For all  
536 quantification of risk and fatality estimates, use a uniform metric of bird or bat fatalities  
537 per megawatt (MW) of installed capacity per year. Refer to Appendix H for a discussion  
538 of raptor use and fatality data from studies at existing wind resource areas.

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T repower or new

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T implies requirement to involve all

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T for species considered potentially susceptible

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T for species potentially susceptible to wind project effects

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T the nature of the impacts

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T define high potential

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499 • If the existing data reflect comparable turbine type, layout, habitat, physical  
500 features, and winds.

501 • Whether the data are scientifically defensible and still relevant.  
502

503 For example, reduced pre-permitting monitoring might be appropriate for a project  
504 surrounded by or near an existing wind development project that had been studied  
505 sufficiently and for which there is little uncertainty as to the level of impact. Such  
506 decisions require expert biological input because short distances and slight  
507 topographical, wind, or habitat changes within or adjacent to the project can make  
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517 formulate ways to reduce the number of fatalities. For example, an unstudied area  
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519 permitting monitoring. A site with high potential for impacts to special-status species—  
520 such as a new wind project proposed within critical habitat for the Threatened marbled  
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535 bat fatality rates are low, moderate, or high relative to other projects. For all  
536 quantification of risk and fatality estimates, use a uniform metric of bird or bat fatalities  
537 per megawatt (MW) of installed capacity per year. Refer to Appendix H for a discussion  
538 of raptor use and fatality data from studies at existing wind resource areas.

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especially for species potentially susceptible to significant impacts and where there is a relationship between bird use and mortality and a quantification of this mortality is required.

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whether such fatalities are biologically significant

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whether such fatalities are biologically significant

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that are to be implemented during operation of the facility. It is vitally important that the pre-permitting impact assessment be used to determine the Operational Monitoring protocols that will be used to confirm the impact predictions. A qualitative or quantitative risk assessment should be conducted to determine whether overall avian and bat fatality rates are low, moderate, or high relative to other projects (See [revised] Chapter 4).

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For some situations, a qualitative prediction of whether the impacts are above, below or within the range for similar California species may be sufficient, as well as a determination of whether direct impacts are likely to be biologically significant. In other situations, a quantification of the amount of predicted mortality may be necessary. For all quantification of risk and fatality estimates, use a uniform metric of bird or bat fatalities (per megawatt of installed capacity per year). (See Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.)

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• If the existing data reflect comparable turbine type, layout, habitat, physical features, and winds.

• Whether the data are scientifically defensible ~~and still relevant~~.

For example, reduced pre-permitting monitoring might be appropriate for a project surrounded by or near an existing wind development project that had been studied sufficiently and for which there is little uncertainty as to the level of impact. Such decisions require expert biological input because short distances and slight topographical, wind, or habitat changes within or adjacent to the project can make important differences regarding bird and bat impacts, as can the types of turbines. Consultation with the lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as a conservation organization representative) is recommended when considering whether existing data are adequate. ~~This consultation will help identify potentially overlooked issues that could cause delays in project development.~~

#### **When More Monitoring May Be Appropriate**

High levels of bird and/or bat use or large uncertainties regarding bird and bat use of the proposed site may need additional study beyond one year to help understand and formulate ways to reduce the number of fatalities. For example, an unstudied area ~~destined to be a new, large wind resource area~~ might warrant more than one year of pre-permitting monitoring. A site with high ~~potential~~ for impacts to special-status species—such as a new wind project proposed within critical habitat for the Threatened marbled murrelet—might warrant multi-year studies. Sites with high raptor use may require more than one year of monitoring to more clearly understand raptor use of the site and determine the potential to reduce impacts through micro-siting.

#### **Step 4: Assess Impacts and Select Mitigation**

To comply with CEQA, lead and responsible agencies make estimates of potential fatalities and risk to individual species and populations to determine “significance” and to develop avoidance, minimization, and mitigation requirements. Address the following three categories of impacts to conduct an adequate CEQA analysis of impacts.

“Direct” impacts refer to bird and bat collisions with wind turbine blades, meteorological towers, and guy wires. Determine direct impacts by reviewing all of the pre-permitting data to evaluate which species might collide with turbines and which non-biological factors (such as topographic, weather, and turbine design features) might contribute to this risk. ~~Make a risk assessment to determine whether overall avian and bat fatality rates are low, moderate, or high relative to other projects. For all quantification of risk and fatality estimates, use a uniform metric of bird or bat fatalities per megawatt (MW) of installed capacity per year. Refer to Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.~~

539 "Indirect" impacts refer to disturbance of bird and bat populations and subsequent  
540 displacement or avoidance of the site and disruption to migratory or movement  
541 patterns. Displacement and site avoidance impacts have not been well documented at  
542 wind energy projects in California. Most of the information on indirect impacts for  
543 projects in the United States comes from studies on grassland and shrub-steppe  
544 breeding songbirds and other open country birds. If the proposed project has potential  
545 for indirect impacts to birds or bats, use before after/control impact or impact gradient  
546 study design, discussed in Chapter 3, to determine if wind turbines are affecting bird or  
547 bat density or behavior.

549 "Cumulative" impact assessments involve a determination of whether or not a project's  
550 incremental impacts, combined with the impacts of other projects, are cumulatively  
551 considerable. Take the following steps to conduct an adequate CEQA analysis of  
552 cumulative impacts on special-status bird or bat species:

- 553 1. Identify the species that warrant a cumulative impact analysis.
- 554 2. Establish an appropriate geographic scope for the analysis.
- 555 3. Compile a summary list of past, present, and reasonably foreseeable future projects  
556 within the specified geographical range that could impact the species.
- 557 4. Assess the impacts to the relevant bird or bat species from past, present, and future  
558 projects.
- 559 5. Make a determination regarding the significance of the project's contributions to  
560 cumulative significant impacts to the species.

### 561 **Impact Avoidance and Minimization**

562 ~~Consider the following~~ elements in site selection and turbine layout and in developing  
563 infrastructure for the facility:

- 564 • Minimize fragmentation and habitat disturbance.
- 565 • Establish buffer zones to minimize collision hazards.
- 566 • Reduce impacts with appropriate turbine design and layout.
- 567 • Reduce artificial habitat for prey at turbine base area.
- 568 • Avoid lighting that attracts birds and bats.
- 569 • Minimize power line impacts.
- 570 • Avoid guy wires.
- 571 • Decommission non-operational turbines.

### 572 **Compensation**

573 Compensation is a common way to mitigate or offset impacts, including cumulative  
574 impacts that cannot be avoided or minimized in other ways. Development of effective  
575 compensation measures should involve the CEQA lead agency, project proponent,  
576 wildlife agencies, and the affected public stakeholders through the CEQA process. Lead

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T<sub>A</sub> During the site screening process or at the beginning of pre-permitting monitoring assessment, identify

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T<sub>A</sub> such as a wind resource area

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T<sub>A</sub> biological

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T<sub>A</sub> Based on the impact predictions, consider

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T<sub>A</sub> around nests

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T<sub>A</sub> This is too vague.

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539 “Indirect” impacts refer to disturbance of bird and bat populations and subsequent  
 540 displacement or avoidance of the site and disruption to migratory or movement  
 541 patterns. Displacement and site avoidance impacts have not been well documented at  
 542 wind energy projects in California. Most of the information on indirect impacts for  
 543 projects in the United States comes from studies on grassland and shrub-steppe  
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 546 study design, discussed in Chapter 3, to determine if wind turbines are affecting bird or  
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 560 cumulative significant impacts to the species.

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 574 impacts that cannot be avoided or minimized in other ways. Development of effective  
 575 compensation measures should involve the CEQA lead agency, project proponent,  
 576 wildlife agencies, and the affected public stakeholders through the CEQA process. ~~Lead~~

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 T<sub>A</sub> significant, biological

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 T<sub>A</sub> one

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 T<sub>A</sub> if deemed necessary by the CEQA lead agency.

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 T<sub>A</sub> It is important that project applicants know, at the time of permitting, all potential mitigation and compensation requirements so that project investors can anticipate all potential mitigation costs and the project can move forward.



577 agencies should ~~establish the terms and funding commitments~~ for compensation prior to  
578 issuing final project permits. Early planning for compensatory mitigation provides  
579 project developers with upfront information of mitigation costs and assurances of  
580 adequate funding to fulfill the required mitigation program. Triggers for additional  
581 compensatory mitigation beyond that required at project approval should be well  
582 defined and feasible to implement, so the permittee will have an understanding of any  
583 potential future mitigation requirements.

585 Establish a biologically meaningful nexus between the level of impact and the amount of  
586 compensatory mitigation required. Unlike habitat impacts, in which an acre of habitat  
587 lost can be compensated with an appropriate number of acres of habitat restored or  
588 protected, no obvious compensation ratio will offset bird and bat collisions with wind  
589 turbines. Therefore, consult with CDFG, USFWS, and species experts in the  
590 development of site-specific ratios and fees to use in establishing compensation  
591 formulae. The compensation must be biologically based, reasonable, and provide  
592 certainty in terms of the funds that will be expended and certainty that the mitigation  
593 will continue to provide biological resource value over the life of the project. Consider  
594 the following list of potential options in developing compensatory mitigation:

- 595 • Offsite conservation and protection of essential habitat
  - 596 - Nesting and breeding areas
  - 597 - Foraging habitat
  - 598 - Roosting or wintering areas
  - 599 - Migratory rest areas
  - 600 - Habitat corridors and linkages
- 601 • Offsite conservation and habitat restoration
  - 602 - Restored habitat function
  - 603 - Increased carrying capacity
- 604 • Offsite habitat enhancement
  - 605 - Predator control programs
  - 606 - Exotic/invasive species removal

608 Compensation typically involves purchase of land through fee title or purchase of  
609 conservation easements or other land conveyances and the permanent protection of the  
610 biological resources on these lands. The land or easements can either consist of a newly  
611 established, project-specific purchase or be part of a well-defined and established  
612 conservation program, such as a mitigation bank. Mitigation banks and conservation  
613 programs must be consistent with the following components of CDFG's official 1995  
614 policy on mitigation programs:

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T therefore establish well-defined terms along with any

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T should strive to

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T for significant biological impacts, which may occur offsite or onsite (e.g., predator control programs and invasive species removal can be effective onsite)

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577 agencies should ~~establish the terms and~~ funding commitments for compensation prior to  
578 issuing final project permits. Early planning for compensatory mitigation provides  
579 project developers with upfront information of mitigation costs and assurance of  
580 adequate funding to fulfill the required mitigation program. Triggers for additional  
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612 conservation program, such as a mitigation bank. Mitigation banks and conservation  
613 programs ~~must be~~ consistent with the following components of CDFG's official 1995  
614 policy on mitigation programs:

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are

- The mitigation site ~~must~~ provide for the long-term conservation of the target species and its habitat.
- The site ~~must be large enough~~ to be ecologically self-sustaining and/or part of a larger conservation strategy.
- The site ~~must~~ be permanently protected through fee title and/or a conservation easement.
- Prior to sale of the property or ~~easement~~ or sale of credits at a mitigation bank, a resource management plan should be approved by all appropriate agencies or non-governmental organizations involved in the property management.
- A sufficient level of funding with acceptable guarantees should be provided to fully ensure the operation and maintenance of the property as may be required.
- Provisions should be made for the long-term management of the property after the project is completed or after all mitigation credits have been awarded for the mitigation bank.
- Provisions should be made for ensuring implementation of the resource management plan in the event of non-performance by the owner of the property or non-performance by the mitigation bank owner and/or operator.
- Provisions should be made for the monitoring and reporting on the identified species/habitat management objectives, with an adaptive management/effectiveness monitoring to modify those management objectives as needed.

### **Operations Impact Mitigation and Adaptive Management**

Operations impact mitigation and adaptive management generally occur only if the level of fatalities at a project site was ~~unanticipated~~ when the project was permitted, and therefore, measures included in the permit are inadequate to avoid, minimize, or compensate for bird or bat fatalities. Once a project is operating, options for impact avoidance and minimization are very limited. Therefore, the lead agency and developer ~~must~~ develop contingency plans to mitigate high levels of unanticipated fatalities before issuing permits. Permit conditions should explicitly establish a range of compensatory mitigation options to offset unexpected fatalities and the thresholds that will trigger implementation. In extreme cases, additional compensatory mitigation may not be adequate for high levels of unanticipated impacts, and project operators may need to consider operational and facility changes such as habitat modification, seasonal changes to cut-in speed, limited and periodic feathering of wind turbines during low-wind nights, seasonal shutdowns, or removal of problem turbines.

Use the adaptive management process as a means of testing these operational and facility changes as experimental options to determine their effectiveness in reducing fatalities. Establish the following elements for a successful adaptive management program: clear, objective, and verifiable biological goals; a requirement to adjust

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T<sub>A</sub> for the target species

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T<sub>A</sub> should

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Entire section should be reduced to a brief discussion of establishing a bounded range of possible mitigation if there is significant uncertainty regarding impacts (which should be avoided). The indicated edits are not sufficient.

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T<sub>A</sub> significantly higher than anticipated

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Date: 5/13/2007 10:14:47 PM  
T<sub>A</sub> There is little experience in the wind industry with adaptive management techniques and they are still considered experimental.

- 615 • The mitigation site ~~must~~ provide for the long-term conservation of the target species
- 616 and its habitat.
- 617 • The site ~~must~~ be large enough to be ecologically self-sustaining and/or part of a
- 618 larger conservation strategy.
- 619 • The site ~~must~~ be permanently protected through fee title and/or a conservation
- 620 easement.
- 621 • Prior to sale of the property or easement or sale of credits at a mitigation bank, a
- 622 resource management plan should be approved by all appropriate agencies or non-
- 623 governmental organizations involved in the property management.
- 624 • A sufficient level of funding with acceptable guarantees should be provided to fully
- 625 ensure the operation and maintenance of the property as may be required.
- 626 • Provisions should be made for the long-term management of the property after the
- 627 project is completed or after all mitigation credits have been awarded for the
- 628 mitigation bank.
- 629 • Provisions should be made for ensuring implementation of the resource
- 630 management plan in the event of non-performance by the owner of the property or
- 631 non-performance by the mitigation bank owner and/or operator.
- 632 • Provisions should be made for the monitoring and reporting on the identified
- 633 species/habitat management objectives, with an adaptive management/effectiveness
- 634 monitoring to modify those management objectives as needed.

### 635 **Operations Impact Mitigation and Adaptive Management**

636 Operations impact mitigation and adaptive management generally occur only if the  
 637 level of fatalities at a project site was ~~unanticipated~~ when the project was permitted, and  
 638 therefore, measures included in the permit are inadequate to avoid, minimize, or  
 639 compensate for bird or bat fatalities. Once a project is operating, options for impact  
 640 avoidance and minimization are very limited. Therefore, the lead agency and developer  
 641 ~~must~~ develop contingency plans to mitigate high levels of unanticipated fatalities before  
 642 issuing permits. Permit conditions should explicitly establish a range of compensatory  
 643 mitigation options to offset unexpected fatalities and the thresholds that will trigger  
 644 implementation. In extreme cases, additional compensatory mitigation may not be  
 645 adequate for high levels of unanticipated impacts, and project operators may need to  
 646 consider operational and facility changes such as habitat modification, seasonal changes  
 647 to cut-in speed, limited and periodic feathering of wind turbines during low-wind  
 648 nights, seasonal shutdowns, or removal of problem turbines.

649  
 650 Use the adaptive management process as a means of testing these operational and  
 651 facility changes as experimental options to determine their effectiveness in reducing  
 652 fatalities. Establish the following elements for a successful adaptive management  
 653 program: clear, objective, and verifiable biological goals; a requirement to adjust

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management and/or mitigation measures if those goals are not met; and a timeline for periodic reviews and adjustments. Successful adaptive management requires a firm commitment by project owners to accountability and remedial action in response to new information that pre-determined bird and bat fatality thresholds are being exceeded. This commitment must be included in the permit condition(s) during the permitting process so that a mechanism is available to implement mitigation recommendations after the project is permitted.

## Step 5: Collect Operations Monitoring Data Using the Standardized Monitoring Protocol

Operations monitoring, also referred to as post-construction monitoring, involves searching for bird and bat carcasses under turbines to determine fatality rates and continuing the collection of bird and bat use data consistent with pre-permitting study methods. At a minimum, the primary objectives for operations monitoring are to determine:

- If estimated fatality rates from the pre-permitting assessment were reasonably accurate.
- If the avoidance, minimization, and mitigation measures implemented for the project were adequate or if additional corrective action or compensatory mitigation is warranted.
- Whether overall bird and bat fatality rates are low, moderate, or high relative to other projects.

## Standardized Operations Monitoring Protocol for Birds and Bats

**Study Duration. Monitor for two years.**

**Number of Carcass Search Plots.** Search approximately 30 percent of the turbines, selecting this subset of turbines either randomly, via stratification, or systematically. The selection process must be scientifically defensible and should be developed in consultation with CDFG, USFWS, and other knowledgeable scientists and appropriate stakeholders.

**Search Plot Size.** Configure search plots at selected turbine sites so that search width is equal to the maximum rotor tip height. For example, for a turbine with a rotor tip height of 400 feet (120 meters), the search area would extend 200 feet (60 meters) from the turbine on each side. The search area may be a rectangle, square, or circle depending on turbine locations and arrangements and adjusted as needed to accommodate variations in terrain and other site-specific characteristics. Searches beyond boundaries of the proposed search area may be needed in some situations to make sure they encompass approximately 80 percent of the carcasses. Consult CDFG, USFWS, and other

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T<sub>A</sub> in some instances,

Author: Jim  
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T<sub>A</sub> The type and duration of operational monitoring should be linked to the pre-permitting monitoring.

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T<sub>A</sub> This monitoring should be based on the impact predictions of pre-permitting. Selection of appropriate monitoring protocols need to be compatible with the data collected during pre-permitting so that the predicted impacts can be evaluated.

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T<sub>A</sub> predicted

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T<sub>A</sub>

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T<sub>A</sub> Conduct baseline monitoring for two years, adjusted downward for Category 3 and 4 project sites as appropriate. [Expand discussion based on Table.]

692 knowledgeable scientists and appropriate stakeholders before modifying search plot  
693 size.

694  
695 **Search Protocol.** Search for bird and bat carcasses using trained and tested searchers.  
696 Search a standardized transect width of 20 feet (6 meters), the searcher looking at 10 feet  
697 (3 meters) on either side. Adjust the transect width as necessary for vegetation and  
698 topographic conditions on the site. Record and collect all carcasses located in the search  
699 areas (unless they are being used as part of a scavenging trial) and determine a cause of  
700 death, if possible.

701  
702 **Frequency of Carcass Searches.** Conduct searches ~~every two weeks for two years~~.  
703 Search frequency may need adjustment depending on rates of carcass removal (high  
704 scavenging rates warrant more frequent searches), target species, terrain, and other site-  
705 specific factors. Establish the frequency of carcass searches after analyzing the results of  
706 pilot scavenging trials and in consultation with USFWS, CDFG, and other  
707 knowledgeable scientists and appropriate stakeholders.

708  
709 **Searcher Efficiency Trials.** Conduct searcher efficiency trials seasonally over two years.  
710 Test each searcher by planting carcasses of species likely to occur in the project area  
711 within the search plots and monitoring searcher detection rates. Geo-reference the  
712 planted carcasses by global positioning system (GPS) and mark them in a fashion  
713 undetectable to the searcher. Test new searchers when they are added to the search  
714 team.

715  
716 **Carcass Removal Trials.** Conduct carcass removal (scavenging) trials ~~seasonally over~~  
717 ~~two years~~. ~~Place carcasses in known locations in~~ the search plots and monitor to  
718 determine removal rate. Check planted carcasses at least every day for a minimum of the  
719 first three days and thereafter at intervals determined by results from pilot scavenger  
720 trials. Where possible, use fresh carcasses of different sized birds and bats likely to occur  
721 in the project, avoiding old or long-frozen specimens and exotic species.

722  
723 **Bird Metrics.** Record bird fatalities per MW of installed capacity per year and bird  
724 fatalities per rotor-swept square meter per year. ~~Additionally, analyze data from~~  
725 ~~different bird groups (such as raptors) separately.~~

726  
727 **Bat Metrics.** Record bat fatalities per MW of installed capacity per year and bat fatalities  
728 per rotor-swept square meter per year, or per other metrics endorsed by USFWS and  
729 CDFG.

730  
731 **Monitoring Reports.** Follow standard scientific report format in operations monitoring  
732 reports and provide sufficient detail to allow agency and peer reviewers to evaluate the  
733 methods used, understand the basis for conclusions, and independently check  
734 conclusions. Append the tabulated raw data from the carcass counts and bird use

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Not much will be learned by surveys every two weeks as by then the majority of carcasses will have been removed. No set time should be used in the guidelines. The frequency for mortality surveys for carcasses must be determined by scavenging trials if one wants to be scientific and have comparable data.

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T with a frequency based on scavenging trials.

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T in consultation with the lead agency.

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T in consultation with the lead agency.

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T (It has not been determined which of these, or other, metrics has more predictive value. Comparisons should be made only between sites with similar conditions.)

735 surveys. Monitoring data may be submitted to the CDFG's Biogeographic Information  
736 and Observation System (BIOS) program, <www.bios.ca.gov>. Chapter 5 provides  
737 details on submittal procedures to BIOS.

738  
739 ~~**Bird Use Counts.** Conduct two years of BUCs, as conducted during pre-permitting~~  
740 ~~monitoring (that is, every week, at sample sites established during pre-permitting~~  
741 ~~studies).~~


742  
743 **Bat Acoustic Monitoring.** Conduct bat acoustic monitoring nightly for two years using  
744 the same methods as for pre-permitting monitoring if CDFG, USFWS, and other  
745 knowledgeable scientists and appropriate stakeholders consider this information a  
746 necessary adjunct to the bat fatality data.

#### 747 **Exceptions to Standardized Operations Monitoring Protocol for** 748 **Birds and Bats**


749 ~~Certain situations warrant exceptions to standardized protocol, but the responsibility of~~  
750 ~~proving that an exception is appropriate and applicable is on the stakeholder attempting~~  
751 ~~to justify increasing or decreasing the duration or intensity of operations monitoring.~~  
752 ~~Justify birds and bats separately when considering an exception. Consult the CEQA lead~~  
753 ~~agency, USFWS, CDFG, biologists with specific expertise, and other appropriate~~  
754 ~~stakeholders (such as conservation organization representatives); exceptions are made~~  
755 ~~to the standardized protocols so they can evaluate the information used to justify the~~  
756 ~~exception and provide their input.~~

#### 757 **When Less Monitoring May Be Appropriate**

758 A reduction of standardized monitoring to one year or less may be appropriate under  
759 the following conditions:


- 760 • If findings from pre-permitting monitoring indicate low to moderate  and bat  
761 use and no risk to special-status species, and
- 762 • If the site is near a comparable site with similar turbine design and layout that was  
763 recently well studied and that has scientifically defensible and relevant data  
764 showing low fatalities.


765  
766 Dispensing with the second year of operations monitoring may be appropriate in a  
767 situation where:


- 768 • Bird and/or bat use was low or moderate and raptor use was low during pre-  
769 permitting monitoring and during the first year of operations monitoring, and
- 770 • Fatalities were, as estimated, low to moderate. 


771  
772 Deciding to reduce monitoring to less than two years requires a high standard of  
773 confidence and certainty and should be made in consultation with the CEQA lead


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 [No purpose is served by post-construction BUCs as no way exists to draw any meaningful conclusions about the changes. Changes can be caused by climate, by off-site changes in bird populations, changes in bird movement patterns unrelated to the wind farm and/or related to the wind farm (no way to know), and offsite--or even out of the country--impacts to birds for which no method exists to ascertain relative to the wind farm. The one exception may be raven counts.]


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 if the lead agency,

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 [As with pre-permitting, the concept of "exceptions" should be removed throughout the document in favor of a category approach, and a decision-tree analysis of information needs within each category. Consequently, while we have attempted to partially salvage this section, the entire section should be reconceived.]

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 Situations Where Changes

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 May Be Warranted

735 surveys. Monitoring data may be submitted to the CDFG's Biogeographic Information  
736 and Observation System (BIOS) program, <www.bios.ca.gov>. Chapter 5 provides  
737 details on submittal procedures to BIOS.

738  
739 ~~**Bird Use Counts.** Conduct two years of BUCs, as conducted during pre-permitting~~  
740 ~~monitoring (that is, every week, at sample sites established during pre-permitting~~  
741 ~~studies).~~


742  
743 **Bat Acoustic Monitoring.** Conduct bat acoustic monitoring nightly for two years using  
744 the same methods as for pre-permitting monitoring if CDFG, USFWS, and other  
745 knowledgeable scientists and appropriate stakeholders consider this information a  
746 necessary adjunct to the bat fatality data.

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749 Certain situations warrant exceptions to standardized protocol, but the responsibility of  
750 proving that an exception is appropriate and applicable is on the stakeholder attempting  
751 to justify increasing or decreasing the duration or intensity of operations monitoring.  
752 Justify birds and bats separately when considering an exception. Consult the CEQA lead  
753 agency, USFWS, CDFG, biologists with specific expertise, and other appropriate  
754 stakeholders (such as conservation organization representatives); exceptions are made  
755 to the standardized protocols so they can evaluate the information used to justify the  
756 exception and provide their input.

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758 A reduction of standardized monitoring to one year or less may be appropriate under  
759 the following conditions:


- 760 • If findings from pre-permitting monitoring indicate low to moderate  and bat  
761 use and no risk to special-status species, and
- 762 • If the site is near a comparable site with similar turbine design and layout that was  
763 recently well studied and that has scientifically defensible and relevant data  
764 showing low fatalities.


765  
766 Dispensing with the second year of operations monitoring may be appropriate in a  
767 situation where:


- 768 • Bird and/or bat use was low or moderate and raptor use was low during pre-  
769 permitting monitoring and during the first year of operations monitoring, and
- 770 • Fatalities were, as estimated, low to moderate. 


771  
772 Deciding to reduce monitoring to less than two years requires a high standard of  
773 confidence and certainty and should be made in consultation with the CEQA lead


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735 surveys. Monitoring data may be submitted to the CDFG's Biogeographic Information  
736 and Observation System (BIOS) program, <www.bios.ca.gov>. Chapter 5 provides  
737 details on submittal procedures to BIOS.

738  
739 ~~**Bird Use Counts.** Conduct two years of BUCs, as conducted during pre-permitting~~  
740 ~~monitoring (that is, every week, at sample sites established during pre-permitting~~  
741 ~~studies).~~

742  
743 **Bat Acoustic Monitoring.** Conduct bat acoustic monitoring nightly for two years using  
744 the same methods as for pre-permitting monitoring if CDFG, USFWS, and other  
745 knowledgeable scientists and appropriate stakeholders consider this information a  
746 necessary adjunct to the bat fatality data.

#### 747 **Exceptions to Standardized Operations Monitoring Protocol for** 748 **Birds and Bats**

749 Certain situations warrant exceptions to standardized protocol, but the responsibility of  
750 proving that an exception is appropriate and applicable is on the stakeholder attempting  
751 to justify increasing or decreasing the duration or intensity of operations monitoring.  
752 Justify birds and bats separately when considering an exception. Consult the CEQA lead  
753 agency, USFWS, CDFG, biologists with specific expertise, and other appropriate  
754 stakeholders (such as conservation organization representatives). Exceptions are made  
755 to the standardized protocols so they can evaluate the information used to justify the  
756 exception and provide their input.

#### 757 **When Less Monitoring May Be Appropriate**

758 A reduction of standardized monitoring to one year or less may be appropriate under  
759 the following conditions:

- 760 • If findings from pre-permitting monitoring indicate low to moderate bird and bat  
761 use and no risk to special-status species, and
- 762 • If the site is near a comparable site with similar turbine design and layout that was  
763 recently well studied and that has scientifically defensible and relevant data  
764 showing low fatalities.

765  
766 Dispensing with the second year of operations monitoring may be appropriate in a  
767 situation where:

- 768 • Bird and/or bat use was low or moderate and raptor use was low during pre-  
769 permitting monitoring and during the first year of operations monitoring, and
- 770 • Fatalities were, as estimated, low to moderate

771  
772 Deciding to reduce monitoring to less than two years requires a high standard of  
773 confidence and certainty and should be made in consultation with the CEQA lead

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the deviation.

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implies requirement for all to be involved

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Agree with categories but will need to define these categories in some fashion, e.g. compared to average or range in California.

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Agree but need to define. See comment above

774 agency, USFWS, CDFG, and other appropriate stakeholders (such as conservation  
775 organization representatives).

776 **When More Monitoring May Be Appropriate**

777 Operations monitoring beyond ~~the recommended~~ two years will rarely be needed if  
778 impacts to birds and bats estimated during the pre-permitting studies have been  
779 adequately avoided, minimized, and mitigated. Upon completion of ~~two years of~~  
780 operations monitoring, CDFG, USFWS, and other scientists and stakeholders who were  
781 involved in developing the operations monitoring protocol should assess whether  
782 continued, long-term monitoring of fatalities is warranted. Monitoring at some level  
783 beyond ~~the second year~~ may be justified if ~~the standard two years of operations~~  
784 monitoring detects fatalities unexpectedly higher than estimated during pre-permitting  
785 studies. The purpose of such monitoring would be to gather information to develop  
786 impact avoidance, minimization, and mitigation measures and to verify whether these  
787 measures were effective in reducing fatalities. Long-term monitoring on a periodic basis  
788 (for example, every five years) for the life of the project should occur if operations  
789 monitoring data or other new information suggests that project operation is likely to  
790 result in substantial impacts to birds or bats that were ~~unanticipated and unmitigated~~  
791 during permitting of the project. Factors to consider in assessing the potential for  
792 unanticipated impacts include changes in bird and bat use of a site due to changes in  
793 habitat conditions or shifts in migratory and movement patterns due to climate change  
794 that might affect collision risk. The CEQA lead agency, CDFG, USFWS, and other  
795 appropriate stakeholders (such as conservation organization representatives) should  
796 participate in decisions to conduct additional standardized monitoring or in the  
797 development of special study protocols.

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significant

## CHAPTER 1: PRELIMINARY SITE SCREENING

Wind energy developers need information to assess the biological sensitivity of the proposed project site early in the development process. This preliminary information gathering, or site screening, consists of a reconnaissance field survey and a desktop effort to collect data about the site from databases, agencies, and local experts. Site screening is the first step in determining the kinds of studies developers will need to conduct during the "pre-permitting" phase to adequately evaluate a wind project's impacts to birds and bats.

Site screening information is required to conduct an informed impact analysis under the California Environmental Quality Act (CEQA) and other state and federal wildlife laws. Conduct data and information gathering early in the siting and development process, such as when the wind energy developer is seeking landowner agreements and investigating transmission capacity. Information compiled and analyzed early in the process allows time for conducting breeding bird surveys or raptor nest searches and assessing the potential for site use by migrating or wintering species. Early information gathering also allows the project proponent the opportunity to seek a different site if unavoidable impacts seem likely despite careful turbine siting.

### Reconnaissance Site Visit

Once the landowner has granted permission to access the proposed wind energy site, arrange for a qualified wildlife biologist who is knowledgeable about the natural history of the region to conduct a reconnaissance survey of the site. The biologist should prepare for the survey by securing recent aerial photography of the site. Surveys should be of sufficient duration and intensity to allow coverage of all habitat types in and immediately adjacent to the project area and provide a basis for predictions about species occurrence at the site throughout the year.

### Databases for Gathering Site Information

The following databases are useful sources of information for site screening.

California Department of Fish and Game's (CDFG's) California Natural Diversity Database (CNDDDB), <[www.dfg.ca.gov/bdb/html/cnddb.html](http://www.dfg.ca.gov/bdb/html/cnddb.html)>, is an efficient and cost-effective source of biological information. The CNDDDB documents records of the location and, when possible, the status of declining or vulnerable species. Be aware that occurrences are only noted in the CNDDDB if the site has been previously surveyed during the appropriate season, a detection was made, and the observation was reported and entered into the database. As such, do not use the absence from the CNDDDB of an occurrence in a specific area to infer absence of special-status species. It is also important

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T<sub>A</sub> should obtain

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T<sub>A</sub> This information will be used to identify species potentially at risk and the impact questions that need to be addressed, using the framework provided in Table A. [CalWEA's proposed General Framework]

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878 of the project. In addition, early consultation with both CDFG and U.S. Fish and Wildlife  
879 Service (USFWS) will assist project proponents in determining the applicability of other  
880 state and federal laws, including California Endangered Special Act (CESA), Federal  
881 Endangered Species Act (FESA), and Department of Fish and Game Code sections  
882 dealing with bird, bat, and raptor protection. Appendix A provides contact information  
883 for the seven CDFG regional offices and headquarters.

884  
885 The USFWS has developed lists of federally Threatened, Endangered, and candidate  
886 species arranged by county or USGS quadrangle that are available from the Ecological  
887 Services Offices (see Appendix B for Ecological Services Office contact information). The  
888 USFWS also periodically identifies birds that are high priorities for conservation action  
889 <www.fws.gov/migratorybirds/reports/bcc2002.pdf>. USFWS biologists can also offer  
890 information about listed species and designated critical habitat. Coordinate early with  
891 USFWS biologists to identify potential impacts to federally listed and migratory species  
892 that are high priorities for conservation.

### 893 **Local Experts and Other Resources**

894 Other helpful sources of information include contacts with biologists familiar with the  
895 area, including staff from universities, colleges, bird observatories, and Audubon  
896 chapters, <www.audubon.org/states/index.php?state=CA>, as well as local birders and  
897 bat experts. National Audubon Society Christmas bird count data,  
898 <www.audubon.org/bird/cbc>, and North American Breeding Bird Survey data,  
899 <www.mbr-pwrc.usgs.gov/bbs/>, can provide useful information about species and  
900 abundance of birds during winter and spring in portions of California. Audubon  
901 California has mapped approximately 150 areas in the state that it considers "Important  
902 Bird Areas," <www.audubon-ca.org/IBA.htm>.

### 903 **Evaluating Data from Nearby Wind Energy Facilities**

904 If the proposed site is near one or more existing wind energy facilities, a biologist should  
905 ~~critically~~ review the pre-permitting and operational studies completed for the nearby  
906 facilities and compare the conclusions with results of the operational monitoring data at  
907 those sites. A site visit is also essential to determine if biological conditions at the  
908 proposed site are similar to those described at the existing project or projects. If studies  
909 from nearby sites are used to form the basis of the environmental analyses for new wind  
910 energy projects, the developer must be able to demonstrate that those studies are  
911 applicable to the proposed project, ~~given that biological and regulatory environments~~  
912 ~~and wind industry technology are always changing~~. Include data from nearby wind  
913 farms in regional or cumulative impact assessments. Regularly contributing wind-  
914 related wildlife data to BIOS, as described in Chapter 5, will facilitate such assessments  
915 and the general accessibility of biological data from nearby wind energy facilities.

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Cities and counties may also have adopted wind energy ordinances or elements that may have been subjected to review under CEQA and may contain information on local birds and bats.

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## Evaluating and Acting on Site Screening and Assessment Data

The preliminary information gathering phase leads to a critical decision point in project site screening: whether or not a project and its proposed site have the potential for ~~irresolvable problems with bird or bat fatalities. If a project moves forward despite indications that substantial bird or bat fatalities might occur, avoidance and~~ minimization options to reduce the impacts are limited, and the project may require costly, ongoing reassessment of impacts and adjustment of mitigation. ~~However, if preliminary information gathering does not reveal potential for substantial bird or bat fatalities in the proposed wind energy project area, the next step is to determine the~~ kinds of studies and level of effort needed for the pre-permitting surveys. This assessment involves asking questions about the potential for birds and bats to occur at the site, how birds and bats might use the site, and whether they might be at risk from wind turbine collisions. Pre-permitting studies will provide the basis for an impact assessment and subsequent recommendations for micrositings or other impact avoidance, minimization, or mitigation measures. Consider the following questions when assessing the potential for birds and bats to occur at the site, making a preliminary evaluation of collision risk, and designing the pre-permitting studies discussed in Chapter 3.

1. Are any of the following known or likely to occur on or near the proposed project site? ("Near" refers to a distance that is within the area used by an animal in the course of its normal movements and activities.)
  - Species listed as federal or state "Threatened" or "Endangered" (or candidates for such listing)?
  - Special-status bird or bat species?
  - Fully protected bird species?
2. Is the site near a raptor nest, or are large numbers of raptors known or likely to occur at or near the site during portions of the year?
3. Is the site near important staging or wintering areas for waterfowl, shorebirds, or raptors?
4. Are colonially breeding species (for example, herons, shorebirds, seabirds) known or likely to nest near the site?
5. Is the site likely to be used by birds whose behaviors include flight displays (for example, common nighthawks, horned larks) or by species whose foraging tactics put them at risk of collision (for example, contour hunting by golden eagles)?
6. Does the site or do adjacent areas include habitat features (for example, riparian habitat, water bodies) that might attract birds or bats for foraging, roosting, breeding, or cover?
7. Is the site near a known or potential bat roost?
8. Does the site contain topographical features that could concentrate bird or bat movements (for example, ridges, peninsulas, or other landforms that might

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The significant unavoidable biological impacts on birds or bats.

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The biologically significant

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958 funnel bird or bat movement)? Is the site near a known or likely migrant  
959 stopover site?  
960 9. Is the site regularly characterized by seasonal weather conditions such as dense  
961 fog or low cloud cover that might increase collision risks to birds and bats, and  
962 do these events occur at times when birds might be concentrated?  
963

964 A "yes" answer to question #1 ~~should prompt early and close consultation with CDFG~~  
965 ~~and USFWS to develop a study plan that addresses potential impacts of constructing~~  
966 ~~and operating the project on listed or special-status species. Advance planning is needed~~  
967 ~~in particular for studies with a seasonal component (for example, nest searches or~~  
968 ~~evaluating potential bat hibernacula). Allow ample time for planning field evaluations~~  
969 ~~when special-status species are involved because survey protocols for a number of listed~~  
970 ~~and special-status species specify a limited window of time during which surveys must~~  
971 ~~be conducted.~~

972  
973 "Yes" answers to questions #2 through #6 call for further investigation with the  
974 techniques described in Chapter 3. The standardized bird use counts discussed in  
975 Chapter 3 provide methods to assess the species composition and seasonal relative  
976 abundance of birds present in the vicinity of proposed wind turbine sites, but additional  
977 studies might also be needed to further investigate these questions. For example, a  
978 project proponent may want to intensify the level of survey effort in the vicinity of  
979 raptor nests, breeding colonies, or habitat elements (riparian habitat stands of trees in  
980 otherwise treeless areas) that might attract birds or bats. Such studies would provide  
981 information to determine if a non-disturbance buffer might be warranted in the vicinity  
982 of the sensitive feature, determine the appropriate size of the buffer zone, and develop  
983 appropriate compensatory mitigation.  
984

985 "Yes" answers to questions #7 through #9 should prompt consultation with CDFG,  
986 USFWS, and scientists with expertise in migratory birds and bat biology. The nocturnal  
987 survey methods described in Chapter 3 discuss techniques to assess nocturnally active  
988 species in the project area.

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[New paragraph] "No" answers to these questions indicate that more limited site evaluation may be called for.

## CHAPTER 2: CEQA, WILDLIFE PROTECTION LAWS, AND THE PERMITTING PROCESS

Numerous regulatory requirements and wildlife protection laws govern the permitting process for locating a wind energy project. ~~Approached individually, these regulatory requirements may seem daunting to wind energy project developers. Therefore, this chapter intends to clarify the permitting process and offer suggestions for successfully completing the process and conforming to all appropriate laws and regulations by:~~

- Providing an understanding of the regulatory framework of environmental laws and processes that govern project siting and permitting.
- Providing an understanding of the agencies and other stakeholders that should be engaged in these processes.
- Encouraging consistent use of pre-permitting assessment methods recommended in these *Guidelines* to secure information on impacts and mitigation that will apply both to the CEQA review and permitting process and wildlife protection laws.

### Initiating the Permitting Process

In California, it is primarily the local agencies that handle the permitting process for wind energy facilities under the ~~mandates of their various land use authorities~~. Discretionary decisions by local agencies to permit wind energy projects trigger the application of CEQA requirements to the permitting process. The permitting process usually begins with the project developer approaching the county or other local public agency responsible for issuing a land use permit. Typically this agency becomes the "lead agency" under CEQA. CEQA provides direction on assessment of the significance of impacts and the development of feasible mitigation, but the county or responsible public agency may have its own resource standards as well. Contact the local agency early in the process to determine if it has its own standard conditions for addressing specific resource policies that apply to bird and bat issues.

Wind energy facilities which have effects on state-listed Threatened or Endangered species may require an additional permit under the California Endangered Species Act (CESA). If the affected species are also federally listed, the facilities may also require permits under FESA.

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NANCY AND ANNIE NEED TO ADD A DISCUSSION ON THE USE OF A SCOPING MEETING TO AGREE UPON SPECIES OF CONCERN TO MONITOR, IMPACT QUESTIONS, DATA NEEDS AND APPROPRIATE MONITORING PROTOCOLS (IN THAT ORDER)

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constitutional land use authority.

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"take"

1022 Other state and federal protective wildlife laws, some of which mandate avoidance of  
 1023 "take"<sup>3</sup> without options for permitting, ~~also influence project siting and operations.~~  
 1024 Project developers, permit decision makers, and the resource agencies involved ~~must~~  
 1025 consider these strict liability laws during the permitting process to ensure that impacts  
 1026 to bird and bat species are minimized and mitigated to offset impacts. Compliance with  
 1027 the *Guidelines* during the permitting process will demonstrate a good faith effort to  
 1028 develop and operate projects in a fashion that is consistent with the intent of these state  
 1029 and federal wildlife protection laws.

### 1030 Involving and Communicating with Regulatory Agencies 1031 and Stakeholders

1032 Timely and thorough pre-permitting assessment surveys are essential to facilitate the  
 1033 permitting process. The developer ~~should~~ contact landowners, local environmental  
 1034 groups; and local, state, and federal wildlife management agencies such as CDFG and  
 1035 USFWS early in the permitting process. Pre-permitting discussions with these groups  
 1036 may provide critical information on which to base site development decisions. ~~There~~  
 1037 ~~may be an existing science advisory committee that has been involved with a nearby~~  
 1038 ~~wind resource area and that can provide information on bird and bat issues of local~~  
 1039 ~~concern.~~ Local environmental groups and wildlife agencies may have relevant  
 1040 information as well as concerns about special-status birds or bats. Early discovery of  
 1041 these issues can give the project developer a glimpse of the type and timing of surveys  
 1042 that ~~will be necessary.~~ Early discussion of proposed survey protocols also will allow for  
 1043 an evaluation of the level and timing of the effort in relation to project milestones such  
 1044 as the desired construction start date.

1045  
 1046 Further, initiating assessment surveys early will help to avoid unnecessary and costly  
 1047 delays during permitting. ~~Adherence to *Guidelines* protocols, including standardization~~  
 1048 ~~of data,~~ will facilitate the necessary detailed analysis by the CEQA lead agency,  
 1049 responsible agencies such as CDFG, and public stakeholders and ~~should~~ increase the  
 1050 speed of the permitting process. If review under the National Environmental Quality  
 1051 Act (NEPA) as well as CEQA is required, then efficient coordination of the combined  
 1052 CEQA/NEPA process is ~~essential~~ to prevent redundancies and to ensure complete  
 1053 coverage of the joint review requirements.

1054  
 1055 Early identification of potential adverse impacts provides more opportunities for  
 1056 implementing impact avoidance and minimization measures. An estimation of potential  
 1057 impacts is also the primary factor in determining monitoring levels once operation of the  
 1058 project has begun. Finding suitable habitat for compensatory mitigation, if necessary,  
 1059 can be time consuming; early and thorough data collection and analysis will aid this

<sup>3</sup>"Take" is defined in section 86 of the California Department of Fish and Game Code as "hunt, pursue, catch, capture, or kill (and attempts to do so)."

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 T "Compliance with Use of the *Guidelines*, modifications of the *Guidelines* made in consultation with the lead agency, or other scientifically valid approaches for baseline studies and monitoring identified, during the permitting process will demonstrate a good faith effort to develop and operate projects in a fashion that is consistent with the intent of these state and federal wildlife protection laws."

OR

"Compliance with Use of the *Guidelines* during the permitting process will demonstrates an good faith effort to develop and operate projects in a fashion that is consistent with the intent of these state and federal wildlife protection laws."

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 I as they may apply to each site and project

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1022 Other state and federal protective wildlife laws, some of which mandate avoidance of  
 1023 "take"<sup>3</sup> without options for permitting, also influence project siting and operations.  
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 1049 responsible agencies such as CDFG, and public stakeholders and ~~should~~ increase the  
 1050 speed of the permitting process. If review under the National Environmental Quality  
 1051 Act (NEPA) as well as CEQA is required, then efficient coordination of the combined  
 1052 CEQA/NEPA process ~~is essential to prevent~~ redundancies and to ensure complete  
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 1057 impacts is also the primary factor in determining monitoring levels once operation of the  
 1058 project has begun. Finding suitable habitat for compensatory mitigation, if necessary,  
 1059 can be time consuming; early and thorough data collection and analysis will aid this

T<sub>A</sub> may be desirable.

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 T<sub>A</sub> These early assessment surveys

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<sup>3</sup>"Take" is defined in section 86 of the California Department of Fish and Game Code as "hunt, pursue, catch, capture, or kill (and attempts to do so)."

1060 process. Inadequate data acquisition may result in more stringent impact avoidance,  
1061 minimization, or mitigation measures to ensure species protection and will likely result  
1062 in increased levels of operations monitoring.

## 1063 **Establishing Permit Conditions and Compliance**

1064 The CEQA lead agency and project proponent should consult frequently with CDFG  
1065 and USFWS throughout the impact analysis and mitigation development process and  
1066 particularly during development of permit conditions. Structure permit conditions to  
1067 clearly define the obligations of the operator and to solidly establish triggers for  
1068 additional mitigation beyond that required upon project approval. For example, the  
1069 permit could specify a range of expected impacts based on pre-permitting studies and  
1070 existing data from other wind energy projects; requirements for additional  
1071 compensatory mitigation, described in the permit, would be triggered if operations  
1072 monitoring data revealed impacts in excess of the predicted range. Compliance with  
1073 mitigation and operations monitoring requirements, as well as all other conditions of the  
1074 permit, are equally important after permits are issued.

## 1075 **Navigating CEQA Requirements and Local, State, and** 1076 **Federal Laws**

1077 The California Environmental Quality Act, or CEQA, governs how California counties,  
1078 cities, and other government entities evaluate environmental impacts to make  
1079 discretionary permitting decisions for wind energy development. The CEQA process is  
1080 key to achieving environmental compliance for a project, but all parties involved in  
1081 planning pre-construction surveys should be aware that following the CEQA Guidelines  
1082 alone may not highlight all of the species and issues that need evaluation. A single,  
1083 coherent analysis of impacts to biological resources sets the stage for both CEQA  
1084 analysis and agency review of permit applications. To streamline the permit application  
1085 process, consider other state and federal wildlife protection laws, discussed below, early  
1086 in the process and integrate them into the pre-permitting study design. For example,  
1087 species at potential risk that are fully protected or that fall under the protection of the  
1088 federal Migratory Bird Treaty Act must be included in surveys, whether or not such  
1089 studies might be required to assess CEQA significance. Initiating timely and thorough  
1090 surveys is also important when considering the potential for state or federal listed  
1091 species, and contacting agencies early in the permitting process can reduce the potential  
1092 for lengthy delays in securing take permits. The permit conditions may need to include  
1093 additional mitigation above and beyond that required by CEQA to avoid, minimize, and  
1094 fully mitigate impacts to birds and bats.

## 1095 **County Ordinances / Regulations**

1096 Some California counties have adopted wind resource elements as part of their general  
1097 plans and/or wind energy zoning ordinances. County siting elements and zoning  
1098 ordinances govern the areas in which wind projects may or may not be located, with

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T cause a lead agency to apply

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T including, if deemed necessary by the lead agency, well-defined and clearly bounded

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1060 process. Inadequate data acquisition may result in more stringent impact avoidance,  
1061 minimization, or mitigation measures to ensure species protection and will likely result  
1062 in increased levels of operations monitoring.

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1066 particularly during development of permit conditions. Structure permit conditions to  
1067 clearly define the obligations of the operator and to solidly establish triggers for  
1068 additional mitigation beyond that required upon project approval. For example, the  
1069 permit could specify a range of expected impacts based on pre-permitting studies and  
1070 existing data from other wind energy projects; requirements for additional  
1071 compensatory mitigation, described in the permit, would be triggered if operations  
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1073 mitigation and operations monitoring requirements, as well as all other conditions of the  
1074 permit, are equally important after permits are issued.

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1081 planning pre-construction surveys should be aware that following the CEQA Guidelines  
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1084 analysis and agency review of permit applications. To streamline the permit application  
1085 process, consider other state and federal wildlife protection laws, discussed below, early  
1086 in the process and integrate them into the pre-permitting study design. For example,  
1087 species at potential risk that are fully protected or that fall under the protection of the  
1088 federal Migratory Bird Treaty Act must be included in surveys, whether or not such  
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1092 for lengthy delays in securing take permits. The permit conditions may need to include  
1093 additional mitigation above and beyond that required by CEQA to avoid, minimize, and  
1094 fully mitigate impacts to birds and bats.

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1096 Some California counties have adopted wind resource elements as part of their general  
1097 plans and/or wind energy zoning ordinances. County siting elements and zoning  
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Note: CEQA does not authorize imposition of mitigation above and beyond the authority provided by laws other than CEQA. Public Resources Code Sec. 21004: "In mitigating or avoiding a significant effect of a project on the environment, a public agency may exercise only those express or implied powers provided by law other than this division. However, a public agency may use discretionary powers provided by such other law for the purpose of mitigating or avoiding a significant effect on the environment subject to the express or implied constraints or limitations that may be provided by law."

1099 restrictions to agricultural zones being a common theme. The ordinances generally  
1100 specify standards for setbacks, height, noise, safety, aesthetics, and other requirements.  
1101 Most county general plans specify that the processing of discretionary energy project  
1102 proposals shall comply with CEQA and direct that the environmental impacts of a  
1103 project must be taken into account as part of project consideration. Typically, general  
1104 plans also direct planning staff to work with local, state, and federal agencies to ensure  
1105 that energy projects (both discretionary and ministerial) avoid or minimize direct  
1106 impacts to fish, wildlife, and botanical resources, wherever practical. Some county  
1107 ordinances include language regarding assessment of impacts to birds and bats, but,  
1108 currently, none provide specific guidance on studies necessary for assessing significance  
1109 of impacts to bird and bat populations or provide direction for monitoring programs  
1110 and feasible mitigation options.

## 1111 **State Laws**

### 1112 **California Environmental Quality Act**

1113 The California Environmental Quality Act (CEQA) requires lead agencies—that is, those  
1114 making land use decisions—as well as any other responsible state agencies issuing  
1115 permits, to evaluate and disclose the significance of all potential environmental impacts  
1116 of a project. The lead agency is also responsible for implementing feasible impact  
1117 avoidance, minimization, or mitigation measures that reduce and compensate for  
1118 significant environmental impacts with the goal of reducing those impacts to less than  
1119 significant levels. Lead agencies determine significance on a project-by-project basis  
1120 because they must consider all potential risk, including cumulative impacts, within a  
1121 local and regional context, as well as evaluate unique factors particular to the project  
1122 area when exercising their discretion to approve or disapprove a project.

1123  
1124 The CEQA Guidelines<sup>4</sup> specify that a project has a significant effect on the environment  
1125 if, among other things, it substantially reduces the habitat of a fish or wildlife species,  
1126 causes a fish or wildlife population to drop below self-sustaining levels, or threatens to  
1127 eliminate a plant or animal community (CEQA Guidelines §15065[a][1]).

1128  
1129 The Environmental Checklist Form in the CEQA Guidelines, Appendix G, states that  
1130 impacts to biological resources are considered “significant” if, among other things, a  
1131 proposed project will:

- 1132 • Have a substantial adverse effect, either directly or through habitat modifications,  
1133 on any species identified as a candidate, sensitive, or special-status species in local  
1134 or regional plans, policies, or regulations, or by CDFG or USFWS.

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T<sub>A</sub> Many county elements and ordinances considered impacts to biological resources when they were adopted, as required under CEQA.

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T<sub>A</sub> discretionary

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T<sub>A</sub> substantially reduce the number or restrict the range of an endangered, rare, or threatened species,

<sup>4</sup>All citations of “CEQA Guidelines” refer to Title 14, California Code of Regulations, sections 15002-15387

1135 • Have a substantial adverse effect on any riparian habitat or other sensitive natural  
1136 community identified in local or regional plans, policies, or regulations by CDFG or  
1137 USFWS.

1138 • Interfere substantially with the movement of any native resident or migratory fish  
1139 or wildlife species or with established native resident or migratory wildlife  
1140 corridors, or impede the use of native wildlife nursery sites.

1141  
1142 CEQA defines three types of impacts, all of which must be evaluated for each wind  
1143 energy project:

- 1144 • "Direct" impacts are caused by a project and occur at the same time and place  
1145 (CEQA Guidelines §15358[a](1)).
- 1146 • "Indirect," or "secondary," impacts are reasonably foreseeable and are caused by a  
1147 project but occur at a different time or place. They may include growth-inducing  
1148 effects and other effects related to changes in the pattern of land use, population  
1149 density, or growth rate and related effects on air, water, and other natural systems,  
1150 including ecosystems (CEQA Guidelines §15358[a](2)).
- 1151 • "Cumulative" impacts refer to two or more individual effects which, when  
1152 considered together, are considerable or which compound or increase other  
1153 environmental impacts (CEQA Guidelines §15355[b]). Impacts from individual  
1154 projects may be considered minor, but considered collectively with other projects  
1155 over a period of time, those impacts could be significant, especially where listed or  
1156 sensitive species are involved.

#### 1157 Fish and Game Code Wildlife Protection Laws

1158 ~~In the broadest sense, CEQA and Fish and Game Code require that government agencies~~  
1159 ~~develop standards and procedures necessary to maintain, protect, restore, and enhance~~  
1160 ~~environmental quality, including fish and wildlife populations and plant and animal~~  
1161 ~~communities, to ensure that projects are consistent with the intent of these laws.~~

1162  
1163 For wind energy projects subject to CEQA, lead agencies are required to consult with  
1164 CDFG, pursuant to CEQA Guidelines section 15086. CDFG uses its biological expertise  
1165 to review and comment upon impacts to wildlife arising from the project and will make  
1166 recommendations regarding the protection of those resources it holds in trust for the  
1167 people of California. In addition, CDFG reviews and comments on environmental  
1168 documents and impacts arising from project activities (Fish and Game Code §1802).  
1169 CDFG is considered a trustee agency under CEQA Guidelines section 15386.

1170  
1171 CDFG does not approve or disapprove a wind energy project as a trustee agency in the  
1172 CEQA process but does have authority to regulate projects that implicate one of the  
1173 statutes that CDFG administers. CDFG and the Energy Commission encourage the use  
1174 of the *Guidelines* for the biological assessment, mitigation, and monitoring of wind  
1175 energy development projects and wind turbine repowering projects in California. The

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This statement is too broad. It is an expensive interpretation of the CF&G Code that is not supported by any specific provision of law.

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T activities

1176 CDFG is aware that wind energy projects may result in bird and bat fatalities despite  
 1177 avoidance and minimization measures. For projects that impact listed species, project  
 1178 developers will need to consult with CDFG and may consider preparing a regional  
 1179 conservation plan or Natural Community Conservation Plan to seek permit coverage.  
 1180 For projects that have impacts to non-listed species, CDFG will consider working with  
 1181 project proponents to develop site-specific mitigation agreements that include  
 1182 avoidance, minimization, and compensation measures based on the guidance provided  
 1183 in this document.

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1184  
 1185 This document only relates to bird and bat species, but a wind energy project may  
 1186 impact special-status species other than birds or bats. These impacts must also be  
 1187 analyzed, and in some cases treated as significant, as part of CEQA. ~~Construction-~~  
 1188 ~~related impacts at wind energy facilities which affect listed "Threatened" and~~  
 1189 ~~"Endangered" species and other wildlife may also (and often do) trigger state and~~  
 1190 ~~federal permit requirements.~~

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 "take"

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 are likely to cause mortality to or adversely impact

1191  
 1192 When CDFG is required to make a discretionary decision to permit a project under its  
 1193 regulatory authority, CDFG must also comply with CEQA in the issuance of these  
 1194 permits and other project approvals. When the project CEQA document is developed in  
 1195 consultation with CDFG and fully addresses the related resource impacts and  
 1196 mitigation, CDFG can use the document as a basis for CEQA compliance, thereby  
 1197 accelerating any subsequent permit processes.

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1198  
 1199 In addition to CDFG's responsible and trustee role in the CEQA process, direct  
 1200 consultation with CDFG is required to ensure that a proposed project will meet the  
 1201 intent of Fish and Game Code statutes for the protection of wildlife species. Several  
 1202 California Fish and Game Code sections that relate to protection of avian wildlife  
 1203 resources and are relevant to wind energy projects are described below.

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 may be

1204 • California Endangered Species Act (CESA), 1984 – Fish and Game Code section 2050  
 1205 et seq. Species that are protected by the state (listed as Endangered, Threatened, or  
 1206 as a candidate) cannot be taken without an Incidental Take Permit (ITP) provided  
 1207 by CDFG or other document authorized by CESA. "Take" is defined in section 86 of  
 1208 the Fish and Game Code as "hunt, pursue, catch, capture, or kill (and attempts to do  
 1209 so)." CESA allows for permitted take incidental to otherwise lawful development  
 1210 projects if all standards in section 2081(b) of the Fish and Game Code are met. In  
 1211 issuing an ITP, CDFG typically requires additional impact avoidance, minimization,  
 1212 or mitigation measures beyond those that may be imposed pursuant to CEQA to  
 1213 ensure that project impacts are minimized and fully mitigated. The issuance of an  
 1214 ITP is a discretionary action by CDFG. When issuing a CESA Incidental Take  
 1215 Permit, CDFG must itself also comply with CEQA. The following link provides  
 1216 access to the full statute:

1217 <[www.dfg.ca.gov/hcpb/ceqacesa/cesa/incidental/cesa\\_policy\\_law.shtml](http://www.dfg.ca.gov/hcpb/ceqacesa/cesa/incidental/cesa_policy_law.shtml)>.

1258 alternatives to, major federal actions significantly affecting the environment. The  
1259 law applies to federal agencies and the programs that they fund, including projects  
1260 for which they issue permits. An example of a wind development project falling  
1261 under NEPA jurisdiction would be the proposed placement of wind turbines or  
1262 associated transmission lines on U.S. Forest Service or Bureau of Land Management  
1263 land.

1264 Recent amendments to NEPA require federal agencies to cooperate with state and  
1265 local agencies to eliminate duplication of procedures such as those that might result  
1266 from fulfilling CEQA requirements. More details on the National Environmental  
1267 Policy Act can be found at <[www.nepa.gov/nepa/regs/nepa/nepaeqia.htm](http://www.nepa.gov/nepa/regs/nepa/nepaeqia.htm)>.

1268 • Federal Endangered Species Act (FESA), 1973, Title 16, U.S. Code section 1531 –  
1269 FESA protects 18 bird species/subspecies listed as Threatened or Endangered in  
1270 California. No bats are currently listed as Threatened or Endangered in California.  
1271 FESA prohibits the take of protected animal species, including actions that “harm”  
1272 or “harass”; federal actions may not jeopardize listed species or adversely modify  
1273 habitat designated as critical. FESA authorizes permits for the take of protected  
1274 species if the permitted activity is for scientific purposes, is to establish  
1275 experimental populations, or is incidental to an otherwise legal activity.

1276 • Migratory Bird Treaty Act (MBTA), 1918, Title 16, U.S. Code sections 703 to 712 –  
1277 MBTA prohibits the take, killing, possession, transportation, and importation of  
1278 migratory birds, their eggs, parts, and nests, except when specifically authorized by  
1279 USFWS. At least 603 migratory bird species have been recorded in California. The  
1280 MBTA authorizes permits for some activities, including but not limited to scientific  
1281 collecting, depredation, propagation, and falconry. No permit provisions are  
1282 available for incidental take. Only criminal penalties are possible, with violators  
1283 subject to fine and/or imprisonment.

1284 • Bald and Golden Eagle Protection Act, 1940, Title 16, U.S. Code section 668 – This  
1285 law provides for the protection of the bald eagle and the golden eagle by  
1286 prohibiting, except under certain specified conditions, the take, possession, and  
1287 commerce of such birds. The 1972 amendments increased penalties for violating  
1288 provisions of the act or regulations issued pursuant thereto and strengthened other  
1289 enforcement measures. Rewards are provided for information leading to arrest and  
1290 conviction for violation of the act.

1291  
1292 Like the California laws, the latter three strict-liability federal wildlife protection laws  
1293 prohibit most instances of take, although each law provides for exceptions, such as for  
1294 scientific purposes. FESA authorizes USFWS to permit some activities that take a  
1295 protected species as long as the take meets several requirements, including a  
1296 requirement that the take be incidental to an otherwise legal activity. Permits may be  
1297 issued under FESA to a federal permitting agency, or developers may seek an Incidental  
1298 Take Permit under FESA for facilities sited on private land or where no federal funding  
1299 is used or no other federal permit is required. The MBTA and the Bald and Golden Eagle

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Not all wind projects requiring federal action trigger the need for an EIS, but rather may be permitted on the basis of an Environmental Assessment Finding of No Significant Impact (FONSI).

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or for wind development

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None of these exceptions apply to commercial wind energy developments.

## CHAPTER 3: PRE-PERMITTING ASSESSMENT

This chapter provides guidance on collecting biological information to assess the potential direct and indirect impacts to birds and bats at proposed wind energy development sites and to develop impact avoidance, minimization, or mitigation measures. The chapter includes recommendations on developing a scientific pre-permitting study and assessing the level of effort required for such studies. Finally, the chapter describes the study methods available for bird and bat field studies and recommended protocols for using the methods.

### Determining the Level of Pre-Permitting Surveys

Most pre-permitting surveys should last a minimum of one year to document how birds and bats use a site during spring, summer, winter, and fall. A single season of data from one year may be inadequate to assess relative abundances of some bird and bat species using the site because seasonal populations of some species are highly variable from year to year. For example, in California's Central Valley, wintering populations of rough-legged hawks, short-eared owls, sandhill cranes, and many waterfowl species can vary considerably from year to year depending on weather conditions in the northern portions of their ranges (Hejl and Beedy, 1986; Garrison, 1993; Schlorff, 1994).

Base any changes to the recommended duration or intensity of pre-permitting studies on the availability of site-specific, baseline data, the species potentially affected; and the magnitude of the anticipated effect. Studies in excess of one year may be necessary in areas lacking baseline information, where considerable annual and seasonal variation in bird and bat populations is suspected or where there is potential for declining or vulnerable species to occur at the site. The number and size of turbines and the extent of the area covered by the project will also influence the need for more or less study because as the number of turbines increases, the magnitude of the potential impact to bird and bat populations will also increase. Proposed projects that involve developing multiple groups of turbines over large geographical areas or those that cover a heterogeneous mix of habitats and terrain may need additional specialized, multi-year studies. Such large-scale studies may be best addressed with a collaborative approach that encompasses a number of different projects within a region.

Not all proposed wind energy projects require a full year of pre-permitting studies. Reduced study effort might be appropriate if scientifically defensible data are available from a nearby project. To be applicable to a newly proposed project, these studies of nearby areas need to provide adequate information to make a fully informed and rigorous impact assessment and develop effective impact avoidance, minimization, or mitigation recommendations. For example, less pre-permitting study might be sufficient

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The level of pre-permitting assessment should be guided by the category that a project falls into within the framework set forth in Table A.



for a small project near an existing, well-studied site for which there is a high level of knowledge about potential impacts to birds and bats and for which operations monitoring studies have confirmed a low level of impacts.

~~A decision to reduce the proposed study duration to less than one year or to use existing data rather than collect new field data should be made with the advice of CDFG, USFWS, and other experienced biologists. Caution is warranted in extrapolating existing data to unstudied nearby sites. Slight topographical or habitat variations can make substantial differences in bird and bat site use and potential impacts. In addition, technological changes including use of large turbines, variations in turbine design or layout, increased operating times, and use of different lighting may require new or additional data gathering.~~

### **Securing Appropriate Expertise to Develop the Studies**

An important component in the development of pre-permitting studies is early consultation with the lead agency and contacts with CDFG, USFWS, local environmental groups, and any other stakeholders with an interest in the project. The lead agency needs to know that the pre-permitting study design has incorporated input from appropriate scientists and from all interested parties. Lead agencies generally rely on experts hired by the project proponent and on biologists from USFWS and CDFG to provide input on pre-permitting study design and on other scientific decision points. Some projects may need additional expertise, which members of a science advisory committee can supply. ~~A standing science advisory committee can provide a consistent forum for lead agencies, agency biologists, and other scientists to discuss technical issues relating to the project. A standing scientific advisory committee has particular value if a lead agency is addressing numerous proposed wind energy projects in a county or region because it provides consistent data interpretation and recommendations.~~

The Energy Commission, in consultation with CDFG, proposes to establish a statewide standing science advisory committee that could also provide information to lead agencies seeking additional scientific expertise. The science advisory committee would include biologists and environmental scientists with expertise in bird and bat wildlife issues related to wind energy development, as well as experts in avian and bat biology (including migratory and flight behavior), raptor ecology, survey protocols, and study design. In the event that unique circumstances require individuals with a specific subject-matter expertise or a familiarity with a specific regional or local issue(s), the Energy Commission, in consultation with CDFG, would work with the lead agency to ensure that appropriate members are included in the standing science advisory committee.

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## Study Objectives and Design

Development of a pre-permitting study begins with a clear identification of the research questions. The next step is establishing a study design appropriate for answering those questions and deciding on sampling units, parameters, metrics (measurements), and specific methods to employ.

The National Wind Coordination Committee (NWCC) provides detailed information about the metrics and methods for designing pre-permitting studies (Anderson et al., 1999). Because that information focuses mostly on diurnal birds, the NWCC is currently developing complementary guidelines to address nocturnally active species in relation to wind power development (Kunz et al., in prep). Consult both documents in the course of developing pre-permitting and operations study design.

Study objectives will vary from site to site, but key issues on most wind energy projects in California will typically include at least the following question:

- Which species of birds and bats use the project area, and what is their relative abundance throughout the year?
- How much time do birds and bats spend in the risk zone (rotor-swept area), and does this vary by season?
- What is the estimated range of bird and bat fatalities from the project, and how does bird/bat use of the site compare to use data from other wind power sites that also have fatality information?
- What potential design and mitigation measures could reduce impacts?

Answering these questions involves a variety of diurnal and nocturnal bird survey techniques as well as bat survey methods. The bird use count to assess bird species composition and seasonal relative abundance is one of the most commonly used bird survey methods. Acoustic monitoring is the primary method used to assess species composition and activity levels of bats. Other techniques include raptor nest searches, which should be conducted on most wind energy development projects in California, and a variety of less frequently used methods such as small bird counts, area searches, migration counts, radar, mist-netting, and visual imaging. Some of these additional methods may be useful depending on the particular concerns at each project site. The remainder of the chapter details the various methods and how to select the most appropriate and useful method based on the concerns for each project site.

Standardization in survey techniques promotes comparison capability at wind energy projects throughout California by employing similar methods and metrics at wind energy projects throughout the state. For example, standardized bird use counts provide baseline data on avian species richness, relative abundance, and diurnal bird use in the vicinity of proposed turbine sites. These standardized methods have been used for many

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Impact questions that need to be addressed.

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the data needs,

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and providing the necessary data to answer these questions. This step will determine the

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This is a good start on defining the types of studies that might be appropriate, but it needs to be expanded and needs to reflect how the pre permitting information will be used in the impact assessment and operational monitoring.

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Which of these species are susceptible to wind turbine impacts. What

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How will pre-permitting data be used in Operational monitoring impact assessment?

## Study Objectives and Design

Development of a pre-permitting study begins with a clear identification of the research questions. The next step is establishing a study design appropriate for answering those questions and deciding on sampling units, parameters, metrics (measurements), and specific methods to employ.

The National Wind Coordination Committee (NWCC) provides detailed information about the metrics and methods for designing pre-permitting studies (Anderson et al. 1999). Because that information focuses mostly on diurnal birds, the NWCC is currently developing complementary guidelines to address nocturnally active species in relation to wind power development (Kunz et al., in prep). Consult both documents in the course of developing pre-permitting and operations study design.

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- How much time do birds and bats spend in the risk zone (rotor-swept area), and does this vary by season?
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Standardization in survey techniques promotes comparison capability at wind energy projects throughout California by employing similar methods and metrics at wind energy projects throughout the state. For example, standardized bird use counts provide baseline data on avian species richness, relative abundance, and diurnal bird use in the vicinity of proposed turbine sites. These standardized methods have been used for many

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will involve

1423 wind energy projects throughout the United States and therefore have benefit for  
1424 comparative purposes. Anderson et al. (1999) describe these methods in detail and  
1425 discuss standardized metrics and methods endorsed by the NWCC and subsequently  
1426 used in many studies (for example, Anderson et al., 2005; Johnson et al., 2000; Kerlinger  
1427 et al., 2006; Smallwood and Thelander, 2004).

## 1428 Diurnal Avian Surveys

1429 The primary diurnal avian survey technique for pre-permitting studies at wind energy  
1430 project areas is the bird use count (BUC). Small bird counts (SBCs), area searches, raptor  
1431 nest searches, and a variety of other methods may also be needed if BUCs are not  
1432 adequate to answer questions about bird use and potential impacts. BUCs estimate the  
1433 spatial and temporal use of the site by all birds, including large birds such as raptors,  
1434 vultures, corvids, and waterfowl, as well as songbirds and other small species. Table 1  
1435 summarizes the diurnal avian survey techniques discussed below and when to use  
1436 them.

1437 All of these survey techniques require experienced surveyors who are skilled at  
1438 identifying the birds likely to occur in the project area and who are proficient at  
1439 accurately estimating vertical and horizontal distances. Kepler and Scott (1981) provide  
1440 details on training observers to estimate distances and testing surveyors for their  
1441 abilities to identify birds by sight and sound. Analysis of data from BUCs, SBCs, and  
1442 other surveys should include suitable measures of precision of count data such as  
1443 standard error, coefficient of variation, or confidence interval (Rosenstock et al., 2002).  
1444  
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It is important to establish a linkage between pre-permitting monitoring and operational monitoring.

Table 1. Comparison of Diurnal Bird Survey Techniques for Pre-Permitting Studies

Technique	Purpose	When to Use
Bird Use Counts	To provide baseline data on bird species composition, occurrence, frequency, and behavior to compare with operations use and fatality data; to inform micro-siting decisions; to provide estimate of potential collision risk based on time spent in rotor-swept area; to provide an estimate of spatial and temporal use of site by all diurnal birds, including large birds (raptors, vultures, corvids, and waterfowl), songbirds, and other small diurnal bird species.	Use on all proposed wind energy projects to provide standardized baseline data on bird use and collision risk.
Raptor Nest Searches	To evaluate location and activity level of nesting raptors in relation to proposed wind turbine sites.	Use to micro-site turbines to reduce potential impacts to nesting raptors, to develop appropriate buffer zones around breeding territories, and to develop compensatory mitigation measures for impacts to raptors.
Small Bird Counts	To provide a relative density estimate of resident breeding songbirds.	Use if project poses a significant indirect impact to resident songbird populations, such as displacement, avoidance, or loss of special-status bird breeding habitat.
Area Searches	To sample the entire avifauna of a wind resource area, including habitats not represented in BUC sample areas.	Use if BUCs might miss special-status species potentially impacted by the proposed project.
Migration Counts	To provide a more complete picture of species composition, passage rates, and flight height of diurnal migrants.	Use if project site is within a known or likely migration corridor and BUCs are insufficient (too brief in duration or infrequent) to assess potential collision risk to diurnal migrants.
Mist-Netting	To detect secretive, cryptic, rare, or hard to identify species; to collect data on condition and age of birds in the project area; to document species composition at migrant stopover sites; to distinguish between wintering and migrant birds.	Use if near a known or likely migratory stopover/fallout site to assess species composition of migrants or if demographic information is needed to make impact assessment to special-status bird population potentially affected by the proposed project.

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T<sub>A</sub> predict

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T<sub>A</sub> during pre-permitting or operational monitoring

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T<sub>A</sub> for preliminary site screening and

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T<sub>A</sub> Use on all proposed wind energy projects to provide standardized baseline data on raptor use and collision risk.

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T<sub>A</sub> provide baseline data to

1876 red bats (Kerlinger et al., 2006). While north-south bat migration has been at least locally  
1877 documented for several species, flyways are poorly known, and trans-Sierra, elevational, as well  
1878 as interior-to-coast migrations apparently also occur. California's large latitudinal range means  
1879 that it provides both migratory pathways and migratory destinations, with some species likely  
1880 raising young in Northern and Central California. Given the diversity and complexity of bat  
1881 movements within the state and the uncertainty surrounding potential impacts of wind turbines  
1882 on bat populations, pre-permitting studies are needed at all proposed wind energy sites to  
1883 investigate the presence of migratory or resident bats and to assess collision risk.

#### 1884 **Acoustic Detection**

1885 Acoustic detection involves specialized acoustic systems (for example, AnaBat®, SonoBat®) that  
1886 allow an experienced user to identify some bat species by comparing the recorded calls to a  
1887 reference library of known calls. Because bats usually echolocate as they fly, broadband  
1888 detection systems covering the frequency range that bats use can provide a measure of bat  
1889 activity. Acoustic systems designed to monitor birds are not suitable for bats because of  
1890 differences in the vocalization frequencies of bats and birds. With these acoustic systems, skilled  
1891 bat biologists may be able to detect and identify some bat species.

1892  
1893 Acoustic monitoring provides information about bat presence and activity, as well as seasonal  
1894 changes in species composition, but does not measure the number of individual bats or  
1895 population density. Acoustic monitoring only records detections, or bat passes, defined as a  
1896 sequence of two or more echolocation calls, with each sequence or pass, separated by one  
1897 second or more (Hayes, 1993). Furthermore, there is some question about how much bats use  
1898 echolocation while migrating as opposed to during foraging or while navigating among  
1899 obstacles, so caution is necessary when assessing bat use of an area based only on acoustic  
1900 monitoring data. Passive acoustic surveys can establish baseline patterns of bat activity over the  
1901 course of a year, but researchers should be aware that with the current state of knowledge about  
1902 bat-wind turbine interactions, a fundamental gap exists regarding links between pre-permitting  
1903 assessments and operations fatalities.

1904  
1905 Conduct acoustic monitoring at all proposed wind energy sites to determine the presence,  
1906 ambient activity levels, and the timing of short-term increases in activity (migratory pulses and  
1907 swarming activity). Collect data on environmental variables such as temperature, precipitation,  
1908 and wind speed concurrent with the acoustic monitoring so these data can be correlated with  
1909 bat activity levels. Pre-permitting surveys for bats with acoustic monitors are recommended for  
1910 at least one year. Year-round surveys provide data on species composition and relative  
1911 abundance of bats in and near the wind facility, assess migration routes and timing of  
1912 migration, and help researchers understand seasonal and daily activity levels in relation to  
1913 proposed wind turbine locations (California Bat Working Group, 2006).

1914  
1915 Detectors at ground level do not provide information about bats at the altitude of the rotor-  
1916 swept area because ultrasound attenuates within tens of meters for many bat species (California  
1917 Bat Working Group, 2006). Therefore, place bat detection systems at least 100 feet (30 meters)  
1918 above the ground in multiple locations in the proposed project area (Lausen et al., 2006) and at  
1919 ground level. Distribute the detectors to cover the project area as completely as possible, at a

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T<sub>A</sub> should be developed in consultation with the lead agency and should be based on the presence of bat species of concern at the site.

1920 minimum including monitoring stations at the north, south, east, and west periphery of the  
1921 project area and one in the center (Lausen et al. 2006). Establish additional stations as needed to  
1922 encompass diverse terrain or habitats and try to maintain a density of at least 1 to 1.5 acoustic  
1923 monitoring stations every 1 square mile (2.5 square kilometers). The placement of acoustic  
1924 monitoring stations will be limited by logistical constraints because stations must either be  
1925 located where existing meteorological towers are available or along existing roads so that  
1926 material and equipment to construct temporary towers can be brought to the site. Reynolds  
1927 (2006) describes information on tower deployment at an eastern U.S. wind development site  
1928 and also discusses the conduct and results of acoustic monitoring and mist-netting. Reynolds  
1929 (2006) and Lausen (2006) also provide detailed guidelines for detector deployment and  
1930 operation. Rainey et al. (2006) provide an in-depth discussion of acoustic monitoring systems.

1931  
1932 Acoustic monitoring must be sustained over a full year to capture the considerable night-to-  
1933 night and seasonal variation in bat use (Hayes, 1997), including pulsed migration events.  
1934 However, areas characterized by cold winters (higher elevations and portions of northern  
1935 California) may not need acoustic monitoring during the coldest months when bats are absent.  
1936 Make decisions on refraining from acoustic monitoring during any portion of the one-year  
1937 monitoring period only after consulting a bat biologist, CDFG, and USFWS.

1938  
1939 Some acoustic monitoring systems are designed to run unattended for long periods of time  
1940 using solar power and collect data passively by storing bat calls for later analysis. Once the  
1941 detectors have been established on towers, monitor nightly. Analysis of the data, however, can  
1942 be conducted on a subset of the recordings by making a preliminary screening of the data to  
1943 look for spikes of activity, with the remainder stored for later analysis if warranted. Make  
1944 decisions on the level of effort needed for screening and analyzing the pre-permitting acoustic  
1945 data in consultation with a bat biologist experienced in acoustic analysis.

#### 1946 **Other Bat Survey Techniques**

1947 Other research tools are available to complement the information from acoustic surveys. The  
1948 Western Bat Working Group has developed a matrix summarizing recommended survey  
1949 techniques for western bats <[www.wbwg.org/survey\\_matrix.htm](http://www.wbwg.org/survey_matrix.htm)>. The California Bat Working  
1950 Group (2006) provides information on survey techniques and on potential risk posed by wind  
1951 turbines to California bat species. (Kunz et al., in prep.) also provides a comprehensive  
1952 description of bat survey techniques in relation to wind turbines sites. Biologists with training  
1953 in bat identification, equipment use, and data analysis and interpretation should design and  
1954 conduct all studies discussed below. Mist-netting and other activities that involve capturing and  
1955 handling bats require a permit from CDFG.

#### 1956 **Mist-Netting**

1957 Bat biologists and experts generally do not consider mist-netting for bats to be an effective  
1958 method for assessing potential risk to bats at a proposed wind energy site (Kunz et al., in prep.).  
1959 Mist-netting samples only a small area well below rotor height and must be conducted on no-  
1960 or low-wind nights (which are rare at wind resource areas) because bats detect and avoid  
1961 moving nets. However, this capture technique can help assess presence of special-status bat  
1962 species (for example, western red bats). Mist-netting can obtain information such as species,

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T with the lead agency and others recommended by the lead agency.

1963 age, sex, and reproductive status of local bat populations that no other source, short of  
1964 collecting the bat, can provide. Such information may be relevant in pre-permitting studies if  
1965 the goal is to evaluate potential project impacts to a local bat population.

1966  
1967 Mist-netting and acoustic monitoring are complementary techniques that, used together, can  
1968 provide an effective means of inventorying the species of bats present at a site (O'Farrell et al.,  
1969 1999). If mist-netting is to be used to augment acoustic monitoring data at a project site,  
1970 trapping efforts should concentrate on potential commuting, foraging, drinking, and roosting  
1971 sites. Methods for assessing colony size, demographics, and population status of bats can be  
1972 found in O'Shea and Bogan (2003). Kunz et al. (1996) provide detailed guidelines on capture  
1973 techniques for bats, including mist-nets and harp traps.

#### 1974 **Exit Counts / Roost Searches**

1975 Pre-permitting survey efforts should include an assessment of known or likely bat roosts in  
1976 mines, caves, bridges, buildings, or other potential roost sites near proposed wind turbine sites.  
1977 An exit count can assess the size, species composition, and activity patterns for any bat-  
1978 occupied features near project areas. An exit count involves a skilled observer watching a bat  
1979 roost exit at dusk when bats are leaving for their nightly foraging. Exit counts require a skilled  
1980 observer equipped with a bat detector and call storage system, plus night vision equipment and  
1981 supplemental infrared illumination. Recording and later viewing of the exodus with one or  
1982 more properly placed infrared video cameras (with supplemental infrared illumination) can  
1983 allow a single biologist to cover large structures or abandoned mines with several portals.  
1984 Rainey (1995) provides a guide to options for exit counts.

1985  
1986 Roost searches can also document bat species that are difficult to detect acoustically or with  
1987 mist-net capture. Roost searches are conducted by looking into or entering potential bat roosts  
1988 (usually using artificial illumination) with the intent of finding roosting bats or bat "sign,"  
1989 including guano, culled insect parts, and urine staining. Conduct roost searches cautiously  
1990 because roosting bats are sensitive to human disturbance (Kunz et al., 1996). Never conduct a  
1991 roost search at known maternity roosts. Searches of abandoned mines or caves can be  
1992 dangerous and should only be conducted by experienced researchers. For mine survey protocol  
1993 and guidelines for protection of bat roosts, see the appendices in Pierson et al. (1999).

#### 1994 **Radar, Infrared Imaging**

1995 During peak bat migratory periods, August through October, researchers may need to augment  
1996 the information from acoustic monitoring by using radar, near infrared, or thermal imagers (as  
1997 discussed earlier) that operate beyond the range of acoustic monitors.

#### 1998 **Repowering—Pre-Permitting Assessment**

1999 Repowering refers to modernizing a wind resource area by removing old turbines and  
2000 replacing them with new turbines. The new turbines are generally larger, taller, and more  
2001 efficient than the old. Repowering requires pre-permitting studies using the same methods as  
2002 those described above for new projects. Some applicable data may be available from the site of  
2003 the pre-permitting studies of the new turbines. If this information is applied to the repowering  
2004 project, the developer must be able to demonstrate that the studies are recent, credible, and

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## CHAPTER 4: ASSESSING IMPACTS AND SELECTING MEASURES FOR MITIGATION

This chapter discusses approaches to assessing impacts to birds and bats that surveys revealed during the pre-permitting phase of wind energy development and to selecting the best measures for avoiding, minimizing, or mitigating those impacts.

Pursuant to CEQA, lead and responsible agencies need estimates of potential fatalities and an assessment of the level of risk to individuals and populations to make determinations of "significance" and to establish impact avoidance, minimization, and mitigation requirements. Assessment of impacts is based on the number of individuals and categories of species at risk, turbine size, design and layout, and the interaction of these attributes with physical factors such as weather and topography.

The information gathered during pre-permitting assessment and the impact analysis evaluated during the CEQA process will also provide an assessment of a project's ability to comply with other state and federal wildlife agency permits besides CEQA requirements. Mitigation at project sites is also essential to ensure that projects will be as consistent as possible with fish and wildlife protection laws.

The chapter is organized into four sections:

- Evaluating and Determining Impacts
- Impact Avoidance and Minimization
- Compensation
- Operations Impact Mitigation/Adaptive Management Measures

### Evaluating and Determining Impacts

CEQA lead and responsible agencies categorize impacts into one of three categories: "direct," "indirect," and "cumulative."

#### Direct Impacts

For purposes of the *Guidelines*, "direct" impacts refer to bird and bat collisions with wind turbine blades, meteorological towers, and guy wires. Potential direct impacts are determined by reviewing all of the pre-permitting data to evaluate which species might collide with turbines and which non-biological factors (such as topographic, weather, and turbine design features) might contribute to this risk. The presence of special-status species using areas that put them at risk may be enough to determine that there are potential impacts. Turbine design characteristics and proposed siting locations are two factors that are known during the impacts analysis and should be considered in assessing potential contribution to risk. Some factors are presented with the understanding that little is currently known about their contribution to fatality risk, so it is incumbent upon biologists making impact determinations to be up to date on the latest research. Operations monitoring from neighboring projects can also provide some

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2049 information on potential impacts. To learn of research advances, regularly consult the National  
2050 Wind Coordinating Committee Wildlife Workgroup Web site,  
2051 <www.nationalwind.org/workgroups/wildlife/>.

#### 2052 **Risk Assessment**

2053 One tool that other studies have used to assess direct impacts is collision risk assessment. The  
2054 goal of the risk assessment is to determine whether overall avian and bat fatality rates are low,  
2055 moderate, or high relative to other projects and to provide measures of overall avian and bat  
2056 casualties attributable to collisions with wind turbines. Use information on bird and bat use of a  
2057 proposed wind energy site to perform a qualitative assessment of risks, classified as a Phase I  
2058 risk assessment (Kerlinger, 2005). A Phase I risk assessment determines whether high bird or  
2059 bat use might represent a fatal flaw of a proposed project and helps to develop studies to better  
2060 evaluate risk. The next level of a risk analysis is to make this assessment more quantitative,  
2061 which involves collecting data on the abundance and spatial and temporal distribution of birds  
2062 and bats using the site, as well as their behavior and the time birds and bats spend in areas  
2063 where they might be at risk of collision, and comparing this information to existing data on  
2064 fatalities at wind resource areas. The "Pre-Permitting Assessment" chapter describes methods  
2065 for collecting these data. Anderson et al. (1999) and Erickson (2006) discuss the analysis of  
2066 various types of risk to birds due to wind turbines.

2067  
2068 For all quantification of risk and fatality estimates, use a uniform metric of birds or bats per  
2069 megawatt (MW) of installed capacity per year to express risk or fatality predictions.  
2070 Refer to Appendix H for a discussion of raptor use and fatality data from studies at existing  
2071 wind resource areas.

#### 2072 **Indirect Impacts**

2073 Potential indirect impacts to birds and bats from wind energy projects include disturbance of  
2074 local populations and subsequent displacement or avoidance of the site and disruption to  
2075 migratory or movement patterns (NWCC, 2004). To date, displacement and site avoidance  
2076 impacts have not been evaluated as extensively in California as they have been in other areas.  
2077 Several studies have been published or are ongoing on the displacement and avoidance impacts  
2078 of wind turbines and associated infrastructure and activities on grassland and shrub-steppe  
2079 breeding songbirds and other open country birds (for example, prairie chicken and sage grouse,  
2080 shorebirds, waterfowl). Some studies have documented decreased densities and avoidance by  
2081 grassland songbirds and other birds as a function of distance to wind turbines and roads  
2082 (Leddy et al., 1999; Erickson et al., 2003; Schmidt et al., 2003).

2083  
2084 Impacts to movement patterns of waterfowl and shorebirds have been a concern in many  
2085 western European countries where offshore wind farms are in the pathway of daily commutes  
2086 of seabirds (Guillemette et al., 1999; Dirksen et al., 2000). A few studies have looked at the  
2087 relationship between nest occupancy and placement of turbines (Howell and Noone, 1992; Hunt  
2088 et al., 1999; Hunt, 2002; Erickson et al., 2003) and have documented relatively few impacts. Most  
2089 of these studies do not conclusively establish that a reduction in use of an area is due to  
2090 avoidance (indirect impact) versus the reduction in a local population due to collisions with  
2091 turbines (direct impact).

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seasonally breeding, migratory, or wintering and whether it is stable, increasing, or decreasing. The assessment should include a discussion of natural and anthropogenic factors contributing to population trends.

2. Establish an appropriate geographic scope for the analysis and provide a reasonable explanation for the geographic limitation used. The geographic scope of the analysis will generally include a larger area than the project site.

3. Compile a summary list of past and present projects and projects in the reasonably foreseeable future within the specified geographical range that could impact the species, including construction of transmission lines and other related wind energy project infrastructure. The list of projects should include other wind generation projects as well as other projects that may involve habitat loss, collision fatalities, or blockage of migratory routes that could impact species under consideration. The project summary should describe the environmental impacts of each individual project on the species and provide the reader with references for information about other projects.

4. Assess the impacts to the relevant bird or bat species from past, present, and future projects. The analysis should make use of population trend information and regional analyses that are available for the species. Make determinations of population viability and the contribution of the project to the cumulative impact. If, after thorough investigation, the impact is considered too speculative for evaluation, state that conclusion, and the cumulative impact assessment can be terminated (CEQA Guidelines §15145). The lead agency needs to identify facts and analysis supporting any conclusion that the cumulative impact is less than significant.

5. Identify the impacts and impact avoidance, minimization, or mitigation measures to the species, and make a determination regarding the significance of the project's contributions to cumulative significant impacts. The significance determination should include an evaluation of the cumulative impacts the project and neighboring projects might have on the local or regional species population or the species as a whole. For some projects, the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations or implementation of a regional mitigation plan, rather than the imposition of conditions on a project-by-project basis.

## Impact Avoidance and Minimization

The most important decision regarding impact avoidance and minimization comes early in site screening, often prior to stakeholder input. If a site is developed despite indications that substantial bird or bat fatalities might result, problems can continue throughout the life of the project. As discussed in previous chapters, compliance with state and federal laws requires both avoidance and minimization of project impacts. Avoidance is best applied during pre-permitting site selection (macrositing) and during site layout planning (micrositing). Good macrositing decisions are essential for choosing an acceptable site or portion of a site.

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This section only briefly discusses qualitative approaches and does not discuss Phase 2 or Tier 2 quantitative approaches. Again, this type of analysis will influence the choice of pre permitting monitoring and operational monitoring.

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IMPACT ASSESSMENT APPROACHES

### Risk Assessment [move down from above and edited]

One tool that other studies have used to assess direct impacts is collision risk assessment. The casualties attributable to collisions with wind turbines. Use information on bird and bat use of a proposed wind energy site to perform a qualitative assessment of risks, classified as a Phase I risk assessment (Kerlinger, 2005). A Phase I risk assessment determines whether high bird or bat use might require more detailed studies and potential impact mitigation by a proposed project and helps to develop studies to better evaluate risk. The next level of a risk analysis is to make this assessment more quantitative, which involves collecting data on the abundance and spatial and temporal distribution of birds and bats using the site, as well as their behavior and the time birds and bats spend in areas where they might be at risk of collision, and comparing this information to existing data on fatalities at wind resource areas. The "Pre-Permitting Assessment" chapter describes methods for collecting these data. Anderson et al. (1999) and Erickson (2006) discuss the analysis of various types of risk to birds due to wind turbines.

For all quantification of risk and fatality estimates, use a uniform metric of birds or bats per megawatt (MW) of installed capacity per year to express risk or fatality predictions. Refer to Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.

2303 reasonable detail how the wind turbines and associated structures will be dismantled and  
2304 removed.  
2305  
2306 Decommissioning a project typically involves removal of turbine foundations to three feet (one  
2307 meter) below ground level and removal of access roads, unnecessary fencing, and ancillary  
2308 structures. The decommissioning plan should also include documentation showing financial  
2309 capability to carry out the decommissioning and restoration requirements, usually an escrow  
2310 account, surety bond, or insurance policy in an amount (approved by the lead agency) sufficient  
2311 to remove the wind turbines and restore the site.

## 2312 Compensation

2313 Compensation is a common way to mitigate or offset impacts, including cumulative impacts  
2314 that cannot be avoided or minimized in other ways. Although impacts still occur, the ability to  
2315 compensate for them can determine whether a project is delayed, approved in a timely manner,  
2316 or not approved at all. Feasible compensatory mitigation is mandated by CEQA if it will serve  
2317 to mitigate a project's effect on the environment to less than significant. Given that all wind  
2318 energy projects impact bird and/or bat species to some degree, compensatory mitigation will  
2319 likely be needed at most wind energy facilities to offset the impacts of wind energy  
2320 development.  
2321

2322 The CEQA lead agency makes the decision on exactly which compensation measures shall be  
2323 required to mitigate for a project's impact. Compensation amount and metrics are site- and  
2324 species-specific and must be formulated for each individual project. Compensation should have  
2325 a biological basis for ensuring protection or enhancement of the species affected by the project.  
2326 Development of effective compensation measures should involve the CEQA lead agency,  
2327 project proponent, wildlife agencies, and the affected public stakeholders, through the CEQA  
2328 process. Lead agencies should establish the general terms and funding commitments for  
2329 compensation prior to issuing final project permits so project developers have some assurance  
2330 of their mitigation costs and monitoring commitment for the life of the project. Triggers for  
2331 additional compensatory mitigation beyond that required at project approval should be well  
2332 defined and feasible to implement, so the permittee will have an understanding of any potential  
2333 future mitigation requirements.  
2334

2335 Compensation required as project mitigation must be monitored for success by the lead agency  
2336 pursuant to a CEQA mitigation monitoring plan. When a permit is required from CDFG or  
2337 USFWS, compensatory mitigation must satisfy those permit conditions to fully mitigate a  
2338 project's effect on listed species.  
2339

2340 The following potential compensation options are known to protect and enhance bird and bat  
2341 populations at biologically appropriate locations when properly designed and implemented:

- 2342 • Offsite conservation and protection of essential habitat
- 2343 - Nesting and breeding areas
- 2344 - Foraging habitat

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Alternatively, counties can obligate property owners to decommission non-operational projects.

2384 Regardless of the form of the compensatory mitigation, the permitting agency should establish  
2385 a nexus between the level of impact and the amount of mitigation. Unlike habitat impacts, in  
2386 which an acre of habitat loss can be compensated with an appropriate number of acres of  
2387 habitat protected or restored, bird and bat collisions with wind turbines are impacts that do not  
2388 suggest an obvious compensation ratio. Collision impacts take place in airspace rather than over  
2389 a specified acreage of land and are chronic impacts occurring each year. The impacts can extend  
2390 well beyond the local environment because the affected birds and bats are often migratory and  
2391 far ranging, sometimes coming from out of state or out of country. Finally, fatalities can vary  
2392 greatly between project sites and from year to year. Under these circumstances, it is difficult to  
2393 identify acreage of land that offers compensation value for some quantity of bird or bat  
2394 fatalities.

2395  
2396 Given the nature of impacts to birds and bats from turbine collision, permitting agencies must  
2397 consider compensation alternatives to a simple acreage ratio. The level of compensation should  
2398 be biologically based and reasonable and should provide certainty in terms of the funds that  
2399 will be expended over the life of the project and certainty that the mitigation will continue to  
2400 provide biological resource value over that same period. Consult the wildlife agencies and  
2401 species experts in development of the ratios and fees to be used in establishing these  
2402 compensation formulas because all of these methods require some forecasting of impacts over  
2403 the life of the project based on pre-permitting studies.

#### 2404 **Operations Impact Mitigation and Adaptive Management**

2405 Operations impact mitigation and adaptive management generally occur only if the level of  
2406 fatalities at a project site was unanticipated when the project was permitted, and therefore,  
2407 measures included in the permit are inadequate to avoid, minimize, or compensate for bird or  
2408 bat fatalities. Once a project is operating, it is difficult to modify turbine site layout, and  
2409 operations impact avoidance, minimization, and mitigation options are limited. Developing  
2410 contingencies and plans to mitigate high levels of unanticipated fatalities becomes even more  
2411 important when choices for operational impact avoidance or minimization are so limited. To  
2412 avoid open-ended conditions that are difficult for developers to include when planning for  
2413 project costs and timing, establish minimization measures and compensatory mitigation that  
2414 could be needed for unexpected impacts as well as the thresholds that will trigger these actions.  
2415 Determine these measures and compensatory mitigation before permits are issued.

2416  
2417 In extreme cases, additional compensation may not be adequate for high levels of unanticipated  
2418 impacts, and project operators may need to consider operational and facility changes. The  
2419 adaptive management process recognizes the uncertainty in forecasting impacts to birds and  
2420 bats and allows testing of options as experiments to achieve a goal and determine impact  
2421 avoidance, minimization, and mitigation effectiveness. These options include maintenance  
2422 activities or habitat modification to make the site less attractive to at-risk species and seasonal  
2423 changes to cut-in speed. During the bat migratory period, limited and periodic feathering of  
2424 wind turbines during low-wind nights may help avoid impacts to bats. If multi-year monitoring  
2425 documents high levels of fatalities, removal of problem turbines or seasonal shutdowns of  
2426 turbines may be options if other minimization measures are ineffective in reducing fatalities.

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This can only be accomplished with an appropriate impact analysis which in turn influences pre-permitting and operational monitoring methods. Pare this section down significantly.

## CHAPTER 5: OPERATIONS MONITORING AND REPORTING

This chapter describes the standardized techniques recommended for collecting, interpreting, and reporting post-construction operations monitoring data. The rationale for operations monitoring at wind turbine sites is to collect bird and bat use and fatality data and compare it to impact estimates from the pre-permitting studies and other wind energy facilities. This information is required to evaluate, verify, and report on compliance and effectiveness of CEQA avoidance and minimization measures and to document compliance with other applicable permit requirements. At a minimum, the primary objectives for operations monitoring are to determine:

- If estimated fatality rates described in permit conditions were reasonably accurate,
- If the avoidance, minimization, and mitigation measures implemented for the project were adequate, or if additional corrective action or compensatory mitigation is warranted.
- Whether overall bird and bat fatality rates are low, moderate, or high relative to other projects.

On a larger scale, monitoring informs the development of new wind energy facilities in California with project-specific fatality data that will improve pre-permitting estimates on other future projects. Collected in a consistent manner, monitoring data will provide insight into the occurrence, magnitude, and reasons for bird and bat fatalities and will fine tune the development of avoidance, minimization, and mitigation measures for wind energy projects throughout the state.

Operations monitoring typically consists of ongoing bird and bat use surveys and counts of bird and bat carcasses in the vicinity of wind turbines. The number of carcasses counted during operations monitoring is an underestimate of the birds and bats actually killed by wind turbines for several reasons. Searchers will inevitably miss some of the carcasses. In addition, some carcasses may disappear due to scavenging or be destroyed by farming activities such as plowing. Some birds and bats also may not be counted because they are injured by turbines and fly or hop out of the search area. Most fatality estimates reported for wind energy projects are therefore extrapolations of the number of fatalities with corrections for sampling biases. The methods described below are recommendations for protocols to conduct bird and bat use surveys and carcass counts, quantify and correct for the inherent biases in carcass counts, and analyze and report the data.

The duration of operations monitoring should be sufficient to determine if pre-permitting estimates of impacts to birds or bats were reasonably accurate and to determine if turbines are causing unanticipated fatalities that require impact avoidance or mitigation actions. In most situations, two years of operations monitoring is needed so that carcass counts and bird and bat use data can be collected in spring, summer, fall, and winter and capture variability between years. If pre-permitting studies indicate high potential for impacts to birds or bats and considerable seasonal or annual variation in bird or bat use, a longer operations monitoring

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NEED TO LINK OPERATIONAL STUDY DESIGN WITH PRE-PERMITTING MONITORING DATA AND THE COLLECTION OF THAT DATA

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Therefore, it is necessary that there be consistency between monitoring conducted during pre-permitting and operational monitoring. It is also important to recognize that unless operational monitoring demonstrates some significant deviation from the pre-permitting assessment of impacts, more detailed monitoring and analysis should not be required as a part of project conditions. More detailed monitoring could be conducted, outside of permit conditions, to answer research questions that may have broader value outside the operation of a particular site.

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(including consistently with pre-permitting protocols)

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This and other types of monitoring may have research value.

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## CHAPTER 5: OPERATIONS MONITORING AND REPORTING

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- If estimated fatality rates described in permit conditions were reasonably accurate.
- If the avoidance, minimization, and mitigation measures implemented for the project were adequate, or if additional corrective action or compensatory mitigation is warranted.
- Whether overall bird and bat fatality rates are low, moderate, or high relative to other projects.

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The duration of operations monitoring should be sufficient to determine if pre-permitting estimates of impacts to birds or bats were reasonably accurate and to determine if turbines are causing unanticipated fatalities that require impact avoidance or mitigation actions. In most situations, two years of operations monitoring is needed so that carcass counts and bird and bat use data can be collected in spring, summer, fall, and winter and capture variability between years. If pre-permitting studies indicate high potential for impacts to birds or bats and considerable seasonal or annual variation in bird or bat use, a longer operations monitoring

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2483 study may be required to determine if pre-permitting estimates of fatalities are accurate, if  
2484 mitigation is working, and if further operations monitoring is warranted. Conversely, minimal  
2485 operations monitoring would be suitable for a project in which pre-permitting studies indicated  
2486 that impacts were likely to be low, or if the proposed project is adjacent to an established and  
2487 well-studied wind farm that had credibly demonstrated minimal levels of impacts to birds and  
2488 bats. Reduced monitoring during the second year might be appropriate if the first year of  
2489 monitoring provides scientifically defensible data documenting low fatality rates and if data  
2490 from use counts indicate that annual variability is low. For all proposed projects, consult the  
2491 CDFG, USFWS, and other knowledgeable scientists and appropriate stakeholders regarding  
2492 study protocol and the duration of an operations monitoring program.

2493  
2494 Upon completion of two years of operations monitoring, CDFG, USFWS, and other scientists  
2495 and stakeholders who were involved in developing the operations monitoring protocol should  
2496 assess whether continued, long-term monitoring of fatalities is warranted. Long-term  
2497 monitoring on a periodic basis (for example, every five years) for the life of the project should  
2498 occur if operations monitoring data or other new information suggests that project operation is  
2499 likely to result in substantial impacts to birds or bats that were unanticipated and unmitigated  
2500 during permitting of the project. Factors to consider in assessing the potential for unanticipated  
2501 impacts include changes in bird and bat use of a site due to changes in habitat conditions or  
2502 shifts in migratory and movement patterns that are a result of climate change and that might  
2503 affect collision risk. Such long-term monitoring could be coordinated with larger regional  
2504 studies within the entire wind resource area.

## 2505 **Operations Monitoring for Repowered Sites**

2506 Operations monitoring for repowering projects will be similar to other wind energy projects  
2507 and will be based on pre-permitting site screening and monitoring results. Additional fatality  
2508 and use data that can augment the new data collection efforts may also be available from nearby  
2509 existing wind facilities. Generally, standardized protocol monitoring should be conducted to  
2510 determine operations fatality levels for birds and bats and whether the levels are approximately  
2511 those estimated during pre-permitting assessment. The discussions in this chapter pertain to  
2512 repowering projects as well as other wind energy projects.

## 2513 **Determining Bird and Bat Abundance and Behavior During** 2514 **Operations**

2515 Data on bird and bat abundance and site use should accompany all fatality studies at wind  
2516 energy project sites. Bird and bat use surveys characterize bird abundance, flight, and perching  
2517 behavior and bat use in and around turbines, as well as topographic features of the site.  
2518 Conduct standardized surveys, as described earlier in the "Pre-Permitting Assessment" chapter,  
2519 to allow for comparisons of data before and after the project and with other projects.

2520  
2521 For operations monitoring of bats, two years of acoustic monitoring is recommended if CDFG,  
2522 USFWS, and other knowledgeable scientists and appropriate stakeholders consider this  
2523 information a necessary adjunct to the bat fatality data. The acoustic monitoring will determine  
2524 ambient levels of bat activity following the commencement of operation, particularly during

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2525 migration. Collect data on environmental and weather variables concurrently with the bat  
2526 activity data collection. The pre-permitting surveys should have indicated which seasons are of  
2527 particular concern for potential impacts to bats and which times of the year may warrant more  
2528 intensive bat and bird monitoring (for example, from July through October when many bat  
2529 species are migrating). The methods should be consistent with those used during pre-  
2530 permitting studies, and the study design should be confirmed in consultation with CDFG,  
2531 USFWS, and other scientists and stakeholders who were involved in developing the pre-  
2532 permitting studies. Kunz (2004), Kunz et al. (in prep), and the California Bat Working Group  
2533 (2006) provide a discussion of post-construction survey methods for bats.

## 2534 **Carcass Searches**

### 2535 ***Establishing Carcass Search Plots***

2536 Establish search plots at approximately 30 percent of the turbines. The turbines to be sampled  
2537 can be selected at random, via stratification, or systematically as long as the selection process is  
2538 scientifically defensible. The dimensions of carcass search plots will vary depending on turbine  
2539 size and configuration and characteristics of the site. The search area should have a width equal  
2540 to the maximum rotor tip height. For example if the rotor tip height were 400 feet (120 meters),  
2541 the search area would extend out 200 feet (60 meters) from the turbines on each side. The search  
2542 area may be a rectangle, square, or circle depending on turbine locations and arrangements. If  
2543 the site is steep, extend the search area on the downhill side because carcasses could fall farther  
2544 from the turbine. In studies where bats are the sole focus of the search, the search radius can be  
2545 smaller than for large birds and raptors. Studies conducted at other wind energy facilities  
2546 indicate that most bat fatalities (more than 80 percent) typically are found within half the  
2547 maximum distance from the turbine tip height to the ground (Kerns et al., 2005).

2548  
2549 Surveyors can select a search area that does not encompass 100 percent of the carcasses, as  
2550 indicated by pilot searches or incidental observations of carcasses outside the search area.  
2551 However, surveyors must quantify that source of error, make corrections in the final calculation  
2552 of fatalities, and disclose that information in the monitoring report. Surveyors should establish a  
2553 search area that includes approximately 80 percent or more of the carcasses.

2554  
2555 Another source of error in carcass counts is crippling bias, the undercounting that occurs  
2556 because some birds or bats might be injured by turbines and move outside of the search area.  
2557 Accounting for crippling bias is difficult. This document does not provide recommendations for  
2558 methods to estimate crippling bias because such attempts in previous studies produced  
2559 relatively little relevant data per unit time of effort (EPRI et al., 2003).

### 2560 ***Conducting Searches***

2561 Carcass search and bird and bat use data provide an estimate of the number of bird and bat  
2562 deaths attributable to collisions with wind turbines or meteorological towers. Locate carcasses  
2563 by using trained and tested searchers who walk the search area in either linear or concentric  
2564 circle transects around the turbine. This document recommends a standard transect 20 feet (6  
2565 meters wide), 10 feet (3 meters) on either side of a centerline (the searcher looking at three