SRC Comments on Sand Hill Draft Environmental Impact Report

Alameda County APWRA Scientific Review Committee

SRC Consensus Input

The Alameda County Scientific Review Committee (SRC) considered the Sand Hill Draft Environmental Impact Report (P276 Sand Hill Wind Draft Environmental Impact Report) at its November 22, 2013 conference call meeting. Alameda County (in P277 Alameda County Memo SRC Guidance on Sand Hill DEIR 2013) had asked the SRC to provide input on the report's methodology, assumptions and proposed mitigations.

The SRC reached consensus agreement on the following input:

- The report should include a more substantive rationale for why alternatives were selected, in particular the rationale for selecting a 10-turbine option for Alternative 1, and should reference the history of the study development and the sample size issues with the original 10-turbine study design.
- Report authors should review text to add clarifications about certain aspects of the methodology and assumptions that are not clearly explained. Specific examples include:
  - Context is needed to explain the universe of options from which an environmentally superior alternative is selected;
  - Table 4.1 (page 4-33): it is confusing as to why Table 4-1 would conclude Alternative 1 as having "Reduced" biological impacts compared to the Proposed Project. The only significant biological impacts due to the Proposed Project was BIO-11 (all others were less than significant with mitigation), and following earlier arguments, the impact measured in terms of fatality rates are likely none to unknown, from a conservative assumption that the MEWTs would have equivalent fatality rates as current turbines.
  - Alternative 1:clarify whether the remaining 3 MW would be removed, replaced with repowered turbines, or continue operating as old generation turbines
  - There is a lack of definition about what is meant by dry weather (seasonal or daily), temporary (hours, days, weeks), the location of staging areas (as well as the level of staging), and the placement of new access roads.
  - Page 3.4-27 (second paragraph): "*The baseline fatality rates for the Full Repower are based on the existing fatality rates from the MT*." However, in the Smallwood report (2013; page 5) he integrates both his data and the MT data (ICF) to derive the baseline rates.

II. Comments by Individual SRC Members

Comments submitted by individual members of the Alameda County Scientific Review Committee (SRC) follow. These comments are individual and do not reflect the opinion of the entire Committee. Commenters are listed in alphabetical order.

Joanna Burger

This EIS addresses the repowering for wind energy in the Altamont, with shrouded turbines (a new wind energy technology). The SRC was asked to comment on three things as they relate to the Altamont and bird strikes:

Methodology
Assumptions
Mitigations.

GENERAL COMMENTS: While the objectives are clear, and some of the descriptions are clear, the methodology and assumptions are not made clear. Further, small samples sizes, lack of replication, variability in samples, contradictory statements, and lack of clarity in the use of terms makes it difficult to follow some of the methods. Further, it would be better if they made their assumptions clear, and addressed the validity of each one.

SPECIFIC COMMENTS:

Executive Summary: The executive summary should be clear, in terms of objectives, assumptions and results, and this is not the case. If was hard to discern whether the overall density of turbines is going to increase with full re-powering, and this should be clear. The methodology used to assess impacts is not clear in the summary, and should be. The unavoidable effects on some species need to be addressed more fully in the introduction.

Methodology: I found it confusing to follow their time line for new turbines, versus the use of old, and the resultant effects on birds, especially our target species. There needs to be more justification that the fatality rates will be similar as existing fatality rates.

While I applaud studies (Smallwood's) to examine the effects of particular strategies, it seems that these observations should be more clearly described, documented, and defended in the EIS itself. Bat studies need to be implemented as this is potentially a large impact.

While not our responsibility, the reptile studies need considerably more attention. From our perspective, the wind turbine effects on birds is the main section of interest. It is not clear exactly when the spatial and temporal pattern of turbine placement will be, especially in light of the remaining old turbines.

Assumptions: The time sequence of re-powering should be more explicitly explained (6-9 months is a long time, and the actual period (seasonally) needs to be discussed).

There is a lack of definition about the assumption, what is meant by dry weather (seasonal or daily), temporary (hours, days, weeks), the location f the staging areas (as well as the level of staging), and the placement of new access roads. Normally short term impact is not 3 years (which seems excessive (page 3.4-28).

Finally, while the assumptions are clearly stated, their specific effect is not described in detail.

Mitigations:

I found the mitigations to be described way too briefly, and without enough detail to evaluate them completely. Decommissioning, for example, can take a very long time. So are they talking about for the whole facility, for a group of turbines? Again, the temporary staging areas poses a problem, and they should be clearly identified in terms of time and space.

Temporary stockpiling could also provide roosting areas for predators, and destroy habitat. Again, this needs to be further described and circumscribed to reduce damages.

There is not enough detail of the mitigation monitoring (page 3.4-33) to determine if this is responsive. Further, what will happen if there are observed effects. What provisions have been made to deal with specific problems??

Further, it is not enough, for the mitigation for nesting burrowing own, to simply refer to other sections. This is a critical species, and one that should be addressed specifically with measures directed at that species. How will the impact of construction materials that might serve as resting places for predators be dealt with. These materials could bring in more predators, making the owls even more vulnerable. Further, it would helpful to justify the exclusion distances with references or other aspect.

Finally, there is no overall estimation of the potential impacts to the four target focal species. What is the final value of the study? A justification of 10 turbines needs to be made, with evidence and potential outcomes. How is the value measured against other impacts. How would one decide, for future work, which alternative is really better? What are the metrics of success or failure and final evaluation?

Jim Estep

Comments on Sand Hill DEIR – Estep (12-18-13)

The County has asked the SRC to provide individual comments on the San Hill DEIR that are related to biological resources issues, and particularly those related to avian and

bat mortality. The County asked for comments specifically related to methods, assumptions, and mitigations.

The project involves repowering of a portion of the APWRA with a new shrouded turbine design. The DEIR has two primary components, 1) it analyzes the effects of the initial 40 turbine repowering project and the associated 3-year avian validation study (BACI study) and 2) programmatically addresses the effects of the remaining project installation (removal of 340 to 350 old turbines and installation of 300 new turbines). Forty shrouded turbines (4MW) will be initially installed as part of the 3-year avian validation study. This will involve the removal of 70 to 80 old turbines (4 MW). New turbines will installed at selected locations with known high fatalities where old generation turbines were removed. Of the remaining 340 to 350 older generation turbines, 157 will be used as the control group to estimate the differences between the old and the new turbines.

Methodology: What are the SRC's thoughts on the methodology used in the DEIR for analyzing impacts to avian biological resources?

1. Baseline. For purposes of conducting a CEQA impact assessment, using the results of the BACI study (and the ICF results for golden eagle) is appropriate to establish baseline fatality estimates to compare pre- and post-project conditions. However, it would be useful to also compare the results with other repowered projects in the APWRA that use non-shrouded turbines. There is already an expectation that the shrouded turbines will result in less mortality than the existing turbines that have proven to cause high rates avian mortality. Perhaps the more interesting question, particularly since the APWRA is likely to undergo rapid repowering over the next several years, is how they compare with the more traditional repowered turbines. While its somewhat unclear, the alternatives analysis on page 4-13 describing the no-project alternative indicates that this comparison is an objective of the initial repower. So presumably, although it is not specifically stated, the results of the BACI study will address the differences between shrouded and non-shrouded repowered turbines. This information will be highly informative with regard to the full repower phase of the project.

Because the BACI study is ongoing and will be the source of data to estimate and compare fatality rate differences, the analysis of the no-project alternative for biological resources on page 4-13 is understandably deficient. However, additional consideration of this issue in the final EIR is warranted in order to more clearly describe the treatment it will received in the analysis of the BACI study and in the supplemental EIR for the full repower phase.

2. BACI Study. Neither the methods section in the EIR nor the first year report of the BACI study sufficiently describe the methods used to select the number and locations of study turbines. For example, how were the 157 control turbines selected? The final EIR should provide additional details or reference a more complete study design document.

3. Full Repower Programmatic Assessment. The programmatic assessment of the full repower seems lacking, at least for biological resource issues. The are several issues

associated with the full repowering that could be, but are not described. For example, the full repower project will include 300 turbines, nearly a 1:1 replacement ratio with the old turbines. And because the new turbines are nearly twice the size as the old turbines, the overall extent of physical material that can influence avian and bat movement may increase. While the exact locations of the these turbines is unknown, they presumably will be installed along strings not unlike the existing turbines. We know that the location, number, and orientation of turbines can influence mortality rates, and while the new shrouded turbines may result in low mortality, these other factors should be a consideration in a programmatic analysis of the full repowering.

Assumptions: What is the SRC's perspective on DEIR assumptions in relation to avian biological resources?

1. The list of assumptions on page 3.4-27 includes only one assumption related to avian biological resources (Avian fatalities are directly proportional to the operational period of wind turbines, calculated as the cumulative installed generation capacity). Because the analysis of avian and bat mortality is based on the BACI study, it would seem appropriate to also include specific assumptions that were used in the development of that study including those related to selection of study turbines, search interval, detection probability, and others. As an alternative, the EIR should refer to the BACI study design to refer the reader to those assumptions.

Mitigations: What is the SRC's assessment of the appropriateness of the avian-related on- and off-site mitigations set out in the draft document?

1. APM 1. Unless I am misinterpreting this, this mitigation measure on page 3.4-52 states indicates that if the mortality rate following one year of post-construction monitoring is below the baseline rates, then monitoring can end. It appears that monitoring may continue only if the mortality rates exceed the baseline. There is no clear rationale described for this approach. One year of post-construction monitoring may be insufficient to make valid comparisons and conclusions. It is also inconsistent with standard practices for post-construction monitoring.

2. APM 2. This should be referred to as winter shutdown since the measure includes the dates November 1 to February 15. While this is consistent with the APWRA-wide shut down, it might be more appropriate to rely on the results of the BACI to determine the most appropriate shut-down period. Since we have no data on collision risk of the new turbine design, perhaps we should not predetermine the specifics of measures to reduce collision risk until data are available.
3. Offsite Mitigation. The other mitigation measures that address avian and bat mortality are standard practice. The measure to retrofit utility poles to avoid electrocution is taken from the USFWS' guidance for the development of an Eagle Conservation Plan (ECP) and thus has been adopted and approved by that agency. Other types of compensatory mitigation, including acquisition of replacement lands or purchasing mitigation bank

credits are no longer considered sufficient to offset avian mortality impacts from operation of wind turbines.

Michael L. Morrison

17 November 2013

My conclusion is this DEIR is a solution in search of a problem. The very purpose of the Sand Hill project is to determine if the new shrouded turbine substantially reduces avian fatalities in the APWRA. If and only if, these turbines can achieve substantial fatality reduction would the applicant proceed with installation of additional units. The ongoing study to determine if such a reduction in fatalities was named "avian validation" to emphasize the essential goal of *validating* that such a reduction did indeed occur. Thus, any alternative that reduces the likelihood of such a determination effectively *invalidates* the study. *Alternative 1 will effectively negate determination of a treatment effect due to the shrouded turbines*. As clearly stated on page 4-2:

"The underlying purpose of the project is to repower the wind energy production facilities owned by the Applicant with shrouded turbines, a new wind energy generation technology, in two phases, beginning with a test project of a sufficient number of the shrouded turbines to support an Avian Validation Study, and subsequently, if that study demonstrates that the shrouded turbine technology is sufficiently compatible with avian use and behavior in the project area, complete the repowering of the facilities with shrouded turbines to produce an equal or greater amount of energy compared to existing production levels."

The turbines selected for study in the Avian Validation Study were done so to maximize the opportunity to identify a change in fatalities following installation of the shrouded turbines. Impact assessment studies, of which the BACI is a foundational method, are a priori compromised by a lack of replication and low number of sample elements (turbines in this study) within the sampling areas (i.e., treatments and controls). Thus, reducing the inherent variability among sampling elements requires maximizing the number of such elements (turbines). Chapter 6 in the book, Wildlife Study Design (2008, Springer-Verlag, 2nd edition), by Morrison et al. discusses impact assessment and applications to study designs similar to the one being implemented at Sand Hill. Pre-treatment data is currently being collected based on the design using 40 treatment and 40 control turbines.

The DEIR clearly states that the 40 turbine design is optimal; for example on page 4-9:

"This is particularly the case with regard to alternatives to the 40-turbine Initial Repower phase; in part
because it is already limited to the minimum number of turbines required to generate a statistically
robust Avian Validation Study of the shrouded turbines, but also because studies like the Avian Validation Study are themselves a common form of mitigation. Similarly, the replacement of existing
turbines with new turbine designs is itself a recognized *Advanced Conservation Practice* for the
potential minimization and avoidance of risk to bald and golden eagles."

Thus, the DEIR acknowledges that 40 turbines is the minimum needed to achieve a rigorous result. And, that the project itself serves as a valuable mitigation. It then logically follows that no change should be made to the 40 turbine design.

The DEIR then contradicts itself by concluding that a 10 turbine experiment might be sufficient; although in the same paragraph it reverses itself and concludes that 10 turbines would not be large enough to provide robust results. On page 4-16:

"Alternative 1 would meet the fundamental project objective of conducting the Avian Validation Study, but to a lesser degree than the Initial Repower because, while the smaller sample size of 10 shrouded turbines would serve to indicate the avian effects of the shrouded turbines, it would not be large enough to provide robust, conclusive statistical results."

In other words, 10 turbines will be fine except that 10 turbines will not be fine!

I was unable to clearly follow the logic in many of the statements regarding potential project impacts. For example on page 4-18:

"Impacts on biological resources would generally be similar, but less severe under the Alternative 1 Initial Repower than the impacts associated with the proposed project in the near term. Construction of fewer turbines would result in less ground disturbance and therefore the corresponding impacts on terrestrial species would be less severe. Potential impacts on avian species would also be less severe than the proposed project as each proposed turbine would have some level of impact."

The statement "in the near term" is vague, but implies that the proposed project has no long-term impacts, of that those impacts would be "similar" to the Alternative 1. Later (see below) we read that the shrouded turbines would most likely reduce avian fatalities; yet in the above statement the DEIR concludes that the project would have more impact that Alternative 1. *Clearly if the shrouded turbines reduce avian fatalities, and impacts to other resources "would be generally similar", then the impact would be less overall under the proposed project.*

The DEIR does not appear to acknowledge that repowering of some type will occur in the Sand Hill wind development regardless of turbine type. The purpose of the experiment (proposed project) is to determine if repowering with shrouded turbines—rather than conventional turbines—will substantially reduce avian fatalities. Thus, if a rigorous result (40 turbine project) is not implemented, there will be no justification in the future to use the shrouded turbines. *Thus the DEIR, Alternative 1, effectively ensures that avian fatalities will not be reduced in the future.*

On page 4-32:
"Alternative 1 differs from the proposed project and other alternatives primarily because the Initial Repower phase of this alternative would consist of only 10 shrouded turbines instead of
40. The reduced scale and duration of construction activities associated with Alternative 1 compared to the proposed project and other alternatives, all of which would entail installation of 40
turbines in the Initial Repower, lessens the potential for significant effects on a number of resources
(Table 4-1)."

On page 2 of the Avian Study Design (APP B) the rationale for the 40 turbine sample size was explained; namely, as due to critical peer review by the SRC. I assume that the lower sample size of 10 recommended in the DIER came from the early study design (which was subsequently found to be inadequate by SRC).

"The study plan changed somewhat from the proposal the SRC reviewed in 2011. These changes were due principally to SRC comments and recommendations following its review of my 2011 study proposal. With FloDesign's support, I followed the SRC's recommendations and responded to comments and concerns. I prepared a study plan for a larger experiment, and subsequently transformed the study plan into a grant proposal, which I submitted to PIER. I won the PIER grant. At about the same time, FloDesign acquired the wind assets of AES SeaWest in the APWRA. The study increased in size from 10 MEWTs to 40 MEWTs. It shifted locations
from Patterson Pass to four sites managed by AES SeaWest. It involves four types of old generation wind turbines instead of one. It also includes both fatality searches and behavior surveys through the entire winter shutdown period, or year-round."

Table 2 in the Avian Study Design (App B) indicates that, given a sample size of 40 turbines each for treatment and control (reference), the resulting mean and confidence intervals (CI) for the predicted number of birds detected over 1 year would be:

- Reference/control 41.5, CI = 34.8 – 49.1
- Treatment 46.5, CI = 37.7 – 55.4

Thus, based on the best empirical data available, Smallwood's analysis suggests that any reduction in fatalities would have to meet or exceed about 10 individuals to show a statistically rigorous outcome of the replacement turbines (all else considered equal between time periods). Clearly any reduction in sample size of turbines will make identification of a treatment effect, even if one occurs, to be highly unlikely. To validate my assumption, I asked Dr. Smallwood to run an analysis for 10 turbines as he did above for the 40 turbine replacement. The predicted number of birds detected at a 10 turbine replacement (following Alternative 1) would be:

- 10 turbine proposal 20.0, CI = -7.9 – 47.9

Thus, the result of implementing Alternative 1 would be to require a reduction of >28 individuals to show a treatment (replacement) effect. Note that ~28 is greater than the mean number detected, making the 10 turbine option untenable.

No citations or other support is provided for the recommendation to reduce the sample size of turbines in the experiment in Chapter 4. Based on the discussion in Chapter 3, it is

apparent that the reduction to 10 turbines was based on considerations of disturbance to other resources because of replacing 10 versus 40 turbines. On 3.4-27 the likely impacts to the Initial Repower are listed to be:

· Initial Repower activities, including decommissioning and construction are expected to occur over a 6- to 9-month period.
· All ground disturbing activities would occur during dry weather.
· All impacts associated with decommissioning activities would be temporary.
· Excavation required to remove foundations of old turbines next to proposed new turbines would occur within the disturbance footprint of the proposed turbine.
· Removal of turbines that do not occur next to a proposed turbine would only have surface ground
disturbance and would not require any excavation because foundations would remain in place.
· All equipment staging, materials storage, and vehicle parking would occur within one of the four
designated staging areas, within the limits of construction for each turbine site, or on existing access roads.
· No new access roads, substation facilities, or operations and maintenance facilities would be required for Initial Repower.

Thus, no impacts are expected outside the immediate vicinity of the currently operating turbines during (at least) the Initial Repower.

As noted above, in several locations the DEIR acknowledges that the shrouded turbines have a high probability of reducing avian fatalities. For example, on page 3.4-51 to 52 the DEIR states:

"Based on the information available, and the theory that the shrouded turbines will present a physical barrier for birds resulting in less collision with moving blades, the new turbines are not expected to have greater impacts when compared to the existing turbines. However, three scenarios
are possible: (1) the proposed project would have a significant reduction in avian impacts; (2) the
proposed project would have some reduction in avian impacts; or (3) the proposed project would
have no reduction in avian impacts."

Likewise on page 3.4-54 the DEIR states:

"Using a conservative assumption that the new turbines will be similar to the existing fatality rate, the Initial Repower may result in 15.5 total focal species fatalities each year. This equates to 2.2 American kestrels, 12.5 burrowing owls, 0.2 golden eagle, and 0.8 red-tailed hawk fatalities each year for the Initial Repower. Although these numbers represent relatively low numbers of fatalities in the context of the number of fatalities in the overall Altamont Pass Wind Resource Area, the project would reduce the numbers of these special-status species and thus the impact is considered a substantial effect. It is equally feasible that the Initial Repower would result in a significant reduction in these fatality rates."

Thus, the DEIR acknowledges that the baseline number of fatalities in the project area is below that seen APWRA-wide. If the current turbines are not replaced then, on average, we would expect a continuation of the current fatality rates until the existing turbines are decommissioned. The expectation, as noted here in the DEIR, is for a reduction in fatalities. Thus, it follows that the greater the number of shrouded turbines that are installed, the greater the *likelihood* of a reduction in fatalities, and thus an overall reduction in fatalities than would otherwise be seen without the project. Additionally, on 3.4-52 to 56 the Applicant details an extensive number of mitigation measures should the expected reduction in fatalities not occur.

Throughout the discussion of Alternative 1 (4.3.2) the DEIR repeatedly concludes that 10 turbines would have a lesser impact on resources (e.g., aesthetics, air quality, cultural) than would 40 turbines. Following this logic, *all* projects would necessarily be forced to reduce the number of installed turbines because of the claimed reduction in impact. Because no justification or rationale for the selection of 10 turbines is provided, one could conclude that *all* projects in APWRA should be reduced by 75% when seeking to repower or install newer generation turbines. No claim is made regarding the absolute reduction in impacts based on a reduction from 40 to 10 turbines. As reviewed elsewhere in my comments, the DEIR actually concludes that minimal or no impact will occur to any resources under the proposed (40 turbine) project, and that a detailed and comprehensive mitigation plan has already been developed by the Applicant should impacts occur. Additionally, the DEIR concludes that it is likely that the shrouded turbines will reduce avian fatalities. If Alternative 1 is accepted, then a precedent has been set where all repowering projects in the APWRA should have installed capacity reduced by 75% to lessen resource impacts. All repowering activities in APWRA should thus be reduced by 75% because all projects require modifications of roads, use of vehicles, the presence of people, and so forth.

Sue Orloff

Concerns and Questions
Sand Hill EIR – 11/20/13

My main concern is that the methodology for analyzing impacts of the avian fatality study is not well explained. There are several confusing and contradictory statements throughout the EIR and Appendices regarding exactly how the data will be compared and analyzed (specific comments below).

Also, I use specific page or table numbers below as references, but many of my questions and concerns are applicable to several other sections of the EIR document.

Executive Summary

Page ES-4 (4th and 5th paragraphs): There is close to a 1:2 replacement ratio for the initial phase compared to about a 1:1 replacement ratio for the full repower. Does the density of repowered turbines increase for the full repower? If so it may be hard to apply the results from the first to the second phase. Density of turbines has been linked to fatality rates.

Impact Analysis - Biological Resources

Page 3.4-24 (Table 3.4-3): Are these fatality rates for both control and impact groups combined? It would be helpful to see a comparison of the control to the impact group fatality rates.

Page 3.4-24 (Table 3.4-3): Comparisons are made between ICF data (blobs 9, 16, 17, and 22) and Smallwood's high risk turbine data. What percentage of the full repowered area is ICF surveying annually? What is the proportion of high risk turbines in the ICF data set? There are no maps that show the locations of the experimental/control clusters and how they overlap with the ICF samples.

Page 3.4-26 (Analysis Methods - general): We already have good evidence that new generation repowered turbines reduce mortality. So the true test of the new shrouded turbines is how they compare to other repowered turbines not to the old generation turbines. This comparison is not mentioned in the EIR.

Page 3.4-27 (second paragraph): "*The baseline fatality rates for the Full Repower are based on the existing fatality rates from the MT*." However, in the Smallwood report (2013; page 5) he integrates both his data and the MT data (ICF) to derive the baseline rates.

Page 3.4-27 (second paragraph): Will the full repowered area be surveyed for fatalities after construction? How will the project-wide (full repower) baseline fatality estimates be used and compared if there is no post construction surveys of the full repowered area?

Page 3.4-27 (second paragraph, last sentence): For the full repower comparisons to ICF data, it may be useful to also use annual data as well as averaged over all years for determining trends.

Page 3.4-52 (APM-1): Don't you also need to compare the pre-construction control group to the post-construction control group for a temporal check? It is not mentioned anywhere.

Page 3.4-53: The threshold percentages used here seem a bit arbitrary and high, especially for RTH. Also, implementing seasonal shutdown to reduce BUOW fatalities may be risky. Based on MT data, seasonal shutdown may actually increase fatality rates for BUOW.

Page 3.4-55 (Mitigation Measure Bio-11b): Is using RSA become the standard for compensation? It seems a little low for compensation.

Page 3.4-67 (Bio-11d): This is the first time the term "performance standards" is used for avian impacts. This needs to be specifically defined - are these target reduction percentages or is it just below baseline.

Avian Baseline Study

Pages 15 and 20 (Tables 2 and 3): There are several fatality rates used in these tables (as well as Table 3.4-3 in the Impact Analysis – Biological Resources section of the EIR). It's confusing which ones are being used and for what purposes. Which rates will be used for comparisons to controls and to post construction?

Smallwood (2013)

Page 7 (4th paragraph): "*Also, the burrowing owl fatality estimate was larger than I expected, indicating that the Forebay wind turbine sites remain very dangerous for burrowing owls. The fatality rates we observed, and which I estimated, were likely conservative compared to past fatality rates at these turbines because <50% of the Forebay wind turbines were functional during the first four months of our study, and >25% remained nonfunctional since August 2012.*"

The high fatality rates were possibly due to many turbines being nonfunctional. Nonfunctional turbines may offer perching opportunities for predators that could increase the fatality rates for burrowing owls.

Page 10 (Table 2): There is a huge difference between PIER's and ICF's mean fatality rates at high risk turbines. So when estimating project-wide impacts from both PIER and ICF, I am concerned that the multipliers used to derive baseline fatality rates can truly adjust for such differences.

Julie Yee

The County requested SRC input on the methodology and assumptions, as they relate to impacts to avian biological resources, and on the appropriateness of avian-related on- and off-site mitigations. My comments on these topics are as follows:

Methodology: The DEIR analyzes impacts to avian biological resources primarily in terms of the collision fatalities that might be expected from the Proposed Project. The DEIR also identifies and analyzes lesser impacts to avian resources (e.g. disturbance and construction-related mortality), however the DEIR determines these to be less-than-significant with mitigation and I do not consider them further. Instead I focus on the one impact to avian species that was regarded as significant and unavoidable:

> Impact BIO-11: Operation of the proposed project could have direct impacts on special-status avian species (significant and unavoidable). (pages 3.4–51 through 3.4-55)

The methodology used in the DEIR to analyze this impact is confusing. The DEIR seems to present appropriate background information, however it sometimes reaches conclusions that seem logically inconsistent. Other times, I just think that more detail or explanation is needed. Specific issues:

1) The baselines for determining impacts (pp. 3.4-26 through 3.4-27) are reasonable, as they are derived from the before-phase of the BACI design, where existing turbines are associated with ongoing collision fatalities. [As a side note, I will mention that when these baselines were first presented (p. 2-17), there had been no explanation of them yet, which confused me. I was further confused when their total was reported as 3.88 (p. 3.4-10) although the numbers on p. 2-17 add to 3.938. Later (p. 3.4-27), the DEIR explains that a slightly different baseline was replaced for GOEA because the baseline based on survey observations (0 fatalities) would be too low. While I understand the baseline definitions now, the references to baseline prior to p. 3.4-27 had been initially very confusing.]

2) Given that the Initial Repower is expected to reduce fatalities from the baseline rates, then the DEIR considers three possible scenarios ranging from significant reduction to no reduction in impacts (pp. 3.4-51 through 3.4-52). The DEIR states the Initial Repower is not expected to have greater impacts than existing turbines, i.e. not expected to have higher fatalities than baseline. How is it, then, that the impacts would be designated "significant and unavoidable"? The DEIR makes the following argument:

   > "Using a conservative assumption that the new turbines will be similar to the existing fatality rate, the Initial Repower may result in 15.5 total focal species fatalities each year. This equates to 2.2 American kestrels, 12.5 burrowing owls, 0.2 golden eagle, and 0.8 red-tailed hawk fatalities each year for the Initial Repower. Although these numbers represent relatively low numbers of fatalities in the context of the number of fatalities in the overall Altamont Pass Wind Resource Area, the project would reduce the numbers of these special-status species and thus the impact is considered a substantial effect." (p.3.4-54)

   The only way this argument should hold is if the impact was being measured against a baseline of zero fatalities, however the DEIR has already established a baseline with positive fatalities, due to existing turbines and foreseeable repowering (using larger turbines if not the Proposed Project) (section 4.3.1, p. 4-12). The argument seems inappropriate.

3) On p. 3.4-52, the DEIR states that the Applicant Proposed Measures (APMs) ("Conduct Avian and Bat Fatality Monitoring" and "Implement Seasonal Shutdowns") must be

considered in the context of determining impacts. I would like to understand better how this was done. APM #2 specifies that seasonal shutdowns continue until fatalities are reduced to a range of 25-50% below baseline rates for three of the focal species (p. 3.4-53). The existing turbines are not subject to these reduction targets, thus the Proposed Project seems to provide additional reassurance for reducing fatality rates rather than settling with maintaining baseline levels. It is unclear how these reduction targets mitigated the impacts determination. The DEIR states:

> "…the Applicant has proposed measures to monitor the impacts of the Initial Repower and to implement seasonal shutdowns if pre-determined thresholds are exceeded for the focal species. Implementation of these APM's would reduce, but would not eliminate the potentially significant impact from the proposed project." (p.3.4-54)

The wording is vague, but seems to imply that fatalities should be eliminated in order for the impact to be not significant. If so, then this argument would apply only for a baseline with zero fatalities, which is not the case.

4) Given that the Proposed Project was described by the DEIR to have "significant and avoidable" impacts to special status avian species (Impact BIO-11), then I was further confused to see, in the comparison of Project Alternatives (Table 4-1, p. 4-33), that the No Project Alternative is listed as having "Increased" impacts compared to the Proposed Project. If the Proposed Project's impacts are significant, then shouldn't the No Project Alternative have "Reduced" impacts when compared to the Proposed Project? While I believe that a determination of "Increased" impacts is more consistent with the overall information presented in the DEIR, it seems inconsistent with the DEIR's determination of the Proposed Project having "significant and avoidable" impacts. It appears that the determination of the Proposed Project having "significant and avoidable" impact is consistently inconsistent.

5) Adding to my confusion about the "Increased" impacts due to the No Project Alternative, when compared to the Proposed Project, the DEIR narrative on this comparison (p. 4-13) describes the two options equivocally: "Overall, the potential impacts of the No Project Alternative would be similar to the proposed Initial and Full Repower phases." If not for information presented elsewhere in the DEIR, this would almost lead one to expect "Similar" be reported in Table 4-1.

6) Another confusing aspect of Table 4-1 is that Alternative 1 (1 MW repowered instead of 4 MW) was described as "Reduced" biological impacts compared to the Proposed Project. Although the DEIR does not state this assumption, I presume that Alt-1 would replace 1 MW of existing turbines with 1 MW of repowered turbines, so that the total MW at Sand Hill would be similar to total MW under either the Proposed Project or the No Project Alternative. As such, all factors are the same, and only the scope of the Project would differ. Since Alt-1 is a smaller version of the Proposed Project, then I

expect that its impacts (relative to Proposed Project) should be in the same direction as the No Project Alternative. Instead, it was opposite ("Reduced" for Alt-1, instead of "Increased" as for No Project). Why? On p. 4-18, the DEIR explains:

> "Potential impacts on avian species would also be less severe than the proposed project as each proposed turbine would have some level of impact."

This argument is also vague and seems to either: (1) ignore the existing impact due to 3 MW of turbines that would continue to operate unrepowered if only 1 MW were allowed to be repowered; or (2) assume that Alternative 1 would replace all 4 MW of existing turbines under the Proposed Project with only 1 MW of repowered turbines. The EIR should be clearer about the total number of turbines (or, more importantly, the number of MW, since fatalities are projected on a per MW basis) that it assumes will operate under Alt-1. Also, all of the arguments for determining the impacts of various projects should be more consistent with the established baseline, which includes collision fatalities, and not merely stating any fatalities to be a significant impact.

7) When identifying an Environmentally Superior Alternative, it was unclear whether the superior alternative must be selected from a set of candidates which includes the Proposed Project, or whether it could only be selected from the Project Alternatives (e.g. a set which includes Alternatives 1, 2, 3, 4, but not the Proposed Project). After our conference call, I understand now that CEQA requires that the ESA be selected from just the alternatives (as opposed to NEPA which, as I understand, requires that an EIS choose a best alternative from a candidate set that includes the Proposed Project). Thus, it would seem that the selection of the ESA involves no ranking of the Proposed Project. I wish that this was clearer in the DEIR because it would be easy for readers who lack that understanding to misinterpret Alternative 1 as being superior to the Proposed Project.

<u>Assumptions:</u> I noted three assumptions related to avian impacts:

8) "Avian fatalities are directly proportional to the operational period of wind turbines, calculated as the cumulative installed generation capacity." (p. 3.4-28)

This is not really true, because temporal variation has been noted in many monitoring reports for the Altamont. However, for lack of a feasible adjustment, it is a standard assumption used in ongoing fatality estimates for the Altamont, and it is reasonable for the DEIR to make the same assumption for approximation.

9) Fatality rates associated with MEWTs are estimated "using a conservative assumption that the new turbines will be similar to the existing fatality rate." (p. 3.4-54)

This is indeed conservative, in the sense that it assumes no changes. However, the DEIR also notes in the same paragraph that "it is equally feasible that the Initial Repower would result in a significant reduction in these fatality rates." For a balanced report, the analysis should consider impacts under other equally feasible assumptions such as this. In scientific

research, this is also known as a sensitivity analysis, so that the conclusions of an analysis can be assessed for its sensitivity to the underlying assumptions. Under an alternative assumption where MEWTs result in a significant reduction in fatalities, then the Impacts Analysis and Alternatives Analysis could have rather different outcomes.

10) A third assumption which was not mentioned in the DEIR, but which is important and necessary for the Alternatives Analysis, has to do with the number of existing turbines (or MW) that would be removed under Alternative 1 (my comment #6 under Methodology). If only 1 MW were repowered, then would all 4 MW still be removed? Or only 1 MW?

Mitigations:

The types of mitigations sound reasonable, but I have no comment about whether they are of appropriate intensity in order to offset the impacts. Additional supporting information would be an improvement. For two of the mitigations, I have these specific comments:

11) The DEIR states "The research and BACI testing of new wind technologies as a means to understanding and reducing avian impacts is a recognized form of avian impact mitigation."
This mitigation benefit would be seriously reduced by replacing the proposed BACI (40 turbines) with the smaller Alternative 1 study (10 turbines).

12) Mitigation Measure BIO-11b: Compensate for the loss of burrowing owl (p. 3.4-55) reads: "Lands will be preserved on a 1:1 rotor swept area basis, with the amount of land preserved equal to the total rotor swept area of the proposed turbines."

I wonder if this is a reasonable amount of area for effective mitigation. References would have been nice. It might be worth noting in the DEIR that FloDesign has a 21.3 m rotor diameter (Fig 2-9, right before p. 2-9), or a radius of r =10.65 m, which amounts to a rotor swept area of 356 sq m per turbine (πr^2). Forty turbines would total to 1.4 hectare.