DRAFT Meeting Summary| January 13-14, 2010
Altamont Scientific Review Committee
Developed by the Center for Collaborative Policy
Reviewed and approved by the SRC

Key Outcomes

Monitoring Report
The SRC reviewed the draft monitoring report (2009) and requested that the SRC's written comments, bird use data, operational data, and the 2009-2010 winter shutdown data be incorporated and the SRC be allowed to review and discuss an additional draft before the report is finalized.

Prioritized Management Measures
In their annual meeting with the SRC, the settling parties asked the SRC to prioritize adaptive management measures, consistent with the settlement agreement. The SRC recommended the following priorities:

1. Repowering as soon as possible using (to be developed) approved siting procedures.
2. Two interim management actions:
    a. High Risk Turbine Removal: the SRC would survey previously unsurveyed portions of the APWRA for high risk turbines; turbines rated 9 or 10 would be selected for priority removal before turbines rated 7.0-7.5 from the previous SRC survey that have not been removed;
    b. Seasonal Shutdown: Four SRC members reiterated the previous SRC recommendation for a 4-month shutdown, 1 member recommended a 12-month shutdown.
3. Burrowing Owl Behavior Study: The Burrowing Owl study has two parts: the behavior study is highest priority and the distribution and abundance study is second priority. Both are designed to address the high number of burrowing owl fatalities.
4. Research on Adjustment Factors (detection probability)

Future Monitoring Goals
The SRC, the Monitoring Team and other interested parties discussed the goals for future monitoring:

- Estimate trends and fatality rates Altamont-wide
- Measure the effect of interim management actions (high risk turbine removal and seasonal shutdown) if the recommended management actions are fully implemented.
- Inform repowering

To continue studying the trend in fatality rates, the SRC recommends that the program include:

- Expanded, improved, and fully supported bird utilization and behavior study;
- An analysis of inter-annual variation in utilization and fatality rates; and
- Double observer survey methodology (improves detection probability estimates).

To inform repowering, the SRC recommends the following studies be pursued:

- Intensive study with short search interval of an existing repowered site with turbines of comparable size to future repowered-turbine size
- Siting assessment and protocol for larger turbines
- Analysis of bird utilization and behavior data
- Post-construction monitoring of repowered turbines
- Immediate implementation of double observer surveys to determine effectiveness prior to repowering
- Burrowing owl study

Action Items & Meeting Follow-Up

Party	Due Date	Action
CCP	Done	Send scheduling poll to SRC for February/March meetings
CCP	1/19	Complete draft January meeting summary for SRC
SRC/CCP	1/24	Complete January meeting summary
CCP	1/19	Post Golden Gate Raptor Observatory data table to SRC website
Monitoring Team	Past due	Provide SRC subcommittee with revised KB data and data sheets

Table of Contents

Meeting Account

Presentation of Draft Three-Year Monitoring Report
Related Documents:
M21 2009 Draft Monitoring Report
P143 Ergas Questions Re MT 12-09 Draft Report
M46_ MT Response to Ergas Questions 1-11-10
P146 _Monitoring & SRC Policy Context

Doug Leslie of the Monitoring Team presented findings from the December 2009 revised draft monitoring report, called the draft Altamont Pass Wind Resource Area Bird Fatality Study.

Key points and initial observations include:

- The Monitoring Team did not have sufficient time to thoroughly analyze the data for this draft and plans to conduct more analyses, particularly of seasonal shutdown data, prior to the final report. The analytical write up was also constrained by time and money.
- The Monitoring Team chose to exclude non-native species from the analysis.
- Figures 3-1 and 3-2 present perhaps the most accurate picture of when fatalities occur seasonally. There is much variation among species.
- In current study data, fatalities of smaller birds spike in January, and there has been a large spike in October before winter shutdown.
- There are striking differences in results based on which analytic approaches used. Results are very sensitive to sampling approach. For example, the results for burrowing owls have a twofold difference depending on the sample used. The common string set appears to include fewer turbines with burrowing owl fatalities, resulting in smaller fatality estimates.
- The take-home message is there is a large degree of inter-annual variation in fatalities, including a large peak in fatalities in the 2006-07 bird year. This fluctuation tends to dominate the comparison between baseline and current study periods.
- Leslie displayed a table that is not in the report that shows fatality trends charted with fall migration data from Golden Gate Raptor Observatory,(used as an indicator of abundance) which showed fatalities and counts tracking in some cases, but not others.
- Tables (3-7 and 3-8) show no trends in relation to seasonal shutdown.
- There was a significantly much lower rate of fatalities at the Diablo Winds repowered turbines compared to the rest of the APWRA. Rates at Diablo Winds are very similar to those at the Buena Vista repowered site.
- Figure 3-9 – There is a relative dip in December for red-tailed hawk fatalities in the Current Study, compared with the Baseline Study which had no dip in the winter. This suggests a possible signal for a seasonal shutdown effect on red-tailed hawks in December. The same is true for golden eagles, but not for burrowing owls or American kestrels.
- The report concludes 1) no evidence of a 50% reduction in raptor mortality, 2) little to no evidence that the seasonal shutdown has contributed to a reduction in annual mortality, and 3) evidence that repowering would result in a reduction in mortality.
- The Monitoring Team feels very confident about their conclusions, although they will conduct more analysis for seasonal shutdown, and possibly high-risk turbine removal as well.

Clarifying Questions and Responses from the SRC and the Public

- In response to a question about the recently revised carcass removal curve, Leslie said five records were added for fresh carcasses found during routine monitoring. The Monitoring Team decided against using separate curves for feather piles and carcasses because there was a large overlap in confidence interval for the different curves -- there was no evidence to justify the use of the

separate curves. Jesse Schwartz of the Monitoring Team said the 48-Hour Search Interval (KB) Draft Study and the Carcass Removal Trials Memo will need to be revised.

- The Monitoring Team has operating hour data for a subset of the turbines, but has not yet had an opportunity to analyze it.
- The final report will include a large appendix with a page of data on every string.
- Shifting from a calendar year to a "bird year" (October to September) analytical unit results in excluding some of the early data (prior to October 1998).
- In response to a question, Monitoring Team members said the number of operating groups is about 36 or 37 and referenced Figure 1-2.
- Because of the different ways that the baseline and current studies were conducted, analysis is very difficult because of differences in sampling protocol and efforts.
- In response to a question, Leslie affirms that a large percentage of the fatalities are feather spots.
- In response to a question, Shawn Smallwood, who has CEC funding to digitize the Monitoring Team's bird use data from the current study, said the data should be available to the Monitoring Team 2 to 3 months from now. The data includes 35,000-40,000 records. There was a spreadsheet on the SRC website, but there were data errors and the data are being reentered. The protocols for gathering bird use data have changed over the last four years, including time period and maximum survey radius, so adjustments will be needed for comparison (e.g., the smallest time and radius might be used to compare the data).

Insights on the Report Findings and Conclusions

SRC members, the Monitoring Team and meeting participants discussed whether and how the draft report sheds light on key questions about the effectiveness of APWRA management actions to date:

Central Questions

1. Did 50% reduction in avian mortality occur?
2. Repowering effect?
3. Hazardous turbine removal effect?
4. Seasonal shutdown effect?

Did 50% Reduction in Avian Mortality Occur?

- The Monitoring Team found no detectable decrease in mortality from the baseline to the current period, and team members have to date not encountered any criticisms of the Draft Monitoring Report that they expect would change the report's conclusions.
- The Monitoring Team did look at the differences between years within the current study. There is somewhat of a downward trend in fatalities during the current study, but there is a large spike in fatalities in 2006 that might be driving that trend in the current study. There are insufficient data to determine if the trend is real.

- Emre Ergas of NextEra asked what could account for the increase in mortality from the baseline to the current study. SRC and monitoring members said they don't believe there is an increase in mortality, and believe the increase in fatality numbers might be influenced by a peak in fatalities in 2006-2007 or by the uncertainty in detection probability and environmental variability such as bird use, food availability, vegetation, weather and winds.
- Ergas asked, then, why the report shouldn't use a comparison of the first two years of the current study to the last two years to determine the reduction in mortality. SRC members said both the current study and baseline study have the same pattern of a higher mortality during the first two years relative to the following two years. A Monitoring Team member said the pattern cannot be attributed with any confidence to an effect of the management actions. Julie Yee said, in her analysis, she also compared the first two years of the current study to the last two years and found a decrease in the ballpark of 50% for burrowing owls and red-tailed hawks. She agreed that these decreases can't be attributed to the management actions.
- One Monitoring Team member said the 50% reduction in mortality is a non-biological objective. If a species population were to plummet, for example, one might find a 50% reduction in mortality resulting simply from the drastic drop in population, rather than the success of any management actions.

Hazardous Turbine Removal Effect

- One Monitoring Team member said the Team at this point had not been able to determine, from the data, whether high-risk turbine removal has been effective. It might be possible to see a signal if the last two years of data is looked at more closely. A percentage of the removed turbines were not being monitored, and data on the timing and location of removals is not very robust. SRC members said they believe that the Monitoring Team needs to conduct further analysis of the data on hazardous turbine removal.

Seasonal Shutdown Effect

- Julie Yee discussed the analysis she recently conducted based on a statistical modeling approach (see P144_SRC Comments on 2009 Draft Monitoring Report M21). Her analysis of seasonal shutdown showed an effect on red-tailed hawks for all four years. She will need to check with the Monitoring Team in regards to the data to confirm her results. She believes there is a seasonal shutdown effect if the data is looked at the right way. Shawn Smallwood said in his analysis of the data, he also detected a rather large seasonal shutdown effect in December. However, he also saw an increase in red-tailed hawks fatalities in the spring, following reactivation of all the turbines. Why this occurs is unclear, but it might be due to (1) habituation to shut-down turbines that are reactivated or (2) the shutdown sparing hawks normally killed over the winter, hence delaying their fatalities to spring (the second hypothesis would apply if red-tailed hawks are staying in the APWRA longer into the spring than earlier thought).
- The Monitoring Team has reviewed Yee's write up and will implement her approach in the final report. However, the MT believes that this approach would not change the report's conclusions, as it does not show a 50% reduction in

mortality Altamont-wide for the four focal species from the winter shutdown effect.
- A Monitoring Team member said mortality is reduced in winter, but not significantly enough to impact annual mortality and show a reduction in mortality from the baseline.
- There may be more confidence in a seasonal shutdown effect after data is analyzed from the 2009-2010 winter shutdown.
- Julie Yee is working on how to use the existing data to analyze whether there is a startup effect from winter shutdown on avian mortality.

Repowering Effect
- While repowered turbines showed much lower mortality than the APWRA in general, one SRC member said there are concerns, particularly with bats, and also golden eagles although effects on the latter species probably could be reduced with careful siting. At the Buena Vista repowered project, all golden eagles fatalities were associated with turbines on ridge saddles and notches. Page 12 of P145_Smallwood Fatality Monitoring Results 12-31-09 shows statistics on bat mortality.

Bird Abundance
The SRC and Monitoring Team were asked if the abundance data expected in three months would answer the questions about the 50% reduction and the effects of management actions. One SRC member said the Monitoring Team's table of fatalities and Golden Gate Raptor Observatory sightings was interesting as the two lines for red-tailed hawks and golden eagles appeared to correlate for some years before decoupling in the last two years of the current study, with fatalities lower than sightings. One might expect to see such a pattern if recently implemented management actions began to have a lowering effect on fatalities. However, the GGRO data are fall migration data from the Marin Headlands and thus are not necessarily applicable to abundance patterns in the APWRA, and thus it is difficult to say now if the data will provide any clear patterns or evidence. The SRC felt strongly that the abundance data should be in the final report.

SRC High-Level Feedback on Draft Monitoring Report

Related Documents
M21 2009 Draft Monitoring Report
P144_SRC Comments on 2009 Draft Monitoring Report M21
P145_Smallwood Fatality Monitoring Results 12-31-09
P147 Smallwood Summary of SRC Recommendations and Concerns
P148 Smallwood Progress of Avian Wildlife Protection Program

SRC members have each produced a comment document on the Draft Monitoring Report. Members summarized their key points of feedback.

Depth of Discussion

- While the conciseness of the report was appreciated, SRC members felt more background information, analysis and discussion were needed in the report. There needs to be sufficient discussion in the report for a layperson to understand the issues and analysis. All findings should be discussed sufficiently, as well as graphed.
- Also, methods should be described transparently and sufficiently enough so that they could be replicated elsewhere.
- Examples:
  - Discuss more extensively the management action of hazardous turbine removal (Tiers 1-3, SRC rated turbines), the removal/relocation process, and the condition of the data and a discussion of why analysis may not be able to detect an effect.
  - Discuss the rationale for using the operating group unit of analysis
  - Discuss the area's geography
  - Discuss the nature of the turbines, the different types

Include Items Agreed to at the SRC's Sept/Oct 2009 Meetings

- The report should include all of the analytical elements the Monitoring Team and SRC agreed to in the September and October meetings.
- Example: Fatalities backdated to bird year 1997 should have been removed in accordance with the filter agreed to by the Monitoring Team and SRC at the September 2009 meeting.

Additional Items Recommended

- The report needs to have a table and timeline indicating what management actions occurred and when they occurred. The timeline should be graphically superimposed on the yearly mortality model for each species. This would include removal of Tier 1-3 turbines, hazardous turbine removal, and the various seasonal shutdowns. The timeline could show fatalities accompanied by lines indicating the time period of the various treatments.
- Building on figures 3-9 and 3-10, develop figures on a per-year basis for each species, with a line showing winter shutdown, hazardous turbine removal (what percentage, tier), etc.
- The report should look at whether turbines adjacent to removed end turbines became end turbines themselves in terms of causing fatalities.
- Add biological context about the four species that would help readers interpret the results. For example, the gap in understanding about burrowing owl fatalities and behavior around turbines; and residents versus migrants, which might explain species fatality differences.
- The WRRS discussion was not sufficiently clear.
- Include a discussion of wind company practices that might limit mortality reductions, such as leaving up derelict turbines and vacant towers; turbine attrition creating gaps in rows; etc.
- Discuss how the 48-hour Search Interval (American Kestrel / Burrowing Owl or KB) Study data was processed. Also, if more birds were found than expected, this would indicate that the models used in the Smallwood 2007 paper on

adjustment factors were too slow. Show fatalities based on feather piles and feather carcasses separately. It is important to use the best methods to create precedence.

- One option to analyze data from the baseline CEC turbines would be to identify the closest search date in the current study to the baseline search dates of the CEC turbines and do a matched comparison (see P145).
- Discuss how the winter shutdown was a trade-off action design for a period of low power production.
- Incorporate the operational data in the analysis.

How to Integrate Caveats

- Discuss the inconsistent implementation of management actions
- Discuss other alternative analyses, explanations or interpretations
- Note that bird abundance analysis was in the original study plan

Tables

- For seasonal shutdown, the table should indicate the mean by a line graph, rather than a bar chart. Also, all of the years are lumped.
- Include means and standard errors.
- Include statistical tests.(or some measures of variance)
- Table 3-3: Explain why the difference in the common strings and all strings data sets results in a 25% greater mortality rate for raptors, but not for non-raptors.

Sections

- Have a separate section on limitations
- Include a glossary
- Include an executive summary
- Include a hazardous turbine removal section

Global

- It is important to use the best methods to create precedence.
- It would be great if more indirect analyses could be performed and the data examined from different perspectives
- Including line numbers in the report would make review and comment easier.
- Include non-native species in the analysis
- Identify who exactly wrote the report

Public Feedback, Comment and Questions on Draft Monitoring Report

- Emre Ergas of NextEra expressed concern about the reliability of the adjustment factors approach used, as it resulted in similar ratios
- Mike Boyd of CARE expressed concern that the results might be skewed by use of the recently provided operating data rather than data companies have provided to the CEC. P145_Smallwood Fatality Monitoring Results 12-31-09 includes a table showing a flat trend in rated capacity from CEC data, while a declining trend in the recently provided data.
- Emre Ergas said the companies vouch for the recently provided data. The data produced for the CEC is production data, not installed capacity data.

- In response to a question, Monitoring Team members said, while sensitivity to adjustment factors is high, the use of the various approaches would not impact the report's conclusions. An SRC member also said he used more conventional adjustment factors and obtained the same results regarding changes in fatality rates (P145).
- In response to a question, Monitoring Team members said the final report will include the analytical items the SRC has asked for.
- Emre Ergas said the report's language needs to be sensitive when describing the provisions of the settlement agreement.

Next Steps
Sandra Rivera of Alameda County said the next version of the report will be the final monitoring report which will, similar to an EIR, include a list of all comments with responses. There may be additional reports that look at particular areas needing additional analysis.

SRC Request to Review another Draft of Monitoring Report
The SRC requested that the bird use data expected to be available in three months and data from the 2009-2010 winter shutdown be incorporated in the final Monitoring Report. The SRC also requested that it be allowed to review and discuss an additional draft of the report before it is finalized.

SRC Annual Meeting the Settling Parties

Under the provisions of Exhibit G-1, The Avian Wildlife Protection Program and Schedule for Settling Parties, the settling parties, in consultation with the SRC, are to meet and confer at least annually to determine if mutually acceptable midcourse corrections in measures to reduce raptor mortality are appropriate after an SRC evaluation of prior year monitoring data. In addition, the exhibit calls for the SRC to prioritize adaptive management measures, to be implemented if a 50% reduction in raptor mortality is not achieved by November 2009.

SRC Responses to Settling Party Questions

Did 50% reduction in avian mortality occur from the Baseline Study period to the Current Study period?
Each SRC member said they did not see evidence that a 50% reduction in mortality occurred. A caveat is that there is not yet bird use data, which was called for as part of the original study plan. Without information on the population context, it is difficult to determine the meaning of the numbers. What do 10 deaths on the highway mean without information of the number of cars on the highway? Bird use would provide the denominator. We may not see much difference in mortality between the baseline and current study periods, but we might have more power to see the mitigation effect.

SRC Recommendation on Adaptive Management Actions to Reduce Mortality
The SRC recommended the following priorities:

1. **Repowering**
    a. Must be done with very careful siting, considering pattern, location, slope, etc., to minimize potential avian mortality.
    b. SRC supports implementing it as soon as possible.
    c. Compensatory mitigation needs to be formulated for the fatalities that prove unavoidable following repowering.

2. **Interim Management Actions until Repowering is Implemented**
    High Risk Turbine Removal
    a. The SRC would conduct a survey of previously unsurveyed portions of the APWRA to identify and rate high risk turbines. Those that are rated 9-10 by the SRC would be considered for priority removal before removing remaining 7.0 – 7.5-rated turbines from the previous survey.
    b. Turbine strings throughout the APWRA should be reassessed annually for hazardous ratings because turbine conditions and configurations change.
    c. There needs to be more data and analysis on the effect of this management action.
    d. This management action includes removing unproductive (derelict) turbines and towers without turbines.

    Seasonal Shutdown
    Four SRC members reiterated the SRC's recommendation for a 4-month shutdown; 1 member recommended a 12-month total shutdown as the only interim measure until repowering.
    a. There needs to be more analysis of seasonal shutdown effect, examining data each year by species.
    b. There needs to be analysis of whether there is a possible spike in fatalities from turbine restarting or not

3. **Recommended Research**
    Burrowing Owl Behavior Study
    The Burrowing Owl study has two parts: the behavior study is highest priority and the distribution element is second priority. Both are designed to address the high number of burrowing owl fatalities. A suggestion is to decouple the behavior study from the distribution/abundance study and resubmit the proposal to the CEC, or it could be funded by the wind companies. The study is important to understand why burrowing owls are being killed, and whether the fatalities result directly from turbines or indirectly from predators.

    Research on Adjustment Factors (also referred to as detection probability)

What does the SRC think of reducing the squirrel population as a management action?

Squirrel control in the past has had no effect on raptor mortality. Also, there are listed species dependent on ground squirrels, so it's not clear the SRC would

recommend it or the Fish and Wildlife Service would approve that as a management strategy.

What could be the potential effect of derelict/unproductive turbines -- towers without blades -- that remain at the APWRA? They could potentially serve as perches.

The SRC has reiterated several times its recommendation that they be removed. It creates a hazardous situation when raptors perch on derelict turbines that are adjacent to operating turbines. Another issue is that turbine attrition can create gaps in rows that can be hazardous to raptors.

Could you assess the science of siting repowered turbines -- do you have enough confidence?

One SRC member noted two good sources to inform re-siting: fatality rate patterns at Diablo Winds and Buena Vista, and behavior data, such as how golden eagles use the landscape. All golden eagles killed at Buena Vista were in ridge saddles or notches in ridges. Another SRC member said professional judgment could be used. There are also the two studies by Smallwood and Neher (2008) and Smallwood et al. (2009) on map based repowering. SRC members cautioned that there could be important siting differences for repowered turbines from the siting guidelines they produced for old generation turbines. One SRC member said, because the entire turbine layout would change, it might be difficult to predict when there would be sufficient confidence on re-siting.

There is also a database about where birds are killed. The behavior patterns of birds won't change. There will be mistakes in siting, but the information going into siting will be much different than 25 years ago.
There will be mortality with eagles and bats. One would have to accept that if mortality is decreased by 85 to 90%, that is a victory. Then you use compensatory mitigation or compensatory habitat for the remaining mortality.

Is there any consensus on a searcher/scavenger rate?

There is limited consensus. We have available only a very poor toolkit. A more accurate adjustment factor would likely need to incorporate changes on an annual and seasonal basis, reflecting changes in scavenger abundance and foraging behaviors.

From a scientific point of view, what would be the best timing for repowering -- is a phased implementation preferred?

Repowering should proceed as fast as possible, with a caveat to pay attention to siting.

Is the 50% metric appropriate? If we do repowering, what would the appropriate metric be? If the goal is to maximize productivity while minimizing mortality, how do we measure progress if not through a 50% metric?

SRC members reconfirmed that they do not think the 50% metric was appropriate as written in the settlement agreement, as it was an artificial target and did not account for cyclicity of populations and migrations. One SRC member would want to know

from the regulatory agencies what is okay, while another one suggested that "appropriate" might be to demonstrate a continual reduction in mortality.

One SRC member said a metric might be: can it be shown that mitigation actions are significantly reducing mortality, showing statistical declines, even for one species. This SRC member preferred not to require a decline in mortality for all four species. It is important to provide targeted questions: did a particular process show something? We have been concerned with all four species -- it is possible that burrowing owls are masking the success of reductions in mortality for other species.

With interannual variation, a trend analysis would be very dependent on the assumptions, and there is a risk that there will be untenable assumptions.

SRC members said it would be helpful to know what the goals are for the interim period in order to develop recommendations on interim management actions.

What do SRC members think about background mortality? Jim Hopper's turbines were shut down for a year, and locked down -- that can give you information on background mortality. Does shutdown data show background mortality?

SRC members said adverse impacts can be caused by turbine/tower presence, even while they are shut down, due, for example, to raptors using the towers as hunting perches. It was for this reason that the SRC had recommended a study on background mortality, utilizing ridgelines without wind turbines.

Can we set up for repowering and appropriate monitoring program, to make sure it is done in a way that is most protective of birds while maximizing energy? I'm concerned we not go down the same path of a monitoring program that doesn't give us the information we need. We would prefer putting monitoring into repowering, rather than existing operations we want to get rid of.

One SRC member said if repowering was moving forward, continued APWRA-wide mortality monitoring of old-generation turbines may not reveal any useful information either in the short or long term. The data would likely not be applicable to new generation turbines. So if the decision is made to move ahead now with repowering, continuing monitoring of the old generation turbines for purposes of collecting mortality data may be unnecessary unless there is a desire to monitor mortality trends during the transition from old generation to new generation turbines. However, this SRC member agreed with some other SRC members that if management measures are implemented (e.g., shutdown, turbine removal, etc.) then it is important to monitor the effectiveness of those measures.

One SRC member said it might be more important to look for additional hazardous turbines to remove as an interim management measure, but to forgo monitoring of the effects of the removals, as it is understood that, biologically, the removals should have a positive effect on mortality trends.

Must all five SRC members go out in the field to rate additional hazardous turbines?

SRC members generally agreed it would be more defensible to use the same procedure of all five SRC members going out into the field. However, at least one SRC member felt that two SRC members could successfully accomplish the task. Also, there is the concern that there is no fatality data for the additional turbines, as they were not monitored. Another option would be for all five to go out the first day, and after that only 2 members (less than a quorum) would go out, or the group would split into two groups of less than a quorum each. SRC members could live with a field group of only 2 members if that's what the County and the settling parties decide they prefer.

The Monitoring Team estimated the rating fieldwork would take about four days.

SRC Discussion: Goals & Objectives for Future Monitoring

Sandra Rivera of Alameda County said the settling parties are in discussions and repowering is the primary focus. Given limited resources, what does the SRC see as the benefit in monitoring old generation turbines if there is no benefit to repowering? What monitoring would be helpful that would speak to repowering?

Participants identified two types of monitoring: 1. Studies or effectiveness monitoring designed to evaluate the effectiveness of management actions or other scientific questions; 2. Compliance monitoring to determine if management actions are being implemented.

Future Monitoring Goals

The SRC, the monitoring team and other interested parties identified the following goals for future monitoring:

- Estimate fatality rates and trends for monitored turbines and Altamont-wide
- Consider the effect of interim measures (High risk turbine removal and seasonal shutdown)
- Inform repowering

SRC members also discussed the important goal of estimating trends in bird utilization.

SRC members said that if repowering will not happen right away, and interim management actions are to continue, it is important to monitor the results of the actions. It may not be possible to show an effect for a specific management action, but it may be possible to show the effect on APWRA-wide mortality. In addition, it is important to continue monitoring for fatalities in order to determine if mortality is continuing to be reduced.

Jesse Schwartz of the Monitoring Team said the original power analysis for monitoring was based on baseline data. Now, with all of the current study data, a new power analysis might show that a smaller sample size is possible. Right now, there is an over representation of

certain operating groups in the sample. Jesse Schwartz and Julie Yee could conduct a power analysis with the new data. The experimental QAQC study could resolve the adjustment factors issue, and there are efficiencies the Monitoring Team could enact now to improve data processing.

SRC members supported the idea, but said it would be important not to change monitoring until that question is answered.

SRC members were asked, if existing resources were reduced substantially, how monitoring of interim measures could be modified. One SRC member said monitoring of interim measures could not be reduced in any way because the ability to detect an effect is already marginal at best. Improved monitoring, rather than less monitoring, is needed.

SRC members said it was important to ascertain that removing a hazardous turbine does not increase mortality at the next turbine.

SRC Recommendation on Goals for Future Monitoring

To continue studying the existing trend in fatality rates, the SRC recommends enhanced bird utilization and behavior monitoring to inform repowering; more focus on inter-annual variation; and double observer surveys for fatalities (which improves detection probability estimates) as part of the program.

To inform repowering, the SRC recommends the following studies be pursued:

- Intensive study with short search interval of an existing repowered site with turbines of comparable size to future repowered-turbine size, to gather information on background mortality, fatalities (species identified) and behavior (flight height and type)
- Siting studies
- Monitoring and analysis of bird utilization and behavior data
- Post-construction monitoring
- Double observer surveys (previously referred to as QAQC study)
  - These surveys entail a second survey team conducting searches on different search dates
  - They are used by the Fish and Wildlife Service
  - The surveys provide information on detection probability, as an alternative to the currently used adjustment factors of searcher detection and scavenger removal
- Burrowing owl study as previously recommended by the SRC
- Studies to establish a nexus between wind turbine-caused impacts and levels of compensatory mitigation

Next Steps

- Alameda County and wind companies to confer on hazardous turbine ranking, as field work will need to happen quickly in time for removals to occur this year.
- Alameda County will communicate with the Monitoring Team and Julie Yee if a power analysis is to be a priority action.

Meeting Summary Approval

Related Documents:
P139_SRC Meeting Summary October 2009
P142 SRC Call Notes 12-3-09

SRC members approved the two meeting summaries with no changes.

General Public Comment Period

Bob Power of Santa Clara Valley Audubon said that any proposal for monitoring should be examined through the filter of "How does this help us with repowering?"

Documents Circulated at Meeting

M21 2009 Draft Monitoring Report
P143 Ergas Questions Re MT 12-09 Draft Report
M46_ MT Response to Ergas Questions 1-11-10
P144_SRC Comments on 2009 Draft Monitoring Report M21
P145_Smallwood Fatality Monitoring Results 12-31-09
P146_Monitoring & SRC Policy Context
P139_SRC Meeting Summary October 2009
P142 SRC Call Notes 12-3-09
P147 Smallwood Summary of SRC Recommendations and Concerns
P148 Smallwood Progress of Avian Wildlife Protection Program
P100_SRC Document List with Reference Numbers

SRC Meeting Participants

SRC Members Days 1 & 2
Joanna Burger
Jim Estep
Sue Orloff
Shawn Smallwood
Julie Yee

Staff
Gina Bartlett, Facilitator, Days 1-2
Sandi Rivera, Alameda County, Days 1-2
Andrea Weddle, Alameda County, Days 1-2
Ariel Ambruster, Facilitator Assistant, Days 1-2

Monitoring Team
Doug Leslie, ICF International (formerly ICF Jones & Stokes), Days 1-2
Jesse Schwartz, ICF International (formerly ICF Jones & Stokes), Days 1-2
Brian Karas, BRC, Days 1-2

Others
(Meeting Sign-in is optional)
Ken Alex, California Atty. Gen.'s office, Day 1
Bill Barnes, SeaWest Power Resources, Days 1-2
Doug Bell, East Bay Regional Park District, Day 1
Michael Boyd, CARE, Days 1-2
Dan Crum, U.S. Fish and Wildlife, Day 1
Renee Culver, NextEra, Days 1-2
Kris Davis, Drinker Biddle, Day 1
Chris Dreiman, enXco, Days 1-2
Emre Ergas, NextEra, Days 1-2
Jon Harvey, Alameda County EBZA, Days 1-2
Jim Hopper, AES SeaWest, Days 1-2
Keith Jenkins, NextEra, Day 2
Nanette Leuschel, Ralph Properties II, Day 1
Bill Mason, EnXco, Days 1-2
Ryan McGraw, AWI, Days 1-2
Steve Mullin, AWI, Days 1-2
Bob Power, Santa Clara Valley Audubon Society, Days 1-2
Joan Stewart, NextEra, Days 1-2
Zack Walton, Paul Hastings & NextEra, Days 1-2
Mark Welther, Golden Gate Audubon, Days 1-2
Bill Yeates, Kenyon Yeates & Golden Gate Audubon, LLP, Days 1-2

List of SRC Agreements Developed January 13 & 14

(Compiled from this document)

SRC recommendation on priority adaptive management actions to reduce mortality
The SRC recommended the following priorities:

4. **Repowering**
    a. Must be done with very careful siting, considering pattern, location, slope, etc., so repowered turbines do not cause golden eagle fatalities.
    b. SRC supports implementing it as soon as possible.
5. **Interim management actions until repowering is implemented:**
    e. **High Risk Turbine Removal**
        i. The SRC would evaluate and rate currently unrated turbines 9 or 10 to be removed. These would be removed rather than those turbines already rated 7.0-7.5 that have not been removed.
        ii. Turbines should be reassessed annually because conditions change.
        iii. There needs to me more data and analysis on the effect of this management action.
        iv. This management action includes removing unproductive (derelict) turbines and towers without turbines.
    f. **Seasonal Shutdown.** Four SRC members reiterated the SRC's recommendation for a 4-month shutdown; 1 member recommended a 12-month shutdown.
        v. There needs to be more analysis of seasonal shutdown effect.
        vi. There needs to be analysis of whether there is a possible spike in fatalities from turbine restarting or not
6. **Recommended Research:**
    a. **Burrowing Owl Behavior Study:** The Burrowing Owl study has two parts: the behavior study is highest priority and the distribution element is second priority. Both are designed to address the high number of burrowing owl fatalities. The behavior study should be decoupled from the distribution/abundance study and the proposal resubmitted to the CEC. The study is important to understand why burrowing owls are being killed, and whether the fatalities result directly from turbines or indirectly from predators.
    b. **Research on Adjustment Factors** (also referred to as detection probability)

SRC Recommendation on Goals for Future Monitoring

To continue studying the existing trend in fatality rates, the SRC recommends improved surveys for bird utilization and behavior; attention to inter-annual variation; and double observer surveys (improves detection probability estimates) as part of the program.

To inform repowering, the SRC recommends the following studies be pursued:

- Intensive study with short search interval of an existing repowered site with turbines of comparable size to future repowered-turbine size, to gather information on background mortality, fatalities (species identified) and behavior (flight height and type)
- Siting studies
- Analysis of bird utilization and behavior data
- Post-construction monitoring
- Double observer surveys (previously referred to as QAQC study)
  - These surveys entail a second survey team conducting searches on different search dates
  - They are used by the Fish and Wildlife Service
  - The surveys provide information on detection probability, as an alternative to the currently used adjustment factors of searcher detection and scavenger removal
- Burrowing owl study
- Studies to establish a nexus between wind turbine-caused impacts and levels of compensatory mitigation