

Meeting Summary | February 12-14, 2008

Altamont Scientific Review Committee

Developed by the Center for Collaborative Policy

Reviewed and Final Approval by SRC on 4/23/2008

Key Outcomes

Monitoring Team Draft Report on Altamont Pass Bird Fatality Study, Oct. 05-Sept. 07

The Altamont Pass Wind Resource Area (APWRA) Monitoring Team presented its latest analysis of two years of Altamont raptor mortality data to the Scientific Review Committee (SRC) and the public at the SRC meeting and a technical workshop on Feb. 12. Interested parties had an opportunity to ask questions on the results and on the monitoring program in general. The latest draft of the report is available on the web at www.altamontsrc.org.

The SRC and Monitoring Team members agreed to a communication plan to develop the next phase of the report, which emphasizes transparency and the separate roles of the two bodies. SRC members decided that Monitoring Team members can discuss data with SRC member Shawn Smallwood, who conducted the 2004 Altamont avian mortality study that formed the baseline used in the Settlement Agreement. The Monitoring Team will log its calls and other discussion points, draft brief memos, and periodically brief the SRC in a public conference call on its progress. The first SRC briefing is scheduled March 11 at noon (California time) to consider statistical issues.

Measuring 50% Reduction in Mortality of Focal Raptor Species

SRC members agreed that **bird use data** should be integrated into the mortality analysis to the extent possible so estimates account for raptor population fluctuations that might influence fatality statistics. To work toward this goal, they agreed that all possible bird abundance and use data for the four focal species should be gathered for evaluation and possible integration. The SRC reiterated its recommendation for acquiring power generation or turbine operating hours data to similarly account for fluctuations in turbine operation.

To compare current mortality with baseline mortality, the SRC supported creating a shared public database containing data from Monitoring Team (2008) and Smallwood and Thelander (2004) studies.

The SRC agreed that there will be four analyses in the baseline comparison:

- One analysis would use all data from 2004 and 2008 extrapolated to the entire APWRA.
- A second analysis would consider only turbines searched in both the 2004 and 2008 studies, which represent about 20% of Altamont turbines.
- Each of these analyses would be developed twice, once using 2004 assumptions and once using 2008 assumptions, to ensure matched comparisons since the baseline established by the settling parties is based on the 2004 study.

Burrowing Owl Behavior Study

In light of the Monitoring Team's data showing unexpectedly high annual mortality estimates and winter shutdown fatalities for burrowing owls, the SRC strongly reiterated its recommendation for a **focused burrowing owl behavior study** to gather information on factors that may be causing the fatalities. It also recommended research into the influence of feather piles, which are commonly the only remains found of burrowing owl fatalities, on the adjustment of mortality due to scavenger removal.

Existing American Kestrel and Burrowing Owl Study

To gather information for potentially refining scavenger removal rates (a factor in equations of avian mortality analyses), the SRC agreed that the Monitoring Team will continue tracking feather spots found in the second month of the American Kestrel Burrowing Owl Study this spring, visiting sites once per week until those feather spots have been followed over one search interval (approximately 37 days). These searches can continue through the end of May.

Hazardous Turbine Ranking

The SRC reiterated its previous recommendation that turbines assigned ratings 8-10 on a hazard scale of 1-10 be removed as one measure toward achieving the 50% reduction in raptor mortality required by the Settlement Agreement. Since the winter shutdown was shorter than three months, the SRC additional recommendation to remove turbines assigned ratings 7 and 7.5 is in effect. (See P68_Turbine List for SRC Selection of Dangerous Wind Turbines 12/21/07 and P69_SRC Hazardous Rating Scale 2/1/08).

Action Items & Meeting Follow-Up

Party	Due Date	Action
B. Karas	done	Update/finalize turbine list (P68), corrections to overlapping #s, heading for monitored/non-monitored
Karas/Bartlett	done	List up-to-date & on web, monitor versus non-monitored
MT	2/14	Distribute bird classification table
B. Karas		Provide photo on vertical gap in wind wall (Patterson Pass, e.g.) for P70
J. Estep	done	Gather Audubon census & PBRG burrowing owl data
MT		Provide abundance data collected by monitoring team
J. Estep	Done	Gather GGRO – Allen Fish migratory bird data
S. Smallwood	Done	Provide Central Valley bird data
Facilitator	Done	Update approved Meeting Notes/Summary
MT	5/9	Monitoring Report due
SRC	done	Prepare questions for statistics conference call
MT	done	Circulate materials for statistics conference call
SRC		Decide on date for annual APWRA visit
SRC	4/2008	Decide on possible April/May meeting, dates of August, October meetings
SRC	3/5	E-mail proposed 2008 scopes of work.

Party	Due Date	Action
SRC	May	Design behavioral study for burrowing owls to improve understanding of high mortality estimates
S. Smallwood		Revise P70 Relocation Guidelines based on input received at meeting
SRC		Define season
S. Smallwood		Provide text of Journal of Wildlife Management article for posting
MT		Pursue establishment of a SQL server site to host the shared public database
Rivera	2/28/08	Post Compliance Reporting Document

Meeting Account

Updates and Announcements

Sandra Rivera of Alameda County gave an update on the status of mediation between the settling parties. She said there have been two mediation meetings, the latest last Friday (February 8, 2008). The parties have not reached a formal agreement, but are discussing a number of items. At the time of the meeting, the parties had not set the next meeting date.

In addition, Rivera reported that industry is removing turbines categorized by the SRC in its recent hazardous turbine ranking as 10 or 9.5, in lieu of Tier 3 turbines. The turbines must be removed by March 31, when the wind season begins. The Settlement Agreement had called for 152 turbines being removed by October 2008. Rivera said industry has committed to removing this number of turbines in an accelerated fashion by March 31. Answering queries from the SRC, Rivera confirmed that replacing the Tier 3 turbine removal requirement with turbines the SRC rated 9.5 and 10 was not an SRC recommendation. She also explained that the replacement of the Tier 3 turbines with other turbines was the Planning Director's decision, and this decision was not linked to the settlement agreement's deadline on granting the companies credit against removing Tier 3 turbines.

Monitoring Report Presentation & Discussion

Monitoring Team members Ed West, Brian Karas and Brian Latta presented "Bird Fatality Study at Altamont Pass, Oct. 05-Sept. 07, Draft Report, 2/11/08 Revision," (M21), which provides analysis of avian fatality data from the monitoring program. The report presents a comparison of average annual mortality rates and an APWRA-wide fatality estimate for all species and the four focal raptor species, and provides an analysis of inter-annual and seasonal variations. The report and PowerPoint slides (M22_ Altamont Pass 2005-2007 Bird Fatality Study Presentation Slides, 2/12/08) will be available on the SRC website.

Ed West said the report is a work in progress. The Monitoring Team aims to be fully objective and welcomes comments. Monitoring Team members think their mortality estimates for American kestrel and burrowing owl are too high. The

Monitoring Team is further examining this issue and has begun to overlay bird use or abundance data to grapple with the number of fatalities.

Based on the monitoring results, the annual adjusted fatalities for the four focal species, adjusted by scavenger removal rate and estimated searcher efficiency, are:

Table 5. Comparison of 2005-2007 APWRA Target Raptor Fatalities to Baseline Values

Species	Baseline	2005-2007 Unadjusted	2005-07 Annual Adjusted	Lower Confidence Interval (95%)	Upper Confidence Interval (95%)	% Change
Red-tailed Hawk	300	229	327	257	398	109%
Golden Eagle	117	49	57	32	81	49%
American Kestrel	333	56	442	171	713	133%
Burrowing Owl	380	150	1258	902	1613	331%
Combined	1130	484	2084	1362	2805	184%

Among the issues noted:

- The “2005-2007 Unadjusted” column represents the number of fatalities counted over the two years, and “2005-07 Annual Adjusted” represents the estimated number of annual fatalities after adjusting for scavenger removal and searcher efficiency.
- Golden eagle and red-tailed hawk fatalities decreased during winter shutdown.
- Second-year mortalities greatly exceeded first-year mortalities. That annual variation can be significant.
- One working hypothesis is that an increase in bird population has led to the observed increase in fatalities. There seems to be a reasonable correlation between red-tailed hawk fatalities and bird use numbers, the clearest pattern among the four species. An MT statistician will help the team take a closer look at this question through a multivariate analysis.
- The burrowing owl numbers are biologically anomalous and given the population of burrowing owls occupying the APWRA, probably a significant overestimate of annual mortality. Bird behavior will be important to understand this anomaly. When there is a shutdown, the burrowing owls may behave in a manner that results in relatively high mortality, or other raptors may hunt burrowing owls from non-operational turbines used as perches.
- The highest red-tailed hawk mortality over the October-December period is October. If the winter shutdown was moved to include October, a decrease in red-tailed hawk mortality might be observed. However, the SRC pointed out that significant loss of wind power generation would also result.
- The different species are responding to the mitigation differently. It's going to be difficult to have a one-size-fits-all mitigation.

- Data on turbine operating hours would be helpful in developing the analysis, and the SRC again recommended these data be provided.

SRC and Public Comments and Discussion

Meeting attendees received (P77) FPLE's review of the monitoring team's report

Joan Stewart of FPLE said FPLE and enXco have operating hours data ready and is pending finalization of the confidentiality agreement with the Alameda County Counsel's Office. One SRC member said it will be important to look not just at abundance and fatalities, but also when the turbines are operating.

In response to a question about whether there is a possibility the monitoring is including fatalities from beyond the two-year monitoring period in the monitoring data and analysis, MT members said carcasses are dated and assigned to the appropriate time period. Surveyors can tell if fatalities are fresh. Those that aren't fresh are backdated to estimated time of death. If the time of death is estimated to be beyond 90 days, the fatality is not included in mortality estimates. WRRS fatalities included were only those within the two-year period, in association with monitored turbines.

Bill Damon said he wasn't able to arrive at the same mortality figures when he did the math, and was not completely comfortable with that transition from two-year to annual data. He asked the MT to walk through a sample calculation, and the SRC agreed that a calculation would be useful. During the course of the meeting, the MT agreed to provide sample calculations in the report so the reader can understand how the MT calculated estimates.

A property owner said there has been a marked increase in the ground squirrel population on the Altamont Pass and asked if the MT has seen an increase in raptor food availability. Thousands of acres that the birds used to fly over have been lost to development, so the birds are in a more confined area. Maybe they are found dead because there is not enough food. Also, could climate records be used to extrapolate on the amount of food? MT members responded they would hope that bird use data would reflect increased bird presence in the Altamont. However, there is no data collection on the number of squirrels. It will be important to address population variables with the annual fatality statistics.

Emre Ergas of FPLE asked if the analysis uses the same scavenger removal rate for WRRS fatalities (found incidentally by wind company employees during regular operations) as that used for monitoring program-found fatalities. He thought that the scavenger rate should be lower for WRRS data. MT members said they assign a rate to all fatalities found within a particular period. Ergas said it seems like that could be double counting. MT members said the number of WRRS fatalities is fairly small.

Smallwood Mortality Analysis

- SRC member Shawn Smallwood described his comparison of mortality estimates between the 1998-2003 (Smallwood and Thelander 2004) and 2005-2007 studies (P76_Smallwood: Comparison of Mortality Estimates in the APWRA 2/7/2008). He said his main purpose was to perform a check on how robust the new estimates are. To do one comparison, he looked only at turbines that both studies monitored. There was no difference in the mortality estimates; he saw no reduction in mortality, and no increase. Another comparison was during and after the Vestas 100-KW turbines were shutdown over a 9-month period (these turbines were shut down for a year, but Smallwood selected the last 9 months for analysis). He found substantial increases in mortality after turbines were restarted, but mortality of burrowing owl, nocturnal owls, and songbirds were still relatively high during the shutdown. Burrowing owl mortality during shutdown was about 0.4 per megawatt capacity per year, and roughly 1.5 when the turbines were on. Smallwood's hypothesis is that red-tailed hawks are using the non-operating turbines as perches, and the burrowing owls don't see them. An additional burrowing owl study is needed.
- Inter-annual variation is high, so multiple years of data are necessary or otherwise the results can be very misleading.
- He also estimated mortality at the Diablo Winds repowered project. It appears that avian mortality is much lower, but an emerging issue could be bat mortality, which was much higher than previously estimated in the APWRA.

Public Comments and Questions

Ergas asked under what scope Smallwood's analysis was done, whether other SRC members asked that the work be done, and how long it took. Smallwood said it was done as part of his job on the SRC and as part of a subcommittee, appointed by the SRC. The board wants good science out of this committee, and this activity is part of performing that job. Smallwood said he spent a couple weeks conducting the analysis. (He later noted that hours were not billed for work done on tasks not directly related to comparing the baseline and new mortality estimates.)

Another questioner asked about having surveys done at a control area without turbines. Smallwood said he felt that would be a great idea; however, the challenge would be finding a comparable area without turbines.

Technical Public Workshop

Notes from the workshop are in a separate document, P79_ February 2008 Technical Public Workshop Meeting Highlights.

SRC Insights from Monitoring Report Presentation

SRC members discussed insights from the monitoring report presentation. SRC members made the following points during discussion:

- The results show that the species are very different and performing differently under different management strategies. The different species will likely require different management strategies to reduce individual species' fatalities.

- Comparison to baseline is problematic – the analysis needs operating time data. Further, the baseline needs refinement.
- There is so much yearly variability in the data that it dwarfs measurement of the effectiveness of potential mitigation measures.
- Presenting the estimates as 3-month moving averages is useful.
- In response to the MT's point about the timing of winter shutdown, it's important to note that the recommended winter shutdown period resulted from trying to achieve a balance between minimizing loss of power generation and reducing mortality – it uses the lowest wind power production season.
- According to the results, burrowing owl mortality is very high. However, while mortality is likely high for this species, when assessed relative to the burrowing owl population occupying the APWRA and throughout the region, it appears that the results may be significantly over-estimating burrowing owl mortality. The cause for this likely overestimate is unclear. Some portion of the apparently high mortality of burrowing owls may be the result of artifact or bias, or the result of one or more other causal factors than wind turbine collisions. A behavior study is needed.

Feedback to the Monitoring Team

- The SRC requested the MT provide the following analyses in graphs:
 - Data by species and by month.
 - Separate fatalities by operational and non-operational turbine status, and look at fatalities at non-operating turbines when they are operating as well.
 - A separate graph of fatalities overlapped with bird use data for each species.
 - Fatalities by the time when turbines are operational.
 - Provide number of individual birds seen during observations, or relative abundance in point counts.
- Look at randomness of sample, in terms of small, medium and large turbines, as large and small turbines were not selected randomly, and mortality estimates related to these turbines may need to be estimated separately.
- Acknowledge limitations in the report.
- Report timing:
 - Avoid holding a workshop on the first day
 - Materials should be submitted 3 days in advance
 - Delivery to the SRC was too late (it was delivered 30 minutes after the workshop began.)

Public Comments and Questions

Renee Culver of FPLE said it is really important to make the data analysis process used in the report transparent to readers.

Ergas asked if there is going to be further consideration of the actual benefits and net effect of winter shutdown on overall mortality. MT members said integrating bird use will be important, which might allow different years to be compared and the

potential causes of mortality to be identified. SRC members said it is a good question, and the answer isn't clear yet.

Monitoring Team on Next Steps for the Report

The Monitoring Team said it now intends to fine tune the analysis; revise information to provide adjusted mortality per year, rather than two-year unadjusted data; conduct a regression analysis to explore the relationship between mortality and bird use; conduct a behavior analysis of birds near non-operating turbines; and be responsive to comments from the SRC and the public.

In discussion, the SRC and the MT agreed that the revised report will include an explanation of formulas that shows how estimates are calculated and how two years of data are used to calculate annual estimates. In addition, the report will acknowledge limits and caveats.

SRC members Jim Estep, Sue Orloff and Shawn Smallwood and audience members provided targeted editing and content comments on the report.

SRC Agreement on Communication with Monitoring Team

The SRC and Monitoring Team members agreed to a communication plan to develop the next draft of the report, which emphasizes transparency as well as the separate roles of the two bodies. SRC members decided that Monitoring Team members can discuss data with SRC member Shawn Smallwood, who conducted the 2004 Altamont avian mortality study that formed the baseline. The Monitoring Team will log its calls and other discussion points, draft brief memos to the SRC describing their activities, and periodically brief the SRC in a public conference call on its progress, questions and statistical issues. The first SRC briefing will be scheduled for mid-March to consider statistical issues. In addition, citations will be given for assumptions. The documents can be linked from the SRC website.

Monitoring Data & Analyses

Burrowing Owl Behavior Study

In light of the Monitoring Team's data showing unexpectedly high annual mortality estimates and winter shutdown fatalities for burrowing owls, the SRC strongly reiterated its recommendation for a focused burrowing owl behavior study to gather information on factors that may be causing the fatalities. In its 2008 work plan, detailed below, the SRC outlined steps to develop a recommendation for the Board of Supervisors. The SRC felt it was important to develop research objectives and methodology to prepare a funding proposal in a timely fashion, in advance of Board of Supervisors consideration of the next budget.

Bird Abundance Data

SRC members discussed the importance of gathering as much bird abundance information as possible and identified several tasks to do so. Members will gather bird abundance data from a variety of sources, including studies and annual surveys

of local and statewide trends in raptor abundance. The additional data may help the monitors and the committee better understand bird use.

SRC Agreement on Importance of Bird Use and Power Data

SRC members agreed that bird use data should be integrated into the mortality analysis to the extent possible so the estimates account for raptor population fluctuations that might influence fatality statistics. To work toward this goal, they agreed that all possible bird abundance and use data for the four focal species should be gathered for evaluation and possible integration. The information will be carefully reviewed and any use of these data will first be discussed. The SRC also reiterated its recommendation for acquiring power generation or turbine operating hours data to similarly account for fluctuations in turbine operation.

SRC Agreement to Create Shared Public Database

The SRC and MT thought creating a central shared database system would be beneficial. The data could be placed on the SRC website for interested parties to use. While database management and processing data will be time-consuming, MT members said it should save time in the long run.

The SRC agreed that the MT should create a shared public database to provide access to the following data:

- 1998-2003 CEC NREL Fatality Data (Used to Develop the 2004 CEC Report)
- 2005-2007 MT Fatality Data (Used to Develop the 2008 Monitoring Report)
- Bird Use Data
- Turbine Operation Data

SRC Agreement on Unit of Analysis

For the monitoring report, the SRC agreed the minimum unit of analysis for comparison will be string per season (adjusted for number of turbines). The SRC and MT will arrive on an agreement for the definition of a season. Both the seasonal and annual rates will be presented.

SRC Agreement on Bird Size Classification Protocol

Another issue in making data from the multiple studies comparable is the definition of bird sizes. Sue Orloff used a different definition than the other two studies in her research (Orloff and Flannery 1992, 1996). The SRC agreed on using the following bird size definitions for the analyses:

- **Small:** Hummingbird to mourning dove
(This size includes kestrel & burrowing owl)
- **Medium:** Pigeon to raven
- **Large:** Red-tailed hawk to golden eagle

Refining Scavenger Removal Rate

The SRC also discussed the current scavenger removal rate, which is an important adjustment factor of mortality estimates, and which had drawn questions and concerns from the audience. While the rate for golden eagles seems satisfactory, the

rate for small birds needs improvement. SRC members supported Monitoring Team efforts to refine the rate. Ed West suggested conducting a sensitivity analysis to examine the bias of the coefficients being used. Shawn Smallwood said he looked at increments of .05 in scavenger removal rates and found significant effects.

Public Comments and Questions

Ergas asked, if some studies had been done with frozen birds, how the same scavenger removal rate would be used when it may not really apply. He questioned if the rate could be wrong and burrowing owls may not be a problem. SRC members agreed, but said it will be necessary to fund research to determine the correct scavenger removal rate for this species. Monitoring Team and SRC members said the scavenger removal rate is based on a compilation of research from across the country, and is not based on a single study. Also, in terms of comparing mortality to baseline, as long as the same source of removal rate estimates is applied to both sets of data, it shouldn't be too problematic.

SRC Agreement on Scavenger Removal Rate Adjustment Factor

The SRC agreed:

- The adjustment factor for Golden Eagle will be ≈ 1 , which corresponds to nearly zero scavenger removal.
- To gather information for potentially refining scavenger removal rates, the Monitoring Team will continue tracking feather spots found in the second month of the American Kestrel Burrowing Owl Study this spring, visiting sites once per week until those feather spots have been followed over one search interval (approximately 37 days). These searches can continue through the end of May.
- After the study, the MT will analyze whether the study substantiates a need for a change in the scavenger removal rate and return to the SRC with a recommendation.

Follow-Up Required for Monitoring and Analysis

- Jim Estep to gather Audubon census and PBRG burrowing owl data
- MT to provide abundance data collected by monitoring team
- Jim Estep to collect GGRO, Allen Fish migratory bird data
- Shawn Smallwood to provide Central Valley bird data
- Data collection should focus on the 4 species
- MT to find a proper site to host the public database
- MT to consider statistician Jesse Schwartz' idea of assigning a search interval to a specific find rather than a survey period, which would increase the power of the analysis.
- The SRC and the MT will hold a March 11 conference call to discuss statistics; the SRC will prepare questions by February 25; the MT will circulate materials by its March 7.

Baseline

Monitoring Team members sought direction on how to compare the 2008 Monitoring Report estimates to the baseline established in the settlement agreement, which is based on the 1998-2003 mortality study (Smallwood and Thelander, “Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area,” published by the California Energy Commission in 2004, R2 on the SRC website).

SRC and Monitoring Team Roles in Baseline

Sandra Rivera provided the following clarification in regards to baseline:

- The settlement agreement sets the baseline for the MT
- The SRC can debate the issue of baseline
- The SRC can make recommendations on baseline changes for the County and Settling Parties to consider in negotiations

Conducting Analyses to Improve Baseline Comparison

There was extensive discussion on ways to make sure that data from the two studies (the 2004 CEC Report and 2008 Monitoring Report) are comparable. SRC and MT members agreed to analyze data using both sets of assumptions: an analysis with the 2004 assumptions and an analysis with the 2008 assumptions. They also agreed that the analyses would use two versions of the data sets. The first will use all 2004 and 2008 samples extrapolated to provide an APWRA-wide estimate (2004 & 2008 Sample Turbines). The second will concentrate on the turbines surveyed by both studies, an 82-megawatt-capacity sample that represents about 20 percent of Altamont turbines (2004 & 2008 Sample Overlap Turbines). This second analysis will not be extrapolated to the entire Altamont, but will be used as an indicator of change in mortality. The purpose of analyzing the overlap turbines is to examine the potential lack of comparability between the 2004 and 2008 samples due to the fact that the majority of the 2004 sample was drawn from a geographically restricted portion of the APWRA.

The goal is to illustrate and understand baseline issues and limitations. This could build evidence for a more accurate baseline. The MT and SRC will provide citations for the assumptions in a transparent way to the settling parties and others.

In summary, to improve understanding of the baseline and, ultimately, to better project a change in mortality at Altamont Pass, the SRC recommends that these analyses move forward (numbering is for clarity, not the order in which the analyses should be conducted):

1. Use 2008 Assumptions on 2004 & 2008 Sample Turbines, extrapolated to the entire Altamont
2. Use 2008 Assumptions on 2004 & 2008 Sample Overlap Turbines for comparison purposes
3. Use 2004 Assumptions on 2004 & 2008 Sample Overlap Turbines for comparison purposes

4. Use 2004 Assumptions on 2004 & 2008 Sample Turbines, extrapolated to the entire Altamont. The comparison to 2004 turbines using 2004 assumptions and extrapolated to the entire Altamont is as requested by the County.

SRC Agreement on Analyses to Compare Current Mortality to Baseline

The SRC agreed that there will be four analyses in the baseline comparison:

- One analysis would use all data from 2004 and 2008 extrapolated to the entire APWRA.
- A second analysis would consider only turbines searched both in the 2004 and 2008 studies, which represent about 20% of Altamont turbines.
- Each of these analyses would be developed twice, once using 2004 assumptions and once using 2008 assumptions, to ensure matched comparisons since the baseline established by the settling parties is based on the 2004 study. The comparison to 2004 turbines using 2004 assumptions and extrapolated to the entire Altamont is as directed by the County.

SRC Method to Measure 50% Reduction

Background: The SRC has been discussing several ways to measure the 50% reduction in raptor mortality called for in the Settlement Agreement (See [P48 SRC Meeting Notes 8/17/07](#), [P71 SRC Meeting Summary 11-12 December 2007](#)). SRC members agreed that the 50% reduction in comparison to the Smallwood and Thelander study figures should be from the beginning to the end of the three-year program that runs from November 2006 to November 2009, but expressed different perspectives on what to measure when measuring the three-year program. Some SRC members saw merit in looking at the last year of the three-year period, while at least one other preferred looking at the three-year period as a program. In December, the SRC agreed to look at all three spans, a three-year period, a two-year period, and a one-year period.

SRC Agreement on Measuring 50% Reduction in Mortality of Focal Raptor Species

After a short discussion, SRC members agreed that they have an interest in looking at multiple analyses. They agreed to look at three spans:

- 1-year span for each year
- 2-year span for Year 2 & 3
- 3-year span

They agreed to consider inter-annual variation and the trend over the three years.

Monitoring Team Questions and Discussion

The SRC accepted the MT recommendation that it continue its current practices for species observations during abundance surveys.

Hazardous Turbine Ranking

Background: Alameda County asked the SRC to identify APWRA turbines they deemed hazardous. The SRC visited the APWRA on November 29-December 1 and December 10 and viewed more than 500 potentially hazardous turbines at roughly 150 sites, which the Monitoring Team had selected because of associated raptor fatalities. SRC members also looked at some sites seen in passing that appeared to have potentially hazardous conditions. During the field visits, the SRC used its combined expertise to assess the relative potential hazard of selected turbines based on professional judgment, recorded mortality and mortality clusters, topographical setting, wind patterns, bird behavior, and turbine type and configuration. From this, they developed a document ranking the turbines in terms of hazards to raptors. The SRC fieldwork methodology is clarified in a report, [P67 SRC Selection of Dangerous Wind Turbines Draft Report 12/9/07](#). The list of turbines ranked is available in a document called [P68 Turbine List for SRC Selection of Dangerous Wind Turbines 12/7/07](#). Rankings are described in [P69 SRC Hazardous Rating Scale 2/1/08](#). The SRC is developing a document containing guidelines for relocating turbines; the latest draft is [P70 SRC Hazardous Turbine Relocation Guidelines](#).

The purpose of the day's discussion was to consider next steps, including the possibility of visiting those turbines not yet viewed for potential ranking and to consider approval of the relocation guidelines.

Public Comments and Questions

Joan Stewart of FPLE said she had questions about the list of turbines, as her company had found some duplicate numbers. A Monitoring Team member said there were four duplicate numbers. Stewart asked that the existing list be replaced with a correct revised list.

Emre Ergas of FPLE asked if there are any data to prove that the ratings are correct. SRC members said the ratings were partially based on mortality data, as well as land configuration, topography and professional judgment. Sites with higher mortality numbers or more dangerous topography received higher ratings.

He also asked why the SRC recommendation for removal included ratings down to 7 and 7.5, and asked why removing turbines from 9.5 to 10 was not enough. An SRC member responded that it was the group's professional judgment that taking out only those turbines rated 9.5 and 10 would not cause a sufficient decrease in overall mortality to result in a 50% reduction.

Sandra Rivera asked if rating new 9 and 10 turbines throughout the Altamont and removing them would have a greater impact than removing the already rated 7 and 7.5 turbines. An SRC member said the additional ratings could not be completed fast enough so that removals could occur this year before the wind season begins in spring.

SRC and MT Discussion

The Monitoring Team provided the following information and estimates:

- Turbines rated 8-10 accounted for roughly 80% of the total mortality among the turbines reviewed.
- A second round of ratings will not be as precise as the first round. The first round was partially based on underlying mortality data, which does not exist for non-monitored turbines.
- The MT estimated four long days in the field to visit the remaining turbines. The second process will likely be longer than the first because without the mortality data, the SRC will likely need to spend more time deliberating in the field.
- "Hazardous turbines" should more properly be called "hazardous turbine addresses."

SRC members commented that it would be more beneficial to remove other turbines not yet visited, that would be rated 9 or 10, rather than removing the 7.5 turbines already rated. However, the timing issue is problematic.

Sandra Rivera asked if the criteria the SRC developed could be applied to the unvisited turbines with aerial photography and GIS. SRC members responded that their work was not meant as a model, but resulted from the gestalt of bringing their expertise into the physical environment. SRC members said they thought the MT could apply the approach. It would need to be done in the field, by objective individuals with expertise.

Public Comments and Questions

Emre Ergas of FPLE said his company is hesitant to remove turbines at the lower end of the rating recommendation -- FPLE representatives don't have confidence in the SRC's ratings and fear that recommendations will be changed again. They are moving the turbines rated 10 and 9.5.

Joan Stewart of FPLE said the company's turbine removals in 1994 were based to a large extent on topography. She questioned if there was a need to go out and look, if the company already knows about topography.

Potential SRC Visit to Non-Monitored Turbines

SRC members questioned if it is worth their time to visit and rate additional turbines, given that existing SRC recommendations for removal are not being completely acted on. In addition, the lack of mortality data may result in less clear and definitive ratings. There would be grey areas so concentrating on very hazardous sites (9-10) or, conversely identifying good locations, would be necessary. An additional product of this visit could be an evaluation of potential turbine relocation sites. The SRC would like the County to query the companies as to whether they want the SRC to pursue further ratings. No action will be taken unless the companies request an additional visit and ranking effort.

Relocation Guidelines

The SRC asked for several changes in the draft of the Relocation Guidelines (P70). After concerns were raised by FPLE representatives about language that might require companies to keep coming back to the SRC, entailing a lengthy process, SRC members agreed that the guideline language will remain the same. However, language on plans and programs will be altered to specify that companies are encouraged to use the guidelines and confer with the SRC if there is confusion or uncertainty.

The SRC agreed to use its annual APWRA visit to look at a portion of the relocated turbines and check for possible misinterpretations of its relocation guidelines.

SRC Agreement on Hazardous Turbine Ranking

The SRC reiterated its previously made recommendation that turbines it ranked 8-10 on a hazard scale of 1-10 be removed as one measure toward achieving the 50% reduction in raptor mortality required by the Settlement Agreement. Since the winter shutdown was shorter than three months, the SRC additional recommendation to remove turbines assigned ratings 7 and 7.5 is in effect. (See P68_Turbine List for SRC Selection of Dangerous Wind Turbines 12/21/07 and P69_SRC Hazardous Rating Scale 2/1/08).

Follow-Up Required

- MT to provide data on what percentage of strings, and what percentage of turbines, the SRC has looked at to date.

Relocation Guidelines:

- On page 10, photo 3, replace with a better picture of a vertical gap. The MT will try to get a picture from Patterson Pass.
- Alter language in section 5 and step 5 to clarify that the SRC will make itself available to review plans if asked. Add language encouraging companies to confer with the SRC if they encounter a situation that lacks clarity.
- Alter wording of relocation program to "relocation program for the future."
- The revised draft will be considered at the next conference call.

SRC Meeting Summary Final Approval

The SRC reviewed and approved the following conference call notes and meeting summary:

- P64_SRC Meeting Notes 10-16-07 Conference Call -- approved with 1 change
- P65_SRC Meeting Notes 11-7-07 Conference Call -- approved with 1 change
- P66_SRC Meeting Notes 11-13-07 Conference Call -- approved with 2 changes
- P71_SRC Meeting Summary 11-12 December 2007 – approved, no changes
- P72_SRC Meeting Notes 1-4-08 Conference Call -- approved with 1 change

The finalized meeting notes and summary will be posted on the SRC website.

Compliance Reporting

Sandra Rivera reviewed a new summary document of compliance with G1 and G2 conditions, P75_ Alameda County APWRA Compliance Reporting 2/13/2008. The document will be available on the SRC website.

The scope of work for the Environmental Impact Report (EIR), previously scheduled for 2007, will be circulated to the SRC in May 2008.

SRC Work Plan in 2008

The EIR is beginning to be developed. The SRC will provide feedback on the scope of work for the EIR consultant.

Environmental Impact Report Schedule	
April/May	County to develop scope
May	SRC review/comment on scope
June	RFP goes out
July	Contracting
1-2 years	EIR completion

The SRC identified its key tasks so far for 2008. They are:

- Review mitigation measures
- Review EIR scope
- Review analysis & data (including burrowing owl study recommendation)
- Other ways to reduce mortality
- Annual APWRA visit
- Measuring change in mortality and comparison to baseline
- Hazardous turbines -- removal, or identifying non-hazardous sites
- Consider scavenger removal trials (including bats) to refine scavenger removal rates
- Bats -- develop reference list on literature and management strategies
- Initiate research directed toward causal factors of burrowing owl mortality

Discussion on specific items included:

- **Proposed burrowing owl study:** The SRC will develop a recommendation for Alameda County on a proposed burrowing owl study, including its reasons for recommending the study. This process will begin with a March 18 conference call to identify questions the study should address. Then 1-2 SRC members will develop a draft proposal and design. In an April meeting, the SRC will review the draft proposal and finalize the recommendation. It will be submitted to the Board of Supervisors in May.
- **Bats:** The SRC will hold a conference call in April to frame questions for the potential bat mortality issue
- **Possible late April/early May in-person meeting:** The above two issues, along with the scavenger removal trial issue, may be dealt with at a 1.5-day in-person meeting instead of through conference calls, contingent on SRC member schedules and availability.

- **Document summarizing SRC recommendations on management strategies:** To be developed at the August meeting.
- **Hazardous turbines:** Further SRC consideration will be contingent upon a request from Alameda County or the wind companies.

Scope of Work for 2008

Sandra Rivera of Alameda County asked the SRC to develop a scope of work for the year. This would list expected tasks and the estimated amount of time (a general range) each SRC member projects to devote to each task. The scopes can be modified, but assist in better planning and aid in encumbering funds for the work. The timeframe will be January 1, 2008 -- January 1, 2009. The facilitator will e-mail a list of tasks to SRC members so each can draft a scope based on that list. SRC members agreed to a March 5 deadline to submit their scopes. The item will then be agendaized for a conference call discussion.

Future Meetings

Conference Calls

- 3/11/08, 12-2 p.m., with MT on statistics
- 3/18/08, proposed burrowing owl study questions

In-Person

- May 28-29, 2008

May 2008 Tentative Agenda Items

- 50% plus baseline
- Towers/ranking
- Settlement
- Review EIR scope

August 2008 Tentative Agenda Items

- Mitigation materials finalized

Documents Circulated at Meeting

[M21 Bird Fatality Study at Altamont Pass, Oct. 05-Sept. 07, Draft Report, 01/25/08](#)

[M21_2008 Altamont Bird Fatality Report, 02/12/08](#)

[M22_ Altamont Pass 2005-2007 Bird Fatality Study Presentation Slides, 2/12/08](#)

[P1 SRC Charter](#)

[P43 Smallwood Memo: Opinion of Some SRC Members that the Period over which Post-Management Mortality will be Estimated Remains Undefined, 26 July 2007](#)

[P44 Smallwood: Effects of Monitoring Duration and Inter-Annual Variability on Precision of Wind-Turbine Causes mortality Estimates in the Altamont Pass Wind Resource Area, California, 26 July 2007](#)

[P45 Yee Email: Monitoring Period and Using Averages to Measure Reduction, 26 July 2007](#)
(response to P43 and P44)

[P48 SRC Meeting Notes 8-17-07 Conference Call](#)

[P64 SRC Meeting Notes 10-16-07 Conference Call](#)

[P65 SRC Meeting Notes 11-7-07 Conference Call](#)

[P66 SRC Meeting Notes 11-13-07 Conference Call](#)

[P67 SRC Selection of Dangerous Wind Turbines 12/11/07](#)

[P68 Turbine List for SRC Selection of Dangerous Wind Turbines 12/21/07](#)

[P69 SRC Hazardous Rating Scale 2/1/08](#)

[P70 SRC Hazardous Turbine Relocation Guidelines](#)

[P71 SRC Meeting Summary 11-12 December 2007](#)

[P72 SRC Meeting Notes 1-4-08 Conference Call](#)

P75_Alameda County Compliance Reporting for SRC Feb 2008 Meeting

P76_Smallwood: Comparison of Mortality Estimates in the APWRA 2/7/2008

P77_FPLE comments on MT Jan 2008 report

[P99 SRC Work Plan and Milestones](#)

SRC Meeting Participants

SRC Members Days 1, 2 & 3

Joanna Burger
 Jim Estep
 Sue Orloff
 Shawn Smallwood
 Julie Yee

Staff

Gina Bartlett, Facilitator, Days 1-3
 Sandi Rivera, Alameda County, Days 1-3
 Ariel Ambruster, Facilitator Assistant, Days 1-3

Monitoring Team

Kurt Clayton, Jones & Stokes, Days 1-3
 Brian Karas, BRC, Days 1-3
 Brian Latta, UCSC, Days 1-3
 Dail Miller, Jones & Stokes, Day 1
 Jesse Schwartz, Jones & Stokes, Days 1-2
 Ed West, Jones & Stokes, Days 1-3

Others

(Meeting Sign-in is optional)

Jamy Bacchus, Rumsey Engineers
 Bill Barnes, AES Wind Generation
 Michael Boyd, CARE
 Hilary Corrigan, California Energy Markets
 Mark Cullors, ACWMA
 Renee Culver, FPLE and AIC
 Bill Damon, AWI
 Jay Dunton, property owner
 Emre Ergas, FPLE and AIC
 Martin Homec, CARE
 Jim Hopper, AES Wind Generation
 Nan Leuschel, Ralph Prop II
 John Moorman, enXco
 Elizabeth Murdoch, Golden Gate Audubon
 Eli Saddler, Golden Gate Audubon
 Julia Sorensen, AWI
 Joan Stewart, FPLE and AIC

Appendix: List of SRC Agreements developed February 12, 13 & 14

(Compiled from this document)

SRC Agreement on Monitoring Team Communication

The SRC and Monitoring Team members agreed to a communication plan to develop the next draft of the report, which emphasizes transparency as well as the separate roles of the two bodies. SRC members decided that Monitoring Team members can discuss data with SRC member Shawn Smallwood, who conducted the 2004 Altamont avian mortality study that formed the baseline. The Monitoring Team will log its calls and other discussion points, draft brief memos to the SRC describing their activities, and periodically brief the SRC in a public conference call on its progress, questions and statistical issues. The first SRC briefing will be scheduled for mid-March to consider statistical issues. In addition, citations will be given for assumptions. The documents can be linked from the SRC website.

SRC Agreement on Importance of Bird Use and Power Data

SRC members agreed that bird use data should be integrated into the mortality analysis to the extent possible so the estimates account for raptor population fluctuations that might influence fatality statistics. To work toward this goal, they agreed that all possible bird abundance and use data for the four focal species should be gathered for evaluation and possible integration. The information will be carefully reviewed and any use of these data will first be discussed. The SRC also reiterated its recommendation for acquiring power generation or turbine operating hours data to similarly account for fluctuations in turbine operation.

SRC Agreement to Create Shared Public Database

The SRC and MT thought creating a central shared database system would be beneficial. The data could be placed on the SRC website for interested parties to use. While database management and processing data will be time-consuming, MT members said it should save time in the long run.

The SRC agreed that the MT should create a shared public database to provide access to the following data:

- 1998-2003 CEC NREL Fatality Data (Used to Develop the 2004 CEC Report)
- 2005-2007 MT Fatality Data (Used to Develop the 2008 Monitoring Report)
- Bird Use Data
- Turbine Operation Data

SRC Agreement on Unit of Analysis

For the monitoring report, the SRC agreed the minimum unit of analysis for comparison will be string per season (adjusted for number of turbines). The SRC

and MT will arrive on an agreement for the definition of a season. Both the seasonal and annual rates will be presented.

SRC Agreement on Bird Size Classification Protocol

Another issue in making data from the multiple studies comparable is the definition of bird sizes. Sue Orloff used a different definition than the other two studies in her research (Orloff and Flannery 1992, 1996). The SRC agreed on using the following bird size definitions for the analyses:

- **Small:** Hummingbird to mourning dove
(This size includes kestrel & burrowing owl)
- **Medium:** Pigeon to raven
- **Large:** Red-tailed hawk to golden eagle

SRC Agreement on Scavenger Removal Rate Adjustment Factor

The SRC agreed:

- The adjustment factor for Golden Eagle will be ≈ 1 , which corresponds to nearly zero scavenger removal.
- To gather information for potentially refining scavenger removal rates, the Monitoring Team will continue tracking feather spots found in the second month of the American Kestrel Burrowing Owl Study this spring, visiting sites once per week until those feather spots have been followed over one search interval (approximately 37 days). These searches can continue through the end of May.
- After the study, the MT will analyze whether the study substantiates a need for a change in the scavenger removal rate and return to the SRC with a recommendation.

SRC Agreement on Analyses to Compare Current Mortality to Baseline

The SRC agreed that there will be four analyses in the baseline comparison:

- One analysis would use all data from 2004 and 2008 extrapolated to the entire APWRA.
- A second analysis would consider only turbines searched both in the 2004 and 2008 studies, which represent about 20% of Altamont turbines.
- Each of these analyses would be developed twice, once using 2004 assumptions and once using 2008 assumptions, to ensure matched comparisons since the baseline established by the settling parties is based on the 2004 study. The comparison to 2004 turbines using 2004 assumptions and extrapolated to the entire Altamont is as directed by the County.

SRC Agreement on Measuring 50% Reduction in Mortality of Focal Raptor Species

After a short discussion, SRC members agreed that they have an interest in looking at multiple analyses. They agreed to look at three spans:

- 1-year span for each year
- 2-year span for Year 2 & 3

- 3-year span

They agreed to consider inter-annual variation and the trend over the three years.

SRC Agreement on Hazardous Turbine Ranking

The SRC reiterated its previously made recommendation that turbines it ranked 8-10 on a hazard scale of 1-10 be removed as one measure toward achieving the 50% reduction in raptor mortality required by the Settlement Agreement. Since the winter shutdown was shorter than three months, the SRC additional recommendation to remove turbines assigned ratings 7 and 7.5 is in effect. (See P68_Turbine List for SRC Selection of Dangerous Wind Turbines 12/21/07 and P69_SRC Hazardous Rating Scale 2/1/08).