DRAFT Meeting Summary | February 13, 2014
Altamont Scientific Review Committee

Developed by the Center for Collaborative Policy
Reviewed, but not yet approved by the SRC.

All SRC Members Present:
Joanna Burger
Jim Estep
Mike Morrison
Sue Orloff
Julie Yee

Key Outcomes

The Altamont Pass Scientific Review Committee (SRC) met in Oakland on February 13, 2014. The following summarizes SRC agreements and key meeting outcomes.

1. Draft 2005-2012 Bird Fatality Report

The SRC reviewed the Monitoring Team's draft bird fatality report incorporating data from the 2012 bird year (Oct. 1, 2012-Sept. 30, 2013). The SRC recommended the following key changes for the final report:

- Calculate a correlation of bird use and fatalities for the four focal species for the non-shutdown months across years for annual fatalities.
- Rather than discussing "cycles," discuss inter-annual variation of fatalities.

In the draft report conclusion:

- Qualify conclusions by removing the word "strong;"
- Remove "grossly" and instead say "may," "could," or "appear" to be underestimated and indicate issue is worthy of further investigation; and
- Add a bullet point on the trend away from 50% mortality reduction, and how it was tentatively reached.

Table changes:

- Table 3.8 - include differences such as search radius, search interval, etc.
- Table 3.7 - say "total fatalities" rather than "total"
- Figure 3-1, 3-2, 3-3 - expand to include data through 2012, using unadjusted by MW rate; correct use of "native"
- Figure 3-9 - remove GOEA extra years
- Figure 3-10 - add 2012 GOEA data
- Figure color/design: use Figure 3-7 as exemplar for Figures 3-1, 3-2, 3-3

2. 2014-15 Monitoring Program

Alameda County will reduce funding for the 2014-15 bird year Monitoring Program by about 50%, to $250,000. The SRC considered possible options for special studies or other work the Monitoring Team could undertake. SRC members are considering studies on background mortality and burrowing owls.
The Monitoring Team and an SRC subcommittee will meet to develop a straw study plan for the SRC to consider at an April conference call meeting.

Upcoming SRC meetings:

Possible conference call meeting in **April** (Topic: Follow-up conversation on the 2014-15 Monitoring Program).
Possible in-person meeting date: **June 9-10**

Action Items & Meeting Follow-Up

Party	Due Date	Action
SRC		**Meetings:** ▪ Possible conference call **week of April 21** ▪ In-person meeting: **June 9-10 - Programmatic EIR**
MT	SRC summer meeting	Final 2005-2012 bird fatality report
MT & Julie Yee, Mike Morrison	Prior to June	MT & SRC Subcommittee on 2014-15 Monitoring Program to meet and develop straw proposal for SRC

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Meeting Account

Announcements

Sandra Rivera of Alameda County had the following major updates:

1. The County received two project applications, both of which were part of the Programmatic Environmental Impact Report (EIR). One application was for NextEra's Golden Hills Phase 1 project, which would remove 1,400 turbines by the end of 2015 and add 48 new turbines (1.7 megawatts each for a maximum of 80 megawatts) in 2016. The other application was for EDF's 20-megawatt Patterson Pass project. County officials expect the draft project EIRs will be available for SRC review in the summer.
2. The County also anticipates AWI will submit an application for its Summit Winds repowering project within the next few months. If AWI does not receive approval for its repower project, the company might pursue modifications to extend its current use permits to 2018.

Draft 2011-12 Bird Fatality Study

Related Documents
M101_APWRA 2005-2012 Bird Fatality Report - DRAFT
M103_February 2014 Presentation Slides
P281 Estep Regional Raptor Data Comparison 2005-2011

Presentation of Draft 2005-2012 Report
Monitoring Team Manager Doug Leslie provided a PowerPoint presentation overview of the Draft 2005-2012 Bird Fatality Study.

The total fatalities for all four focal species have decreased since 2005. The available data suggest the seasonal shutdown and hazardous turbine removal helped decrease fatalities, especially for golden eagles and red-tailed hawks. The reduction in burrowing owl and American kestrel fatalities due to these mitigations might be underestimated due to potential confounding with predation, especially during the winter shut down. Doug Leslie noted that the results still have high uncertainty because the data are very sensitive to small changes in fatalities, possibly due to reduced sample size. Additional key points included:

Changes Since Last Report

- **Summary of changes to the analytical methods**: The Monitoring Team refined the analytical methods based on the August 2013 SRC meeting discussion. The Monitoring Team also included a summary in the report of all analytical and presentation changes made since the last fatality study.
- **Fewer old-generation turbines to monitor:** 29% of APWRA is repowered now (Figure 3-1).

Bird Use

- **Many surveys observed little bird activity:** Approximately 21% of surveys observed no birds at all, and 51% did not observe any focal species. Observations of burrowing owls were especially rare (Slide 6).
- **Comparing bird activity at another location:** The Monitoring Team reviewed monthly bird surveys of agricultural and wetland properties managed by the Natomas Basin Conservancy near Sacramento. The Natomas Basin data are not directly comparable to APWRA bird use data due to different topographical and land use patterns, providing dissimilar feeding and nesting resources. However, the general trends and relative abundance of American kestrels and red-tailed hawks were similar to APWRA bird use data (Slide 8). Researchers at Natomas Basin also observed few burrowing owls.
- **Seasonal behavior of large birds skewing annual estimates**: Golden eagle and red-tailed hawk bird use increased dramatically during the seasonal shutdown, but their unadjusted fatalities showed no seasonal differences. This makes comparing annual bird use and fatalities difficult.
- Bird use surveys were not designed for burrowing owls, so the data do not accurately reflect burrowing owl activity in APWRA.

Adjusted Fatality Rates

- **Cyclic pattern in fatalities not seen**: Golden eagle and red-tailed hawk adjusted fatality rates did not appear to follow an annual cyclical pattern (Figure 3-6). The inter-annual peaks were not the same duration as those described in Shawn Smallwood's study (see P268).

Estimated Fatalities

- **Estimated Fatalities and Bird Use**: Total fatality estimates of red-tailed hawk were slightly correlated with bird use; golden eagles appeared inversely related, but the relationship was not statistically significant (Figure 3-7). American kestrel estimated fatalities and bird use remained constant; burrowing owls' estimated fatalities were also constant except for a large decrease in 2006. Note: if something is not significant, it is not significant!
- **Rolling Average**: The 2010-2012 three-year rolling average of estimated fatalities for three focal species increased (Figure 3-8), but the overall rolling average based on total focal species was similar to last year's 37% fatality reduction from the 2005-2007 baseline (Table 3-6).

Effectiveness of Management Actions

- **Seasonal Shutdown:** Golden eagle and red-tailed hawk fatalities decreased while overall bird use increased during the seasonal shutdown period (Figure 3-4 and Table 3-7). Conversely, American kestrel and burrowing owl fatalities were higher than expected during the shutdown and were primarily characterized by feather spots (Table 3-7). This suggests the seasonal shutdown effectively decreases turbine-related fatalities for golden eagles and red-tailed hawks, but suggests that non-turbine-related mortality on American kestrel and burrowing owl may increase during this period.
- **Repowering:** Repowered turbines at Buena Vista and Vasco Winds (but not Diablo Winds) had significantly lower average annual adjusted fatality rates than at old generation turbines APWRA-wide (Table 3-8). Repowering might be contributing to decreased estimated fatalities.
- **Hazardous turbine removals (HTR):** The Monitoring Team found little evidence

for the effectiveness of hazard turbine removal when comparing the Santa Clara Operating Group (which did not have HTR) to the APWRA-wide turbines (excluding Santa Clara) , because few hazardous turbines remain (Figure 3-10).

Predation Affecting Small Bird Fatality Numbers?

An unexpectedly high proportion (44%) of burrowing owl and American kestrel fatalities occurred during the period of the seasonal shutdown (Figure 3-3). This suggests the possibility that non-turbine-related fatalities are occurring during this period. Approximately 75% of the American kestrel and 87% of the burrowing owl carcasses during this period were characterized as feather spots (Figures 3-2), a substantially higher proportion of feather spots than that recorded during the non-shutdown period. This, along with a greater number of red-tailed hawks reportedly inhabiting the APRWA during the winter shutdown period suggests the possibility that predation on burrowing owls and American kestrels is contributing to the high fatality rates for these species during this period and may over-inflate the annual turbine-related fatality rates for focal species.

Data Sensitivity

- **Varying Subset Results**: When the Monitoring Team conducted subset data queries, the results varied widely for unknown reasons. The multiple changes to monitoring procedures, including the 2010 sample size reduction, could be a major cause.
- The Monitoring Team found a BLOB with only a small portion surveyed in one particular year, with fatalities that produced abnormally high fatality estimates. The Monitoring Team will investigate how to remedy that data.

SRC and Monitoring Team Discussion of Draft Fatality Report

The SRC expressed appreciation for the summary of historical changes to the Fatality Study, as it provided clear and helpful context.

In response to a question about why the data were truncated for many of the report's figures, Doug Leslie said seasonal comparisons of unadjusted fatalities are limited to 2005-2009 because the sample size decreased by half in 2010. The truncated data did not affect conclusions. Only 2007-2009 had similar effort in terms of observation survey hours and number of carcass searches (Slides 4-5).

The SRC raised the following issues:

- Even though burrowing owl bird use data were not applicable APWRA-wide, it still reflected the birds' activity around turbines where the owls occur.
- If calculations omitted the season shutdown months, the annual fatality averages should increase to the same level as non-winter season monthly averages. This method would eliminate possible confounding results from the cross-over and phased shutdown periods of 2005-2008.
- Using bird use data were more appropriate for detecting potential cycles rather than using fatality rates.
- Since some small bird fatalities could be predation-related, especially during the seasonal shutdown, then the SRC and the County might be facing a value judgment of which species are more important to survive.
- In response to a question about why burrowing owl fatality rates were low at Buena

Vista (Table 3-8), Monitoring Team members said burrowing owls used to be there, but no longer inhabited that area.
- In regard to data sensitivity, variation among BLOBS was expected. BLOBS help identify hotspots and look at long term variation over APWRA, but they were not comparable to one another because of their topographic differences from one another.

Brian Karas, Monitoring Team, said the larger search radius at repowered turbines covered more hill slope where burrowing owls might inhabit, which may increase the chance of finding burrowing owl carcasses associated with burrowing owl burrows. Those carcasses might or might not be turbine strikes.

Potentially Overestimating Turbine-related Mortality

Some SRC members said if there are more feather spots during the seasonal shutdown, then those spots might have been caused by the turbines having an indirect negative impact on small birds by providing perches for predators.

Brian Karas said feather spots are automatically dated as 45 days since the fatality. The Monitoring Team questioned whether this affected accurately backdating carcasses.

Public Comment on the Fatality Study

Renee Culver of NextEra raised the following issues:
- NextEra developed repowered turbine sites based on the more robust bird models (i.e., red-tailed hawks, golden eagles, and American kestrels). The burrowing owl model has the largest uncertainty.
- Table 2-3 had an error. There were no repowered operations at Vasco Winds in 2010.

SRC Suggestions for the Draft Fatality Report

The following list summarizes suggestions by the SRC for improving the draft report.

SRC Member Suggestions

SRC member suggestions do not reflect SRC consensus.
- Test data sensitivity and variance by comparing a subset of 2009 fatality data equal to the sample size in 2010.
- Test areas with the smallest sample size.
- PPT Slide 3: Ambiguous survey "sessions" term – either clarify or omit the term "session."
- PPT Slide 8: Comparing Natomas bird use data – use the same scale for the y-axes.
- Conduct a power analysis to calculate a significant sample size (i.e., how many surveys away from turbines).
- Calculate the distance between feather spots and turbines and suspected turbine related fatalities, since carcasses close to turbines were likely turbine strikes, while feather spots away from turbines were more likely predation-related.

SRC Consensus Suggestions

Tables & Figures

- Table 2-3 – The surrogate fatality rates for Vasco Winds should be "7" in 2011 and no data for 2010.
- Figures 3-1, 3-2, and 3-3 in the Draft Report –
    - Include data through 2012.
    - Use the number of "unadjusted fatalities/MW/month" rather than "unadjusted fatalities/month."
    - Make sure the use of the term "native" species was consistent in the figure titles and axis labels.
    - Use similar color and design (i.e., dashed and solid lines) as Figure 3-7
- Figure 3-4 in Draft Report – Refer to PowerPoint Slide 16 for the accurate Figure 3-4 information. The Monitoring Team will correct the labels and data sources in Figure 3-4 of the Draft Report.
- Figure 3-7: Unit equivalents – Include a unit conversion for how many observation points are in a cubic kilometer.
- Figure 3-9 in Draft Report – Remove 2010-2011 data for golden eagles, since monitoring stopped at Diablo Winds in 2009.
- Figure 3-10 in Draft Report – Add 2012 golden eagle data.
- Table 3-7 – Change "Fatalities" column title to "Total Fatalities"
- Table 3-8 – List differences between repowered groups (e.g., search radius, height, and search interval).

Other Issues

- Discuss "inter-annual variation" in fatalities, not "cycles." Describing the adjusted fatality rates as "cyclical" was problematic because the data did not support or contradict a cycle hypothesis.
- Note the change from "cycles" in the report (page viii) – Explain the change to discussing "inter-annual variation," because previous reports discussed "cycles."
- Mention the 50% reduction in the Conclusion section – Add a bullet point about the trend away from the 50% reduction (i.e., a smaller decrease in reduced fatalities) with a caveat about the data potentially being confounded by predation.
- Use qualifying language for the Conclusion section –
    - Replace the phrase "total fatalities are grossly underestimated…" with a phrase similar to: "fatalities may be underestimated due to possible confounding factors (e.g., predation), and deserves additional attention."
    - Remove the word "strong" in the statement "There is strong evidence…"
- PowerPoint presentation information – Incorporate graphics and information from the presentation into the report as appropriate (e.g., Natomas data with permission, survey hours, and number of surveys).

SRC Recommendations

- Calculate a correlation between bird use and fatalities for golden eagles and red-tailed hawks for the non-shutdown months across years, to address the influx of large birds during the winter.
- Investigate predation impacts on small birds by using unadjusted fatalities per square meter, rather than per megawatt, for burrowing owls and American kestrels only.
- More generally, use neutral language and/or add qualifying phrases to the report.

Next Steps

- The Monitoring Team will develop the final version of the report.
- Based on SRC members' feedback, the Monitoring Team will continue to reference the meeting summary for SRC recommendations, and can contact SRC members for clarification if necessary.

Meeting Summary Review/Approval

Related Document

P272_SRC Meeting Summary August 2013

The SRC approved the August 19, 2013 meeting summary subject to the following changes:

- Page 3: The group agreed categorizing small vs. large gulls was unnecessary, so this item can be removed from the summary.
- Page 20: In the first bullet point, replace "Monitoring Team recommended" with "County recommended."

FloDesign Study Update

This item was postponed.

Altamont Context: 2013 CalWEA Study on Improving Bird and Bat Fatality Estimates

Related Document

R69_ Improving Methods for Estimating Fatality of Birds and Bats at Wind Energy Facilities

P283_Karas CalWEA Presentation

Report Presentation

Brian Karas of Ecostat, Inc. and Ventus Environmental Solutions presented an overview of a new detection probability method for more accurate bird and bat fatality estimates. Bill Warren-Hicks led the CalWEA-funded research team that developed the Partial Periodic Estimator and integrated detection probability trials implemented at Vasco Winds. Brian Karas provided recommendations for using the approach for future study designs and analyses.

Key points included:

- **Inaccurate Assumptions**: Traditional estimators had several assumptions that could bias the results. For example, these estimators assumed all carcasses of the same species had the same searcher efficiency (i.e., a 30-day-old burrowing owl carcass was just as detectable as a 5-day-old). They also did not account for carcass persistence, or carcasses remaining on-site and not being detected by a searcher for multiple search intervals (this is referred to as "bleedthrough").
- **Survey Study to Compare Estimators (Slide 4):** Searchers left all detected bird

and bat carcasses in the field for field managers to track carcass persistence. Researchers used traditional methods for calculating carcass persistence and searcher efficiency, but also developed new mathematical functions that modeled carcass persistence and searcher efficiency as a function of time and carcass age.

- **Short Search Intervals Risk Bleedthrough:** The research team experimentally proved that bleedthrough occurred when search intervals were relatively short.
- **Searcher Efficiency Affected by Carcass Persistence and Vegetation:** The study found that searcher efficiency and carcass removal were both time-dependent. Bats were also harder to detect than small birds, and small birds were removed more quickly than bats (Slide 7). The study found that vegetation made bat and small bird carcasses virtually undetectable (Slide 8), even when it was short vegetation (3-8 inches).
- **Differences Among Fatality Estimation Equations:** The study looked at biases for four traditional estimation equations (Slides 9, 10, and 14) and found that if search intervals were long compared to the average carcass persistence time, then all four estimators were approximately equal. The bias increased as search intervals shortened, and depending on the estimator, the estimator either under- or overestimated fatalities (Slides 11-12).
- **Partially Periodic Estimator**: The new estimator developed by the study accounted for diminishing searcher efficiency and bleedthrough (Slide 15).
- **Implementation**: The research team collaborated with NextEra to implement integrated detection probability trials for bird and bat carcasses at Vasco Winds. These trials preserved traditional survey methods of searcher efficiency and carcass persistence trials. By integrating the trials into standard monitoring, overall detection rates were measured. The overall detection rates were sensitive to the combined effects of search efficiency and carcass persistence as well as other effects on detection probability such as bleedthrough. The research team then compared the traditional adjustment method to the new "overall detection rate" calculation method.
- **Advantages of Using Overall Detection Rate *D***: This variable accounts for both searcher efficiency and carcass persistence rates (Slide 20). Estimated fatality rates calculated using ***D*** were lower than with conventional estimators (e.g. Horvitz-Thompson) for small and large carcasses (Slide 21). Very large carcasses had the same detection probability rates with respect to search interval lengths, i.e. no differences between 7-day and 20-day intervals.
- **Recommendations**: The research team outlined how to implement the Partial Periodic Estimator and integrated detection trial methods (Appendices A & B respectively). Since different estimators have varying level of biases, people need to review the methodologies before comparing estimates. If researchers want to estimate whether mortality at repowering projects has changed, then past estimates need retro-fitting, and future studies need to collect sufficient information through integrated detection trials to develop unbiased comparisons.

SRC and Monitoring Team Discussion

Brian Karas provided the following responses to SRC and Monitoring Team questions and comments.

- The survey study was at pre-repowered (old-generation) Vasco Winds.

- Researchers strategically placed carcasses along turbine strings. Searchers had no prior knowledge of existence or number of trial carcasses at any turbine string. Searchers also did not expect a certain maximum number of carcasses, because they never found all of the placed carcasses.
- The integrated detection probability trials were sensitive to time-dependent searcher efficiency and carcass persistence.
- The Monitoring Team's QAQC model could not account for bleedthrough.
- The researchers did not analyze the effect of carcass color on searcher efficiency and carcass persistence.
- Carcass check frequency for the Vasco winds integrated detection trial followed the industry standard of checking daily for one week then less frequently, as they expected most removals to occur in the beginning.
- If researchers want to accurately compare mortality at old generation turbines to new generation turbines, then integrated detection probability trials should be conducted at the old generation sites slated for repowering.
- A cost-benefit analysis should determine whether integrated detection trials for the 2014-15 Monitoring Program are worthwhile. The more rigorous the study (e.g., sufficiently comparing old generation turbine data to repowered turbines), the more costly the integrated detection trials will be.
- The integrated detection trial data were site-specific; therefore Vasco Winds data could not apply to all of APWRA.

Public Comments
There were no comments from the public.

SRC Comments
SRC members provided the following comments:

- SRC members suggested quantifying conclusions and trends (e.g., "small birds were removed X% more quickly than bats").
- The group discussed strategies for publishing the findings. An SRC member recommended submitting the findings to a statistics journal that addresses biological issues, and then posting a comparison of different estimators using the same dataset in the Wildlife Society Bulletin.

Altamont Context: Discussion of Recent Smallwood Study Outcomes & Planned Research

Related Documents
P284 Smallwood Data Needed in Support of Repowering in the Altamont Pass WRA
P274 Ventus Vasco Winds 2012-13 Avian and Bat Monitoring Report Year 1

Prior to the meeting, Shawn Smallwood, Research Consultant, distributed P284, a summary for SRC members of his current research and recommendations to them for studies that would develop information applicable to repowering in APWRA. The paper's top recommendations supported research to test new detection methods and adjustment factors at old-generation turbines with an expanded integrated detection trial. He also recommended

detection trials using trained dogs and study of expanded search radii around old-generation turbines.

Discussion on 2014-15 Bird Year Monitoring Program –

Related Documents
P282 Alameda County Memo on 2014-15 Monitoring Program
M102 Memo on 2014-15 Monitoring Program

Background
Sandra Rivera of Alameda County provided context for the 2014-15 Monitoring Program, the final year of monitoring old-generation turbines. The Alameda County Board of Supervisors directed County staff to reduce the 2014-15 Monitoring Program budget by 50%. The Monitoring Team said the reduced funds can not support sufficient monitoring. Therefore, the County is asking the SRC to consider potential studies for that year. The County asked the SRC to consider options based on certain criteria for a focused study or studies:

- Would the study help assess repowering impacts?
- Would results be transferable to repowered turbines?
- Would the study be able to generate sufficient data, evidence or insights?
- Would the study help increase understanding of avian mortality or reduce avian mortality?

Additionally, the SRC was asked to consider whether a particular species is a priority for studies, because:

- Research indicates the species may have mortality issues associated with repowered turbines
- The species is a priority species of concern for resource agencies
- Research on the species at old-generation turbines could shed light on avian mortality at repowered turbines.

Constraints
During the discussion, County staff and the Monitoring Team noted the following issues:

- The budget for the 2014-15 Monitoring Program was $250,000 (Note: P282 Memo incorrectly states the budget was $294,423).
- The Monitoring Team had one year to complete a focused study/studies.
- The work could only occur at old-generation turbine sites, not repowered sites. If monitoring occurred at old-generation sites scheduled for repowering, there was no guarantee the level of monitoring would continue after 2015.
- Repowering would occur and was unlikely to shut down during the winter.
- The 2014-15 bird year might have abnormal environmental conditions (e.g., dry weather).
- Meeting participants were not aware of any major repowering construction or turbine changes that would occur during 2014-15, except that AWI was to shut down 220 turbines by March 2015.

Public Comment
Renee Culver and Joan Stewart of NextEra provided the following information:

- NextEra will remove its remaining old-generation turbines in 2015
- The company submits its wind turbine information to the County at the beginning of every year

Study Topics Mentioned to Date

The SRC reviewed a list of potential study topic ideas that have been raised to date by the Monitoring Team, SRC members or members of the public:

- Background mortality – investigate the contribution of predation on small bird fatality rates during winter shut-down period.
- Behavior/bird use – i.e., continue collecting bird use data
- Bat mortality
    - Detection probability/adjustments
    - Activity or distribution/abundance -- Possibly use sonar or dogs to detect bat activity at old and new turbines.
- Adjustment factors – Conduct integrated detection trials to help link old-generation turbine data to repowered turbines.
- Specific species – Focus on mortality/activity of a particular species such as golden eagles, burrowing owls or red tailed hawk
- Search radius – Investigate appropriate search radii around turbines and uncertainties associated with search radius.

An SRC member wanted clarification on the County's criteria memo because the study design might be different depending on the County's priorities (e.g., assessing repowering or data transferability).

Sandra Rivera provided the following clarifications in response to SRC questions about the County's intent:

- From a practical standpoint, the County wanted the study to inform CEQA reviews of proposed repowering projects.
- The species focus was likely limited to the four focal species and bats.

Initial SRC Discussion

In a first discussion of the potential topics, SRC members made the following points:

- It would be better to concentrate on one study rather than spreading resources among multiple projects. It would be important to have a large-scale perspective and focus on what affects mortality the most.
- For fatality rates to be comparable to repowered turbines, the Monitoring Team should conduct studies at old-generation turbines slated for repowering and/or areas similar to repowered sites.
- Some evidence suggests that new-generation turbines negatively affect bats. However, a bat study would likely be more expensive and complex than the 2014-15 budget could support.
- Perhaps they should explore methods for improving repowered site selections, because the current method did not necessarily reduce bird mortality, especially for burrowing owls.

Public Comment

Renee Culver of Next Era, responding to an SRC question, said the company funds specific research projects as part of its mitigation program. Their research suggested APWRA is not an area of high bat abundance.

Renee Culver of NextEra suggested the following ideas:

- The SRC could consider comparing different new-generation turbines' mortality impacts. She said this may be an opportune time to look back at past SRC meeting summaries for proposed projects that were never pursued because of time and funding.
- Conduct feather isotope analyses on species such as burrowing owls to identify migrant versus resident populations. Resource agencies were concerned with whether a project impacts a local or migratory bird population. In response, an SRC member said the isotope data need to be compared to samples across a broader geographic range outside of APWRA to capture population differences.
- Golden eagle DNA analysis or telemetry studies to understand the population structure and fatality patterns outside of APWRA.

Brian Karas, a consultant to Ventus and the Monitoring Team, suggested stopping current monitoring now and redirecting resources to a focused study. He urged the SRC to include integrated detection trials in the 2014-15 study. He said the QAQC adjustment factors are less biased than traditional methods, but integrated detection trials could improve them further, especially for bats. The trials are needed in order to compare fatality data from old-generation turbines to data collected at the new repowering projects.

SRC Continued Discussion

Based on their discussion, SRC members identified the following topics as potentially of most interest:

- Background mortality
- Adjustment factors
- Burrowing owl - nocturnal studies

The SRC and Monitoring Team discussed specifics of potential studies.

Doug Leslie said reference sites for a background mortality study would be far from turbines, but also as similar as possible to turbine sites.

Brian Karas said a possible background mortality study plan could involve surveying fatality density away from the old-generation turbines, conducting a simplified integrated detection trial to estimate background mortality in the area, then calculating the estimated background mortality in a given area as a function of bird size. Repowered projects could use this estimate to predict the expected background mortality.

An SRC member suggested estimating bird fatality away from turbines as number of carcasses per square meter since per megawatt was not applicable.

Public Comment

Renee Culver of NextEra raised questions about whether a background mortality study could produce an APWRA-wide estimate. In response, Doug Leslie said an APWRA-wide estimate will have high variance. One SRC member said if the study focuses on where one species occurs (e.g., burrowing owls), then the estimate may be APWRA-wide for that species alone.

Kim Brown of Ventus asked the Monitoring Team if, in siting turbines to avoid impacts to avian species, golden eagles would trump burrowing owls. In response, Doug Leslie said it would depend on the background mortality rate. She expressed concern that a background mortality study may be too costly and not provide sufficient data on burrowing owls to select turbine sites. In response, an SRC member said wind companies can consider burrowing owl nesting colonies when selecting turbine sites.

Renee Culver said NextEra has the best siting model for red tailed hawks and the high-priority golden eagle species. To date, the data at repowered sites suggest turbine-related burrowing owl fatalities are not a substantial issue. There are also several past and present burrowing owl studies (e.g., Shawn Smallwood's burrowing owl distribution study and nocturnal study). In response, an SRC member said more information is needed about the Smallwood study.

SRC Suggestions for Preferred Study Topics
After discussing several study topics, SRC members favored investigating background mortality and/or burrowing owl activity. SRC members provided the following major study aspects to consider:

Background Mortality

- **Potential Methods**:
  - Establish reference sites for carcass and feather spot surveys
  - Use the integrated detection probability trial method
  - Select sites with burrowing owls and/or high fatalities
- **Benefits**:
  - Address a major issue that was confounding fatality estimates
  - Help inform repowering project plans
- **Drawbacks**:
  - Possibly high cost if the study uses carcass checks
  - Possibly site-specific

Burrowing Owls

- **Potential Methods**:
  - Behavior studies; nocturnal surveys
  - Feather spot analyses
  - Flight behavior near turbines
- **Benefits**:
  - Address the weakest model of the focal species because the bird use study was not well-designed for burrowing owls.
  - Address whether the repowered turbine operations directly or indirectly exacerbates burrowing owl fatalities.
- **Drawbacks**:

- Possibly high cost for nocturnal surveys
- Since Shawn Smallwood has already conducted burrowing owl observations, it would be important to identify what has been done and additional work is needed.

SRC Recommendations
SRC members identified a background mortality study and a nocturnal survey of burrowing owl activity as potential 2014-15 study topics. Among SRC members, there was greatest support for a background mortality study. SRC members said, if feasible, a burrowing owl study can be included in the 2014-15 work, as well. SRC members also were considering whether an integrated detection trial as part of the background mortality study can help inform repowered projects.

Next Steps
- A subcommittee consisting of the Monitoring Team and SRC members Mike Morrison and Julie Yee will develop a straw proposal informal study plan for the SRC to consider at its next meeting.

Public Comment on General Issues

There were no general comments from the public.

Future SRC Meetings

Next In-person meeting:
Possible Dates: June 9-10
Potential Topics for next In-Person Meeting:
- Review subcommittee's proposed focused study design for the 2014-15 Monitoring Program
- Draft Programmatic EIR

Next Conference Call Meeting:
Possible conference call meeting the week of April 21 to continue discussion on 2014-15 Monitoring Program

Documents Circulated at Meeting

M101_APWRA 2005-2012 Bird Fatality Report - DRAFT
M103_February 2014 Presentation Slides
P281 Estep Regional Raptor Data Comparison 2005-2011
P272_SRC Meeting Summary August 2013
P278_Smallwood First Annual Report of Turbine Experiment Forebay
R69_Improving Methods for Estimating Fatality of Birds and Bats at Wind Energy Facilities
P283_Karas CalWEA Presentation
P284 Smallwood Data Needed in Support of Repowering in the Altamont Pass WRA
P274 Ventus Vasco Winds 2012-13 Avian and Bat Monitoring Report Year 1
P282 Alameda County Memo on 2014-15 Monitoring Program

M102 Memo on 2014-15 Monitoring Program

SRC Meeting Participants

SRC Members
Joanna Burger
Jim Estep
Mike Morrison
Sue Orloff
Julie Yee

Staff
Sandra Rivera, Alameda County
William Fleishhacker, Alameda County
Andrew Young, Alameda County
Ariel Ambruster, Facilitator
Stephanie Horii, Assistant Facilitator

Monitoring Team
Doug Leslie
Brian Karas, Ecostat, Inc. & Ventus
Chris Brungardt, ICF

Others
(Meeting sign-in is optional)
Kim Brown, Ventus
Renee Culver, NextEra
Andrew Roth, Altamont Winds, Inc.
Brad Schafer, ICF
Joan Stewart, NextEra

List of SRC Agreements Developed February 13, 2014

(Compiled from this document)

2005-2012 Draft Fatality Study Report

- Calculate a correlation between bird use and fatalities for golden eagles and red-tailed hawks for the non-shutdown months across years, to address the influx of large birds during the winter.
- Investigate predation impacts on small birds by using unadjusted fatalities per square meter, rather than per megawatt, for burrowing owls and American kestrels only.
- More generally, use neutral language and/or add qualifying phrases to the report.

2014-15 Monitoring Program

- SRC members identified a background mortality study and a nocturnal survey of burrowing owl activity as potential 2014-15 study topics. Among SRC members, there was greatest support for a background mortality study. SRC members said, if feasible, a burrowing owl study can be included in the 2014-15 work, as well. SRC members also were considering whether an integrated detection trial as part of the background mortality study would help inform repowered projects.