Meeting Summary | August 19, 2013
Altamont Scientific Review Committee

Developed by the Center for Collaborative Policy
Reviewed and 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 August 19, 2013. The following summarizes SRC agreements and key meeting outcomes.

1. 2005-2011 Bird Fatality Report

The SRC reviewed the Monitoring Team's final bird fatality report incorporating data from the 2011 bird year (Oct. 1, 2011-Sept. 30, 2012). The SRC and Monitoring Team agreed that the report will include an addendum that will describe the extent of changes between the draft and final reports and why those changes occurred.

The Monitoring Report was produced with an updated QAQC dataset, and SRC Member Julie Yee replicated the Monitoring Team's analysis and produced the same point estimates. This verifies that the report's point estimates can be replicated.

Based on the new analyses, the reduction from the 3-year rolling average baseline to the 3-year rolling average calculated from the last period in 2010 changed from about a 50% to a 36% reduction.

2. FloDesign Permit Conditions for Unproductive Turbines

The SRC recommended Alameda County add an exemption to the FloDesign/Forebay Wind LLC permit to allow unproductive turbines to remain on site through the end of the Smallwood FloDesign study, to allow for appropriate comparisons in the study. The SRC also supported maintaining the same on-the-ground turbine conditions, i.e., operating/non-operating, tethered/non-tethered, to the extent possible to support the study.

3. 2013-14 Monitoring Program

The SRC supported maintaining the current monitoring sample size for the October 2013-September 2014 bird year. SRC members also favored that the rotating panel design continue by rotating again to the first panel, with the proviso that the Analysis

Subcommittee will meet prior to August 31 to discuss the matter further and may recommend otherwise. If the Subcommittee reaches consensus in support of another approach, an SRC conference call meeting will be held for SRC consideration of the issue.

4. Monitoring Team Analytical Approaches Going Forward

The SRC agreed to recommend the following refinements to the Monitoring Program analytical approach in forthcoming reports:

- The SRC reached consensus agreement in support of a Monitoring Team recommendation that Diablo Winds turbines be reassigned to their own BLOB;
- Reference Shawn Smallwood tables incorporating pre-2005 data in next report discussion section;
- Change unknown aged carcass backdate from the currently used mid-point in 0-90 days to mean days to removal by wingspan length;
- Consider the first search of new turbines a clearing search.
- Establish the first search date as the start date for a string. Any fatality that backdates before that date will be removed from the analysis.

The SRC recommended that the Monitoring Team make clear in the report those analytical changes that have occurred since the previous report.

In further analytical work:

- SRC Member Jim Estep will update his earlier review of regional avian population data.
- The Analysis Subcommittee will consider developing a Monitoring Team multivariate analysis, and resolve confidence interval issues and carcass backdating issues around start date.

Upcoming SRC meetings:

Possible conference call meeting in **December** (Topic: Sandhill repowered project DEIR)
Possible in-person meeting date:

- **February 12-14** [Date changed post-meeting]

Action Items & Meeting Follow-Up

Party	Due Date	Action
SRC		**Meetings:** ▪ Possible December conference call, FloDesign/Sandhill repowered project DEIR ▪ In-person meeting: **Feb 12-14**
Analysis Subcommittee	December	Meet to consider confidence interval and standard error issues for the next fatality report.

Party	Due Date	Action
Analysis Subcommittee/Monitoring Team	December	Work to develop a multivariate model with the goal of identifying the impact of various management measures and other variables on fatality rates and trends.
Monitoring Team	Mid-Oct.	Develop addendum to M98 or final report describing the extent of changes between the draft and final reports and why they occurred, and making distinction between major/minor errors discovered, as many are minor. Package so addendum is available to readers of the report.
Monitoring Team	Future reports	Feather spot table: add explanation that it is % feather spot/% non-feather spots
Monitoring Team	Future reports	Table 3-4 - consider adding * explaining change in numbers, given 500 red-tailed hawk number difference from draft report
Monitoring Team	Future reports	Consider alternative wording for "amortization" in reports
Monitoring Team	Future reports	Reassign Diablo Winds turbines to their own BLOB, and clearly acknowledge and explain the reasoning for the change in the report.
Monitoring Team	Feb. 2014	Fig 1-2: Add "18" to area now blank that is part of BLOB 18
Monitoring Team	Feb. 2014	In next report, talk about how this version differs from past reports, document history of change
Facilitation Team	DONE	Send out link to SRC on CalWEA study, Smallwood reports
Julie Yee	Mid-Sept	Share search radius research with SRC
Facilitation Team	For next meeting	Agendize discussion of search radius issue if SRC is interested
Facilitation Team	For next meeting	Agendize Brian Karas to talk about CalWEA study
Alameda County	As needed	Discuss golden eagle study coordination options and procedures with USGS
Alameda County		Consider SRC recommendation for FloDesign permit exemption on unproductive turbines until study is completed
Monitoring Team/Analysis subcommittee	DONE	Conduct email discussion on 2013-14 monitoring design rotating panel - whether to restart with original panel.
Analysis Subcommit	December	Examine the search radius issue and whether it should be a future agenda item; consider first searches and potential

Party	Due Date	Action
tee		buffer periods for start dates
Jim Estep	December	Collect and analyze regional avian population data for next monitoring report round

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Meeting Account

Announcements

Sandra Rivera of Alameda County had four major updates:

1. The County had received a new project application, Makani Wind, which will involve one installation of their new fixed-wing kite power system, and the County will keep the SRC updated on the application process.
2. The EIR public draft for the Sandhill FloDesign project was scheduled to be available in December. The Sandhill EIR would include a program review of the eventual 300 repowered turbines (40 have already been installed as part of the study). The County might need to schedule a conference call meeting with the SRC in December to discuss this project.
3. The Draft Repowered Program EIR and the Avian Protection Plan (APP) would be released between December through February. The County would decide whether to hold an SRC conference call meeting or discuss the reports at the next in-person meeting.
4. Regarding the Altamont Winds, Inc. (AWI) permit modification request, the East County Board of Zone Adjustments (EBZA) decided to remove the phased shutdown requirement as AWI requested, but upheld the seasonal shutdown requirement. AWI's permits expire at the end of December 2015 and all AWI

turbines will be shutdown. There was no appeal from AWI.

Monitoring Team Announcements
Doug Leslie, manager of the Monitoring Team, introduced Karl Dickman as the new database manager who had been working with SRC member Julie Yee on the analyses replication and correcting database issues.

Monitoring Database Audit & Analysis Subcommittee Review

Related Documents
M98 Database Rectification Completion Memo
M100 August 2013 Presentation Slides
M96 APWRA 2005-2011 Draft Bird Fatality Report

Discussion of Database Audit
Monitoring Team Manager Doug Leslie provided a PowerPoint presentation overview of the database audit and additional database updates. Key points included:

- Due to several issues in the March draft 2010-11 Bird Year Fatality Study, the Monitoring Team conducted a thorough database audit and datasheet review. The Team identified and corrected a few programming errors and re-ran the original database queries. Any database corrections were noted in the M98 memo.
- Other changes included updated turbine information from turbine companies. BLOBs that did not have adequate information for estimating surrogate fatality rates were identified and excluded from analyses. There was a minor substitution for the surrogate fatality rates (Table 2-3) for BLOB 27, which was added to the monitoring design in the 2007 bird year and did not have fatality estimates for 2005 and 2006.
- Based on the new analyses, the change in the 3-year rolling average from the first to the last period has decreased from 50% at the end of the 2010 bird year to 36% at the end of the 2011 bird year. This change was likely due primarily to revisions in the QAQC analysis calculating detection probabilities, and would be further discussed during the QAQC Analysis Update and Final Study Report [See page 7].

Discussion of Analysis Subcommittee Review
SRC Member Julie Yee of the Analysis Subcommittee reviewed the analytical framework using the mathematical walkthrough in Appendix D of the fatality report (M96 APWRA 2005-2011 Draft Bird Fatality Report). She worked with the Monitoring Team to clarify a few formulas and was able to replicate the same fatality rate estimates and Altamont-wide fatality estimates.

While Julie Yee was able to replicate the point estimates, she did not compute the confidence intervals and standard errors before the August meeting. She will continue to work with the Monitoring Team to address this issue.

Monitoring Team Responses to SRC Questions and Comments:
The Monitoring Team provided the following information to address the SRC's questions about errors that the monitoring team discovered and corrected in the database:

- In the M98 memo, errors were categorized as either "Major" or "Minor." Major errors were those that were directly used in calculations, while minor errors were not. Those categorized as "major" did not necessarily affect the results, but had a greater likelihood of affecting the results than "minor" errors.
- Error categories were further classified into types – "fatality status," "other" and "transect sequence." An example of "other" would be "carcass condition," which might not be used directly in calculations (therefore not under the "fatality status" category, but was nonetheless important to include). "Carcass condition" served as back-up information that helped determine whether it should be included in analyses.
- The Monitoring Team discovered an error in how amortization, the adjusted fatality counts for when a BLOB was not surveyed for the full bird year, was calculated specifically in the 2006 bird year for red-tailed hawk.

SRC Discussion on the Database Audit:
SRC members raised the following questions and issues:

- Several SRC members were concerned that someone in the future would read previous fatality reports and become confused by incongruences. They recommended an explanation in the text of the fatality report to identify and document why there were particular changes in the results in the study. Detailed explanations could go into an appendix.
- The M98 memo identified many errors that were merely omitted data for variables that were not used in the analyses. One SRC member suggested making that distinction clearer, as many so-called "errors" were insignificant and not relevant to outcomes.
- The estimated annual fatalities for red-tailed hawks for 2006 in this report version were approximately 500 fatalities less than those in the draft report (764 in Table 3-6 of draft report; 237 in Table 3-4 of final report). This must be noted and explained in the report.
- Several SRC members said the term "amortized" to describe fatality rate was not being used appropriately. Suggested replacements included "adjusted" or "extrapolated." Changes in terminology between reports should be clearly noted in the next report(s).

Public Comment on the Database Audit:
Loan Tran of NextEra asked whether the Monitoring Team was able to determine the root cause of all the errors in the database.

In response, Doug Leslie of the Monitoring Team said many errors were due to haste in producing the report and not querying the database correctly, rather than errors in the database's structure. Most errors were blanks where there were no data entries.

Loan Tran of NextEra then asked whether the data available to the public on the SRC website incorporate the corrections.

In response, Monitoring Team members said the public database was updated and available for download on the website.

Unresolved Issues and Next Steps for the Database Audit: The Analysis Subcommittee

made recommendations for the analysis, but a few changes could not be implemented before the August meeting. The recommended changes included:

- Clearing searches were first implemented in the 2010 bird year with the rolling panel design and fatalities found during those searches were excluded from analyses. However, a large number of new turbines were added to the study design in 2007, and the fatalities from those first searches had been included into the analyses. To maintain consistency, first searches of new turbines need to be identified and associated fatalities excluded from the analyses.
- Searches prior to the beginning of the current study (October 1, 2005) need to be excluded from analyses.
- Reassign Diablo Winds turbines to their own BLOB -- the Analysis Subcommittee wanted input from the entire SRC on this [See SRC Discussion page 8].

Next Steps

- The Analysis Subcommittee will meet to consider confidence interval and standard error issues for the next fatality report.

QAQC Analysis Update

Related Documents

M96 APWRA 2005-2011 Draft Bird Fatality Report
M100 August 2013 Presentation Slides

Update Presentation

Doug Leslie of the Monitoring Team gave an overview of changes made in the QAQC analysis since the March meeting. Key points included:

- The Monitoring Team created a cleaner dataset after reviewing all data associated with the Team's scavenger/carcass removal trials and the American Kestrel/Burrowing Owl Study. It also identified and removed fatality records that did not belong in the dataset.
- QAQC sample size increased because more records were found during the database audit. Compared to the draft report, this slightly lowered detection probabilities for smaller focal species, but produced higher detection probabilities for red-tailed hawks and golden eagles (Figure 3-3).

There were no questions or comments from SRC members or the public.

Final 2011-12 Bird Fatality Study

Related Documents

M96 APWRA 2005-2011 Draft Bird Fatality Report
M100 August 2013 Presentation Slides

Report Presentation

Doug Leslie of the Monitoring Team presented a summary of the final 2005-2011 Fatality Study Report and the results of analyses incorporating 2011-12 bird year data. Compared to

the March 2013 draft report, most of the results and trends did not change. Key points from the final report included:

- **Bird Use:** Red-tailed hawk and golden eagle bird use increased and stayed high during winter, while average monthly fatalities decreased during this time (Figure 3-2). American kestrel fatalities and bird use did appear correlated (Figure 3-2).
- **Fatality Rates:** From 2005 to 2011, adjusted fatality rates declined for all focal species except for American kestrel, which increased (Figure 3-4). In the 2011-12 bird year, adjusted fatality rates decreased for red-tailed hawks and golden eagles, but there was a larger increase in fatality rates for burrowing owls and American kestrels (Figure 3-4). The relationship between bird use and estimated APWRA-wide fatalities was more strongly correlated for red-tailed hawks and burrowing owls than American kestrels (Figure 3-5). Golden eagles appeared to have an inverse relationship, especially in the early portion of the study, and there still appeared to be an anomalous spike in 2006 for burrowing owl fatalities (Figure 3-5).
- **Repowering:** Average annual adjusted fatality rates at repowered turbines were significantly lower than non-repowered (Table 3-9).
- **Possible Predation Issue**: Results suggested that predation (possibly by red-tailed hawks) may be contributing to the increase in winter fatality rates of smaller focal species, especially burrowing owls. Red-tailed hawk use was positively correlated with burrowing owl fatalities (Figure 3-2), and the proportion of burrowing owl and American kestrel carcasses characterized by predation evidence (i.e., feather spots) was higher in winter months than non-winter months (Figure 3-10).
- **50% Mortality Reduction Trend:** The estimate for total annual fatality reduction was 36% (Table 3-7). This was less than 50% because the 3-year rolling baseline is now actually lower (1,134 in Table 3-9 of draft report; 953 in Table 3-7 of final report), primarily due to red-tailed hawk data corrections. Additionally, the most recent 3-year rolling average increased when the 2011-12 bird year was added (i.e., 1.15 fatalities per MW for 2008-2010 to 1.48 for 2009-2011).
- **Winter Shutdown:** Fatality rates were expected to be higher at Diablo Wind turbines, which did not shutdown in the winter, compared to non-Diablo Wind turbines. However, there were no strong relationships because the Diablo Winds sample size was too low for an adequate comparison (Figure 3-9).
- **Hazardous Turbine Removal:** The Santa Clara Operating Group was predicted to have higher fatalities because it was not subject to hazardous turbine removal, and there might be possible supportive evidence for two species, American kestrels and red-tailed hawks (Figure 3-11).

SRC Discussion on the Final 2011-12 Fatality Study Report:

SRC members shared the following comments:

- Some SRC members said fatality rates and bird use appeared to track relatively well over the last five years (even for golden eagles to a certain degree). Fatality rates and bird use appeared to have stabilized but later increased in the last year or two. This would support the hypothesis that their population numbers could be cyclical, although the driving factors were uncertain. One SRC member noted these species have different ecologies, and one would not expect the estimates to closely overlay each other.

- It would help to have other datasets available (e.g., weather patterns, wind farm projects, local/regional data, and pre-2005 APWRA data; other local bird data) to provide more insight into the relationship between populations and fatalities at Altamont. The best control treatments are going to be other local and regional datasets. One SRC member noted anecdotally that American kestrel populations have been increasing state-wide in recent years. Several years ago, the SRC looked at data from the Golden Gate Raptor Observatory (GGRO), USGS Breeding Bird Survey, and the National Audubon Society's Christmas Bird Count. [See P82 Estep Regional Raptor Population Data Summary]. These datasets might be worth revisiting.
- The linear regression trend lines and their corresponding equations help indicate the overall tilt of the trend pattern over time, but are not appropriate for predicting future fatality estimates (Figs. 3-4 to 3-8). The trends in fatality and bird use were not expected to be linear, and the Fatality Study was not intended to make future predictions.
- The red-tailed hawk fatality rates dramatically decreased at Diablo Wind turbines in 2007-2009 (Figure 3-9).
- The large peak in 2006 for burrowing owl fatality rates at both Santa Clara turbines and the rest of Altamont remains a curiosity (Figure 3-11).
    - Sandra Rivera of Alameda County said the Santa Clara field had no high-risk hazardous turbines.
    - The Monitoring Team reported that the Santa Clara area was good burrowing owl habitat, but turbines were turned off there during 2006. The blades were fixed and should not be moving. Other BLOBs also had these extreme peaks in 2006. The Monitoring Team did not have census data for burrowing owls, but could look for patterns in the BLOB data.
    - One SRC member noticed that the peak in 2006 is now less for some species after the database corrections.
- The 50% reduction goal combining four different species appears to be problematic because their ecologies are different, and conservation of one species might negatively affect another. Additionally, the fatality rates appear to be cyclical, so the 50% reduction goal might not be appropriate anymore. It might be preferential to focus on how APWRA fatality rates compare to regional trends.
    - Sandra Rivera of Alameda County added that since the 50% reduction decision had already been made at the point in time required by the Adaptive Management Plan, the 50% reduction would now function more as a reference point. Most companies will turn off their old-generation turbines by 2015, and there would likely be more repowering projects in the future. Therefore, Alameda County is more interested in determining what factors are driving bird fatality dynamics in the APWRA.

Consideration of a Diablo Winds BLOB

The Diablo Winds turbines are intermixed with other turbines and so were placed in three separate BLOBs containing other turbine types, even though the Diablo Winds turbines were exempted from seasonal shutdown. The Analysis Subcommittee recommended designating Diablo Winds turbines as their own BLOB. Analysis Subcommittee members provided the following information to SRC questions and comments:

- BLOBs were stratified by turbine type and spatial differentiation in an effort to create homogenous units, but did not need to be contiguous. Since the Diablo Winds turbines have not been monitored after 2009, they have been treated separately in the analyses already.
- Diablo Winds turbines had a much greater rated capacity, 660 kW versus 120 kW for surrounding old-generation turbines. The turbines were dispersed on similar topography through BLOBs 7, 11, and 15 (Figure 1-2) and originally could not be combined into one BLOB due to monitoring logistics. There was only one string of Diablo Winds turbines that could potentially distort fatality estimates for nearby old-generation turbines in BLOB 11.
- In Figure 1-2, the unlabeled BLOB surrounded by 12, 14, 15, and 19 was part of BLOB 18.

SRC Comments on Consideration of a Diablo Winds BLOB

- In regard to what the preferred search radius would be for the larger repowered turbines, there had been studies and models that could estimate the likely impact radius for turbines. This would always be imperfect, however, since factors such as the movement of injured birds could not be differentiated from birds thrown by a turbine.
- Label both sections of BLOB 18 in Figure 1-2.
- It appeared that a new BLOB for Diablo Winds would not significantly alter results. However, that change should be clearly documented in the report, along with all other methodological changes.

Public Comments on the Fatality Report

Joan Stewart of NextEra said data from the company's Vasco Winds project, which came online in 2011, was scheduled to be available to the public near the end of 2013.

SRC Suggestions for Bird Fatality Studies:

- Clarify that Figure 3-10 illustrated the proportion of carcasses characterized by feather spots for that season and not the entire bird year.
- Review Table 3-4 and include a short explanation addressing the large difference in red-tailed hawk estimated fatalities between the draft and final reports.
- Reorganize the M98 memo layout to distinguish between major and minor factors.
- Consider an alternative term for "amortized" fatality rate. In any case, the chosen term should be clearly defined.
- Some SRC members encouraged the Monitoring Team to publish its research for peer review.

SRC Recommendations for the Final 2011-12 Fatality Study Report

- The SRC recommended a report addendum to describe changes between the draft and final reports and why they occurred, including changes to the database. The reports need to be transparent to the public, and it must be clear that later reports cannot be compared to earlier reports, as data and methods may have changed. There should be a documented history in future Fatality Reports that clearly explains what has changed in the data, study design and analytical approaches over time.

- As suggested by the Analysis Subcommittee, the SRC recommended for future analyses reassigning the Diablo Winds turbines to their own BLOB, with the stipulation that the Fatality Report needed to clearly acknowledge and explain the reasoning for the change.

Next Steps

- SRC members requested a future discussion on results of the CalWEA study (See Link to CalWEA paper, R69). Brian Karas, Monitoring Team member and a participant of the study team outside of Monitoring Team work, was asked to provide a brief presentation at a future meeting.
- If available, information for Vasco Winds will be included in the 2012-13 report.
- The Analysis Subcommittee will work with the Monitoring Team to develop a multivariate model with the goal of identifying the impact of various management measures and other variables on fatality rates and trends. The model would potentially help relate fatality rates to bird use and identify the impact of various turbine conditions at the BLOB level.
- Invite Shawn Smallwood to present his research on burrowing owls, ideally for the same meeting as the SRC's review of the Avian Protection Plan.

USGS Golden Eagle Study

Related Documents

P271 USGS Golden Eagle Information Brief 2013

Study Presentation

David Wiens of USGS gave a presentation on USGS' golden eagle study that is using ground-based surveys and a multistate occupancy design to study golden eagle occupancy in the Diablo Range. In past monitoring, Grainger Hunt had identified 58 golden eagle territories within 30 km of the Altamont Pass. In 2013, 57 of the 58 territories were occupied by adults (many of which were non-nesting). Scientists used radio-marked birds captured near the APWRA to track movement. For certain age groups, the leading cause of death was collisions with wind turbines, based on injuries sustained and carcass location.

The proposed expanded study region (6,845 km^2) would incorporate historical nest locations and was based on the range of the radio-marked birds. The study's objectives are to estimate the proportion of area occupied by territorial pairs and the proportion of area occupied by territorial pairs that also produce at least one fledgling, calculate the detection probability, and identify factors affecting detectability. This first year of work is focused on providing recommendations to improve monitoring strategies across the large study area. Sample sites were randomly chosen and will be visited multiple times during the breeding season. Occupancy is defined by three categories: not detected, detected with no evidence of nesting, or detected with evidence of successful nesting (i.e., at least one fledged young). Detecting evidence of successful nesting will be difficult. The difficulties of determining fledging success were discussed.

There were several randomly-chosen sampling polygons within the APWRA that would be excluded from study's monitoring protocol at this point in time. However, study researchers are open to including APWRA in the future.

SRC and Monitoring Team Discussion on the USGS Golden Eagle Study
David Wiens of USGS provided the following information to SRC and Monitoring Team questions and comments:

- Historically, reproduction had been highly variable, and nesting success ranged between 20% to 84% in the 58 monitored territories.
- By observing the eagle's behavior, the survey team can pinpoint nests and identify if the eagle is local and whether it is paired. The difficult task has been determining if nests are successful. Researchers have not been classifying "detection with evidence of nest but unknown success status." However, the model framework is flexible and could incorporate that classification. The model was also designed to account for imperfect detection of nesting.
- Sample units are 1500-hectare polygons, although that size might be reduced. Researchers will start with 4-hour observations and adapt survey duration based on time until first detection.
- Researchers are using randomly-chosen sites because there were errors in the habitat maps they possessed, and they were also interested in sampling non-ideal habitats. If the study continues, they will likely transition to a territory-based sampling design.
- Recording prey species data might not be logistically feasible.
- Researchers have not decided whether they will choose different sites in succeeding years.
- Depending on funding, there may be continued monitoring for the historical 58 territories.

SRC Comments and on the USGS Golden Eagle Study

- If the study did go forward, it would be helpful if the APWRA was definitely sampled, even if that data would be excluded from analyses because they were not randomly chosen.
- Some areas will be difficult for ground-based surveys due to limited road access and susceptibility to weather conditions.

Public Comment on the USGS Golden Eagle Study
There were no comments from the public.

Next Steps for the USGS Golden Eagle Study
SRC members were interested in the USGS golden eagle study and encouraged researchers to include the APWRA in its monitoring area. Sandra Rivera of Alameda County will discuss coordination options and procedures with David Wiens offline.

FloDesign Unproductive Turbines

Introduction:
Sandra Rivera of Alameda County is seeking an SRC recommendation supporting a Conditional Use Permit exemption to allow FloDesign to leave up unproductive turbines, which its permit requires to be removed after one year of inactivity. The purpose would be to maintain on-site conditions for Shawn Smallwood's before-after study of the new FloDesign turbine design. When he began his study in 2012, there were some unproductive

turbines up at the time, and the County and FloDesign would like an exemption so they can remain standing until the study is completed.

John Howe of FloDesign provided background information for the SRC. FloDesign had acquired those sites in April 2012 from AES (formerly called SeaWest sites, now called Forebay Wind). The new repowered project is called Sandhill. FloDesign repaired many non-functioning turbines, but a number remain non-operating. FloDesign had 157 turbines as part of Shawn Smallwood's Before-After Control-Impact (BACI) avian study; half of those turbines come out November 1, 2013 and will be replaced by 40 new FloDesign turbines in spring 2014. For turbines that were not part of the BACI treatment, Shawn Smallwood urged FloDesign to leave all unproductive turbines unchanged for the duration of the study. The Smallwood study began in April 2012 and is due to the California Energy Commission on March 31, 2015. FloDesign's funding from the Commission's Public Interest Energy Research program would expire then, and its goal is to have as close to 480 turbine months of study as possible before then.

John Howe of FloDesign and members of the Monitoring Team provided the following information in response to SRC questions and comments:

- 12% of FloDesign's area were comprised of unproductive turbines (an estimated 50 individual turbines). Unproductive turbines are randomly distributed between the avian study and non-study area, and approximately a third of the unproductive turbines were in the avian study survey area. Shawn Smallwood wanted all the unproductive turbines to remain, including those outside the study area.
- The study area never had any "hot spots" for fatalities. The high-risk hazardous turbines had been removed prior to the study. All of the turbines should still have their blades in place. Micon turbines had locking blades, but the Altechs did not and could be spinning, although slowly.

SRC Comments on FloDesign Unproductive Turbines:
SRC members provided the following comments:

- If the blades were not locked down, then they should remain unaltered.
- Turbines in adjacent BLOBs could potentially compromise the control effort in the Smallwood design. The turbines in BLOB 10 appeared to be the only turbines in close proximity.
    - John Howe of FloDesign said that given the orientation of the turbines and the prevailing winds coming primarily for the southwest, FloDesign did not think its turbines were influenced by BLOB 10 turbines.

Public Comments on FloDesign Unproductive Turbines
John Howe of FloDesign expressed his concern that if the County was going to require the turbines to remain unchanged, that might restrict their engineers if they deemed a turbine to be dangerous. He requested the SRC to include language that allowed for safety adjustments.

SRC Recommendations on FloDesign Unproductive Turbines
The SRC agreed to recommend that Alameda County give FloDesign a permit exemption from removing unproductive turbines until the Smallwood study is completed. The SRC also recommended that the exemption include language that would attempt to maintain the initial

turbine conditions to the extent possible, and that they receive updates on the study as it progresses.

2013-14 Monitoring Program

Background:
Doug Leslie of the Monitoring Team and Sandra Rivera of Alameda County provided background on the Monitoring Program for the coming bird year starting on October 1. ICF evaluated various cost-saving options, including a reduction in sample size. The Monitoring Team concluded that a sample size reduction could potentially result in an under-sampling of certain BLOBs, and therefore the recommendation is to maintain the existing sample size.

If the sample size is maintained, there are a few options for adjusting the rolling panel design. This design was implemented in 2010 and has now rotated through all three panels. The 2013-14 bird year monitoring could:

1. Rotate to the first original panel
2. Begin with the third panel, or
3. Re-randomize the panels and begin a new set of rotations.

Issues to consider:

- A potential logistical issue for rotating to the first panel is whether Shawn Smallwood is conducting randomized carcass detection trials at FloDesign.
    - John Howe of FloDesign said the carcasses should be confined to Shawn Smallwood's study area and not affect the Monitoring Team's study area.
- The analytical framework was set up to account for changes in turbine numbers.

An SRC recommendation is needed by the end of August if it might result in a significant change to monitoring implemented on October 1. Because the 2013-14 Monitoring Program budget is more limited, the Monitoring Team needs consensus on a finalized analytical framework before the 2012-13 bird year Draft Fatality Report would be presented.

SRC Discussion on the 2013-14 Monitoring Program
SRC members raised the following questions and issues:

- There is not enough time for a full 3-year rotation before repowering takes place. The SRC should focus on what to do within that limited timeframe.
- Rotating to the first panel is the more intuitive process. It is uncertain whether the panel design could be modified based on the results of the initial rotation. The Analysis Subcommittee agreed to review if there could/should be any modifications and report back shortly after this meeting.

Public Comment
Joan Stewart of NextEra said that NextEra's approximately 1,100 turbines are scheduled to be shut down by October 31, 2015.

John Howe of FloDesign said that, assuming its project proceeds along the planned timeline, 404 FloDesign turbines would shut down by the end of 2015 or early 2016.

Andrew Roth of AWI said that, with its modified permits, AWI would shut down 814 turbines by November 1, 2015. He suggested that since these shutdowns would be occurring before another complete panel rotation could be completed, perhaps the design should be modified to account for this limited time frame.

Continued SRC Discussion on the 2013-14 Monitoring Program

An SRC member asked whether the goals had changed from the 50% reduction, and if so, what sampling was necessary to address those goals.

- Sandra Rivera of Alameda County said that while there had not been a formal adoption of different objectives, there had already been a gradual transition towards new goals after the December determination on the 50% mortality reduction, and it would be important to keep the Settling Parties informed about any changes. The new goals generally could include establishing a baseline for future APWRA projects and maintaining the monitoring program's ability to determine trends.

One SRC member suggested that if the SRC knew the locations of future projects, a potential strategy for reducing costs would be to focus monitoring at these locations without compromising the study's integrity. Until the SRC knew more about those locations, it would be best to continue the same monitoring protocol. A map of definite future repowering projects should be provided to the SRC as soon as possible.

In response, Sandra Rivera said the programmatic EIR due in December-February would have more information about potential projects.

An SRC member suggested another strategy for reducing costs would be identifying which issues were of most concern and decreasing the timespan of monitored variables. That option would call for intensive discussion before modifying the study design in any significant way.

Members of the Analysis Subcommittee emphasized they still had to resolve confidence interval issues in the analyses before making any changes to the study design.

Public Comment on the 2013-14 Monitoring Program

Andrew Roth of AWI asked, if the Monitoring Program and analysis framework were designed to reach the 50% reduction, and now the study was no longer aiming for that 50%, what was the possibility for altering the study design? Ultimately, AWI wanted to reduce monitoring costs rather than accepting past methods solely because that was what had been done in the past. AWI had expected more discussion and exploring whether, with the SRC's help, there could be cost-saving reductions in monitoring efforts.

- In response, Sandra Rivera of Alameda County said the initial 50% reduction study design was primarily developed by non-biologists, and whether or not the 50% reduction was achieved had become irrelevant because management actions moving forward would likely be very limited. Even if the 50% reduction had not been determined in December 2012, changes would have been slight. The County's permits require monitoring, but do not specify what the goals should be in regards to monitoring. The County is encouraging the SRC to glean as much information from the study design that has been developed rather than focusing on fatality estimates

and the 50% reduction. Changing the Monitoring Program now could hinder the SRC's ability to make determinations about future projects and to compare fatality rates.

- An SRC member said the sampling design process determines the minimum level of effort to achieve a study's objective with statistical significance, then it examines how much that would cost. Approaching the study in the reverse manner could increase confidence intervals and compromise a study's integrity.

John Howe of FloDesign expressed concern whether companies with no repowering plans in the coming year would be impeded from future redevelopment. FloDesign representatives would not want a curtailment of monitoring to hinder their opportunity to redevelop sites in the future.

- An SRC member agreed, but since the permit process and project planning had a significant amount of lag time, the SRC should have time to evaluate potential impacts. The SRC wanted the best available and updated information provided.

John Howe of FloDesign wanted to note that one of the reasons FloDesign decided to do the avian study in the Altamont was due to this extensive monitoring history. It would have taken a lot longer if there had not been this baseline of data. This Monitoring Program has had significant value to the company in that respect.

SRC Recommendation on the 2013-14 Monitoring Program

- The SRC recommended maintaining the existing Monitoring Program sample size.
- The SRC supported the next Monitoring Program year rotating back to the first panel, with the proviso that there will be further consideration by the Analysis Subcommittee and potentially a different recommendation from the Subcommittee for the SRC to consider.

Next Steps for the 2013-14 Monitoring Program:

- The Analysis Subcommittee will hold an e-mail discussion in the August 26-30 timeframe to consider the rolling panel design.
- If the Analysis Subcommittee decides to recommend an alternative methodology, an SRC conference call meeting will be held ASAP for the SRC to consider the issue before the next bird-year sampling begins.

Discussion of Analytical Approaches Going Forward

Related Documents:

M96 APWRA 2005-2011 Draft Bird Fatality Report
M99 Analysis Subcommittee Deliberations Memo
M100 August 2013 Presentation Slides

Introduction

Doug Leslie, Monitoring Team manager, reviewed issues and questions that the Analysis Subcommittee had developed about future analytical approaches. These issues were primarily focused on whether the Monitoring Team should adjust survey protocols in an effort to achieve greater accuracy, review outside datasets for comparison, and choose a

method for consistent data management even though the study design had changed over the years.

SRC and Monitoring Team Discussion on Analytical Approaches Going Forward
The SRC and the Monitoring Team provided the following comments and issues for consideration:

1. Adjustments for variable search radius
Adjusting the search radius would account for fatalities that have been detected outside of the search radius (50m normally, 75m at Diablo Winds turbines, and 60m at Buena Vista turbines), but would also increase monitoring effort. Shawn Smallwood had recently published a paper that calculated the aerodynamics of where carcasses may land. SRC member Julie Yee is familiar with another paper related to the topic that she will cite to the SRC.

2. Assessing trends in fatality rates including data prior to 2005 bird year
Several SRC members supported the idea of reviewing and discussing data prior to 2005, even if it is not part of the statistical analyses. Shawn Smallwood had recently circulated a paper analyzing long-term fatality trends including data prior to 2005 (See R68 Smallwood Altamont Fatality Rates Longterm). SRC members took a quick look at the tables in the report and shared the following insights:

- The Smallwood report did not use data from the Monitoring Team's corrected database, and the magnitude of peaks differed, but there did appear to be evidence of cyclical patterns. There might be a 5-6 year cycle in the APWRA.
- The Altamont data should be compared to regional data for impact assessment related trend analysis.
- It would be interesting to explore whether there were cyclic trends at lower trophic levels (e.g., small mammals, insects, vegetation).

3. Exploring alternatives to the 3-year rolling average
SRC members considered whether the report should continue to estimate the trend in mortality based on the original baseline estimate in the Settlement Agreement and the three-year rolling average estimates. They also considered whether to include both an annual average and a 3-year rolling average for fatality estimates. One SRC member favored using only the annual average estimates given the potential cyclic fatality rates. Other SRC members preferred that the Monitoring Team continue developing estimates based on multiple approaches involving both the annual average, the 3-year rolling average, and the 3-year rolling average baseline (2005 – 2007) estimates.

4. Analysis of fatality reductions over time based on permitted capacity
The Monitoring Team had been concerned with insufficient turbine-removal data for two operating groups in Contra Costa County: Tres Vaqueros and Northwind. The SRC and Monitoring Team discussed whether it was more appropriate to use "permitted capacity," the capacity the turbine field is permitted for, rather than "installed capacity," which is based on data provided by wind companies about turbine operations during the year. The Monitoring Team did not see a significant difference when it compared fatality estimates

APWRA-wide and Alameda County alone (PPT Slide 27), and would recommend continuing to use installed capacity unless the Analysis Subcommittee suggests otherwise.

Public Comment

Joan Stewart of NextEra asked whether "permitted capacity" referred to how many turbines were allowed under the conditional use permit. Many times in older permits, not all of the turbines were built even at the time they were permitted.

- Brian Karas of the Monitoring Team explained that it referred to the maximum number that ever existed of that type of turbine.

Joan Stewart of NextEra suggested an alternative term, such as "built" or "original/nameplate/construction," to avoid misunderstanding. The 1998 EIR detailed "built" information for Alameda and Contra Costa County including numbers of what could potentially be built under the Conditional Use Permits and what was actually built.

5. Assigning backdates to carcasses of unknown ages

In the past, when a carcass characterized by feather spots could not be aged confidently, it was given the default of 45 days – the mid-point value between the 0-90 day backdate timeframe. A more accurate value could be calculated via two approaches:

- Use the mean "days to removal" as a function of wingspan, or
- Use the mean "days until detection" by the search team based on detection probability estimates. This second alternative would theoretically be more accurate but was less feasible and subject to the high uncertainty of the detection probability estimates.

The Monitoring Team and a member of the Analysis Subcommittee said that either alternative would not significantly alter results. The SRC recommended using the mean "days to removal" to estimate unknown carcass age as a function of wingspan.

6. First searches, start dates, and carcass data subject to exclusion

The SRC and Monitoring Team considered different approaches for a consistent treatment of first searches of new turbine strings. In 2007, many turbines were added to the Monitoring Program, but first searches for these new turbine strings were included in analyses because most were added in the spring. The Analysis Subcommittee and the SRC recommend excluding these first searches from analyses. SRC members and the Monitoring Team discussed other issues regarding first searches, and decided upon the following criteria to maintain consistency in the methods:

- Any carcass that backdated prior to the beginning of a monitoring year (October 1) should be excluded from estimates for that monitoring year (already in practice).
- The first search of a newly added turbine string would be treated as a clearing search and excluded from analyses. First/clearing searches occurred in 2005, 2007, and at rotating panel strings from 2010 to the present.
- The first search date of any turbine string (new or not) would be established as the start date for that particular string and fatalities discovered on that search would be excluded.
    - Additionally, any carcass found in subsequent searches that backdated to prior to the first search date/start date would be excluded as well.

The question was raised whether it would be appropriate to include a buffer period before the first search date, which would account for carcasses detected in the first search that were obviously fresh. Several SRC members advised that, if a buffer period was established, it should not be more than 2-3 days prior to the first search date.

7. Increase in gull fatalities

Although gull fatalities had historically been a normal occurrence, they had approximately doubled in the northern portion of Altamont since 2011. There was an increase in fatalities at an old hot spot (i.e., location with a high number of fatalities) in BLOB 10 near Bethany Reservoir, but a new hot spot had developed in BLOB 13 near the newly constructed Dyer Reservoir. Potential reasons for the increase in gull mortality could be overall increased gull population in the region, but this requires more consideration.

Public Comment

> Joan Stewart of NextEra said there was a landfill directly in line with the two hot spots, which could be attracting gulls. She added that a recent news article noted an expansion of gull populations in the Bay Area, not just in waste management locations.

An SRC member asked that the Monitoring Team searchers begin tracking whether gull carcasses are large or small, as size can help distinguish possible species involved, and whether there is cause for concern.

SRC Recommendations on Analytical Approaches Going Forward

- The SRC recommended that the Monitoring Team reference Shawn Smallwood's tables that incorporated pre-2005 data in the 2012-13 Fatality Report discussion section.
- Although not a complete consensus, a majority of SRC members supported continuing to develop fatality trend estimates based on both annual average and 3-year rolling average estimates.
- The SRC supported using the mean "days to removal" to estimate unknown carcass age as a function of its wingspan.
- The SRC requested that the Analysis Subcommittee further evaluate any unresolved issues regarding the treatment of first searches and potential buffer periods for start dates.

Next Steps for Analytical Approaches Going Forward

- SRC Julie Yee will cite an aerodynamic study document regarding search radii to SRC members.
- The Analysis Subcommittee will examine the search radius issue and recommend whether it should be a future agenda item, and will consider first searches and potential buffer periods for start dates.
- SRC member Jim Estep will collect and analyze regional avian population data, following up on his 2008 effort, to help provide context to APWRA fatalities and bird use data.

Meeting Summary Review and Approval

Related Documents:

P269 SRC March 2013 Meeting Summary

SRC members approved P279, the March 25, 2013 meeting summary as is.

Public Comment on General Issues

There were no general comments from the public.

Future SRC Meetings

Next In-person meeting:

Possible Dates: February 12-13

Potential Topics for next In-Person Meeting:

- Provide input on draft repowering EIR/Avian Protection Plan
- Review burrowing owl study outcomes
- Review FloDesign/Vasco Winds study insights
- If the meeting is in February: Draft 2005-2012 monitoring report

Next Conference Call Meeting:

Possible conference call meeting in December

Topic: Sandhill repowered project DEIR

Next Steps

- For agenda topics at the next meeting, SRC Member Julie Yee asked about the priority of the seasonal shutdown model analysis she was working on, which was identifying which factors were most affected by seasonal shutdown. The County recommended it should have a lower priority at this time to the other analytical items she is working on.
- One SRC member requested that, for substantial discussion questions such as future analytical approaches, it would be helpful to have 1-2 pages of reference material (e.g., pertinent graphs, tables, and other contextual information) distributed to SRC members with adequate review time prior to meetings.

Documents Circulated at Meeting

M98 Database Rectification Completion Memo
M96 APWRA 2005-2011 Draft Bird Fatality Report
P271 USGS Golden Eagle Information Brief 2013
M99 Analysis Subcommittee Deliberations Memo
P269 SRC March 2013 Meeting Summary

SRC Meeting Participants

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

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

Monitoring Team
Chris Brungardt
Doug Leslie
Brian Karas
Karl Dickman

Others
(Meeting sign-in is optional)
Bob Eggers, Altamont Winds, Inc. (AWI)
John Howe, FloDesign Wind Turbines
Meg Lawler Fratanduono
Andrew Roth, AWI
Brad Schafer, ICF
Joan Stewart, NextEra
Loan Tran, NextEra
Dave Wiens, USGS

List of SRC Agreements Developed August 19, 2013

(Compiled from this document)

SRC Recommendations for the Final 2011-12 Fatality Study Report

- The SRC recommended an addendum to describe changes between the draft and final reports and why they occurred, including changes to the database. The reports need to be transparent to the public, and it must be clear that later reports cannot be compared to earlier reports, as data and methods may have changed. There should be a documented history in future Fatality Reports that clearly explains what has changed in the data, study design and analytical approaches over time.
- As suggested by the Analysis Subcommittee, the SRC recommended for future analyses reassigning the Diablo Winds turbines to their own BLOB, with the stipulation that the Fatality Report needed to clearly acknowledge and explain the reasoning for the change.

SRC Recommendations on FloDesign Unproductive Turbines

The SRC agreed to recommend that Alameda County give FloDesign a permit exemption from removing unproductive turbines until the Smallwood study is completed. The SRC also recommended that the exemption include language that would attempt to maintain the initial turbine conditions to the extent possible.

SRC Recommendation on the 2013-14 Monitoring Program

- The SRC recommended maintaining the existing Monitoring Program sample size.
- The SRC supported the next Monitoring Program year rotating back to the first panel, with the proviso that there will be further consideration by the Analysis Subcommittee and potentially a different recommendation from the Subcommittee for the SRC to consider.

SRC Recommendations on Analytical Approaches Going Forward

- The SRC recommended that the Monitoring Team reference Shawn Smallwood's tables that incorporated pre-2005 data in the 2012-13 Fatality Report discussion section.
- A majority of SRC members supported continuing to develop fatality trend estimates based on both annual average and 3-year rolling average estimates.
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