

Meeting Summary | July 8, 2015

Altamont Scientific Review Committee

Developed by the Center for Collaborative Policy
Reviewed and approved by the SRC

4 of 5 SRC Members Present:

Joanna Burger
Jim Estep
Mike Morrison
Julie Yee

Absent:

Sue Orloff

Key Outcomes

The Altamont Pass Scientific Review Committee (SRC) met in Oakland on July 8, 2015. The following summarizes SRC agreements and key meeting outcomes.

2005-2013 Bird Fatality Data & Background Mortality Findings

The SRC heard the Monitoring Team's presentation on fatality data from the 2013 bird year (Oct. 1, 2013-Sept. 30, 2014) and findings from the Background Mortality Study.

The SRC provided the following consensus recommendations for the Monitoring Team report to be produced in Nov-Dec 2015:

Fatality Report:

Assessment of seasonal shutdown. The SRC agreed there will be two metrics for calculating the effect of seasonal shutdown: 1) 3.5 months divided by 12 months; and 2) bird use during seasonal shutdown divided by bird use for total year.

Background Mortality Study:

How to use background mortality study findings in the fatality report.

- The SRC supports addition to the report of a table showing overall fatality estimates, with fatalities of American kestrel/burrowing owl/small birds backdated to seasonal shutdown removed (slide 23). Caveat as needed that the study period is only one year, that it reflects only one set of environmental conditions, and that there has been a great degree of variability seen over time in the Altamont.
- Conclusion wording: revise conclusion about predation as a significant source of mortality to incorporate the possibility that turbines facilitate predation and cause fatalities.
- Test the assumption that the control sites beyond turbine search radii are not influenced by turbines at the treatment sites (post-hoc gradient analysis).

SRC's assessment on defining limits to applicability of findings. The Monitoring Team's existing caveats are appropriate.

Bird Use:

SRC thoughts on new bird use methodology and data use. Show confidence intervals in the final report charts.

Final Reports:

Report organization. Combined report with background mortality study in the appendix.

Upcoming SRC meetings:

- **Conference Call:** The SRC will hold a conference call meeting in summer or fall 2015 to consider old-generation turbine monitoring going forward.
- Next in-person meeting: the date is **Friday, November 13, 2015.**

Action Items & Meeting Follow-Up

Party	Due Date	Action
SRC		Meetings: <ul style="list-style-type: none"> ▪ Conference call date to be determined. Agenda item: Monitoring approach going forward for old-generation turbines In-person meeting: Friday, November 13, 2015.
MT/AC	August	ID timetable for developing monitoring plan, start of monitoring & straw monitoring approach for SRC consideration
MT	October	2005-13 fatality report with background mortality report in appendix

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Meeting Account

Announcements

Sandra Rivera of Alameda County shared the following updates:

- The East County Board of Zoning Adjustments (EBZA) approved the NextEra Golden Hills Project, which will remove old generation turbines and begin repowering construction by the end of 2015. NextEra also submitted its Golden Hills North repowering project, which will remove 324 old generation turbines.
- EDF continues to remove its old generation turbines at Patterson Pass, and the County expects it will submit its repowering permit application shortly.
- The Ogin/FloDesign/Sandhill shrouded turbine project will not proceed forward because the company did not receive the permits to connect to the grid.
- The County will review AWI's Summit Winds Project application.
- Brookfield, a new company to operate in the Altamont Pass Wind Resource Area (APWRA), submitted an application to place meteorological towers on a portion of Mulqueeney Ranch to conduct wind analyses.
- Because the County approved AWI's request to extend its conditional use permits through 2018, the SRC will continue to meet to review and discuss avian fatality mitigation measures.
- A Technical Advisory Committee, consisting of regulatory agencies, will review the monitoring design and results for repowering projects as part of their mitigation measures.

Response to Questions

Sandra Rivera provided the following responses to SRC members and the public's clarifying questions:

- The County Board of Supervisors approved AWI's permit extension request based upon a number of reasons, one of which was the fact that AWI is a small, local renewable energy company.
- Ogin's permits for its old generation turbines also last until 2018; however, the County does not know if Ogin intends to transition to repowered turbines before that time.
- After the 2015/2016 shutdown period ends, only Ogin and AWI will have operating old generation turbines.
- Brookfield has not decided whether to place repowered turbines on its site yet.

Workshop on 2005-2013 Monitoring Data and Preliminary Background Mortality Study Findings

Related Documents

[M106 July 2015 Presentation Slides](#)

Presentation on 2005-2013 Monitoring Data

Doug Leslie of the Monitoring Team presented the 2005-2013 monitoring data, and also preliminary findings from the background mortality study conducted during the 2014-15 seasonal shutdown period (see M106 July 2015 Presentation Slides for specifics).

Methodology Issues

There is one change to the monitoring analytical framework that addressed an under-monitoring issue. A small number of base layers of operating group boundaries (BLOBs), which had a low percentage of their turbines monitored, produced skewed results. Based on SRC input from the June 2014 meeting, the Monitoring Team used surrogate fatality rates for BLOBs with less than 15% of a BLOB's installed capacity sampled in a given year. This changed the estimates of APWRA-wide total fatalities for the 2005 and 2006 bird years, but the conclusions regarding the 50% mortality reduction goal for the focal species remain the same.

Bird Use

Bird use survey protocols were changed in December 2012 to address problematic issues, such as short survey duration and many surveys with no focal species detected. Under the new protocol, the Monitoring Team has increased the number of observation points and survey duration and recorded all observed species.

The resulting new bird use data has not changed previous conclusions regarding seasonal trends in bird use or relationships with fatality rates over time. Doug Leslie advised against deeply analyzing the burrowing owl data for trends, because the bird use protocols do not effectively detect burrowing owl activity. For the other three focal species, bird use varied seasonally, and fatality rates did not correlate well with bird use (except for red-tailed hawks).

Effectiveness of Seasonal Shutdown Management Action

The Monitoring Team reviewed all focal species fatalities whose estimated death date occurred during the shutdown period and identified the highly likely turbine-related fatalities. The team then used only the years with the universal 3.5-month seasonal shutdown period (i.e., 2009 to 2013 bird years) to analyze the seasonal shutdown's effectiveness. Significantly fewer golden eagles and red-tailed hawk fatalities occurred during the shutdown period than expected, while burrowing owls exhibited the opposite trend (i.e., significantly more fatalities occurred during the shutdown period than expected). A significantly higher proportion of the fatalities that occurred during the seasonal shutdown consisted of feather spots, possibly due to predation. The proportion of annual burrowing owl fatalities that occur during the seasonal shutdown period significantly increases over time, which is contrary to the assumption that no avian fatalities should occur during the shutdown period if all fatalities are turbine-related.

Presentation on Preliminary Background Mortality Study Findings

Doug Leslie reviewed the impetus for the background mortality study and the preliminary findings. Due to a reduced budget and the unusually high mortality for small birds during the seasonal shutdown period, the SRC recommended conducting a background mortality study during the 2014-15 shutdown period. The Monitoring Team, with input from the SRC Subcommittee (Mike Morrison and Julie Yee), developed a matched pairs study design (i.e., the treatment and control ridges are highly similar, but the treatment ridge possesses non-operating turbines, while the control ridge was typically a ridge that previously possessed turbines and now no longer possess turbines, although pads remain). The Monitoring Team conducted clearing searches at all the study sites (at least two clearing searches at sites not previously monitored) and conducted searches approximately every 9.3 days.

The Monitoring Team found significantly more small bird fatalities on ridges with non-operating turbines (31 fatalities) than on ridges without turbines (14 fatalities). These data suggest non-turbine-related small bird fatalities do occur during the seasonal shutdown period, likely due to predation.

Based on this finding, the Monitoring Team excluded American kestrel and burrowing owl fatalities with the estimated death date occurring during the seasonal shutdown from fatality estimates. This alternate analysis considers how the fatality estimates would be affected if these excluded fatalities were non-turbine-related. The resulting estimates increased the percent reduction in fatalities; therefore suggesting that, in this alternate scenario, the seasonal shutdown of old-generation turbines during the winter period effectively reduced the turbine-related fatalities in APWRA.

SRC Discussion

2005-2013 Monitoring Data

The SRC discussed the analytical framework changes and evaluated several hypotheses that may affect the trends in fatalities, bird use, etc.

An SRC member asked for further explanation on the purpose for identifying feather spots that happened to have obvious signs of being turbine-related fatalities. Monitoring Team members said the purpose was to address a clear backdating error. Approximately six fatalities occurred close to the transition between the seasonal shutdown period and the regular turbine operating period. These fatalities were clearly turbine-related (oiled feathers), but the study protocols automatically assign a death date that backdates into the seasonal shutdown. The Monitoring Team identified those obvious turbine-related fatalities and designated the deaths as occurring outside the seasonal shutdown. A Monitoring Team member suggested another method to more accurately estimate the death backdate utilizing earlier detection probability QAQC information.

Some SRC members said the expected percentage of fatalities that the Monitoring Team identified for the seasonal shutdown period (29%, obtained by taking 3.5 shutdown months divided by 12 total months in a year, given a null hypothesis that fatalities occur uniformly throughout the year and without seasonal variation) may be an inaccurate assumption due to seasonal variation. Ideally the expected fatality number would derive from winter data in a similar area.

An SRC member suggested using the bird use data to create a ratio (bird use during the winter/total bird use during the year) as a more appropriate proxy. The Monitoring Team said that approach may work for other focal species than burrowing owls

SRC members and the Monitoring Team also discussed hypotheses for the high number of fatalities consisting of feather spots found during the seasonal shutdown. Naturally occurring processes include more inexperienced juvenile birds and/or a predator influx, or a combination. Monitoring Team members said that predation may be a likely cause for feather spots. SRC members said feather spots may also result from other factors besides predation; there are not sufficient data to determine the predominant cause for feather spots.

An SRC member asked why the data indicated burrowing owl use was higher in April, May, June, and August in 2012-13 than in previous years. Doug Leslie responded that the bird use data for burrowing owls are difficult to extrapolate APWRA-wide. For example, one family of burrowing owls could create the spikes in bird use.

An SRC member asked if the Monitoring Team calculated the ratio of bird fatalities to bird use and tracked that relationship over time. Doug Leslie said the bird use data may not wholly represent true bird use; many surveys did not detect focal species, and the surveys are not designed to detect burrowing owls.

Other SRC comments included:

- Elaborate on any changes to the analytical framework (e.g., justify the 15% sampling threshold for BLOBs) in the Monitoring Report.
- Add clarification to the presentation slides (see Slide 8) that 2009-13 represent the years with the full 3.5 month universal seasonal shutdown.
- Other monitoring efforts in the region have not detected extraordinary changes in the red-tailed hawk population abundance.

Preliminary Background Mortality Study Findings

SRC members and the Monitoring Team discussed the possibility that the turbines indirectly facilitate predation on small birds because more small bird fatalities occur at sites with turbines than sites without turbines. An SRC member said a predation event should have associated evidence that the Monitoring Team could look for and analyze (e.g., plucking and scattered feathers). If avian predators use turbines and taller infrastructure as perching spots to safely feed, the Monitoring Team should find more fatalities near turbines and other infrastructure.

The SRC and Monitoring team discussed the background mortality study's applicability limits. The SRC agreed the findings only apply to mortality during the seasonal shutdown and not the rest of the year. They also agreed the findings represent only one year of data and are not robust enough to be a forecasting tool for estimated background mortality for new generation turbines. However, they agreed that the study does support the hypothesis that other factors besides turbines contribute to avian mortality and warrants further research.

An SRC member said the Monitoring Team should further investigate the cause of death for the 14 small bird fatalities at non-turbine sites before concluding these are naturally-occurring background fatalities. Another SRC member suggested the death total may not be entirely abnormal; a focused search effort will likely find more fatalities than what a regular passerby might detect. Doug Leslie added that approximately half of the control sites were former turbine sites with remaining infrastructure that predators may use as plucking perches.

An SRC member said that the SRC and Monitoring Team cannot conclude whether birds use the turbines and infrastructure as hunting perches and/or plucking spots without observation data.

An SRC member asked whether the distance between turbine site and control sites might contribute to fatality detections. For instance, a fatality could occur in the control site, but a predator or scavenger carries the carcass into the treatment site, or vice versa. SRC members and the Monitoring Team discussed the possibility of analyzing the effects of distance from sampling site. The Monitoring Team pointed out that distance could be difficult to define because the control and treatment sites are not point locations. The SRC and Monitoring team then discussed a few methods to measure distance between the treatment and control sites; an SRC member suggested using a geographic information system (GIS) to locate the center of mass of a search area polygon representing each control or treatment site.

SRC members and the Monitoring Team briefly discussed whether detection differed between treatment and control. A Monitoring Team member suggested investigating differences in detected fatalities between the first and second round of clearing searches (after clearing). An SRC member said identifying differences between clearing search rounds may prove difficult, because turbine sites

that were already part of regular monitoring would likely have fewer carcasses than previously unmonitored sites.

Other SRC comments included:

- Provide more identification information for the large unknown birds.
- Provide the proportion of bird fatalities at control sites that were composed of feather spots.

Public Comment

2005-2013 Monitoring Data

Doug Bell of the East Bay Regional Park District (EBRPD) recommended Pete Bloom's research in Southern California as a source of information on red-tailed hawks. He asked if the Monitoring Team compared inter-year variability for the bird use data under the new protocol. Doug Leslie responded that the team cannot make those comparisons because it only has one year of data under the new protocol.

Gabriela Quirós of KQED asked the SRC and Monitoring Team which metric was selected to gauge avian mortality percent reduction, because Slide 8 presents six different metrics. Doug Leslie provided context on the settlement agreement with the 50% mortality reduction goal. He said Slide 8 presents several different metrics because several approaches to estimate mortality reduction exist, each with merits and drawbacks.

Doug Bell asked whether the Monitoring Team excludes certain types of feather spots. The Monitoring Team said it uses criteria to determine if a feather spot qualifies as valid fatality (e.g., a minimum number of feathers).

Joseph DiDonato of Wildlife Consulting and Photography said that factors such as grass height and seasonal wind patterns can affect the detection probability of feather spots (e.g., higher grass height and high winds can hide and disperse feathers respectively).

Shawn Smallwood said low small bird fatality counts in 2005 may be due to the longer search interval (60 days). The increase in small bird fatalities over time could be a product of increased detection when the search intervals became more frequent. Doug Leslie agreed the search interval could contribute to the low numbers in 2005, but the latter years still indicate an increase in fatalities during the seasonal shutdown.

Preliminary Background Mortality Study Findings

Renee Culver of NextEra said that NextEra staff received calls from the Monitoring Team to help fetch avian carcass remains from the top of turbines. She said she does not know whether these events are statistically significant, but it is anecdotal evidence the birds use turbines as plucking perches.

Shawn Smallwood said his research staff and he observed predators and scavengers heavily using the turbine for perch sites for hunting sites and moving bird carcasses, sometimes for long distances (e.g., a half-mile). He said his past data suggested most fatalities are found 50 meters from the turbine, indicating a turbine-related death. He also said this year's drought dramatically affected bird populations; the background mortality study findings may not provide an accurate comparison to other years.

SRC Consensus Recommendations for the Monitoring Report and Background Mortality Study

Monitoring Report

- Include two metrics for calculating the expected fatalities during the seasonal shutdown: 1) 3.5 months divided by 12 months; and 2) bird use during seasonal shutdown divided by bird use for the total year.
- Include confidence intervals in the bird use graphs.

Background Mortality Study

- Revise the conclusion about predation as a significant source of small bird mortality (see Slide 27, 3rd bullet point) to incorporate the possibility that turbines facilitate predation and that other factors (e.g., more prey abundance) may also contribute to mortality.
- Qualify the conclusion on Slide 27 (last bullet point) to state that the seasonal shutdown of old-generation turbines reduced focal species fatalities, with the exception of primarily burrowing owls, where turbines may indirectly facilitate predation on small birds.
- The SRC supports the Monitoring Team's suggested addition of a table to the report that shows overall fatality estimates with the removed number of fatalities of American kestrels, burrowing owls, and other small birds (clearly defined) backdated to seasonal shutdown (see Slide 23). Include the appropriate caveats (e.g., study period is only one year, the study reflects only one set of environmental conditions, and there has been a great degree of variability seen over time in APWRA).
- Test the assumption that the control sites beyond turbine search radii are not influenced by turbines at the treatment sites (post-hoc gradient analysis to determine if differences between control and treatment sites are related to the distances between them).
- The Monitoring Team can decide whether to explore differences between the first and second round of clearing searches to investigate whether detection differed between treatment and control sites.
- The Monitoring Team's existing limits to applicability of the study's findings are appropriate.
- The SRC provided recommendations for incorporating the background mortality study findings into the Monitoring Report. SRC members said the 2005-2013 Monitoring Report should be consistent with previous reports and include the background mortality study's major findings in the main report body. The Monitoring Report should include clear explanations on the impetus for the study, methods and analyses, findings, and implications and applicability limits. The SRC said the report should present the wide array of possible factors that contribute to the background mortality study's findings (e.g., predation, scavenging, inexperienced juvenile birds, food availability, indirect turbine-related effects, and searcher detection rates). The full background mortality study should be included as an appendix. It should describe any additional analyses (e.g., post-hoc gradient analysis on distance between treatment and control sites).

Next Steps

The Monitoring Team will complete analyses of the monitoring data and background mortality study findings and will produce the 2005-2013 Monitoring Report for the SRC's next in-person meeting in November.

Meeting Summary Review, Approval

Related Documents

[P291 SRC Meeting Summary June 2014](#)

[P292 SRC Call Notes 7-9-14](#)

[P301 SRC Call Notes 12-11-14](#)

SRC members approved P291, the June 9, 2014 in-person SRC meeting summary, and P292, the July 9, 2014 Conference Call meeting summary, subject to minor revisions. SRC members approved P301, the December 11, 2014 Conference Call meeting summary, as is.

Presentation and Discussion of Shawn Smallwood's Altamont Research and Insights

Related Documents

[P302 Smallwood Altamont Research Highlights 2011-2015](#)

Presentation

Shawn Smallwood provided an overview of and insights on his avian and bat research from 2011 to 2015 in the APWRA. Main points include:

Burrowing owl study

He and his research team tracked spatial and temporal changes in burrowing owl nesting density and distribution.

- Nest clusters grew, dissipated, and shifted locations several times across the APWRA (although some nests retained their positions).
- Nest density correlated with movement away from nests during the non-nesting season (i.e., the more burrowing owls within a nest cluster, the more burrowing owls moved away during the non-nesting season).
- The research team incorporated these data to develop predictive models to help forecast future burrowing owl population dynamics.

Integrated detection trials

The integrated detection trials conducted at the Ogin and Vasco Winds turbine sites were designed to simulate bird and bat carcass detection probabilities, determine whether body mass can serve as a predictor detection rate variable, and quantify species identification and error rates of death date estimates.

- Although his research team consisted of highly trained searchers, species identification accuracy declined the longer that a carcass remained in the field before detection, especially for smaller species.
- Death date estimations varied widely, carcass detection often required multiple searches, scavenging also resulted in feather piles, and body mass served as a useful predictor of overall searcher detection rates. These findings imply that clearing searches may not fully clear an area. The findings also imply that searches may underreport species (especially small or rare species), vary greatly in death date accuracy, and incorrectly assume feather piles resulted solely from predation.

- Body mass as an overall detection rate predictor is appropriate to adjust fatality rates at the species level rather than size class.

Fatality monitoring adjustments

Shawn Smallwood provided a brief overview of the adjusted fatality rates for select species, including the four focal species.

- Surprisingly, they found higher fatality rates for many of the birds at non-operating turbines, possibly due to turbine structure collisions.
- Search intervals need to be short to be accurate, because long search intervals (e.g., 30 days) miss many carcasses, especially bats. Bat detection is especially difficult, and other tools, such as the use of dogs, will improve bat detection.
- Few burrowing owl chicks emerged from nests in the past year, possibly due to the drought and decreased prey abundance. This may explain low burrowing owl encounters for the background mortality study and nocturnal surveys.

Nocturnal surveys

Shawn Smallwood shared several videos he recorded using a thermal camera to monitor nocturnal bird and other animal behavior which provided insight into behavior that could lead to fatalities.

- He conducted both individual animal tracking and passive videos.
- He observed birds colliding into turbine structures (including non-operating turbines) and many birds and bats engaging in risky flight behavior (e.g., flying close to operating turbine blades). He said birds and bats often fly dangerously close to turbine blades because they are distracted (e.g., chasing another animal).
- He mapped out several behavioral observations and found that birds and bats' flight paths closely associate with turbine sites rather than other areas. He also mapped nocturnal mammal movement and said carnivores such as coyotes, skunks, and badgers purposely move towards turbine sites in search of food.
- Bats appear to be attracted to wind turbines, possibly because insects may congregate near the heat of the turbines.
- Shawn Smallwood said these observations indicate that carnivores may affect the fatality estimates near turbines (e.g., eating a carcass before a searcher detects it), and the turbines pose major risks for birds and bats.

Behavioral surveys

During behavioral surveys of golden eagles, red-tailed hawks, and American kestrels, most close encounters with turbine blades occurred at non-operating turbines, which indicates the birds may comprehend that turbines are dangerous.

Siting repowered projects

Key findings related to repowered project siting include:

- There are several challenges for monitoring impacts at repowering turbines. Before-after repowered monitoring over only a few years may be inaccurate partly due to multi-annual avian fatality cycles. He recommended monitoring improvements such as long-term monitoring and before-after, control-impact experimental design.
- He used the behavior survey data (e.g., use, behavior, and passage rates), golden eagle GPS telemetry data, and fatality monitoring data to develop a map-based collision hazard model that can help wind companies select repowering sites.

- He said one challenge is that use rates vary with terrain (i.e., where at some terrains are more difficult to see birds), which complicates comparing or extrapolating data (e.g., comparing use rates across the country); he suggested a terrain model may help address this issue.
- He also reviewed the benefits and drawbacks to GPS telemetry data. Telemetry can quickly gather flight path data at a landscape level, but intervals between datum points are usually long (15 minutes), and telemetry cannot quantify behavior/interactions.
- He then presented several examples using the collision hazard model to identify locations that pose high risk for a particular species.

SRC and Monitoring Team Discussion of Shawn Smallwood's Altamont Research and Insights

SRC members said they found Shawn Smallwood's findings and videos very interesting and thanked him for sharing his research.

SRC members and Shawn Smallwood discussed why many high-density burrowing owl nest clusters change over time. Possible factors include predators discovering nest cluster locations, the drought decreasing prey availability, vegetation changes, and/or nest parasites.

An SRC member asked whether a correlation was found between the burrowing owl population and burrowing owl fatalities. Shawn Smallwood said that he has not conducted that analysis yet.

In response to an SRC member's question, Shawn Smallwood said the integrated detection trial findings do not negate past monitoring data. Rather, the findings emphasize the data's complexity and the need for careful and appropriate data interpretation.

Public Comment

Renee Culver of NextEra asked how many risky behavior observations occurred at non-operating turbines compared to operating turbines. Shawn Smallwood responded that for golden eagles, American kestrels, and red-tailed hawks, 52-79% of turbine close encounter events occurred near non-operating turbines and noted that some models of turbines have blades that cannot be locked down, and move slowly ("feathering") when the turbine is not operating.

General Public Comment Period

Doug Bell of the East Bay Regional Park District said one of the take-home messages for him is that several factors other than predation may result in feather spots and he believes this warrants further research.

Future SRC Meetings

Next Conference Call Meeting

Summer or fall 2015

Potential Topics:

- Monitoring approach going forward for old-generation turbines

Next In-Person Meeting

Tentatively scheduled for Friday, November 13, 2015 [the SRC later confirmed this date.]

Potential Topics:

- Draft 2005-2013 Bird Year Monitoring Report
- Background Mortality Study Results

Next Steps

- The Facilitator will coordinate with SRC members, Monitoring Team members, and Alameda County staff to schedule the next conference call meeting.

Documents Circulated at Meeting

[M106 July 2015 Presentation Slides](#)

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[P302 Smallwood Altamont Research Highlights 2011-2015](#)

SRC Meeting Participants

SRC Members

Joanna Burger
Jim Estep
Mike Morrison
Julie Yee

Staff

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

Monitoring Team/ICF

Doug Leslie
Brian Karas
Karl Dickman
Chris Brungardt

Others

(Meeting sign-in is optional)

Justin Almase-Ruschell, CCP
Doug Bell, East Bay Regional Parks District
Kim Brown, Ventus
Renee Culver, NextEra Energy
Joseph DiDonato, Wildlife Consulting &
Photography
Gerry Fleischman, Powerworks (AWI)
Gabriela Quirós, KQED
Shawn Smallwood

List of SRC Agreements Developed July 8, 2015

(Compiled from this document)

2005-2013 Bird Year Fatality Monitoring Report

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