

NOTES | 3/26/2008 Conference Call
Altamont Pass Wind Resource Area Scientific Review Committee
Developed by the Center for Collaborative Policy
Reviewed and Approved by the SRC 7/2/2008

Topic: Statistics

Action Items

1. Jesse Schwartz to send citation for Cormack, Jolly, and Seber model. (See below.)
2. Monitoring Team to include discussion of current correction-factor limitations in 2008 Monitoring Report.
3. Monitoring Team to revisit WRRS data and determine how they will be used in the report.
4. Brian Latta will ask Fish and Wildlife Service how long eagles can be left in the field.
5. SRC needs to schedule a lengthy conversation regarding how field work and statistical analysis can be interfaced and how necessary modifications will be made.
6. Julie to speak to Monitoring Team about programming codes.
7. All documents shared with the SRC need to have a number, author, page number, current date, and at least 3-4 sentences of background information about the document with a reference to other documents if applicable. For any in-person meeting, 30 hard copies of documents are required.

Overview

The meeting purpose was to facilitate and initiate discussion about statistical questions with the monitoring team relating to bird fatality at Altamont Pass Wind Resource Area. Prior discussion has taken place between the Scientific Review Committee (SRC) and the Monitoring Team (MT) at the February SRC meeting.

The SRC agreed to think about establishing a new set of variables to calculate the scavenger and observer correction factors/rate. The SRC will explore addressing the scavenger rate and observer rate of birds using the Cormack, Jolly, Seber model. This model is different than the current correction factors being used that are based upon observer bias (P) and scavenger bias (R) values.

References

- Cormack, R.M. 1964. Estimates of survival from the sighting of marked animals. *Biometrika*. 51: 429-438.
- Jolly, G.M. 1965. Explicit estimates from capture-recapture data with both death and immigrations--stochastic model. *Biometrika*. 52: 225-47.
- Seber, G.A.F. 1965. A note on the multiple recapture census. *Biometrika*. 52: 249-52.

Related Documents

[Link to Monitoring Results Page with Latest Documents](#)

M21 2008 Altamont Bird Fatality Report

This report was presented at previous meeting.

P76 Smallwood Mortality Estimates APWRA 2005-2007

Shawn Smallwood analyzed data from the monitoring program using a different method to see if he obtained the same results as the MT. Some of his results differ from the MT. When comparing mortality between time periods only for those turbines mutually surveyed by the 1998-2003 and 2005-2007 monitoring teams, they do not demonstrate a change in mortality over time. He also estimated the number of fatalities on the Diablo Winds repowering project, and he compared mortality at Vesta turbines that did not operate for 9 months to the same time period the next year when they did operate.

P77 FPLE Comments on MT Draft Report

Bill Warren-Hicks commented that the equation adjusting mortality needs further review before he can accept its validity.

P80_Yee Statistical Review 2008 Monitoring Report

P83 Yee Comments about Rxp Denominator

This document reflects a discussion that Julie Yee had with Bill Hicks (see P83 – Yee Comments about Rxp Denominator) about the Rp factor in the denominator of the adjusted mortality estimate.

P84 Yee: Example Zero Values

Julie Yee concludes that there is no bias associated with zero values.

M23 Altamont Statistics Comments

Jesse Schwartz commented that the document is a response to mostly Julie Yee's comments (P80). He agrees with suggestions made to this point.

Equation 1

Everyone agreed to discuss Equation 1 further. The following chronicles the discussion:

Julie Yee stated that she examined the equation and did not find a discrepancy with the equation. Jesse agrees with Julie's findings and that there is no discrepancy in equation 1.

Bill Hicks disagrees with Equation 1. Hicks commented that P and R are calculated a specific way. P (observer bias) must be conditional on R (scavenging bias). When asked by the facilitator, Yee said that she agreed with Hicks' comment. Hicks's disagreement stems from:

- 1) P must be conditional; there is no empirical evidence for an interaction between the scavenger rate and the searcher detection rate.

- 2) Scavenging (R) changes over time. Because P is conditioned on R , when R changes, then P must change too, but Equation 1 does not account for this interaction.
- 3) Hicks is concerned about the risk of over-estimation.

Hicks commented that the observer can miss a bird and the scavenger gets the bird. There is no way to track the bird. Using statistical theory, mathematically the observer and scavenger rates are contingent upon each other. He proposed that a new method or an independent method should be used that might create different or the same results.

Schwartz commented that using a new or independent method would be best. He recommended looking into a different model for observer error, developed by Cormack, Jolly, and Seber (CJS). The CJS model simultaneously estimates detection probability and survival rates, where “survival” represents the persistence of a carcass as opposed to its disappearance. Two features are interdependent: the detection probability is dependent upon survival, and survival is dependent on detection. The monitoring program would need to monitor both. Schwartz agreed with what everyone was saying although he feels that they need to get clarity and agreement on what models are being used and then implement the appropriate data gathering methods and analyses. Smallwood agreed and reminded everyone that funding is necessary to further research and obtain solid P and R values.

Someone commented that scavenging greatly affects the mortality estimates that are being reported and that there is likely both temporal and spatial variation in scavenging rates. This variability makes comparisons to baseline mortality problematic, unless one assumes the same temporal and spatial variation in scavenging rates were present during the baseline study. Given these limitations, comparing raw numbers was suggested as a possibility. Another person responded that this was not possible due to the variation in survey intervals.

Using CJS Model

Ed West asked if the decay function could be applied to existing data. Schwartz replied that the MT could run the data on a per-value input and do this on existing data. Several SRC members concurred that this is a good alternative for the current report. One member questioned how the CJS model would be incorporated. Schwartz commented that the decay function and CJS model could be used. The monitoring program’s data collection would be built around the CJS model. Using the CJS model, once a carcass was found, it would be marked and left in the field (except eagles). Schwartz added that there would need to be a pre-survey where carcasses were marked. Then an additional survey would be conducted where the carcasses would be retrieved from the field. Then these data would be taken and compared to other multiple encounter data. This approach could be incorporated over the long run, not to be used in the current report that is being developed. The next step would be to complete a CJS analysis and see if this model would work in the field, if it does, then continue and move forward with creating a new report.

Joan Stewart recommended and others agreed that the existing report should summarize this discussion and uncertainty as well as future improvements to the analyses.

Current Report

- One SRC member commented that he is uncomfortable producing a report when many of the SRC are not in agreement with the numbers that are being published (mainly as a result of unreliable estimates of *P* and *R* values). However, he is not sure what to do, but feels that the proposed solutions (e.g., acknowledging the limitations and controversy and outlining a modified approach in the current report) might be the best alternative in moving forward.
- Another member concurred that she is also concerned with producing the report, but feels that summarizing comments made by the SRC to date and other limitations is proposed solutions the best alternative. For future reports, CJS might be a possible method to integrate into the current monitoring and to improve the correction factor.
- One SRC member noted the significance of the variability in scavenging rates and expressed regret that the crossover experiment was not used with a phased shutdown because it might have provided some insight into at least the winter shutdown effect without the problems of scavenging discrepancies.
- A fourth SRC member agreed with other sentiments that the proposed alternative of using the current results and then using the CJS model as the best solution over time. There is a need to learn more about the *R* and *P* adjustments and using alternative methods. A possible alternative could also be using camera traps.
- This information obtained from the studies could be used to help other wind farms nationally and internationally.

Next Step

The SRC and MT will discuss how to modify future field design related to the statistical methods used and dealing with the differences in assumptions.

Using WRRS Data in Analyses

The existing data set includes WRRS data, which consists of about 20 birds found on the ground by wind company employees. There are questions about the number of birds because carcasses were not always left in field. Renee Culver clarified that communication with the MT has improved and that industry field crews consistently leave carcasses in the field. Schwartz commented that the MT can account for detection efficiency by asking when a bird was surveyed and when it was picked up. Then this information can be recorded.

Renee Culver commented that since the beginning of conducting searches, a more standardized search method has been implemented at the turbines.

Smallwood's mortality estimates didn't include injured birds in the 2003 CEC study.

Ed West said that the MT will look at the number of dead vs. injured birds. The MT will review this information and then decide whether to include it in reports. The MT will explain criteria as to what numbers are included in the data set.

Public Comment

Bill Hicks commented that to develop scientifically sound mortality estimates, the MT and SRC should look at double counting and how they are adjusting for this in the data set. A hyper distribution method could be used. There is not one method or one approach that can be used. The monitoring program should have be a proposed set of questions that can be answered and stick with answering these specific questions. Once these questions are developed, it's possible to look at multiple (5 or 6) ways to approach answering questions. The MT has developed some of these questions in its monitoring protocols. (M1 APWRA Monitoring Protocols - 7/11/07)

Next Conference Call

Date: April 8, 2008, 1- 3 p.m.

Agenda: Comparing Methodologies and Double Counting

To prepare, review the:

- 2008 Monitoring Report (M21 2008 Bird Fatality Report)
- Shawn Smallwood document (P76 Smallwood Mortality Estimates APWRA 2005-2007)
- Julie Yee's Forthcoming Document (P85 Yee: Estimating Method in Sept. 2007 Analysis)

ATTENDEES

SRC

Joanna Burger
Jim Estep
Sue Orloff
Shawn Smallwood
Julie Yee

Jesse Schwartz
Ed West

Others

Bill Barnes
Renee Culver
Bill Damon
Emre Ergas
Jay Hawton, Altamont
Jim Hopper

John Mormon
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