

Estep Responses to Audubon Questions to SRC

1. In SRC member Yee's 9/14/07 "Guide to September 2007 Analyses on Shutdown Effect," she points to an analysis of the data that shows kestrel fatalities are 76% less during shutdown compared to operation.

Question: Is this the type of analysis of the data that persuaded the SRC to recommend a four month seasonal shutdown? Is it correct to say that the SRC believes there will be a substantial reduction in avian mortality of the four focal raptors if there is a four month seasonal shutdown beginning on November 1, 2007?

Response: Yes, the analysis provided by SRC member Julie Yee contributed to our decision for a four month shutdown. However, there were other data that also supported the decision. The data suggests that there could be a substantial reduction for three of the four focal species. The recommendation includes carefully synchronizing the shutdown dates with monitoring dates to avoid some of the problems previously encountered. To do so, the recommended start date was October 15.

Question: Does the SRC believe it is probable that the companies are currently on track to reach a 50% reduction in raptor mortality as defined in the Settlement Agreement? Why or why not?

Response: In the absence of a four month shut-down, the SRC does not believe that the companies are on track to reach a 50% reduction. Preliminary data does not indicate that this is the case. Also, few management actions have occurred that would contribute to a reduction of this magnitude. In the absence of other management actions, the SRC decided that this was the only action that could be taken that would result in a significant contribution toward reaching the 50% reduction goal.

2. SRC member Yee's Guide also states:

For the analysis on page 2 of M16, there were over 15000 turbine survey visits, and the estimated reduction is highly significant (p-value ,0.0001).

Question: Would the SRC explain the significance of this information so a layperson can understand what is meant by "highly significant"?

Response: Julie Yee provides a thorough explanation of statistical significance. Very simply, the greater the significance – as indicated by a lower p-value – suggests a greater likelihood of predicting the outcome.

Question: How is the "shutdown effect" estimate derived in the M16 analysis? For example, on page 1, from where is the value of parameter "a" (0.000225) or parameter "b" (0.2399) derived?

Response: Refer to Julie Yee's responses.

Question: Might different statistical tools or models change the analysis? For example, under “Specifications,” the M16 report states that “Distribution for Dependent Variable” is “Poisson,” and that the “Optimization Technique” is “Dual Quasi-Newton.” What do these tools entail? Would other models/tools/techniques change the conclusions supporting seasonal shutdown?

Response: Refer to Julie Yee’s response. Note, however, that in general different types of statistical tests can reveal different results. The statistician uses the test that best fits the data depending on a variety of factors – as Julie notes in her response. It is probably reasonable to suggest that using other tests with variable results would not be sufficient to change the SRC’s recommendation in support of a seasonal shutdown.

Question: Why do the various units of measurement (MW or Turbine) and the differing sampling units (Turbine or String) change the “fit statistics” in the M16 report? What does it mean to change “fit statistics” based on turbine vs. mega watt units?

Response: Refer to Julie Yee’s response.

Question: The M16 analysis reports % mortality reduction in terms of reduction per turbine, per MW, or per string. However, these respective reductions vary. What would be the overall % reduction in mortality from seasonal shutdown?

Response: Refer to Shawn Smallwood and Julie Yee’s responses.

Question: Why is the M16 report’s standard error so high, and the t-Value so low, for Golden Eagles?

Response: Small sample size.

3. In Wally Erickson’s September 12, 2007 Updated Seasonal Shutdown Analyses, he states,

For red-tailed hawks, the fatality estimate is 2.6 times higher at the operating turbines compared to the non-operating turbines.

Question: Does the SRC agree with Erickson’s analysis of the impact of operating turbines on red-tailed hawks?

Response: The SRC agrees that mortality of red-tailed hawks is substantially higher during periods of turbine operation. However, as noted in Smallwood and Yee responses, the SRC lacks confidence in Erickson’s specific results due to the sampling and analysis approaches used. Still, both Erickson and Yee’s estimate of reduction suggests that there is a substantial effect of operating turbines on red-tailed hawks.

4. While acknowledging that a seasonal shutdown is likely to reduce mortality for red-tailed hawks, Erickson also claims “[t]he data for the other 3 raptor species is too limited to make any inference.”

Question: Is Erickson’s claim about the adequacy of the data for the three other focal raptor species inaccurate? SRC Member Yee’s Guide to the September 2007 Analyses on Shutdown Effect states,

For example, in the first analysis on page 2 of M16, the estimated rates of kestrel fatalities per turbine is 76% less during shutdown compared to during operations with a standard error of 15.7%. Whether the shutdown is one month or two months in winter, the percent reduction in fatalities is predicted to be 76% less.

Response: Refer to Julie Yee’s response. Erickson’s approach did not lend itself sufficiently to reaching conclusions regarding the other three focal species. That is the reason the SRC decided to have Julie re-analyze the data using a different approach. While sample size is typically an issue for monitoring studies, and particularly for mortality-type studies, Julie’s analysis revealed what the SRC considered to be more appropriate and more accurate in terms of the effects of shutdown on each of the focal species.

Question: Are Erickson and Yee looking at the same data? Please explain.

Response: Refer to Julie Yee’s response.

Question: What work have the SRC members (and/or the Monitoring Team members) done since receiving the incomplete analysis from Erickson (August 2007) to increase our understanding of how the seasonal shutdowns have been affecting raptor mortality at the APWRA?

Response: Refer to the Smallwood response.

Question: The SRC has now recommended that the companies implement a 4-month shutdown from November 2007 to February 2008 in an effort to reach the 50% reduction requirement. What factors led to this recommendation from the SRC? How confident is the SRC that this winter shutdown will have a positive impact on reducing avian mortality?

Response: Refer to Smallwood response. I would also add that preliminary data suggested that little to no reduction was occurring due to few management actions being implemented and that in order to begin moving toward achieving the 50% reduction goal, a more substantive action was required. The SRC is fully prepared to assess the value of all possible measures that could contribute to a reduction in mortality and to make recommendations regarding implementation of those measures. To date, however, few

other management measures are available that would sufficiently contribute to this reduction and meeting the requirements of the Settlement Agreement.

Question: Are there other measures that the SRC can recommend with similar confidence that will have a positive impact on reducing avian mortality?

Response: Not yet. Those that have been brought to the table such as blade painting, while potentially effective, have no corresponding data that can be analyzed such that the SRC can make a recommendation with respect to reducing mortality. At best, some measures (e.g., blade painting) can be studied to determine their effectiveness, then if proven to be so, implemented accordingly. This, however, does not suggest that certain measures not be implemented. For example, turbine removal and relocation and rock pile removal may contribute to a reduction in mortality and along with other on-the-ground management actions should be fully implemented.

Erickson's 9/12/07 Update also points out some problems with the actual on the ground monitoring.

Question: What is needed to improve the monitoring of avian mortality during the seasonal shut down?

Response: As Smallwood indicates, the most important issue is the synchronization between fatality monitoring and the shut-down period.

Question: How does the SRC envision phasing in the seasonal shutdown to match the monitoring team's on-the-ground capabilities?

Response: Refer to Smallwood response.

Question: How often will the turbines be monitored during a four month seasonal shutdown?

Response: The four-month shutdown will not alter the monitoring frequency. It will remain a 30-day interval.

Question: With all the turbines shutdown does the existing monitoring team have the resources to gather the necessary data, so the SRC can evaluate the effectiveness of a four month shutdown? If not, what does the SRC/Monitoring Team require to ensure that the turbines are monitored per the protocol during a 2007-08 winter shutdown?

Response: Refer to Smallwood and Yee comments.

Question: Can the mortality data from a four month seasonal shut down be compared to the mortality data from the ½ - ½ seasonal shutdown?

Response: Refer to Smallwood and Yee responses.