Smallwood's Responses to P24G

19 July 2007

Page 1, Para. 1

Whether the turbine numbering matched was never in much doubt in my mind because the turbine numbers of the turbines in this turbine field were posted right on the turbine's tower or utility box. When in the field we did not have to guess which turbine was which.

Page 1, Para. 2

We recorded data on turbine 2059, which we characterized as "tower gone." Turbine 2060 was characterized as the end-of-row turbine because it was, in fact, the last turbine in the row standing above the ground. From the birds' point of view, this is all that matters; the empty turbine pad at 2059 was not a turbine birds needed to worry about.

Page 1, Para. 3

These attributes were used in the model as described in the report. However they were used, though, the 2006 WEST, Inc. report largely verified our predictions of which turbines are likely most dangerous to birds.

Page 1, Para. 4

I will point out again that the 18 turbines addressed in this letter are one of several issues I raised regarding the accuracy of the reasons FPLE says it relied on to decide which turbines to shut down or relocate in 2004. I would like to see FPLE address the other issues I raised. I would also like to see FPLE address points 2 through 5, which I raised on April 23, 2007 (P26).

Page 2, Question 1

First, I want to again point out that these questions were not "the SRC's questions." On May 10 I wrote the following in an email to Gina Bartlett and Sandi Rivera and copied to the SRC:

"Also, for the record, I have not requested or agreed to request knowledge of which WRRS records came from scientific studies versus incidental finds. I don't think this is an SRC request, but rather a request from one or more members of the SRC. I don't want anyone to get the false impression that I was party to this request.

In my opinion, it does not matter where the WRRS data were derived, unless the SRC is willing to account for sampling effort per each scientific study. For example, the CEC team searched some of the turbines in the FPLE turbine field at issue, and these were only surveyed twice. Other scientists likely surveyed some of the same turbines we did, as well as some we didn't. How can anyone compare the results without knowing which turbines were searched by each

scientist and how many times each was searched? Without all the information, such a comparison is meaningless. This is the fundamental problem with WRRS."

After this email, the SRC member who asked Question 1 withdrew the question.

Page 2, Question 2

P24E presents data held by WEST, Inc., and for each turbine it compares the values of variables named *derelict*, *derelict2*, and *condition*. The document identifies inconsistencies between *derelict* and *condition*. However, WEST, Inc. received this data set prematurely and without explanation. I did not release this data set. It was 2004 when it was released by the project manager, who had not conferred with me prior to releasing it. The data set was still undergoing quality control, so some variables I did not use in hypothesis-testing were still part of the data set. One of these variables was *condition*.

The default value of *condition* was "Operational," which was the value recorded unless otherwise changed by the operator of the GPS. I don't remember why this variable became suspect, but I do recall the decision to not use it. This is why this variable does not appear in the subsequent reports. I can point out multiple additional occasions when I decided not to use a GPS attribute because I either did not like the way the data dictionary presented the attribute to the field worker, or the field worker did not understand how to record the attribute. Whenever I've decided to abandon an attribute, the default values record automatically each time a record is added to the data set. For this reason, it is not a good idea to take someone else's GPS data set and use it without consulting the original investigators.

I had made another visit to the turbines during 2002-03 in order to record additional attributes that were not included in the original GPS data dictionary. One of these attributes was *derelict*, which was the variable I relied upon for representing the operational status of the turbine. Some of the other attributes included *wind wall*, *canyon*, and *location*.

Page 3, para. 3 (after Question 4)

I am not convinced the 18 turbines in question were shut down in 2004 and not in 2002. And besides, why does the Settlement Agreement identify May 2002 as the earliest shut down date that can be considered for credits? Why was it that date, instead of May 2004?

Page 3, Para. 4 to the end of the page

The additional explanations and files supplied by FPLE address the timing issue, which goes to the question of whether 18 of the turbines had already been shut down by 2002. The additional files supplied by FPLE are consistent with the recommendations in Smallwood and Thelander (2004). This additional explanation does not address the problems I pointed out with FPLE's specific consideration for removal numbers 1 through 4 (see P26).

Page 4, Summary point 1

I was unaware USFWS told FPLE to rely on actual fatality locations and not just models. Is there written documentation of this instruction?

Page 4, Summary point 2

If I'm not mistaken, FPLE was supposed to have already removed the Tier 1 & 2 turbines. Unless credits are granted, I recall the Settlement Agreement states under Term 4 that the Tier 1 & 2 turbines are to be shut down within 30 days of the effective date of the agreement, and all derelict towers/turbines are to be removed. How is shutting down Tier 1 and 2 turbines later during maintenance consistent with the terms of the Settlement Agreement?

Page 4, Summary point 3

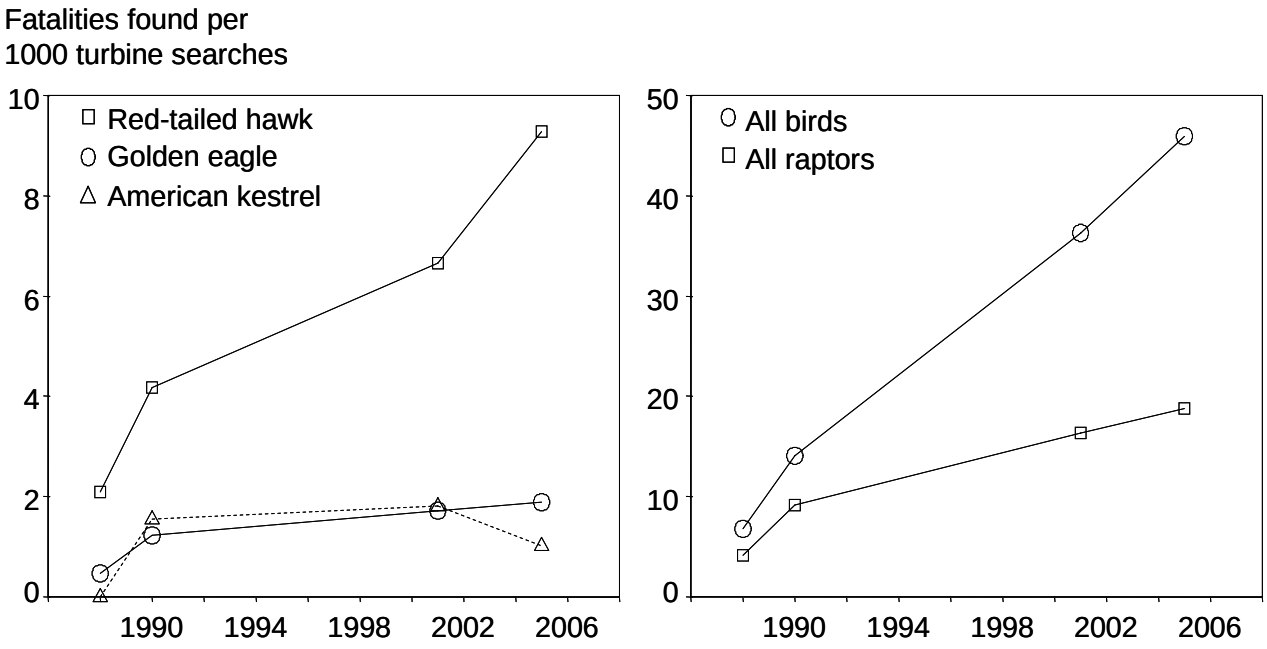
I thought the majority of the SRC recommended these 9 turbines be shut down. I didn't realize the agreement was to relocate them.

General Response

I recently compared fatality monitoring results from studies that sampled turbines from throughout the APWRA. In the figure below, the number of fatalities found per 1000 wind turbine searches are compared among 4 APWRA-wide studies: 1988-89 (Howell and DiDonato 1991), 1989-91 (Orloff and Flannery 1992; R30), 1998-2003 (Smallwood and Thelander 2004; R2), and 2005-06 (WEST, Inc. 2006; R36). Data were plotted on the middle year of each study. For raptors, turbines were assumed searched once per month in Howell and DiDonato (1991) and Orloff and Flannery (1992), even though actual searches occurred weekly and biweekly in those studies. Raptors typically last longer in the environment, so monthly searches would find nearly as many raptors as weekly or biweekly searches.

These graphs demonstrate no reduction in mortality, except perhaps for American kestrel. In fact, the graphs indicate a general increase in mortality. Reasons for the increase could be several: (1) researchers may have used different methods, though it is unclear whether methods differed enough to matter; (2) raptors might be accumulating in the APWRA as they are forced out of other habitat areas destroyed by human activities; and (3) changes in the APWRA might have increased collision risk, such as converting from lattice to tubular towers, commencing ground squirrel control in 1997, and deploying derelict lattice towers at ends of turbine rows after 2003.

Another point to consider is that the operating capacity of the APWRA has not changed since 1999. According to data submitted to the California Energy Commission, the operating capacity of the APWRA during 1999 was 598.94 MW, whereas in 2006 it was 592.99 MW. One cannot expect much change in mortality resulting from a 1% decrease in operating capacity, unless something dramatic was changed in the way the turbines are operated or located on the landscape. This is the context in which the SRC is deliberating whether to grant FPLE credits for previously shutdown turbines.



Another, related consideration is the increasingly difficult situation the Companies and the SRC find themselves. The longer it is until substantial remedial measures are taken, the more unlikely it will be to achieve the Settlement Agreement goal of a 50% mortality reduction among raptors. This is because the comparison will be between the new mortality estimate and the baseline estimate. The baseline estimate was an average annual mortality estimate, so the new mortality estimate will also be an average annual mortality estimate. Assuming the WEST, Inc. (2006; R36) results remain unchanged into this year – and there is no reason to assume otherwise because nothing else has been done to reduce mortality – then the first of the SRC's three-year monitoring period will have achieved about 0% mortality reduction. Incorporate this value into the calculation of the average annual estimate, and the SRC is faced with having to achieve an average 75% mortality reduction over the last two years in order to achieve the three-year average annual reduction of 50%:

$$50\%\ \text{Reduction} = \frac{0\% + 75\% + 75\%}{3}.$$