NOTES | 8/11/2011 Conference Call
Altamont Pass Wind Resource Area Scientific Review Committee
Prepared by the Center for Collaborative Policy
Reviewed and Approved by the SRC.

All 4 Current SRC Members Present

Discussion Topics

QAQC Study Issues

Meeting Outcomes

- The SRC reviewed the results of Julie Yee's power analysis on the QAQC Study and identified next steps in the analysis needed to determine the detection probability for small raptor carcasses, and determine whether there might be a benefit to continuing the QAQC Study on a smaller scale into the 2011-12 bird year.

Action Items

Party	Due Date	Action
Julie Yee		Produce power analysis looking at error in the adjusted fatality estimate
Sue Orloff		Track down and provide carcass data collected for her Altamont study (R30)
Julie Yee, Jesse Schwartz & Brian Karas		Work on analysis of whether small raptor decay curve has a steep or shallow decline, including incorporating carcass data from the QAQC Study, the KB Study and scavenger removal trials, as well as Orloff
Brian Karas		Work with Julie Yee and Jesse Schwartz to obtain their review of his draft memo on QAQC descriptions of data, then circulate draft memo to public/SRC
Sue Orloff		Available to make calls to rehab centers to find more fresh carcasses for Monitoring Team

Announcements

Sandra Rivera of Alameda County said that the appointment of Mike Morrison of Texas A&M to the SRC had not made it to the Board of Supervisors agenda in August. It is expected to be on the agenda September 13, to allow Mike to participate as an SRC member at the September 26-27 in-person meeting.

QAQC Study Issues

Related Documents

P220_Yee QAQC Study Power Analysis

Power Analysis

During the July 2011 in-person meeting, SRC Member Julie Yee had agreed to develop a power analysis to help the SRC and Monitoring Team determine the number of trial

carcasses needed to estimate detection probability rates from the QAQC Study, and identify whether work done during the 2010-11 bird year would be sufficient. In the interim since the July 21-22 in-person meeting, she said, Monitoring Team members Jesse Schwartz and Brian Karas have generated some great ideas on how to use QAQC data to develop optimal sampling. She expressed her appreciation for their work, and said she wasn't able to follow up on the development of these other ideas since her task for the call was to focus on the power analysis, which is laid out in document P220. The SRC and Monitoring Team have further work to do to lay the groundwork for decisions at the next in-person meeting on QAQC for the 2011-12 bird year. This step is critical for the meeting.

The analysis of datasets of different sample sizes (number of trial carcasses, particularly small raptor carcasses), using the data simulation program that she has developed, was designed to answer the following question:

- What level of sampling is needed to estimate detection probability functions and to discern their significant differences?

Her analysis involved three parts:

1. Using a range of five sample sizes from 50 to 1000, she looked at the precision of the detection probability function for each, in terms of the width of confidence intervals and the size of standard errors.
2. For a certain standard error relative to the mean (such as coefficient of variations 5%, 10% or 20%), what number of small raptor carcasses would need to be sampled?
3. Since adjustment factors are currently based on the Smallwood 2007 detection probability model, what is the power of detecting a difference in the aggregate detection probability rate from that derived by the Smallwood 2007 model? For the comparison, she used the hypothetical detection probability model introduced in her P207 memo. The P207 function is similar to that used in Smallwood 2007, in the sense that both functions represent in an aggregate of 1) a carcass removal probability that decays as a log-linear function of carcass age and 2) a searcher efficiency rate. However, the P207 model has a shallower decay than Smallwood's model.

As one issue revolves around the question of whether it was feasible or necessary to use only fresh carcasses, she conducted and presented side-by-side comparisons of power simulations assuming only fresh carcasses, so that carcass ages were essentially known (referred to in P220 as "KnownAge"), versus using carcasses that were already aged from 0 to 10 days when found and assumed fresh when used as a trial carcass (estimated age, or "EstAge" in P220).

Another issue revolves around the question of whether to use only a primary search, versus both a primary and secondary search, and she also compared these alternatives. This resulted in the side-by-side comparisons of four combinations of QAQC survey models ranging from the greatest information (known carcass age and use of both primary and secondary searches) to the least information (estimated carcass age and use of only primary searches).

Julie Yee walked meeting attendees through P220. Key points included:

- As shown in Figure 2 on Page 3, the amount of error increases as information decreases to a point where the amount of error is very wide.
- Figures 3-6: As sample sizes increased, the width of confidence bands decreased to the point where there was not much difference in the QAQC survey models.
- The graphs suggested that with anything less than 100 carcasses, there is some uncertainty. This situation does not look as bad under the P207 detection model as the Smallwood 2007 detection model.
- Figure 12, Page 9: The level of sampling needed to achieve a particular standard error around a detection probability estimate is different for different carcass ages, with more sampling needed to ascertain the detection probability for older carcasses.

SRC and Monitoring Team Questions and Comments

SRC members and Monitoring Team members raised the following issues in questions and comments:

- Does sample size represent the number of all carcasses, or just small raptor carcasses? Julie Yee said that the sample size is the number of only the birds in the bird group for which that detection probability estimate will apply.
- How is "estimated age" derived? Julie Yee said, using the same method described in P207, she simulated this by generating a date of fatality and adding noise (a random number of days) varying from 0-10 days, with a mean of 2 days. This simulates situations in which relatively recent carcasses of uncertain age are assumed fresh when used as a trial carcass.
- Referring to power simulation results based on the Smallwood 2007 detection model, does Figure 2 mean that nothing can be discerned from carcasses with more than 40 days of age? Julie Yee said she was reluctant to interpret that estimate of the detection probability for greater than 40-day old carcasses, because of the low level of confidence.
- Jesse Schwartz of the Monitoring Team agreed with the questioner, saying he interpreted the results as showing that no reliable information is available after a carcass reaches 30 days in age. Since the Monitoring Team's average search interval is 32-35 days, there is no information available from carcasses that died four weeks prior. The implication from the figure is that searches are cheap and birds for experiments are expensive. More information can be derived from double sampling. This comment refers to results based on the Smallwood 2007 detection model,
- An SRC member concurred, while also noting that there was no difference in the amount of information derived from known versus estimated carcass ages if there was both a primary and secondary search.
- Monitoring Team member Brian Karas provided the following data on the age of carcasses found by the Team:

Estimated Carcass Age	Percent
0-3	7%
4-7	5%
8-30	32%
31-90	36%
Unknown (feather spot)	20%

- Jesse Schwartz suggested that SRC members choose a desired power, and then look at how long it would take to gather enough data to achieve it.
- Julie Yee said she prefers choosing a coefficient of variation, which is the standard error divided by the mean estimate, rather than power, which requires additional assumptions. The coefficient of variation is the amount of error in relation to what we want to estimate.
- An SRC member was concerned that it is difficult to tell how precise the results would be in the 25-to-40-day survey interval range.

Discussion on Selection of Curves to Represent Small Raptor Carcass Decay
Julie Yee said there are differences between the Smallwood 2007 and P207 curves. If the detection probability function steeply decays like the Smallwood 2007 curve, then detection probability for 30-day intervals will not be precise unless there are much larger sample sizes. If the detection probability function is more like the P207 curve, there may not be as dramatic a decay rate, which would ease the sample size requirements. Fifty trial carcasses won't suffice when detection decays rapidly, but it might be enough for a P207 curve.

In relation to Figure 7 on Page 6, there is an issue about the assumption of the shape of the curve. If one is fitting a linear function to data that do not follow a linear pattern, one can get large errors in estimating the function. P207 and Smallwood 2007 are based on a log linear curve for the carcass removal curve, and large deviations can also occur for log linear curves. For Smallwood, searcher efficiency was a constant. In P207, it is generalized to a logistic regression function with the Y variable, detection probability, constrained between 0-1. It is still considered a linear function of carcass age, except that it is linear with respect to the logic of the detection probability and is shaped somewhat like an S due to the constraint that the detection probability function must flatten as the probability approaches 0 or 1. She chose the logistic regression function because it is a general family of curves which allows searcher efficiency to vary with carcass age, and Smallwood's 2007 constant is part of this family as a special case. We will never know the functional form of the true detection probability curve, and assumptions will always need to be made. There can be error from the sampling effort and from model misspecification.

Jesse Schwartz said he and Julie Yee have been looking at Kaplan-Meier fits, which suggest a smaller decay rate, compared to the Smallwood 2007 curve, for carcasses of 3-5 days. If so, this would mean the Smallwood curve overestimates the removal rate. Jesse Schwartz, Julie Yee and Brian Karas agreed it is important to look at the data to see if a slighter decay rate such as the P207 curve is more realistic.

An SRC member agreed, saying it would be encouraging if use could be made of this analysis.

Jesse Schwartz said the implication for the QAQC Study is that, rather than winding it down, there might be a smaller level of effort focused on answering this question about small raptors. The one year of QAQC surveys did not produce 50 fresh small raptor trial carcasses, but he believes that two years will.

SRC members expressed interest in a second year of QAQC study if it will result in 50 trial carcasses that result in an improved detection probability estimate.

Julie Yee said she thinks it would be workable to continue the study to achieve a sample of 50 fresh carcasses, assuming that the detection probability curve is like the P207. However, she is also sensitive to the expense of the study, and wondered if there is a way to trade expenses.

An SRC member said it would be important that, if the money is spent, we get a reliable answer.

Public Comment
Renee Culver of NextEra said in Figure 13 it looked as if the curve was the same for one or two searches. In response, Julie Yee said there might not be much additional benefit with two searches, if the detection rate function is similar to the shallow P207 curve.

Jesse Schwartz said one alternative might be to do only a primary search with a pre-and post-search. It would be important to look at the distribution of intervals between placement of the carcass and the search.

Julie Yee reviewed Figure 14, Page 11. The analysis indicates there is fairly good power for discerning the difference between the Smallwood and the P207 detection probabilities for older carcasses due to greater differences in those detection curves at that age range, but less power for younger carcasses due to smaller differences between the detection curves. The important point is that the closer the curves are, the harder it is to distinguish between them.

Public Comment
Mike Morrison said he sees the ultimate goal as obtaining an accurate estimate of the change in abundance of dead things through time. He suggested a possible tool might be Program MONITOR, software that performs power analyses to look at sample sizes needed to monitor changes through time. You need to be able to determine how many birds were killed in a particular year and estimate the number in 2020. The only way to do so is to establish an effect size. You have to be able to sample a certain number of birds to estimate that there would be a 10% decrease in carcasses or a 20% decrease in carcasses. The approach is similar to that used with endangered species populations. His look at the graphs seems to indicate that the confidence interval is starting to decline. He questions whether 50 carcasses is going to be sufficient, and thinks it might be closer to the range of 100 to 200 carcasses. He hopes he is wrong.

In response, Jesse Schwartz agreed that that would be incredibly useful, and said the Monitoring Team did some of that work a year ago when it re-factored the monitoring design.

In response, Julie Yee said she did consider looking at the fatality estimation problem as a population estimate problem, but decided this would only estimate the number of individuals at any time in a sampling area. We are really trying to estimate, not the number of carcasses lying in the Altamont at a given time, but the number of birds being killed - the

recruitment or "births" into that population -- as the target. She asked if MONITOR could help achieve that, the number of fatalities on the ground versus the number being added.

Mike Morrison said it could show the change in abundance through time. He finds it particularly useful in helping to lay out all the options for people, and looking at trends and when a percentage change will be detected. It could be a complement to what is currently being done.

Jesse Schwartz said Julie Yee and Shawn Smallwood had addressed the three-year average question. Doug Leslie has focused on the comparison to the two-week search interval likely to be required under repowering. The goal is to populate a 30-day curve and a 14-day curve.

SRC Discussion of Further Analysis of QAQC Approach
An SRC member said this was a very helpful discussion that clarified a number of issues. The SRC needs to think about this. It will be important to reach the 50-carcass number.

Another SRC member agreed that reaching a minimum number would be important. It is also important to use as many fresh carcasses as possible (and to be able to compare fresh and non-fresh). Fresh carcasses are likely scavenged more quickly than slightly older carcasses and all carcasses start out fresh. Therefore, fresh carcasses and known age carcasses should not be considered the same. The Monitoring Team should be able to get a lot of fresh carcasses from rehab centers.

One SRC member agreed that more fresh carcasses need to be looked at. In the near-term, it is important to explore and continue within the current framework. In the long term, the SRC might want to consider the utility, expense and cost/benefit of this approach, and what the potential alternatives might be, in a new repowered landscape.

Next Steps

- Julie Yee will carry out a power analysis looking at the error in the adjusted fatality estimate.
- Jesse Schwartz and Brian Karas will look at data from carcasses in the KB Study (M32) and scavenger removal trials as well as the Orloff and QAQC data. They will produce either a data analysis or a descriptive report that gives a sense of whether the detection curve is steep or shallow in the Altamont. Julie Yee will work with Jesse Schwartz and Brian Karas on this. Answering this question will help decide the sampling effort for next year. Doing so will require an analysis of the data collected so far.
- Sue Orloff will find carcass data for her 1992 study (R30, Orloff & Flannery) to help in this analysis.
- Brian Karas will get feedback from Jesse Schwartz and Julie Yee on his first draft memo and then circulate the memo to the public and SRC.
- Sue Orloff offered to make calls to rehab centers to find more fresh carcasses for the Monitoring Team, should the Team desire.

Jesse Schwartz said he and Brian Karas have had very helpful discussions and the next month looks to be very productive.

Wrap Up and Next Steps - Next in-Person Meeting

The next in-person meeting is scheduled for **September 26-27.**

Sandra Rivera of Alameda County said a new topic for the meeting is SRC discussion and recommendation on the effectiveness of seasonal shutdown. AWI has requested a change in CUP conditions, largely based on an argument that seasonal shutdown is ineffective. Alameda County would like a recommendation from the SRC on its effectiveness. She added that modifying the permit would require an EIR.

Public Comment
Mike Lynes of Golden Gate Audubon said the question of whether data show an effect from seasonal shutdown in reducing mortality will be a key topic for stakeholders, because of the AWI request.

Sandra Rivera said there will be an opportunity to discuss this issue at the in-person meeting, as well as an opportunity to provide written materials for the meeting.

Other tentative topics for the meeting include:

- SRC consideration of QAQC Study for 2011-12 bird year
- Goals and objectives for 2011-12 bird year
- EIR
- Final Monitoring Report?

ATTENDEES

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Joanna Burger
Jim Estep
Sue Orloff
Julie Yee

Consultants
Jesse Schwartz
Brian Karas
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Identified Public
Renee Culver, NextEra
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