

# Who Ran Off With My Data?

## Estimating carcass persistence and scavenging bias in western Alaska

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### INTRODUCTION

Estimating bird and bat mortalities from collisions with towers, turbines and wires and powerlines is a function of total number of dead animals observed, corrected for observer bias, scavenging bias, habitat bias, and crippling bias (Faanes 1987, APLIC 1994, Smallwood 2007).

Scavenging bias is the proportion of dead animals removed from a sampling area prior to a mortality search. Failure to account for biases may lead to an underestimate of mortalities. Scavenging bias is measurable for a sampling area, but estimates of carcass persistence have been highly variable (Osborn et al. 2000).

**Our carcass persistence study is robust ( $N = 565$ ), and identifies sources of variation researchers should consider when estimating scavenging bias.**

### STUDY AREA

We estimated carcass removal rates in Cold Bay, on the Alaska Peninsula in western Alaska



The Cold Bay area supports a diversity of potential scavengers that vary seasonally including:



Avian species in the study area, but abundance varies seasonally

### THE SCAVENGERS

Brown bears, resident, but only active from early April to late November



Bald Eagles, common in fall, winter, and spring



Red fox, common year round

### METHODS

Scavenging trials were conducted: 1) across seasons to better understand seasonal variation in carcass persistence; 2) along ten 1-km line transects with carcasses placed every 100 meters; 3) using a sampling with replacement methodology; and 4) rechecks occurred daily for 6 days.

Carcass persistence was estimated using a "known fate" analysis (White and Burnham 1999, Ward et al. 2006); replacement carcasses were included using a staggered entry design (Pollock et al. 1989); overdispersion\* in these data was assessed using the median  $\hat{c}$  approach in Program MARK (White and Burnham 1999); we developed a simple model to relate the number of carcasses found during searches to the likely number of carcasses originally present given a range of potential search times following carcass deposition.

\* Greater variability in repeat estimates of a population proportion than would be expected if the population had a binomial distribution.

### RESULTS

- Only a small proportion of carcasses persisted for the duration of the study
- There was considerable variation in persistence among transects across sampling periods
- Carcass persistence was lowest in winter and highest in summer
- The probability of a carcass persisting for 24 hours was 0.404 (95% CI = 0.343-0.467)
- Larger carcasses (geese) persisted at a higher rate, and this effect was consistent across all three seasons

### CONCLUSIONS

- Daily carcass persistence was less than 50% per 24 hours
- Carcass persistence varied among transects. Thus, managers seeking to estimate carcass persistence at a particular site should take caution when extrapolating data from nearby or similar sites
- Carcass persistence varied among seasons. Thus, studies designed to estimate persistence at a given site should be replicated to assess temporal variation
- Even if carcass surveys are conducted daily, when carcass removal rates are high, the adjustment for scavenging will have a substantial influence on estimates of total mortality
- For carcass searches conducted less frequently, the adjustment for carcass persistence will have a dominant effect on estimates of total mortality. Accordingly, accurate estimates of carcass persistence are essential for estimating total mortality associated with towers, wind turbines and powerlines.