

## Preassessment Data Report #5

Persistence rates of bird carcasses on beaches of Unalaska Island, Alaska, following the wreck of the M/V *Selendang Ayu*

### COMMENTS OF THE RESPONSIBLE PARTY

#### Page 3; Paragraph 1; Abstract

*“These extremely low persistence rates and the relatively low detection probabilities (Byrd and Reynolds 2006a) suggest that only a very small proportion of all deposited carcasses were found and recorded during beach searches on Unalaska Island.”*

Delete “*extremely low*” and “*very small*”

This sentence is argumentative and should be modified as noted or deleted.

#### Page 3; Paragraph 2; Introduction

*“Recovered carcasses represent only a fraction of the total number deposited on beaches (Flint et al. 1999).”*

Delete second to last sentence

#### Page 4; Paragraph 1; Introduction

*“Additionally, resident populations of scavenger populations occur commonly in the affected area, including red foxes...”*

Add “much of” before “*the affected area*”

#### Page 4; Paragraph 4; Study Design

Add the following as the first paragraph under “*Study Design*”:

The sample size, in terms of number of beaches, is small. Also, the beach segments were not randomly selected but rather they were chosen for logistic feasibility. Further, the classification of beach segments used in the experiment did not mimic the distribution of beach types in the oil spill core area. As such, this might limit the extensibility of the persistence rate over the range of the oil spill area.

#### Page 5; Paragraph 1; Study Design

*“...high, high water line.”*

Replace with “higher high water line”.

Page 6; Paragraph 3; Results

*“However, there were insufficient data to directly estimate a detection rate using a standard Cormack-Jolly-Seber Model (Pollock et al. 1990).”*

In the absence of sufficient data, it would be appropriate to use the Searcher efficiency rates developed for this incident by Byrd and Reynolds.

Page 7; Paragraph 4; Rewash Probability

*“Only one tagged carcass was subsequently found on a beach other than where it was marked, demonstrating that scavengers could remove carcasses from beaches to areas not generally searched.”*

The results of this survey would also be subject to Searcher efficiency and should be adjusted.

Page 8; Paragraph 3; Discussion

*“The initial mortality event and deposition of carcasses from the M/V Selendang Ayu may have caused scavengers to focus activity on beaches, but by the time of the study the deposition rate of carcasses was apparently insufficient to satiate or overwhelm scavengers.”*

This is speculative and should be deleted.

Page 8; Paragraph 4; Discussion

Add the following sentence to the end of the paragraph:

*“On the other hand, the scavenging rates were likely higher on the beach types selected for the study. Scavenging by foxes on exposed beaches, of coastal segments with little or no access to the beach, would likely be much lower than on beaches backed by grasslands or marshes.”*

Page 8; Paragraph 6; Discussion

*“We conclude that scavenger density on Unalaska Island is uniformly high resulting in consistently low persistence rates for all circumstances.”*

The fact that several beaches along cliffs and headlands are virtually cut off from terrestrial scavenger access, this conclusion is not correct.

The persistence study was conducted on beaches adjacent to habitat that would support high densities of foxes. The study beaches were easily accessible by foxes, which are more likely to remove the entire carcass from the beach than avian scavengers. Much of the spill area consists of rugged coastlines backed by high cliffs. Carcasses in these areas would more likely accumulate on pocket and collector beaches. The density and types of scavengers on these remote pocket and collector beaches, and the extent of scavenging on those beaches, would likely have been different from that on the study beaches. For example, if avian scavengers, which are more likely to leave carcass remnants on the beach than foxes, are more prevalent on pocket beaches, persistence on these beaches would likely be higher than on the study beaches. Also, foxes on study beaches might be more likely to remove entire carcasses and cache them in adjacent grasslands than on remote beaches backed by steep cliffs.

Page 9; Paragraph 1; Discussion

*“...persistence rates are expected to be even lower on exposed beaches due to re-wash activity (18% of the study area). The 45% of the study area that is non-accessible coast (i.e. cliff areas) is expected to have lower persistence rates due to their structure and exposure.”*

What about scavenging on exposed beaches, which would likely be less than on the study beaches?

Recommend adding “and thus, the birds wash up onto pocket beaches, which act as collector beaches. And since there are not as many foxes on several of these beaches, the persistence rate could be higher” to the end of the paragraph.

Page 9; Paragraph 3; Assumptions of estimation models

*“True detection probability for the study was likely very close to 1.0...”*

The fact that birds were missed and rediscovered indicates the actual **detection** rate is less than 1.0 propagated over multiple visits.

*“...(i) it was an experimental study were carcasses were purposively placed on the beach, hence the initial number of carcasses and their locations were known by the searchers,...”*

If birds were relocated by scavengers, but not removed from the beaches, as reported in the re-analyses, the Searchers would not have prior knowledge of their location.

*“...(ii) all numbered boards placed under carcasses were relocated.”*

A brightly colored board that is much larger than a bird is easier to detect.

Detection probability is defined as the probability that a carcass known to be on the beach will be found by a searcher (taken from Report 6, page3). Persistence rate is defined as the probability that a carcass will remain within the study area for a given period of time (take from Report 4, page 3). Accurate estimation of persistence rates assumes a perfect detection probability of 1; detection probabilities less than 1 will result in an underestimation of persistence rates.

Given that it was determined that two carcasses were missed on a search with subsequent detection on a later search, then the clearly the detection probability was  $< 1$ . One might ask how many other carcasses were missed on subsequent searches. Based on the Preassessment Data Report for detection probabilities (Report 6), detection probabilities can range from 40% to 70%, depending on whether or not searchers are making one or two passes of the beach area, respectively. In the designed experiment for estimating persistence rates, one may expect the detection probabilities to be higher than the single pass 40% estimate since searchers knew the locations of the planted carcasses. However, the assumption of 100% detection is unrealistic given that there were two known misses at some point in the study. It is possible that several other carcasses were moved by scavengers and were not detected. The analysis and subsequent estimates for persistence rates do not take into account the inherent uncertainty in the detection rates, which could result in estimated persistence rates that are different than actual values.

#### Page 9; Paragraph 4; Conclusions and Recommendations

*“The combination of extremely low persistence rates and relatively low detection probabilities (Byrd and Reynolds 2006a) suggests only a very small proportion of total carcasses deposited on the Unalaska beaches by the event were actually found during beach searches.”*

This is argumentative and speculative, delete.