

To Whom it May Concern:

I was asked by the Save Drakes Estero Coalition to first obtain the raw seal data from NPS that had been previously provided to Dr. Goodman and then to analyze that data to independently determine if there was any statistical basis for the May 2007 NPS claim of an “80% reduction” in seals that subsequently generated controversy.

I am by profession an applied mathematician with a Doctoral degree from the University of Pennsylvania and master’s degrees from the Pennsylvania State University and ESME (France); I also have patents pending on mathematical algorithms I have developed. I am very familiar with statistical analyses and fully qualified to render an expert opinion.

Background to the Controversy:

On May 8, 2007 Dr. Sarah Allen, Senior Staff scientist for the Point Reyes National Sea Shore, testified before the Marin County Board of supervisors that:

“The harm is resulting in [the] abandonment of one area where more than 250 seals, including 100 pups [occurred] 2 years ago [...]. This year chronic disturbance and placement of bags on the nursery area has caused an 80% reduction in the seals, dropping to around 35 this last Saturday.” [Emphasis mine]

To this day this statement remains contested primarily by Dr. Goodman and supporters of Drakes Bay Oyster Company. Dr. Goodman claims that pup population on Sandbar A dropped by 80% between 2005 and 2007 and that this population decline is primarily attributable to disturbances by Park visitors because Sandbar A is outside the oyster cultivation area. I have analyzed the data and these claims by Dr, Goodman, limited as they are to Sandbar A, are true.

However it does not necessarily follow from these facts alone that, as Dr. Goodman further claims, Dr. Allen must have referring to Sandbar A and only Sandbar A in her testimony and thus by implication Dr. Allen was misleading the public about the oyster company’s impact on seals. Dr. Goodman supports his further claims by stating that he has reviewed the seal data and can find no data other than from Sandbar A that could support Dr. Allen’s testimony. So I was asked to revisit the final tally of seal population now that the 2007 season closed to see if it is possible to discover if there are data other than from Sandbar A that Dr. Allen could have been referring to in her testimony.

Throughout this evaluation, it is important to understand that Dr. Allen’s testimony was presented informally and verbally, rather than in a formal written scientific report and that it was presented at a time dictated by the Supervisors meeting (May 8) before the data was finalized at the June 30 end of the seal pupping season. Thus, on the basis of her testimony alone, the public does not know specifically what Dr. Allen meant by “one area” nor by “two years ago” nor even whether the “80%” was exact, or rounded to the nearest 5% or 10%.

Consequently, I examined data from a number of seal haulout areas within the oyster harvest area. I also examined year end 6/30/05 seal data that was “two years ago” using as a reference the date of Dr. Allen’s 2007 testimony as well as 6/30/04 seal data that was “two years ago” using as a reference the date of the last seal data (6/30/06) that had been completed when Dr. Allen testified. Lastly, I looked at various “rounding” scenarios.

My report will ignore the various seal haulout areas that I tested but which did not yield significant seal population change. Instead, I will focus on sandbar OB.

From where does the 80% in the testimony come?

Given that Dr. Allen’s testimony was presented on Tuesday morning May 8, 2007, it must have been prepared *at the latest* on Monday May 7th and must have been based on data collected prior to that date. Looking back, the maximum pup count on sandbar OB (38) was

observed on Friday May 4, 2007, but this data point was turned in *at the earliest* by of the end of work day Friday and most likely did not reach Dr. Allen's desk in time to be incorporated into the preparation of her testimony. The next highest pup counts on OB was observed on April 23 with a count of 19. Furthermore, Between April 23, and May 4 four more surveys were conducted showing subsequent declines in pup population (8 on April 25, 2 on April 26, 9 on April 29 and 14 on April 30), reinforcing the notion that at the point in time when Dr. Allen most likely prepared her testimony, it would have been reasonable for her to assume that the April 23 count of 19 was probably the maximum expected for the year even though that current seal data year would not have officially end until 6/30/07.

The 2005 maximum count for the same location was 62. In consequence, if Dr. Allen were using the April 23 2007 count of 19 as the reasonably expected 2007 maximum, then she would have reported a 69.35% decline. But it seems unlikely, let alone inconsistent, that Dr. Allen would round this result to 80%, so I concluded this scenario to be unlikely. However since the 2004 pup count on sandbar OB (108) was the largest observed after the recovery from the 1998-1999 el niño at a time when oyster production was at an all time minimum, it could be interpreted as the pup carrying capacity of that location and as such taken as a reference. Furthermore, as noted, it is a reasonable possibility that Dr. Allen's "two years ago" comment could have been from a reference date of the last seal data (6/30/06) that had been *completed* when Dr. Allen testified. Under this assumption Dr. Allen would have then seen a decline of 82.41% during the preparation of her testimony, which it would seem reasonable for her to have rounded to the nearest 5th percentage, or 80%.

The claim for the 80% decline may thus have reasonably had the following history: The April 23 survey, which reported 19 pups on OB, was presumably the last entered in the database when the analysis supporting Dr. Allen's testimony was conducted. This analysis compared the April 23 figure of 19 to the 2004 peak of 108 on OB, which was then rounded *down* to an 80% reduction.

Admittedly, the year of reference was not quoted, the seal haul out was not specified, and the percentage decline was rounded down most probably for simplicity. It must be noted, however, that if everyone were an experienced scientist or statistician cognizant of the duration of the seal data collections dates, then they surely should have interpreted the numbers provided in Dr. Allen's testimony as conditional since they were derived near the middle of the pupping season. In fact, as we know now after the final data points were analyzed, there was a subsequent and unexpected up-tick in the maximum seal count at OB on Friday May 4th to 38. Using that final maximum pup count, the final drop in pup population on sandbar OB was 64.81%, which is quite significant, although not as much as the 80% of Dr. Allen's testimony

Conclusions:

Unfortunately the claim for an 80% decline in seal population took a life of its own and became a sound bite "mantra" amplified through the media, which fueled a bitter divisiveness in the community and interfered with further reports, testimonies and analysis. But this "80% reduction" figure is not "deception" or "scientific misconduct". At worse the Park's statements pointing to an 80% decline only reflected "precautionary principle" concerns based on an on-going interim assessment. The final 2007 declines (compared to the 2004 peaks) of 64.31% on sandbar OB and 41.94% on sandbar UEF, two of the sandbars most preferred by pupping seals that also happened to be near areas that had been fallow of oyster operations for some years and had just in 2007 seen renewed oyster operations, confirm this precautionary concern.

Furthermore the data shows, the "deception" and "misconduct" accusation raised by Dr. Goodman over the 80% figure has no basis in fact, since the 80% figure clearly can be derived and justified based on assumptions reasonable at the time of Dr. Allen's testimony.