

September 29, 2008

To: Dr. Susan Roberts, Director, Dr. Pete Peterson, Chair, and members, Ocean Studies Board Drake's Estero panel, National Research Council, National Academy of Sciences

From: Dr. Corey Goodman, resident Marshall, CA; member, National Academy of Sciences

RE: **2008 subsite OB data contradicts Becker's presentation to NRC panel & NPS paper in press in Marine Mammal Science**

Update: the impact of the 2008 data on Becker's model

Based on new information previously unavailable, this memo will supplement my earlier analysis of the NPS harbor seal data concerning subsite OB. I now include the 2008 pupping season (April to May 15) data, something that was conspicuously absent from NPS presentations to your panel.

At your September 4, 2008 meeting, NPS Dr. Ben Becker made two presentations concerning the harbor seals at subsite OB. He concluded that as oyster production increased, that the mean number of seals at OB decreased. Becker made two statements about OB to your NRC panel.

- First, in his morning presentation, he discussed his paper in press in Marine Mammal Science in which he claimed that statistical analysis showed that as oyster production increased, the mean number of seals at subsite OB declined. He focused on a comparison of 2002-2004 vs. 2005-2007. I previously commented on the weakness of this analysis and the invalidity of the major conclusion.
- Second, in his afternoon five minute presentation, Becker claimed that Dr. Allen and Superintendent Neubacher had cited this decline at subsite OB on May 8, 2007 in their testimony and on May 8 and 11, 2007 in their Drakes Estero Report, when they referred to an 80% decline in seals at one subsite from 2005-2007 ("*two years ago*"), culminating in ~35 seals at the subsite on Saturday May 5. I reported previously that their claims were unambiguously consistent with sandbar A.

As reported to your panel, the decline at subsite OB occurred between 2004 and 2005 (2004 was unusually high – a spike over the last eleven years). There was no significant change at subsite OB between 2005-2007, and these three years were within the 11-year mean. There was nothing unusual at OB in 2007. Moreover, I showed that it was sandbar A and not subsite OB that had the 80% decline from 2005-2007, and that sandbar A had 33 seals on May 5th while subsite OB had 82.

New Information – 2008 NPS harbor seal data on subsite OB

What happened to the seals at OB during the 2008 pupping season? Becker presented data for seals at OB for previous years based on the mean from April 15 to May 15. He had the 2008 data or access to it for over three months prior to making his presentation to your panel but did not include or reference it. Why didn't he show whether 2008 supported or contradicted the conclusion of both his presentation to your panel and of his paper in press?

In anticipation of your September 4, 2008 NRC panel meeting, in late July, I submitted a FOIA request to NPS which included a request for the long overdue 2007 NPS harbor seal report, the 2008 NPS harbor seal database, and the edit log documenting the reasons why NPS added the April 26 Trip Report to the 2007 database nine months after the fact, among other documents. In response to my FOIA request, on the eve of your panel meeting, I received from NPS some of the harbor seal data for the 2008 pupping season. I was advised that the 2007 NPS harbor seal report was in peer review. I received the edit log, albeit incomplete.

Given that Becker's paper required considerable analysis, the 2008 data was not analyzed until the last few days. In brief, the 2008 data contradicts Becker's statements to your panel, and contradicts the major conclusion from his paper in press in Marine Mammal Science.

Relationship of oyster production vs. seals at subsite OB including 2008 data

As shown in the table below, and as presented previously, the mean number of seals at subsite OB in 2005, 2006, and 2007 was 75, 88, and 62, respectively. What is new in the table below is the mean number of seals at OB for 2008. That number is 97, which is higher than any of the previous three years, and above the 11-year mean (75). At the same time, the number of pounds of shucked oysters harvested from Drakes Estero continued to increase from 467K pounds in 2007 to 493K pounds in 2008 (as estimated by DBOC using standard methods based upon numbers to date and projections for the remainder of the year).

| Year | Mean seals at OB (Apr 15 - May 15) | Oysters (pounds) | Mean seals at Drakes Estero | Max adult seals at PORE (PRNS) |
|------|---------------------------------------|---------------------|--------------------------------|-----------------------------------|
| 1997 | 64 | 476,791 | | |
| 1998 | 15 | 292,188 | | |
| 1999 | 19 | 125,749 | | |
| 2000 | 21 | 34,094 | 692 | 2576 |
| 2001 | 36 | 65,676 | 829 | 2617 |
| 2002 | 149 | 78,064 | 905 | 3272 |
| 2003 | 113 | 118,643 | 1080 | 3082 |
| 2004 | 183 | 96,754 | 905 | 3622 |
| 2005 | 75 | 138,958 | 836 | 2838 |
| 2006 | 88 | 291,538 | 863 | 2660 |
| 2007 | 62 | 466,503 | 748 | 2771 |
| 2008 | 97 | 492,787* estimated | | |

Becker and his NPS colleagues had access to this data since the 3rd week of May, and yet failed to tell your panel, and the Editor of Marin Mammal Science (Dr. Daryl Boness), that the number of seals at subsite OB had gone up in 2008, and thus that the 2008 data did not support the conclusion of his NRC presentation or of his MMS paper.

Below is an analysis using Pearson's correlation coefficient of oysters (lbs shucked) in Drakes Estero vs. the mean number of seals at subsite OB and vs. sandbar A from 2000-2008, 2004-2008, and 2005-2008. A value of +1 is a strong positive correlation while a value of -1 is a strong negative correlation. To be statistically highly relevant, the correlation, positive or negative, should be greater than 0.80. The negative correlation of oyster production vs. sandbar A is much stronger than the correlation with OB.

Oysters (lbs shucked) vs. seals at subsite OB (mean Apr 15-May 15)

| <u>Years</u> | <u>analysis</u> | <u>correlation coefficient</u> |
|--------------|-----------------|--------------------------------|
| 2000-2008 | OB same year | - 0.06 |
| 2004-2008 | OB same year | - 0.57 |
| 2005-2008 | OB same year | + 0.12 |

Oysters (lbs shucked) vs. seals at sandbar A (mean Apr 15-May 15)

| <u>Years</u> | <u>analysis</u> | <u>correlation coefficient</u> |
|--------------|-----------------|--------------------------------|
| 2000-2008 | A same year | - 0.86 |
| 2004-2008 | A same year | - 0.99 |
| 2005-2008 | A same year | - 0.98 |

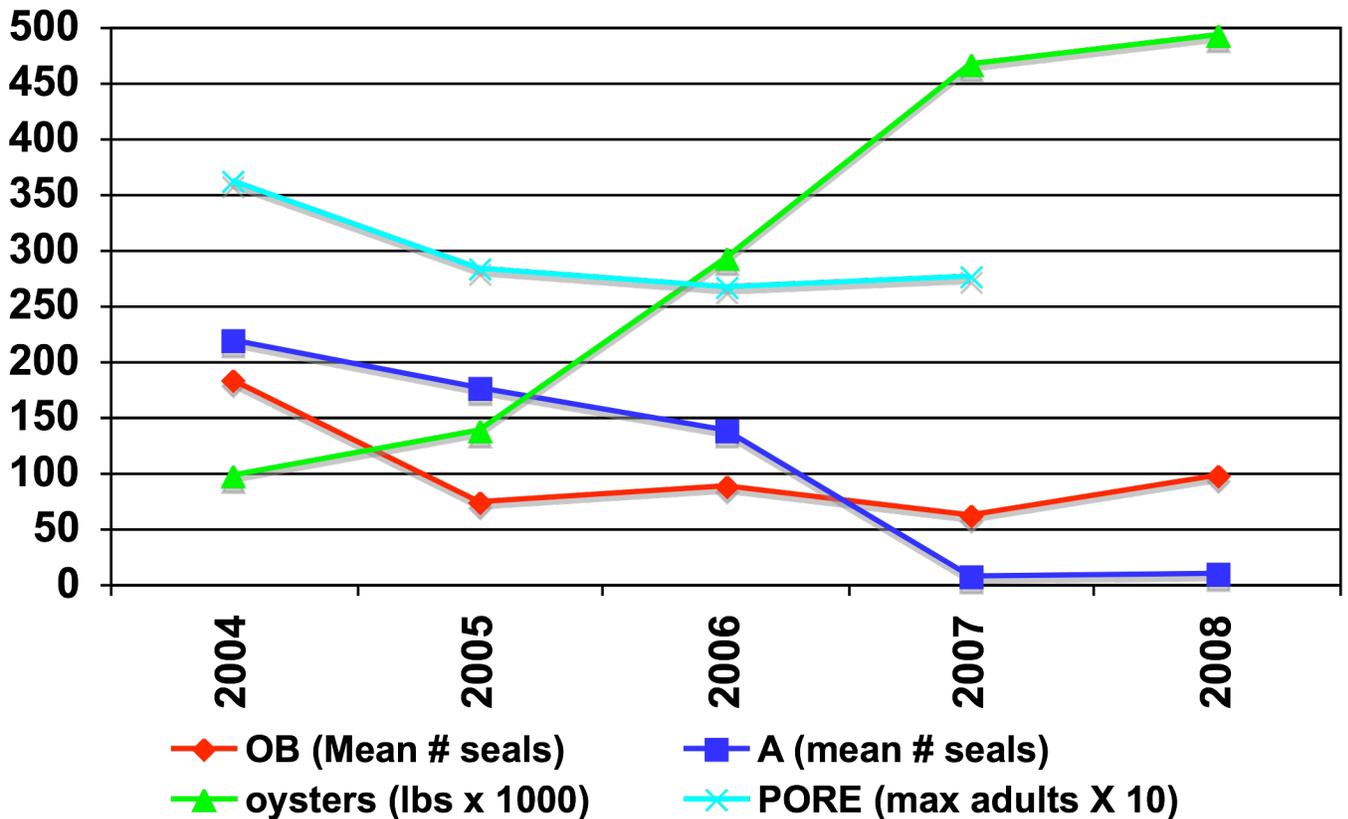
These data lead to three conclusions.

- First, there is no relationship between seals at OB and oyster production. Values of - 0.06 and + 0.12 are not meaningful. If one selectively includes the decline at OB from 2004 to 2005, and focuses solely on this boundary, one can derive a selective (manufactured) correlation, but when one includes the data out to 2008, that correlation is weak (- 0.57).
- Second, there is a much stronger relationship between seals at A and oyster production (with a negative correlation approaching - 1.0). However, there are no oysters on sandbar A, and no oyster operation near it. This is a spurious correlation.
- Third, in all likelihood, something else in the environment, such as ocean conditions, may have led to the decline in seals in recent years. The decline notwithstanding, it is still within the NPS protocols of normal variation.

Becker must have known that the 2008 data contradicted his presentation and paper. If he didn't have the data, he certainly had access to it, since one of his co-authors is the manager of the database and the other is the scientist who oversees the harbor seal program. Didn't one of them look at the OB data for 2008 after May 15th this year? Didn't they talk about the 2008 data in relationship to their paper and analysis?

The graph below plots the key data for 2004-2008, showing the mean number of seals (Apr 15 – May 15) for subsite OB and sandbar A, the maximum number of adults for the entire PRNS (PORE) combined harbor seal populations (X 10), and oyster production by DBOC in Drakes Estero (shucked weight in pounds, X 1000).

The graph shows that the mean number of seals at OB remained relatively flat from 2005-2008 (and even went up in 2008), while oyster production increased. The PORE populations reflect the same trends (data for 2008 are not available to me). It was sandbar A that went down significantly from 2006 to 2007, and remained down in 2008. That is the dramatic 80% decline that the NPS cited in May 2007, and DBOC has nothing to do with it: according to the NPS database, Park visitors and predators are the major source of disturbances at sandbar A. Sandbar A is in the wilderness area. The oyster operation gets nowhere near sandbar A.



The omission of the 2008 data (April 15 – May 15) from the presentation at the September 4, 2008 meeting of the NRC Ocean Studies Board panel, and the omission from the Editor of Marine Mammal Science, raises serious questions about the conduct of these NPS scientists. In 2007, the NPS made strong public claims in testimony and publications in the middle of the pupping season (on May 8 and May 11), but in 2008, they didn't show you the 2008 data three months after the season was over.

After my initial communication with Dr. Susan Roberts in late 2007, I prepared and

submitted (at Dr. Roberts' request) on December 18, 2007 a comprehensive statement of scientific misconduct by NPS. Now almost one year later, the NPS has made a new presentation to you, and submitted a new paper in press. Once again, we find errors of omission and selective data analysis that forms the basis for misleading and incorrect conclusions.

Last January, NPS affirmed that they follow the OSTP scientific misconduct policy. The White House Office of Science & Technology Policy "*Federal policy on research misconduct*", entered into the Federal Register in December 2000, includes selective omission in the definition of scientific misconduct when it states:

"Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record."

Conclusions. The NPS research presented to the NRC and the Marine Mammal Science journal does not accurately represent the research record in the NPS harbor seal database.

Dr. Becker's presentation before your NRC panel on the harbor seal data never mentioned the 2008 data at subsite OB that contradicted his major conclusion. Although his paper was submitted to the Marine Mammal Science journal February 2008, he certainly should have examined the April-May 2008 data, determined if it supported or refuted his paper's conclusions, and included that data and analysis in his presentation to your panel. Moreover, if that data contradicted his paper in review, he should have told the editor and referees.

Becker claimed that his model is predictive. What better way to test his model than to see if it predicted the 2008 data? The first harbor seal season after he formulated his model contradicted his model, and that information was withheld.

Becker also gave an incorrect explanation for what Allen cited in May 2007 in her public testimony, and NPS changed his explanation five days later. Neither one makes sense.

The NPS made selective use and analysis of scientific data. There is no reason, based upon the NPS harbor seal data, to conclude that the oyster operation is having a negative impact on the harbor seals in Drakes Estero. Becker's model cannot support such a claim, particularly in light of the 2008 data.

Becker's paper is based on an a priori hypothesis that increased oyster production in Drakes Estero has led to a decline in the seal population. Becker only tested his hypothesis at subsites OB, UEF, and UEN within a very narrow time period. He claimed a negative correlation at subsite OB, but upon further analysis, this correlation is quite weak. Expansion beyond that time period in either direction shows the hypothesis to be invalid: Becker's hypothesis fails for events both prior to and after the time period of the data that he selected. Moreover, expansion to other neighboring populations also reveals that the hypothesis is invalid (see my previous letter to you).

In addition, he failed to check the hypothesis against data for other subsites. For

example, had he checked his model against sandbar A which has no oyster operation, he would have seen a far stronger negative correlation, raising serious questions about his model. By selectively picking certain dates, subsites, and unwarranted assumptions (oyster production in one year vs. seals in the previous year), Becker violated a very basic tenet of statistical analysis -- the hypothesis cannot be based on the sample used to test the hypothesis. His selection of such highly restricted data, given the whole NPS I&M database, and his failure to perform such a simple test as checking his model against a site that had no oyster operation (especially one that had become the focus of much public debate), raises serious questions of his bias.

Recommendations.

The NRC panel should ask Dr. Becker to include the 2008 data from OB in his analysis, and resubmit it to both the NRC, and to the Marine Mammal Science journal. The NRC panel should ask Dr. Becker to withdraw his paper and do his statistical analysis over again, using data going back to 2000 (and preferably to at least 1991 and potentially the 1970's), and including the 2008 data. The panel should ask to see the same analysis done on the other seven subsites in Drakes Estero, and the Drakes Estero population and the nearby combined PORE populations.

cc: NPS Deputy Chief Scientist Dr. Dennis
NPS Regional Director Jarvis
NPS Superintendent Neubacher
NPS Staff Scientist Dr. Allen
NPS Staff Scientist Dr. Becker
Editor Marine Mammal Science Dr. Boness
DBOC Lunny