

January 18, 2009

To: Dr. Susan Roberts, Director, Dr. Pete Peterson, Chair, and members, Ocean Studies Board panel to investigate NPS science concerning Drakes Estero, National Research Council, National Academy of Sciences

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

**RE: New Information Shows that the National Park Service Committed Scientific Misconduct in the Documents it Presented to Your Panel**

When NPS scientist Dr. Ben Becker made his presentation to your NRC panel on September 4, 2008, some of his most important conclusions were based upon NPS records of disturbances to harbor seals by Drakes Bay Oyster Company (DBOC) in 2007. Kevin Lunny was suspicious of those data, and went back to examine the dates and times of the events that Becker cited. He continued to be struck by the fact that all of the "mariculture-related" disturbances in 2007 cited by the NPS occurred in less than two weeks prior to the May 8, 2007 Marin County Board of Supervisors hearing.

Becker told your panel that DBOC had caused six disturbance events in 2007, all during that two-week period, and based powerful conclusions on a statistical analysis of those events. Lunny knew that I had already debunked four of those six 2007 disturbance events (three events on April 26, entered into the database nine months after the date, and one event on May 8, the day of the Marin County hearing), had discussed some of that data with you in my presentation on September 4, 2008, and would be following up with you (see my letters to you of September 22 and October 25, 2008). Lunny focused on the remaining pair of disturbance events that occurred fifty minutes apart on April 29, 2007. He was suspicious. April 29, 2007 was a Sunday. Lunny's oyster harvesters typically don't work on Sundays, and according to DBOC business records, they didn't that Sunday. Lunny looked at the tides for that day. They looked too high to him.

After discussing his suspicions with John Hulls (science correspondent, Pt. Reyes Light newspaper) and me in September, Lunny took three actions. First, Lunny contacted Dr. John Largier (Bodega Bay Marine Lab, U.C. Davis) to ask for his help, given his tidal buoy in Drakes Estero, in comparing the Pt. Reyes NOAA tidal buoy outside the estero in the ocean vs. the tidal lag at the inner sandbars inside Drakes Estero. Second, he asked John Hulls to find a date with similar tides in which he could directly examine and photograph the tidal conditions at the relevant inner sandbars in Drakes Estero. Hulls conducted his experiment just two weeks ago on January 1 and 2, 2009.

Finally, Lunny asked me to look at Largier's tidal numbers and Hull's experimental results, and to compare them to the NPS harbor seal database, survey records, and Becker's paper and presentation to your panel. On October 25, 2008, I wrote to you that the April 29, 2007 disturbance events were suspicious in that DBOC time card and payroll records showed that only one DBOC employee was working that Sunday, and it was Lunny's daughter selling oysters at the onshore retail counter. At that time I had not yet examined the details of the April 29 disturbance events, forms, and records.

Since Hulls' experiment on January 1 & 2, 2009, and Hulls write up of his data provided to Lunny and me on January 12 (to be submitted to you by Lunny), I have reviewed the NPS I&M harbor seal database, disturbance survey forms, and other NPS records.

**I write to you today with my analysis of the disturbance events of April 29, 2007, their relationship to Largier's and Hulls' data, and their relationship to the NPS database and Becker's paper and presentation to you. Simply said, NPS presented you with false science. It is physically impossible for the disturbance events to have taken place as described. Moreover, these data violated the NPS QA/QC protocols and never should have been entered into their database, and violated Becker's stated QA/QC protocols and never should have been included in his paper or presentation.**

This new information provides strong support to the conclusion that, throughout the Summer and Fall of 2008, NPS officials and scientists provided your NRC panel with harbor seal data and analyses that are false and misleading. There is little ambiguity – your NRC panel was repeatedly presented with false science.

**Tide charts and direct experimental analysis of tides similar to those in Drakes Estero on April 29, 2007 reveal that the sandbars in question were under water when seals were supposedly observed getting flushed off of them (by oyster workers that time clock and payroll records show were not working that Sunday). Swimming harbor seals cannot be flushed off of a sandbar that is under water. Seals cannot be flushed by workers that are not working.** Seals cannot be flushed by workers purportedly working at a distance of six to eight football fields, six to eight times the official protective zone. This is prima facie false science – the tide charts and photos tell it all.

In Becker I (the first version of Becker's paper in press in Marine Mammal Science submitted to your panel on June 3 and presented to you on September 4, 2008), Becker considered oyster-related disturbances from 2000-2007 even though Lunny had owned DBOC only from 2005-2007. According to Becker I, there were zero mariculture-related disturbances during the five-year period 2000-2004. If we eliminate the suspicious and improbable records from 2006 and 2007, then there were also zero mariculture-related disturbances during the three-year period of Lunny ownership (2005-2007).

At the same time that NPS included mariculture-related disturbance records from 2006 and 2007 that were not credible, Becker and colleagues ignored the legitimate records of thousands of seals flushed into the water largely by Park visitors during 2005-2007.

In Becker II (the second revised version of the Becker et al. paper), Becker cherry-picked the data by arbitrarily going back to 1996 (instead of just 2000) to claim six oyster-related disturbances in 1996 (and none in 1997-1999). Four of those six disturbances were fabricated – they do not exist in the database – as I wrote to you on December 8, 2008. The other two were caused by oyster workers on a single day (May 4, 1996) – over twelve years ago and nine years before Lunny took ownership of the oyster farm and cleaned it up. Are we to believe that a weak correlation based on this one 12+-year old survey form from 1996 is evidence that DBOC is today causing harm to the seals?

Why did NPS officials ask Becker and colleagues to begin their study in August 2007, an analysis that ultimately led to their paper and presentation to you on September 4,

2008? Becker's analysis was initiated just a few weeks after Senator Feinstein's July 21, 2007 meeting in which she asked that an independent science panel review the NPS Marin County hearing testimony and published report ("*Drakes Estero: A Sheltered Wilderness Estuary*") of May 2007, a request that became your panel's first study.

**The fabricated story NPS presented to your NRC panel on September 4, 2008 and since about disturbances at sandbars OB and UEN had the effect of diverting the panel's attention away from the NPS misconduct in May of 2007.** Your mission was to investigate this previous misconduct, including claims of harm to harbor seals by DBOC that I have documented to you previously were blatantly false (see my report to you on December 18, 2007, my presentation to you on September 4, 2008, and my letters to you on September 22 and October 25, 2008).

NPS officials and scientists knowingly misled your NRC panel and the Editor of the Marine Mammal Science journal. NPS scientist Dr. Ben Becker (verbally on September 4, 2008) and NPS Regional Director Jon Jarvis (in writing on September 24, 2008) both misled your panel about what NPS officials and scientists had said and written in May of 2007, and what their data actually shows. They presented you with false science including false explanations, false data, and false analysis.

On December 12, 2007, at the request of the NRC, I submitted a report documenting serious scientific misconduct on the part of NPS officials and scientists. That date was before the NPS I&M harbor seal database was inappropriately altered and the Becker manuscript was submitted to the Marine Mammal Science journal. In subsequent discussions, Dr. Susan Roberts insisted that your panel was neither going to investigate nor comment on scientific misconduct. Misconduct, I was told, was off limits.

Although you declared that you would not investigate scientific misconduct, you may now have little choice, if you are both to follow Federal law and uphold the integrity of the National Academy of Sciences. If the NPS presentation to the Marin County Board of Supervisors on May 8, 2007 (and accompanying Drakes Estero report) was chapter one of NPS scientific misconduct, then the NPS presentation to your NRC Ocean Studies Panel on September 4, 2008 (and accompanying Becker et al. paper and September 24 Jarvis letter) was chapter two of NPS scientific misconduct. **This second chapter of misconduct has inexorably placed your panel not solely as passive spectator but rather as active participant in the NPS misuse of science.**

In 1992, the NAS issued a report that proposed a standardized definition of scientific misconduct. Based on the NAS report, the White House OSTP issued a standardized federal policy for scientific misconduct in 2000. At the time, NAS President Bruce Alberts said about this policy: "*... we believe that the proposed common definition of misconduct and the procedures outlined for handling such allegations are a major step forward.*" The OSTP policy, as Lunny noted in his recent letter to you, applies to all Federally-funded grants and contracts. How can the organization that first proposed the Federal policy, and which presently is a Federally-funded contractor for this study and thus subject to that policy, nevertheless continue to declare that the topic of the policy – scientific misconduct – is off limits?

The false science that the NPS gave the NRC surpasses the threshold of the OSTP definition of scientific misconduct that became Federal policy in 2000. The false science that the NPS gave the NRC also surpasses the threshold of the NPS January 31, 2008 Scientific Code of Conduct. Finally, the false science that the NPS gave the NRC puts the integrity of the National Academy of Sciences at risk, and should clearly surpass the threshold of action by the NAS to investigate these serious allegations. I believe you are now obligated – according to law, but more important, to uphold NAS integrity – to investigate whether the NPS presented the NRC with intentionally false and misleading scientific information to influence your deliberations.

## Conclusions

- (1) The harbor seal disturbance events attributed to Drakes Bay Oyster Company (DBOC) on April 29, 2007 are not credible. No such disturbances could have occurred as described -- the tide was too high; the workers were not working. These data failed the NPS I&M harbor seal database QA/QC protocols and never should have been entered into the NPS database. These data failed the QA/QC protocols that Becker presented to your NRC panel on September 4, 2008 and never should have been presented to you. These data failed the QA/QC protocols in the Becker et al. paper in press in Marine Mammal Science and never should have been included in that paper.
- (2) None of the harbor seal disturbance events attributed to DBOC during Kevin Lunny's three-year ownership of DBOC (2005-2007) are credible. Much of these data as described in NPS presentations and publications to the NRC are either fabricated or falsified, and others are suspicious and do not pass the NPS I&M harbor seal database management QA/QC protocols and procedures.
- (3) The only mariculture-related disturbances in the NPS I&M harbor seal database that may be credible from 1996 to 2007 are two disturbances in 1996 and two in 2003.
- (4) Becker's presentation to you on September 4, 2008, and his paper in press in Marine Mammal Science that was submitted to you, cherry-picked data by relying solely on the small number of disputed (and in some cases falsified or fabricated) disturbances purported to be caused by the oyster farm, and completely excluded the hundreds of legitimate records of disturbances, mostly by Park visitors, of harbor seals that led to many thousands of seals getting flushed into the water during pupping season.
- (5) After objections were filed concerning the first version of Becker's paper -- Becker I, he and colleagues further cherry-picked the NPS database and changed certain numbers and statistical analyses in resubmitting the second version -- Becker II. The cherry-picked data, including 1996, 2006, and 2007 data that are fabricated or falsified, permitted Becker and colleagues to draw the unsubstantiated conclusion that the number of mariculture-related harbor seal disturbances increased as the number of harvested oysters increased.
- (6) The preponderance of evidence supports the conclusion that fabricated and falsified data and analyses, cherry-picked data, and data that did not pass NPS QA/QC protocols were presented to your NRC Ocean Studies Board panel.

## **April 29, 2007: Historical Context for Disturbance Record**

To appreciate the importance of the April 29, 2007 disturbance events (as entered in the NPS I&M harbor seal database) requires understanding the historical context of that date within the broader discussions and NPS claims from 2005-2007. In particular, April 29, 2007 – and its purported disturbance events – took place twenty-four days after the April 5 meeting between PRNS Superintendent Don Neubacher and Marin County Supervisor Steve Kinsey during which Neubacher told Kinsey that NPS had data showing serious harm to the harbor seals in Drakes Estero caused by Drakes Bay Oyster Company (DBOC). April 29 was five days after NPS scientist Dr. Sarah Allen admitted to NOAA's Joe Cardaro by email that NPS had "*no direct observations*" of DBOC causing seal disturbances. April 29 was nine days before the Marin County Board of Supervisors hearing that was called by Supervisor Kinsey, largely in response to the April 5 meeting, to ask for unanimous Board approval of a letter to Senator Feinstein requesting her assistance concerning NPS accusations against DBOC. This historical context is described in detail in the Appendix at the end of this report.

## **April 29, 2007: Disturbance Record in NPS I&M Database**

April 29, 2007 was a Sunday nine days before the Tuesday May 8, 2007 hearing of the Marin County Board of Supervisors. As of this date, there were no data in the NPS I&M harbor seal database showing what Superintendent Don Neubacher had claimed to Supervisor Steve Kinsey twenty-four days earlier on April 5 -- namely, that NPS had data showing serious harm to the harbor seals by DBOC.

At the time of the Marin County hearing on May 8, the disturbances on April 29, 2007 were the only data in the NPS I&M database reporting disturbances (two events, fifty minutes apart) to the harbor seals in Drakes Estero by DBOC during the three-year (2005-2007) ownership by Kevin Lunny. This QA/QC'ed NPS database was sent to me from Regional Director Jon Jarvis by certified mail on August 13, 2007. That NPS database reports that on April 29, 2007, first one seal, and fifty minutes later four more seals, were flushed into the water (FW's) by DBOC workers. According to the same observers, on the same day (April 29), 55 harbor seal FW's from subsite L were caused by Park hikers.

As documented below, the April 29, 2007 DBOC disturbances could not have occurred according to a review of worker records and tidal charts. However, even if the entries were a true record of disturbances caused by DBOC, then as of April 29, 2007, DBOC would have caused 1/500<sup>th</sup> of the FW's of harbor seals in Drakes Estero recorded in the NPS harbor seal database from 2005 to 2007.

## **April 29, 2007: Oyster Workers Were Not Working**

April 29, 2007 was a Sunday. Except for long holiday weekends, Lunny's oyster harvesters do not work on Sundays. Lunny has gone back to his electronic time records and his pay records from April and early May, 2007. DBOC records show that only one

employee was working that day (Lunny's daughter Brigid), and she was selling oysters at the onshore retail counter. None of the employees who prepare oyster bags, harvest oysters, or work on oyster boats were working that Sunday. Not a single oyster worker had clocked in on Sunday April 29. DBOC has an electronic time clock, and their records are clear – no one from DBOC except Brigid Lunny was working on that day.

## **April 29, 2007: Observations Inconsistent with Business Practice**

The April 29, 2007 entries into the NPS I&M harbor seal database are based upon a PRNS Harbor Seal Disturbance Survey form for that day filled out by "E + D Leite" (observers #142 and #143). Below is what their survey form reported.

At 12:50, a motorboat flushed one seal from sandbar UEN. They wrote: *"mom & pup flushed when boat accelerated toward Bull Point from N. end of OB channel after throwing out bags."* The distance from the UEN haul-out site to the location of this motorboat would have been about one half mile or approximately 2,400 feet. This is equivalent to six to eight football fields in length.

At 13:40, the form recorded a second disturbance. A motorboat flushed five seals from sandbar UEN. The observers wrote: *"boat returned, threw more bags, left again."*

On April 22, 2008, the NPS, California Coastal Commission (CCC), and Lunny jointly adopted a new protocol stating that oyster boats are required to stay at least 300 feet away from seals to avoid disturbing them. This protective zone was established by NPS and CCC based upon the Marine Mammal Protection Act and recommendations from both the National Oceanic and Atmospheric Administration (NOAA) and California Department of Fish and Game. The distance described between the flushed seals and the purported oyster boat that allegedly disturbed them on April 29, 2007 – approximately 2,400 feet – was eight-fold further away than the NPS, CCC, NOAA, and CDFG agreed upon 300-foot protective zone.

According to Kevin Lunny, owner of DBOC, and Luis Armienta, one of the managers of his oyster farm, the April 29, 2007 disturbance records are inconsistent with their business practice and are nearly impossible to have occurred as described. Not only were none of the DBOC oyster harvesters working on Sunday April 29, 2007, but the times and distances are suspicious. The observers recorded that an oyster boat flushed a seal at sandbar UEN at 12:50 after throwing out oyster bags, and then returned and threw out more bags and flushed more seals at 13:40, fifty minutes later.

The members of your NRC panel that visited Drakes Estero on September 5, 2008 will remember that it takes twenty minutes or more to travel by boat from the oyster farm at the top of Schooner Bay, out along Schooner Bay, into the larger estero, and then along a circuitous route to sandbars UEN and OB. Traveling back and forth to sandbar UEN is so time consuming that oyster workers typically only make the trip once, not twice, per day to deposit oyster bags. It takes 20 minutes to motor back in, and 20 minutes to motor back out. Once at the dock of the oyster farm, it takes 20 minutes or so to prepare and load the boat with additional oyster bags, and this does not account for additional break time. As described by manager Armienta, this seldom happens – oyster workers

motor out once and drop off oyster bags. There simply was not enough time on April 29 from 12:50 to 13:40 for the boat to return to the dock, pick up more bags, and motor back out to sandbar UEN. According to Armienta, it is hard to imagine that the events occurred as described (let alone the fact that none of the oyster workers were working that day).

## **April 29, 2007: The Tide Was Too High**

The oyster workers were not working on Sunday April 29, 2007. Had they been working, the timing of the disturbance events are inconsistent with DBOC business practice. Most important, the tides were too high. At the time of the disturbance events, the haul-out sites on sandbar UEN were under water. **Swimming harbor seals cannot be flushed off of a sandbar that is under water.**

As stated above, the entry of two disturbance events on April 29, 2007 at 12:50 and 13:40 into the NPS I&M harbor seal database are based upon a PRNS Harbor Seal Disturbance Survey form for that day filled out by "E + D Leite" (observers #142 and #143).

Do these NPS records give us any indication of the tides on that day? The PRNS Harbor Seal Survey form for April 29, 2007, also filled out by "E + D Leite", noted the "low tide level closest to survey time" as "16:25" and that the tide was +1.4 (the high low tide was actually 16:49 or later that day). The observers record that at 14:15, they counted 751 seals in total on sandbars in Drakes Estero, including 245 seals at sandbar UEN and 35 seals at sandbar OB. However, in the notes they wrote: "*poor tide – counted when ..... at 3:15*". On the photocopy given to me by NPS, I cannot read the 4 or so words between "when" and "at 3:15". Based upon the tide chart with appropriate lag correction, it would have been difficult if not impossible for them to count seals on UEN and OB until 15:15 (see below). If the tide was too high and they couldn't count the seals on UEN or OB until 15:15, then how could they record a disturbance at 12:50?

### **What were the tides on April 29, 2007?**

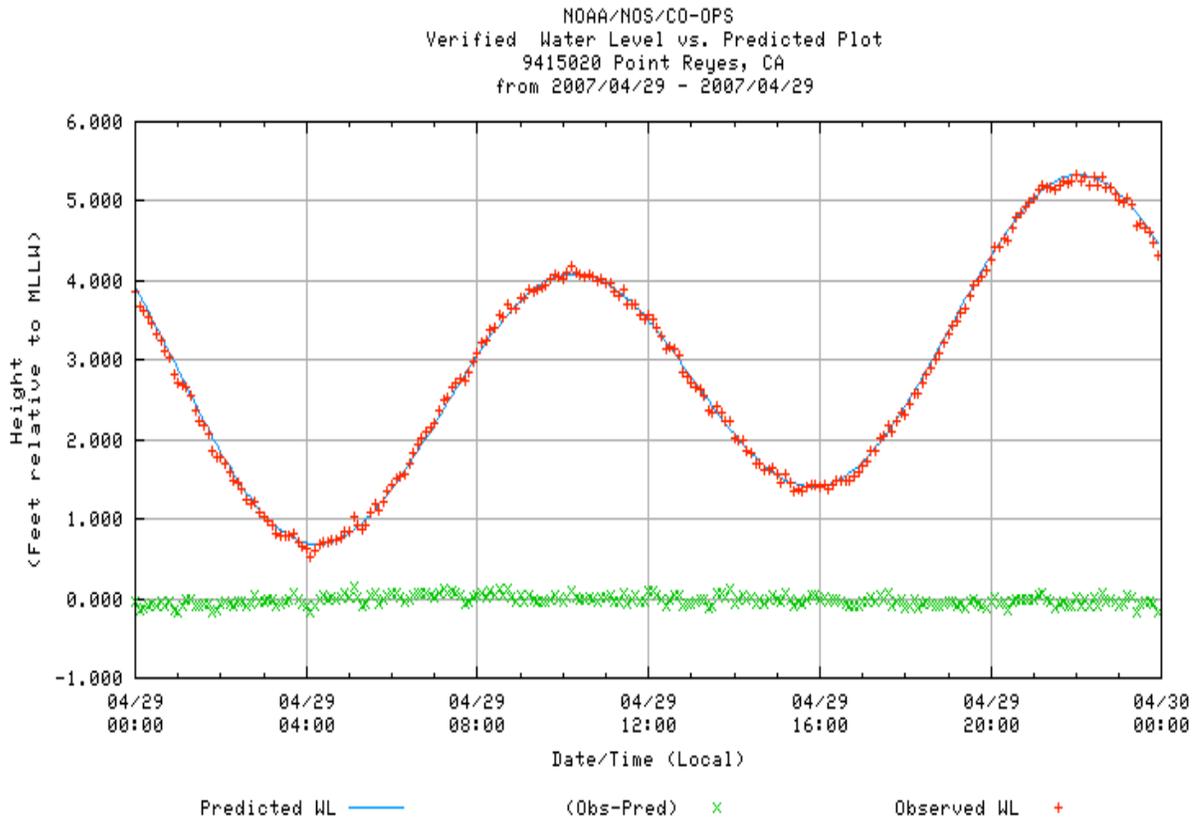
The official NOAA buoy for Point Reyes, outside the mouth of Drakes Estero, shows the observed water level in the graph below. The tides inside Drakes Estero lag behind these times, given the small mouth, large extensive set of bays, and the long channel.

The graph on top of the next page is for the Pt. Reyes NOAA buoy in the ocean. A similar graph for Drakes Estero would require a temporal lag correction.

The next issue is to determine the time conversion (the lag) factor for the inner sandbars UEN and OB in Drakes Estero relative to the NOAA buoy in the ocean. By how much time do the tides at sandbars UEN and OB lag behind the Pt. Reyes NOAA buoy?

The NPS July 2004 paper "*Pinniped Long-Term Monitoring Program, San Francisco Area Network of Parks*" by Hester, Allen, Adams, and Nevins (the handbook with protocols and procedures for the PRNS harbor seal monitoring program), tells the harbor seal observers (on pages 7 and 8 of the harbor seal standard operating procedures) to make a +45 minute correction for Drakes Estero relative to the tide book which uses Golden

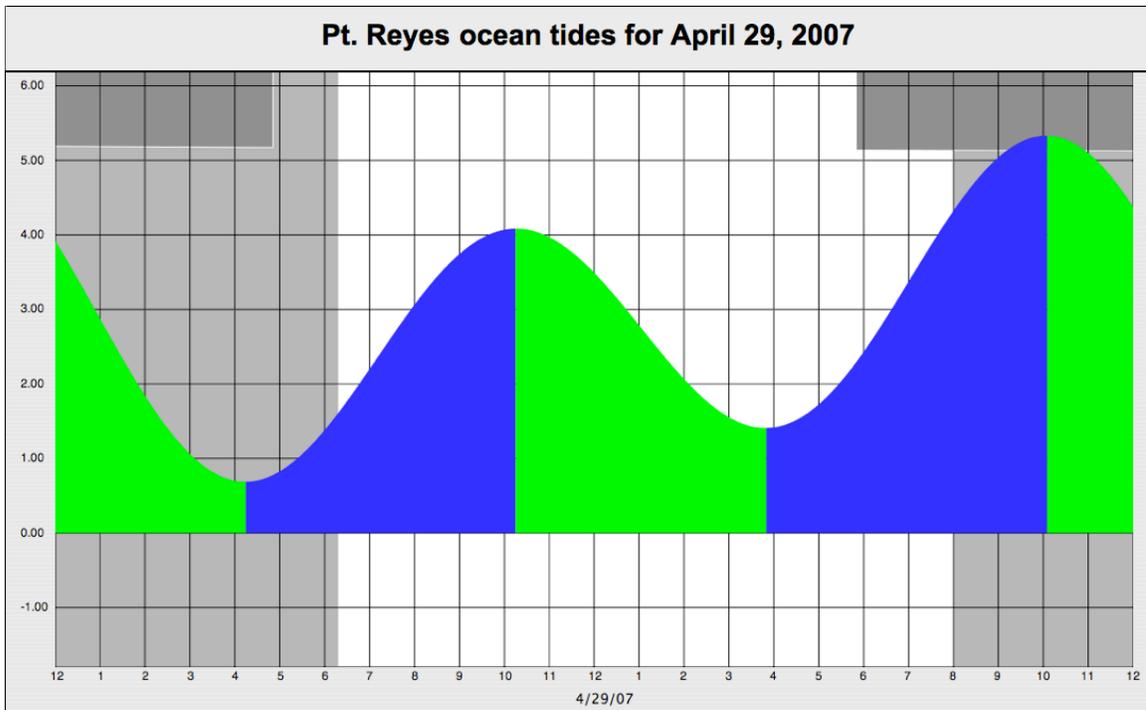
Gate Bridge from which to make adjustments. The problem with the +45 minute correction is that while it might be appropriate for most of harbor seal subsites near the mouth of the estero, it is unlikely to apply to the inner sandbars deeper into the estero.



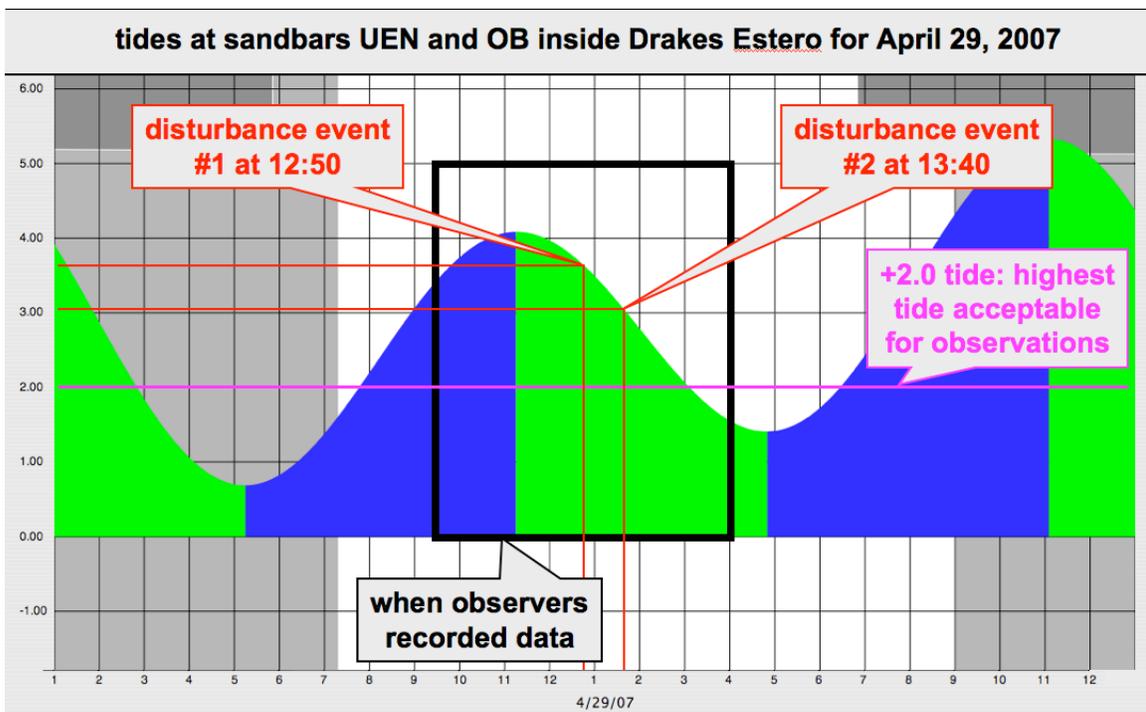
To determine the Drakes Estero lag time more precisely, Kevin Lunny wrote to Dr. John Largier (Bodega Bay Marine Laboratory, U.C. Davis) and asked for his correction based upon his buoy inside Drakes Estero relative to the Pt. Reyes NOAA buoy. Based on data from his buoy, Largier responded to Lunny's inquiry by writing that at the mouth of Schooner Bay (further into Drakes Estero than the sandbars UEN and OB), the correction is a 1.4 hr lag at high tide and a 1.7 hr lag at low tide compared to the Pt. Reyes NOAA buoy. The lag would be less at the sandbars UEN and OB.

At the request of Kevin Lunny, John Hulls designed and conducted an experiment to examine the tidal heights and sandbars in Drakes Estero at tides comparable to April 29, 2007. On January 1 and 2, 2009, Hulls measured the high tide at sandbar OB and determined that it had about a 1.3 hr lag at compared to the Pt. Reyes NOAA buoy tide chart. This is consistent with Largier's 1.4 hr lag further up the estero. Thus, in considering the lag from the Pt. Reyes NOAA buoy to sandbars UEN and OB, here I use a 1 hr lag (although the true lag is probably closer to the 1.3 hr lag measured by Hulls). A longer lag would make the tides higher at the reported times.

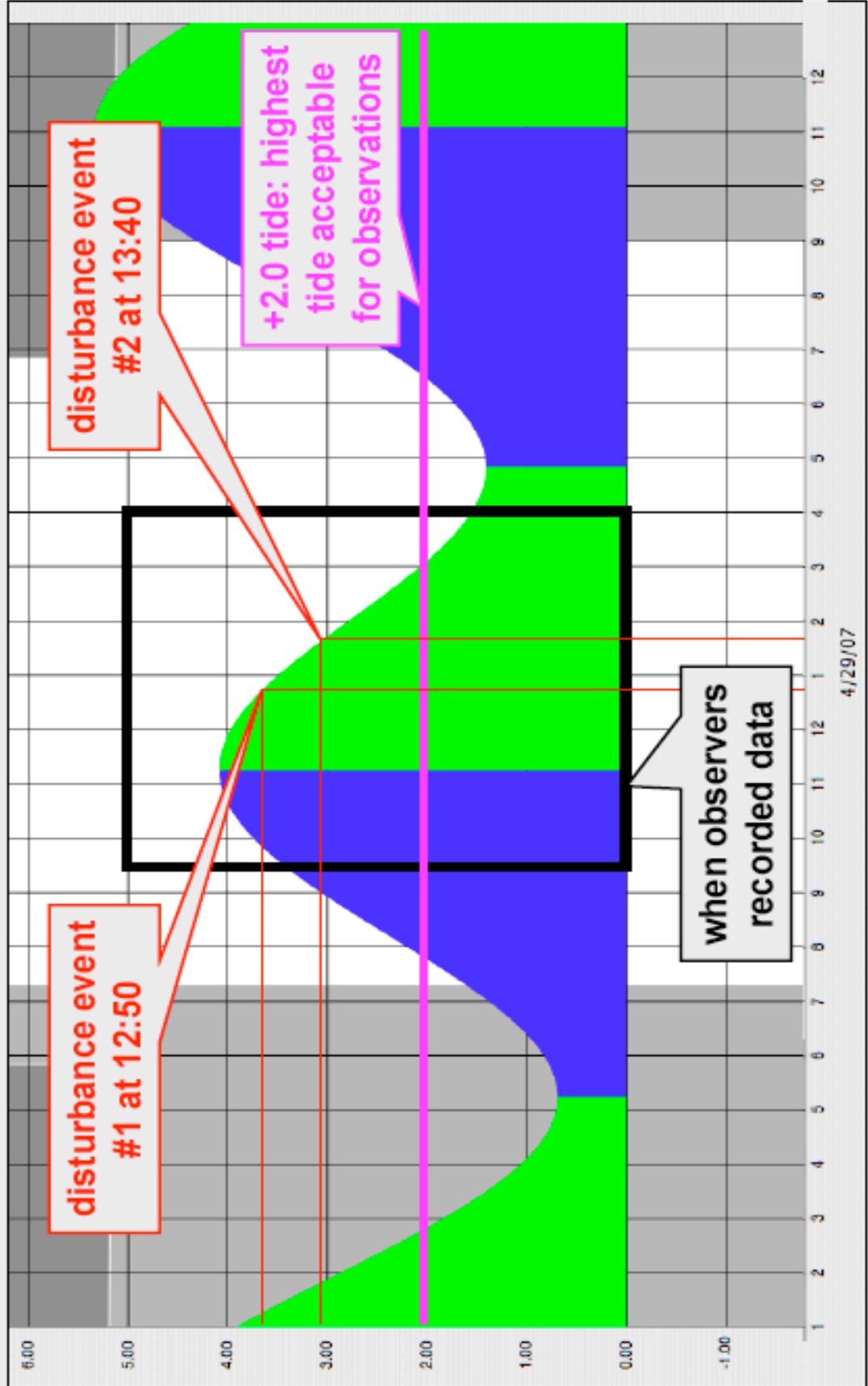
The graph on top of the next page presents the April 29, 2007 tide as on the Pt. Reyes NOAA buoy graph but from the "Mr. Tides" web site which provides an hourly time scale for better resolution. The time scale is for the ocean outside Drakes Estero.



To calculate the tidal height at inner sandbars UEN and OB inside Drakes Estero, we need to add at least one hour (according to Largier and Hulls, as noted above).



tides at sandbars UEN and OB inside Drakes Estero for April 29, 2007



Based upon these assumptions and corrections, the above graph presents the same tide data but with the time axis shifted by one hour to the left to correct for the tides at inner sandbars UEN and OB in Drakes Estero. Largier's and Hulls' data suggest that the lag is greater than 1 hour (more like 1.3 hr). A larger version of this same graph is shown on the preceding page.

On April 29, 2007, the (low) low tide at Drakes Bay occurred at 04:14 and was +0.7 ft. At sandbars UEN and OB, this low tide would have occurred at 05:15 or later.

The (low) high tide occurred at 10:14 and was +4.1 ft. At sandbars UEN and OB, this high tide would have occurred at 11:14 or later.

The (high) low tide occurred at 15:49 and was +1.4 ft. At sandbars UEN and OB, this (high) low tide would have occurred at 16:49 or later.

Let's return to our tide chart with our one-hour time lag, and compare it to the disturbance observations in the NPS database.

**The PRNS observers claimed to see an oyster boat flush one seal off sandbar UEN at 12:50 on April 29, 2007. At 12:50, only about one and one half hours after the high tide of +4.1 ft, the height of the tide at sandbars UEN and OB would have been above +3.5 ft (John Hulls, in his report of 1/12/09, calculates a tide of 3.60 at this time).**

**The PRNS observers claimed to see the same oyster boat flush five more seals off sandbar UEN at 13:40. At 13:40, the height of the tide at sandbars UEN and OB would have been above +3.0 ft (Hulls in his report calculates a tide of 3.05 at this time).**

The tide in Drakes Estero would have still been above +2.0 ft at 15:00 and would have dropped below +2.0 ft for the first time since around 07:30 that morning at around 15:15 that afternoon. In other words, the tide would have been above +2.0 ft for about eight hours that day, and would have been above +2.0 ft during most of the time that the observers were recording their seal counts and disturbances.

### **At what tides are seal haul-out sites at sandbars UEN & OB above water?**

We are interested, of course, as to when the eastern edges of sandbars UEN and OB close to the deep channel are above water. These are the haul-out sites used by the seals and cited by the NPS observers on April 29, 2007.

The NPS survey data from June 11, 2007 gives us a sense of this tidal height. On that date, the low tide of +1.9 ft occurred at 14:24 + 1 hr lag = around 15:24. The observations were made between 13:00 and 15:15. The observer noted: "*UEN under water entire survey.*" OB, which is a bit lower, was the same. Thus, just before a +1.9 tide (and presumably at around +2.0 or so), both haul-out sites at sandbars UEN and OB were still under water. For the seal counts, the observer noted zero seals at UEN and OB while counting 23 seals at UEF, 51 at DEM, and 503 at L. These data suggest that the haul-out sites at sandbars at UEN and OB start to rise above water at tides around +2.0. This correlates with the NPS handbook for observers (see below) and Becker's paper

(see below) that state that observers should only make observations when the tides are below +2.0 ft. The +2.0 level is marked on the graphs on pages 9, 10, 13, and 14.

In his data collection of January 1 and 2, 2009, John Hulls noted when the very highest point on UEN and OB first rose above the water. At UEN, this was just at +3.0 ft. However, the highest location on UEN, Hulls noted, was some distance further west from the eastern sandbar adjacent to the deep channel where the seals haul-out. At sandbar OB, the highest location appeared at a tide of around +2.0 ft. The tide had to get lower at each location to have any considerable extent of the haul-out sites exposed and dry, particularly the haul-out sites immediately adjacent to the eastern deep channel from which the seals haul-out.

John Hulls photographed the estero, with particular reference to sandbars UEN and OB, at the times on January 2, 2009 at which the tides were similar to those reported in the disturbance records from April 29, 2007. He concluded that sandbars UEN and OB were under water at the times at which the observers claimed to have seen oyster workers flush seals into the water. All of Hulls' photographs and data are available upon request (see Hulls' report).

### **April 29, 2007: Disturbance Survey Violated NPS Protocols**

Hester et al. (NPS July 2004: "Pinniped Long-Term Monitoring Program, San Francisco Area Network of Parks") is the handbook that from 2005-2007 provided the protocols and procedures for the PRNS harbor seal monitoring program. Hester et al. wrote:

*"To maximize the number of seals on the haul out site, surveys should be conducted between a medium (2.5 ft) to a low (-1.0 ft) tide level during mid-day."*

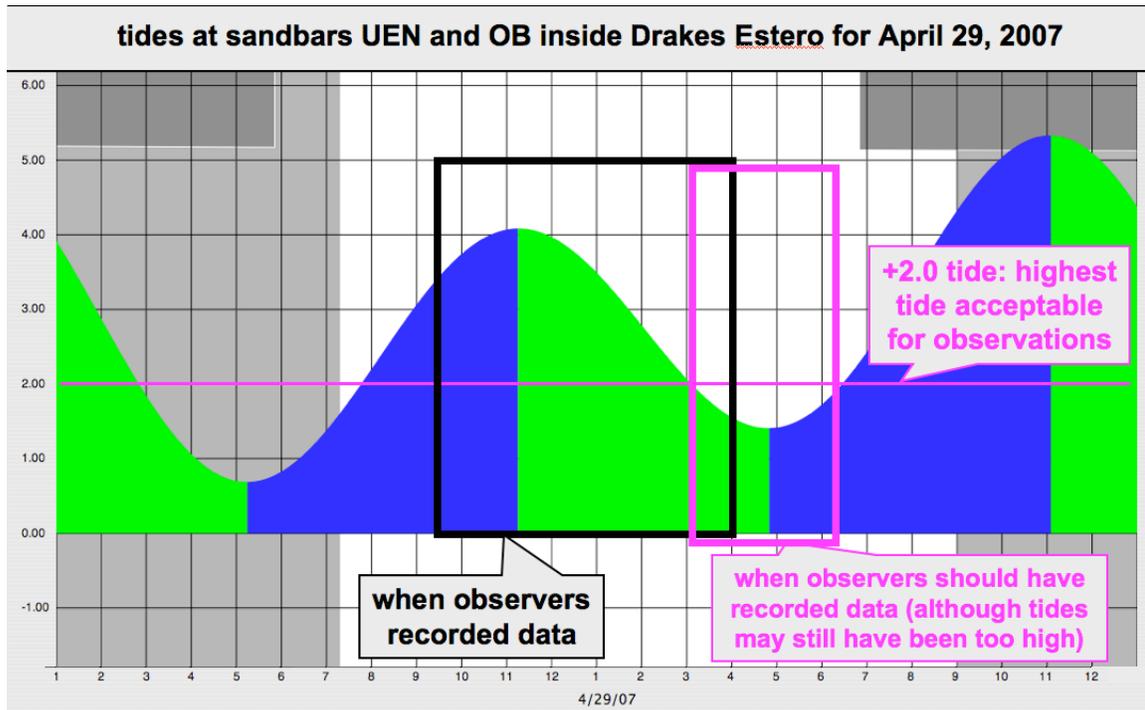
On page 23, Hester et al. wrote concerning when to conduct a harbor seal surveys:

*"Ideally +2.0 ft tide or less."*

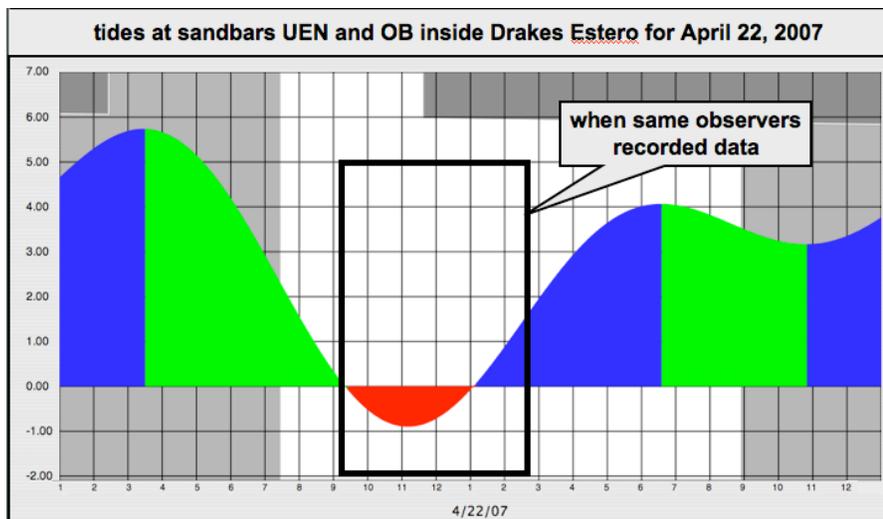
The observations by E + D Leite on April 29, 2007 did not follow that protocol. This single fact should have disqualified these observations from being entered into the NPS I&M harbor seal database. The tide was above +2.0 – it was above +3.5 ft and +3.0 ft respectively for the two disturbances -- when they claimed to have observed oyster workers flushing the seals. The sandbars were under water. Given the shape of the tide chart for April 29, 2007, they probably should not have been making observations at all on that day, and certainly not during the period during which they recorded DBOC disturbances.

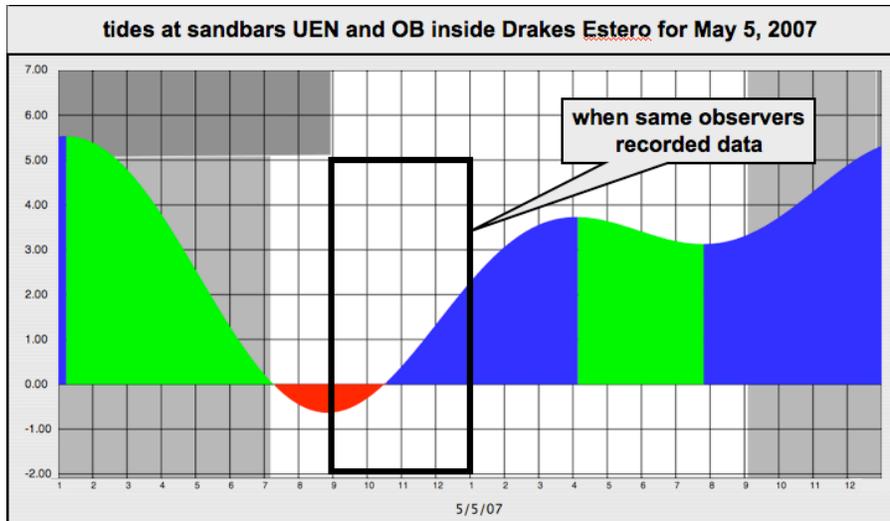
According to NPS protocols, the tides were mostly inappropriate during mid-day on April 29, 2007. For sandbars UEN & OB, the only time period during which the Leites could have picked a two-hour observation period and met the NPS protocols would have been during the three hours from 15:15 to 18:15 (around the low tide of +1.4). However, the Leites made their observations from 9:30 to 16:00, with disturbance records at 12:50 and 13:40 and seal counts at 14:15 and 15:15. They acknowledged this

when they wrote “*poor tide*”. The graph below shows in black when the Leites made their observations vs. in purple when they should have made their observations.

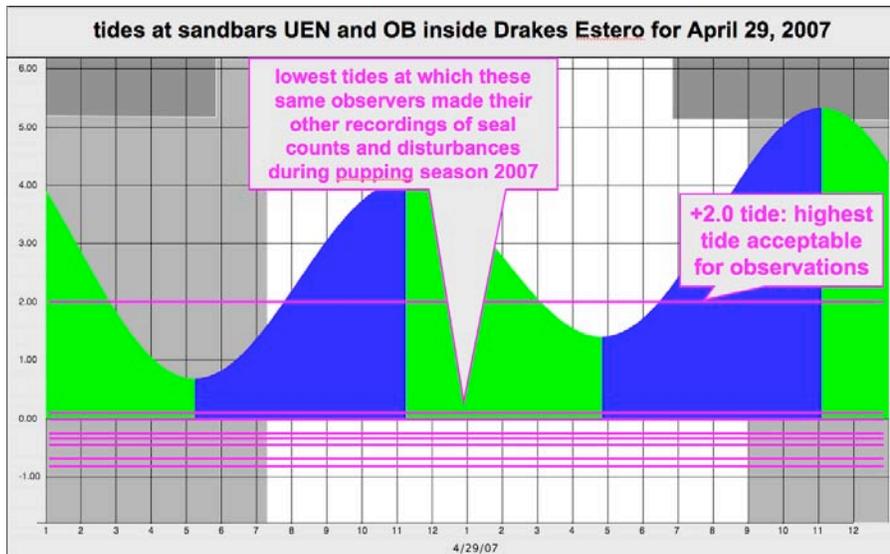


Was it typical of the Leites to make observations at inappropriate tides? No. They are observers #142 and #143 in the NPS I&M harbor seal database. They recorded no observations in the database prior to 2007. In 2007, they filed survey forms with data on 9 days: March 24, March 28, April 9, April 21 (a “*class with Sarah*”), April 22, April 29, May 5, May 9, and July 21. Eight of the observations (excluding July 21) were made during pupping season. Below are shown the tide charts and observation period for the Leites on their observation date immediately preceding April 29 (April 22) and immediately following April 29 (May 5). Note that on both dates (April 22 and May 5, 2007), the Leites were out during a low tide that fit the NPS I&M database protocols.





With the exception of April 29, 2007, the Leites made their other 7 observations during pupping season according to NPS protocols. They observed disturbances and counted seals at tides of -0.8, -0.7, -0.4, -0.3, -0.3, 0.0, and +0.1 ft on the other dates. April 29, 2007 was the outlier. This is shown graphically below.



On April 29, the Leites made disturbance observations at +7.5 hr and +8.5 hr relative to the lowest low tide of +0.7 ft that occurred in darkness at 5:15, and at -4.0 hr and -3.0 hr relative to the high low tide of +1.4 ft that occurred in the late afternoon at 16:49.

The disturbance records on April 29 were made above a +3.0 ft tide. With the exception of April 29, 2007, the Leites made their other observations during the 2007 pupping season on days in which the lowest low tide was significantly less than +2.0 during daylight hours. On six dates, they made their observations at the low tide. On two dates, they made their observations either one hour before or one hour after the low tide. Only on April 29 did they make their observations seven-eight hours after the low

low tide or three-four hours before the high low tide. Moreover, on all of their observation dates during pupping season, the low tides were +0.1 ft or less.

By all NPS criteria, April 29, 2007 was not an appropriate day for observing harbor seals on the inner sandbars in Drakes Estero since the low tide in the estero occurred at around 5 am that morning. Why did the Leites make their six and one half hour survey on this inappropriate Sunday? Why didn't QA/QC eliminate these records to be consistent with NPS protocols? While we do not know the answers to these questions, we do know that five days earlier on April 24, 2007, Sarah Allen admitted that NPS had no direct observations (see Appendix). April 29, 2007 was the **first** record in the NPS database of DBOC workers disturbing harbor seals. Moreover, it was the **only** disturbance record in the NPS database nine days later on May 8 when Neubacher and Allen testified about harm to harbor seals by DBOC.

In summary, the survey and disturbance data on April 29, 2007 violated the NPS data management protocols. The data violated the NPS QA/QC procedures. The data should never have been collected. The data should never have been entered in the database. The data never should have cleared QA/QC. The data are not credible.

## **April 29, 2007: Disturbance Survey Violated Becker Protocols**

At the NRC panel meeting on September 4, 2008, NPS scientist Dr. Ben Becker stated that he went through the harbor seal data "*disturbance event by disturbance event*", and eliminated ambiguous data or data that did not meet certain criteria in terms of tides and quality. If this is true, then how did he include the April 29, 2007 disturbance data?

In Becker's paper in press in Marine Mammal Science (Becker II), he wrote (pg. 12):

*These data were then filtered to remove: (1) data from observers with less than one year of survey experience, (2) observations at tide levels above +2 ft (+0.61 m) (MLW) when fewer seals would be present because some subsites might be submerged (Allen Miller 1988; Grigg et al. 2004), and (3) observation dates where weather reduced visibility. Tide level and tide time were standardized to the Golden Gate Bridge, San Francisco (PST).*

As described above, the inclusion of the April 29, 2007 data violated both of Becker's first two "filters". The Leites evidently did not have more than one year of survey experience. Their first survey in the database was March 24, 2007, and in that report, they acknowledged "*have lost confidence in identification [of pups] if not paired with mom.*" They took a class with Sarah Allen on April 21, 2007, eight days prior to April 29. They do not appear to have been veteran observers on April 29, 2007. Moreover, their observations were not made at tide levels below +2.0 ft. The two purported disturbance records of oyster workers flushing seals were made at above +3.5 and +3.0 ft respectively, far above the +2.0 ft level set in Becker's paper.

Not only did the April 29, 2007 record violate the NPS I&M database management protocols and should not have been entered into the NPS harbor seal database, but it also violated Becker's verbal QA/QC protocols presented to the NRC panel on

September 4, 2008, and Becker's written QA/QC protocols in this paper and thus should not have been included in his paper in press in Marine Mammal Science journal.

The April 29, 2007 disturbance data are not credible. Disturbances to harbor seals by oyster workers could not have occurred as described. It was a Sunday. Time cards and pay records reveal that the oyster harvesters were not working. The UEN and OB sandbars were under water. The observers refer to an oyster boat that by their own description was approximately one half mile – approximately 2400 ft. or six to eight football fields -- away from the harbor seal haul-out site.

The NPS official overseeing the NPS I&M database should never have entered this data in the database. Dr. Ben Becker and his colleagues should never have included this data in their paper. This was the **first** entry in the NPS database (as provided to me on August 13, 2007) of an oyster worker disturbing a harbor seal in the two and one-half years during which Lunny had owned DBOC. And these critical (and false) observations were made nine days before the May 8, 2007 hearing.

**The NPS needed these disturbance data to support Neubacher's accusations to Supervisor Kinsey twenty-four days earlier (April 5), and the conclusions they were about to make publicly on May 8. These key disturbances were the only such events in the NPS database on May 8 when Don Neubacher and Sarah Allen testified about harbor seal disturbances caused by DBOC to the Marin County Board of Supervisors.**

## **Disturbance Events Cited in Becker I & Becker II Papers Included Fabricated, Falsified, and Suspicious Records**

The first version of the Becker et al. paper (Becker I - in press in the Marine Mammal Science journal) was submitted to your panel on June 3, 2008, and presented to your NRC panel by Becker on September 4, 2008. To correlate mariculture-related disturbances with harvested pounds of oysters, Becker I focused on oyster-related disturbance events from 2000-2007.

According to what Becker told the NRC panel, he went through the NPS I&M harbor seal database "*disturbance event by disturbance event*" with the NPS database manager (David Press, a co-author of the Becker paper). Do the disturbance events Becker cited meet the standard to be included in a publication and to be presented to your NRC panel as evidence that the oyster farm is harming the harbor seals? Do these events constitute bona fide mariculture-related disturbances? No.

Becker I listed one mariculture-related disturbance event in 2006 and six mariculture-related disturbances in 2007. However, none of these records are credible.

Once we eliminate those disturbance events that are not credible, we are left with zero disturbance events caused by the oyster farm over the three-year period 2005-2007. According to Becker's presentation to your panel and the first version of his manuscript (Becker I), there were zero mariculture-related disturbance events during the preceding five-year period 2000-2004.

During the three years that Lunny owned DBOC (2005-2007), there are over one hundred disturbance events in the database documenting thousands of seals getting flushed into the water by Park visitors, but not a single FW caused by DBOC. All of the over one hundred disturbance events, and over three thousand flushed seals, were ignored, as Becker and colleagues focused on this minute subset of NPS data. This is a striking example of selective use, and selective omission, of data.

On September 22, 2008, I wrote to you and documented that the one and only mariculture-related disturbance event cited by Becker for 2006 was falsified in that it blatantly misrepresented what is in the NPS I&M database. *"Possibly oyster related"* as written in the side notes did not make this a verified mariculture-related disturbance. The observer described a boat that Lunny does not own (see DOI Office of Inspector General report for description of Lunny's boats). The observer did not call it an oyster boat, but rather a motor boat. Many fishing and recreational motorboats enter the estero. There is no reason to assume that this boat came from the oyster farm. No data confirm this as a mariculture-related disturbance event, and thus, it should not have been counted as one in Becker's paper. This is confirmed by paper co-author Dr. Sarah Allen who wrote to NOAA Joe Cardaro on April 24, 2007 and admitted that NPS had *"no direct observations"* of DBOC disturbing the harbor seals.

The six mariculture-related disturbance events cited by Becker for 2007 all occurred in the twelve days leading up to the May 8 Marin County Board of Supervisors hearing. In my September 22, 2008 letter to your panel, I documented that four of these six events were invalid. Three of them occurred on April 26 as reported in Dr. Sarah Allen's Trip Report. On that date, the oyster boat engine was broken and the workers had clocked out and gone home when Allen reported observing most of these disturbances.

NPS scientist Allen violated the NPS management protocols that she co-authored. Allen did not use the proper forms. Allen did not enter the data in the database for nine months (coincidentally right before submission of Becker's manuscript that relied heavily on these data). Lunny filed a formal complaint about this alleged disturbance several months prior to when Allen and Press entered the data into the NPS I&M database. The NPS never responded, but they nevertheless entered the data into the database without following their entry log protocol and without justifying how this data entry improved the integrity of their database. It is remarkable that they thought it appropriate to tamper with their database in violation of their own protocols just prior to submission of a paper for publication that was based upon this database. These April 26, 2007 disturbance events are not credible.

A fourth of these six mariculture-related disturbance events cited by Becker for 2007 occurred on May 8, the date of the Marin County Board of Supervisors hearing. It seems physically improbable that a single oyster boat could simultaneously flush seals from three different islands over one mile apart (or over sixteen football fields away). These data also should not have been included. They too are not credible.

In this report as documented above, I have described how the remaining two mariculture-related disturbance events cited by Becker for 2007 (occurring on April 29, 2007) could not have happened as described. The tides were too high. The workers

were not working. The timing of the events seems improbable. The entry of the April 29 records violated the database QA/QC protocols, violated Becker's QA/QC protocols, and should not have been included in his NRC presentation or his paper.

In summary, there are no credible mariculture-related disturbance events in the NPS I&M database for the three-year period (2005-2007) that Lunny owned DBOC. Becker I claimed that there are no mariculture-related disturbance events for the five-year period (2000-2004) before Lunny purchased DBOC. Thus, there were zero disturbances for the years cited in Becker I. Becker's analysis in the first version of his paper was false.

Prior to Becker's submission of the revised Becker II paper to the Editor of the Marine Mammal Science journal on October 24, 2008, and subsequently to your NRC panel, he knew that I had objected to his cited 2006 disturbance event and four of his six 2007 disturbance events on September 22, 2008. That was the extent of my formal objections.

What did Becker do in the next version of his paper, Becker II? On December 8, 2008, I wrote to you and described how Becker changed the years, the way in which he calculated the disturbances, and other features of his analysis. Most interesting, he told us in Becker I that he purposefully did not include data prior to 2000. He wrote:

*"Disturbance data is only included for the years 2000 to 2007 because the subsite specific disturbance data prior to 2000 has not been converted to current data standards."*

For the Becker II paper, Becker told the Editor, Dr. Boness, in his cover letter: *"We now include disturbance data for 1996-2008."* He gave the Editor no reason why he included more years. He gave no explanation for why the pre-2000 data were now worthy of his paper when he excluded them from Becker I. Had they been brought up to "current data standards"? Becker never told us what changed to the pre-2000 data.

Interestingly, something else that is quite important did change between Becker I and Becker II that was not disclosed. Becker never told the Editor that for Becker I, he found zero mariculture-related disturbances in 2003 (see Table 1 in Becker I), whereas for Becker II, two mariculture-related disturbances in 2003 appeared on Figure 2B with no explanation of how they were missed in Becker I, or how Becker's QA/QC protocol failed him. Remember that he told the NRC panel that he and David Press reviewed the database *"disturbance event by disturbance event"*. The 2003 disturbance data changed from Becker I to Becker II with no comment about why these data were missed in Becker I or how they were found for Becker II.

Why are the 2003 disturbance data important? During his presentation to your panel, and in the first version of his paper, Becker made the conclusion that there is a positive correlation between the size of the oyster farm (as measured by pounds of harvested oysters) and the number of mariculture-related harbor seal disturbances. In Becker I, which analyzed 2000 to 2007, the authors claimed that there were zero mariculture-related disturbances in the years with lower numbers of oysters (2000-2005) (see Table 1 in Becker I). If indeed there were two mariculture-related disturbance events in 2003 when the number of oysters was relatively low, then the conclusion made in Becker I, and later reaffirmed in Becker II, might not withstand the objections raised about the veracity of the 2006 and 2007 disturbance events. The inclusion of the 2003 disturbance

events in Becker II made this conclusion from the statistical analysis, particularly if the disturbance events of 2006 and 2007 were excluded, difficult to support. Perhaps this is why the data from 1996-1999 were included in Becker II. Given their conclusion from Becker I, statistically deriving the same conclusion in Becker II (given the inclusion of the 2003 data) was facilitated by the inclusion of the 1996 data.

Becker went on to tell the Editor of the Marine Mammal Science journal:

*Lines 319-329: Results of oyster harvest vs. disturbance correlation and rank tests. These are all now based on disturbance rate rather than frequency. We illustrate here that **omitting up to nine of the disturbances (including the one in 2006 and 2/3 of those [in] 2007)** still would result in a significant increase in disturbance with increase in oyster harvest. Also see figure 2B.*

In his statement in the results section of his paper on lines 319-329, he told us one important fact that he did not tell the Editor in his cover letter when he wrote:

*For example, there was still a significant positive correlation ... of disturbance rate with oyster harvest even when **removing the 2006 disturbance, four of the 2007 disturbances** (including two disturbances on one day in 2007 that the mariculture company challenged), and **four of the 1996 disturbances** (nine total) from the analysis.*

Becker told us that “This correlation is highly robust to sample size.” As framed by Becker, this may be technically correct given that he cherry-picked both the data he included and the data that he excluded, but it is highly misleading. It is not because the data are so strong, but rather because this kind of correlation (in this case using 1-tailed Spearman ranks test) is a weak test, and can be driven by a single anecdotal observation. According to Dr. Michael Walker, a statistics professor at Stanford, this is a weak statistical test that is prone to having small samples distort correlations.

Why in Becker II did Becker expand pre-2000 to include 1996 data? Becker acknowledged that he should eliminate the 2006 disturbance record and four of the six 2007 disturbance records, although he did not actually do so in Becker II (he wrote that he could do his statistics without them, but still included them in figure 2B in his paper). We do not know whether Becker was aware that his other two 2007 disturbance events (from April 29, 2007) were false.

In Becker II, he claimed that there were six such events in 1996. In fact, as I wrote to you on December 8, 2008 (over six weeks after he resubmitted his revised Becker II manuscript to the Editor and to your NRC panel), he fabricated four of those six records: they simply do not exist in the NPS I&M harbor seal database. These are false claims, but they make for a dramatic data point in figure 2B of Becker II (see next page).

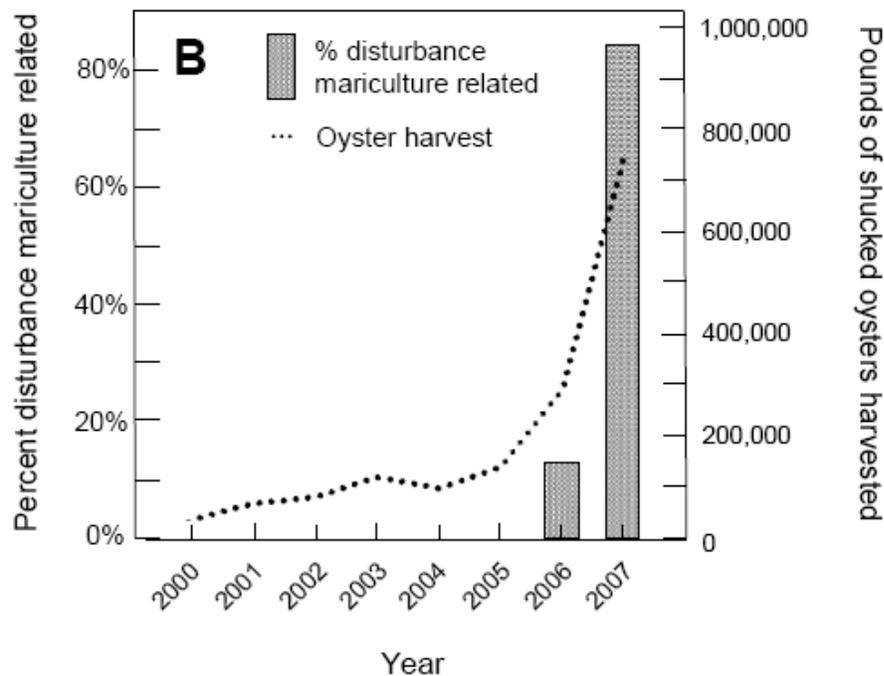
Becker wrote to Editor Boness that he could also use the Spearman ranks test to derive a correlation if he excluded nine disturbance events (one in 2006, four in 2007, and four unspecified in his letter to the Editor). In the text of the paper, he told us the identity of the other four excluded disturbance events: four of the six disturbance events in 1996.

Why did Becker do his statistics by removing four of his six records from 1996? Up until December 8, I had only objected to the one record in 2006 and four records in 2007. I had neither looked at nor commented on the 1996 data. It is striking that Becker included six 1996 disturbance events in his paper – four of which were fabricated – and then claimed that he could do his statistics after removing four of the six 1996 records.

Becker told us in the text of the paper that he could exclude from his statistical analysis the four disturbance events in 1996 that do not exist in the NPS I&M database, but he nevertheless included these four events in the visually powerful figure 2B.

Finally, I think it appropriate to ignore the NPS mariculture-related disturbance in 2008. How can we trust the NPS in 2008 after they were accused of misconduct in 2007?

Below and on the next page are Figure 2B from the two different versions of the Becker paper: Becker I and Becker II [Becker, B.H., Press, D.T., and Allen, S.G. *Modeling the effects of El Nino, density-dependence, and disturbance on harbor seal (*Phoca vitulina*) counts in Drakes Estero, California: 1997 – 2007*. *Marine Mammal Science* (in press, 2009)].



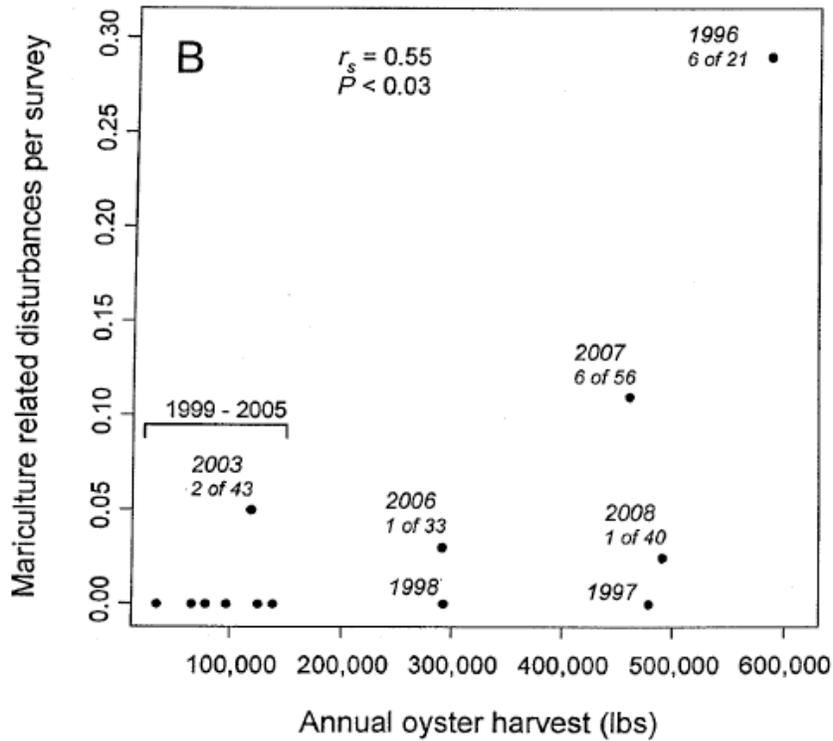
In the two figures (above and on the top of the next page), note the differences between Becker I and Becker II, with particular reference to the 2003 data. Immediately above on the previous page is shown Figure 2B from Becker II. With the exception of the two disturbance events in 2003, all of the points above zero include false claims – falsified, fabricated, or suspicious disturbance events.

1996: should be 2 of 21, not 6 of 21;

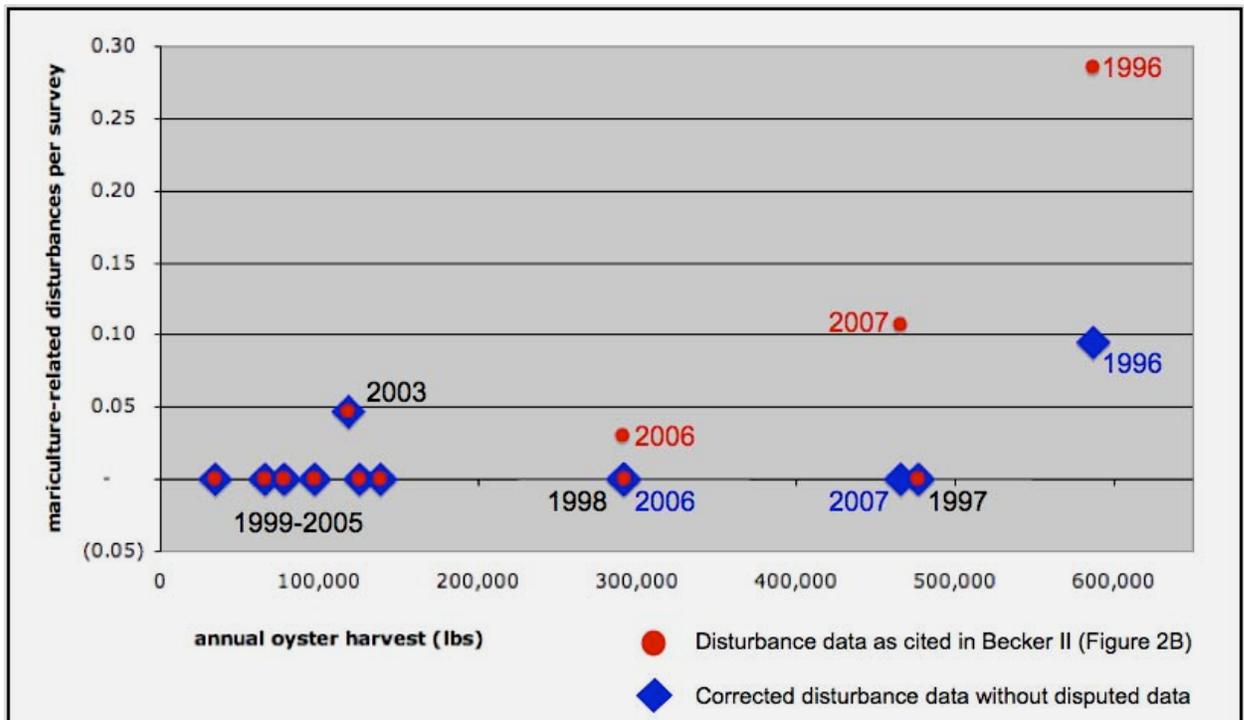
2006: should be 0 of 33, not 1 of 33;

2007: should be 0 of 56, not 6 of 56;

2008: this is the year after NPS was accused of misconduct, and should not be included.



Below is a redrawing of Becker II Figure 2B, with and without this disputed data. In red are shown the data cited in Becker II. In blue are shown the same years but corrected with the disputed (fabricated, falsified, suspicious) data excluded. Note that when the data are corrected, the only two years above zero are 2003 and 1996.



When the disturbance data are corrected, the correlation of disturbances to number of oysters gets much weaker. If Becker II had stayed with the same years as Becker I (2000-2007) and not cherry-picked the 1996 data, then the relationship would actually be a negative correlation driven by the two disturbances in 2003.

Below is a table with the rate of mariculture-related disturbance events based on the data cited in Becker I and in Becker II. In the left column it shows the data as presented in Becker I or Becker II. In the middle column it shows the correct disturbance rates when the fabricated, falsified, and suspicious data (not following QA/QC protocol) are removed.

### Data cited in Becker I and II vs. same analysis without disputed data

year	data cited by Becker	without disputed data	lbs harvested oysters
1996	0.29 (6/21)	0.09 (2/21)	587,172
1997	0 (0/24)	0	476,791
1998	0 (0/31)	0	292,188
1999	0 (0/40)	0	125,749
2000	0 (0/44)	0	34,094
2001	0 (0/42)	0	65,676
2002	0 (0/37)	0	78,064
2003	0.05 (2/43)	0.05 (2/43)	118,643
2004	0 (0/49)	0	96,754
2005	0 (0/37)	0	138,958
2006	0.03 (1/33)	0 (0/33)	291,538
2007	0.11 (6/56)	0 (0/56)	466,503
2008	0.02 (1/40)	? (current year should be excluded)	492,787

color key: black = years and data cited in both Becker I and Becker II (2000-2007)  
 red = years and data cited only in Becker II  
 blue = data that changed from Becker I to Becker II; Becker I reported zero mariculture-related disturbances in 2003; Becker II reported two in 2003

Earlier in this report, I noted that correlation tests are amongst the weakest in statistics. If we compare the pounds of harvested oysters to the rate of mariculture-related disturbances from 1996 to 2007 (using the correct data in the middle column) using Pearson's test, we get a weak positive correlation of +0.47. If we make the same statistical comparison for 2000-2007, we get a very weak negative correlation of -0.12 (based upon the 2003 data, which appeared in Becker II but which was missed in Becker I). In other words, based on a single anecdote that is twelve years old, namely, the disturbance survey on May 4, 1996 of oyster workers (under a previous owner) disturbing seals at two different times, we can (falsely) conclude that as the number of pounds of oysters increases, so do the number of oyster farm disturbances. Without that record, the correlation flips.

The only reasonable conclusion is that Becker needed to cherry-pick the 1996 disturbance data to support his pre-determined thesis. The positive correlation is based upon a single survey taken over twelve years ago and nine years before Lunny took over ownership of the oyster farm and cleaned it up. Becker II claimed there were six mariculture-related disturbance events in 1996 when in fact there were only two – the other four simply do not exist in the NPS I&M harbor seal database.

Are we to believe that a very weak correlation based on this one twelve+-year old survey form from a single day in 1996 (May 4, 1996) is evidence that DBOC was causing serious harm to the harbor seals in 2007? Does this one record from 1996 teach us anything about Drakes Estero in 2007 or today? Does this one record from 1996 allow us to conclude that as the number of oysters increased, so did the number of oyster-related disturbances?

## Summary

In this report, I have presented new information that suggests that, throughout the Summer and Fall 2008, NPS officials and scientists provided your NRC panel with harbor seal data and analyses that was false and misleading. As shown here, there is little ambiguity – your NRC panel was presented with false science.

Tide charts and experimental analysis of tides in Drakes Estero all confirm that on Sunday April 29, 2007, the UEN and OB sandbars were under water when seals were supposedly observed getting flushed. Business records (time clock and payroll records) show that the oyster workers were not working on that Sunday. Swimming harbor seals cannot be flushed off of a sandbar that is under water. Seals cannot be flushed by workers that are not working.

With the debunking of the two disturbance events from April 29, 2007, we can now conclude that none of the mariculture-related disturbances claimed by Becker to have occurred in 2006 or 2007 were valid. None pass the threshold of the NPS harbor seal database protocols. None pass the threshold of the QA/QC protocols outlined in Becker's paper and to your panel on September 4, 2008.

When Becker resubmitted his paper to the Marine Mammal Science journal, and to your panel, he went back to 1996 (including data he previously said should not be included) so that he could cherry-pick two legitimate mariculture-related disturbances in 1996. Becker also fabricated four additional disturbance events that simply do not exist in the NPS harbor seal database. If the Becker II paper were revised to remove the disputed data, then the authors' hypothesis would collapse.

Becker I cited six mariculture-related disturbance events in 2007. After arguments were presented that four of these six events (April 24, 2007 and May 8, 2007) were not credible, Becker essentially conceded these disturbance events. In Becker II, he stated that his statistical analysis was robust when he eliminated these four events.

Clearly, the 2007 disturbance events are key. On April 24, 2007, Dr. Sarah Allen wrote to NOAA's Joe Cardaro and admitted that NPS had "no direct observations" of DBOC disturbing seals, consistent with the fact that Becker's cited 2006 disturbance is invalid.

I have shown here that the remaining two mariculture-related disturbance events from 2007 could not have occurred as reported, and should neither have been entered into the NPS database nor included in Becker's paper and presentation to your NRC panel.

Concerning DBOC disturbance of harbor seals in 2007, Superintendent Don Neubacher and Senior Scientist Dr. Sarah Allen gave testimony to the Department of Interior Office of Inspector General (DOI OIG). The DOI OIG Report of July 23, 2008 (pg 25) stated:

*The first version of the Sheltered Wilderness report, uploading to the PRNS Web site in February 2007, was written prior to the 2007 pupping season and reflected, "Disturbances to resting and breeding seals currently remain low because oyster activities are not occurring at existing seal haul out sites." The updated version of May 2007 stated that disturbances to the seals had "increased dramatically" in 2007 and specified that one area in the estero had experienced an 80 percent decline in seals. Allen and Neubacher explained that the situation with the seals did not become an issue until 2007, when DBOC began to expand its operation.*

In summary, we have come full circle. In May of 2007, the NPS testimony and Drakes Estero Report claimed that disturbances to the harbor seals by the oyster farm had increased dramatically in 2007, as DBOC expanded its operation. In July of 2007, Senator Feinstein asked for an independent science panel to investigate that NPS testimony and report. Your NRC panel resulted from Feinstein's request. One year later, the NPS submitted Becker's paper to you, and had Dr. Ben Becker present his results and conclusions to you on September 4, 2008. This paper diverted attention away from the Drakes Estero Report by claiming a statistical analysis showing that mariculture-related disturbances are positively correlated to the number of oysters harvested. Just as the initial 2007 claims that the disturbances to the seals by DBOC had "increased dramatically" in 2007 were false, so too the 2008 claims that the disturbances correlated with size of the oyster farm are equally false.

## **Epilogue – Cherry-Picking and Abuse of the Scientific Process**

As I was finishing this report, I noticed something that had been staring at all of us for many months -- the title of Becker's paper: *Modeling the effects of El Nino, density-dependence, and disturbance on harbor seal (Phoca vitulina) counts in Drakes Estero, California: 1997–2007*. The years 1997-2007 were reinforced in the second sentence of the abstract where he wrote: "Here, we use an 11-yr (1997-2007) study of a seal colony located near a mariculture operation in Drakes Estero ..." If Becker had stuck to those years, and to the correct mariculture-related disturbance data that met his QA/QC protocols, then he would have found no relationship between disturbances and number of oysters. Actually, he would have found a very weak negative correlation (-0.17).

Becker cherry-picked the 1996 data, but never changed his title or abstract, which still begins with 1997. The only way they could get their positive correlation, if they used the corrected data, was to include data from the year before the study period – 1996.

Cherry-picking -- the misuse of facts by selective choice or presentation of data -- is one of the basic "*categories of deceitful tactics and abuse of the scientific process*", according to Dr. Peter Gleick (President, Pacific Institute; member, NAS; MacArthur Fellow). In Gleick's February 7, 2007 testimony to the Senate Committee on Commerce, Science, and Transportation in a hearing on "Climate Change Research and Scientific Integrity", he referenced cherry-picking data as one form of abuse of the scientific process. However, with those same words, he could just as well have been referring to the misuse of scientific research by the National Park Service in its claims of harm to the harbor seals in Drakes Estero by Drakes Bay Oyster Company.

# Appendix

## Timeline

### Historical Context for April 29, 2007 Disturbance Survey

#### January 2005

In the January 8, 2009 issue of the Pt. Reyes Light newspaper, Editor Tess Elliott reported that in January 2005, shortly after Kevin Lunny purchased Drakes Bay Oyster Company from the Johnson's, a meeting of Superintendent Don Neubacher and an ad hoc group of local community members was held at the seashore headquarters. Ken Fox, President, Tomales Bay Association, was in attendance. Based on an interview of Ken Fox, Elliott wrote:

*"The issue of Drakes Bay Oyster Company and what happens in 2012 was discussed for well over an hour," Fox said. "Gordon Bennett [of the Sierra Club] said that it would have been easy to get Johnson's out because their offenses were so egregious, but that it was going to be hard to get Kevin out, especially if he ran a good operation.*

*"There seemed to be an agreement that there should be a pretty big push to get Lunny out," he added. "And Don didn't try to dissuade anybody."*

#### End of 2005 to April 2007

The Department of the Interior Office of the Inspector General (OIG) Report of July 21, 2008 on the management of Pt. Reyes National Seashore (PRNS), states:

*[Marin County Supervisor] Kinsey told OIG investigators he had met with members of the Lunny family at various times since approximately the end of 2005 to discuss their concerns about the future of DBOC. In Kinsey's opinion, Neubacher was "holding [the Lunnys] hostage" until they agreed to sign a document agreeing to leave by 2012. He opined that Neubacher was "throwing down a gauntlet of obstacles" for the Lunnys by refusing to sign off on some building permits that the county was ready to issue to DBOC ...*

#### April 5, 2007

Superintendent Don Neubacher met with Marin County Supervisor Steve Kinsey on April 5, 2007 at the Park headquarters. Kinsey told Kevin Lunny (owner, DBOC) on April 11, 2007 that Neubacher made "strong environmental accusations" against DBOC including claiming that he had data of harm to harbor seals by DBOC. Kinsey told Lunny that Neubacher claimed that DBOC committed "environmental felonies" (see DOI OIG Report). Kinsey told Lunny that Neubacher claimed to have overwhelming data of environmental harm caused by DBOC, including in particular harm to harbor seals, a protected marine mammal.

The OIG Report states (concerning April 5, 2007 Kinsey-Neubacher meeting):

*Kinsey said the atmosphere was like that of a “war room.” Kinsey could not recall whether he told Lunny that Neubacher was “crazed,” but he felt it was accurate to say that Neubacher was “very upset” and “seemed obsessed” with proving that DBOC was harming seals and eelgrass in the estuary.*

*Kinsey confirmed that he told Lunny that Neubacher intended to shut DBOC down. Kinsey stated that although he did not specifically remember Neubacher saying this, the tenor of the meeting left no doubt in Kinsey’s mind that Neubacher intended to shut DBOC down prior to 2012.*

*According to Kinsey, Neubacher made “strong environmental accusations” against DBOC during their April 2007 meeting and made reference to DBOC committing environmental felonies. Kinsey summed up Neubacher’s portrayal of Lunny as a “character assassination.”*

**As of April 5, 2007, Lunny had owned DBOC for two and one-half years (beginning in January 2005). The NPS harbor seal database (obtained on August 13, 2007) recorded over 2000 seal FW’s (flushed into water, the most serious disturbance to seals and pups) during the three seal pupping season (March-May) from 2005 until April 5, 2007, but not one of them had been caused by DBOC. As of April 5, 2007, when Neubacher made his strong claim to Supervisor Kinsey, there were no NPS data to support Neubacher’s claim of harm to harbor seals by DBOC. Not a single harbor seal had been flushed into the water by oyster workers as of April 5<sup>th</sup>. Not a single record in the NPS database showed a verified disturbance to harbor seals by the oyster farm from January 2005 until April 5, 2007.**

As a result of their April 5, 2007 meeting, Supervisor Kinsey invited Superintendent Neubacher to attend a hearing before the Marin County Board of Supervisors on May 8, 2007 to consider, as quoted in the OIG Report:

*... “adoption of a draft letter to our federally elected representatives” supporting the continued operation of DBOC.*

#### **April 24, 2007**

NPS Senior Scientist Dr. Sarah Allen emailed Joe Cardaro of NOAA. Writing in response to his request for data showing harm to harbor seals by DBOC, Allen admitted that she and NPS had “no direct observations” of DBOC causing seal disturbances. Allen was right – the NPS database had record of no FW’s by DBOC as of April 24, 2007. It was two weeks before the May 8<sup>th</sup> hearing, and NPS still had no data showing harm to harbor seals by DBOC.

#### **April 26, 2007**

Dr. Sarah Allen published a first-authored article in the Pt. Reyes Light newspaper claiming that DBOC had recently put oyster bags in pupping areas and as a result seal numbers at that site had dropped dramatically. The NPS database reveals that as of April 24, 2007, when he would have submitted the final version of her article for

publication, Allen he had no such data to support her claims. Her email to Cardaro on the 24<sup>th</sup> confirmed the same: “no direct observations”.

On the same day as Allen published her article in the local newspaper, she also authored her “Trip Report” describing the first FW’s caused by DBOC in the two and one-half year history of ownership of DBOC by Lunny. Her alleged observations occurred in the late afternoon. A “Trip Report” was not normal protocol. Her observations were not entered onto normal survey and disturbance forms. Her data were not entered (as protocol specifies) in the QA/QC NPS database as provided to me nearly three months later on Aug 13, 2007. DBOC records show that the boat engine was broken that day and being repaired, and that the oyster workers had already clocked out and gone home when some of the disturbances were alleged to have occurred. The events could not have taken place as described. Neither Allen nor Neubacher mentioned the April 26 Trip Report at the May 8 hearing.

This trip report is suspicious at best. After a formal complaint about the April 26 Trip Report was filed by Lunny on Sept 27, 2007, the NPS database manager, David Press, nevertheless entered the April 26 Trip Report into the revised NPS database given to Goodman on January 16, 2008, further violating the NPS data management protocols. The data were then used in Becker’s paper in press in Marine Mammal Science journal. Given that the oyster boat engine was broken, the workers had clocked out, and the data were not entered onto the correct forms and into the database for nine months, this record is not credible.

#### **April 29, 2007**

April 29, 2007 was a Sunday nine days before the upcoming Tuesday May 8, 2007 hearing of the Marin County Board of Supervisors. As of this date, there were no data in the NPS database showing what Neubacher had claimed to Supervisor Kinsey 24 days earlier on April 5, namely that NPS had data showing DBOC harming the harbor seals.

April 29, 2007 is the date of the first entry in the Aug 13, 2007 official NPS QA/QC’ed version of the NPS database of five FW’s caused by DBOC during the two and one half year ownership by Lunny of DBOC. On the same day, 55 FW’s were caused by Park visitors. This disturbance record, as described in this report, is highly suspicious and not credible.

Even if the April 29, 2007 entry had been a true record of a disturbance caused by DBOC, which is doubtful (see main body of this report), then as of April 29, 2007, DBOC would have caused 1/500<sup>th</sup> of the FW’s of harbor seals in Drakes Estero recorded in the NPS harbor seal database from 2005 to 2007.