Marine Mammal Commission
Protecting Marine Mammals in Drakes Estero

Dr. Corey S. Goodman's presentation
Disturbances of Harbor Seals in Drakes Estero: NPS Claims vs. NPS Data

80% decline claim

Marin County
Supervisors hearing

07 Trip Report

CA Coastal Commission hearing

J F M A M J J A S O N D

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Becker III

MMC panel
meeting

Becker I

NAS panel
1st meeting

eport

Becker II

NAS panel
2nd meeting

80% claim explanations:
Sept 4: NPS Becker
Sept 9: NPS Neubacher
Sept 17: Dr. Richard (SC)
Sept 24: NPS Jarvis

Harbor Seal Claims: changing landscape, but equally false

- May 2007: **80% decline** at subsite caused by DBOC
  1. **False claim**: occurred in 2007 at middle sandbar A; DBOC not cause
  2. **Stonewalled**: refused to say which site they cited and how calculated
  3. **16 months later**: NPS gave three different & untenable post-hoc stories
- Sept 2007: prominence of **April 26 Trip Report**
  1. **Historic**: 1st DBOC disturbance in 2 1/3 years, right before key hearing
  2. **Controversial**: oyster boat engine broken, workers clocked out
  3. **Anecdotal**: did not follow protocols, not proper forms, not in database
- Sept – Oct 2008: **Becker I & II papers**
  1. **False claim**: oyster increase does not lead to disturbance increase
  2. **False claim**: oyster increase does not lead to seal decrease
  3. **Misleading statistics**: 2005 decline county-wide and not due to DBOC
- February 2010: **Becker III paper**
  1. **Questionable data**: availability, quality, and relevance of pre-1992 data
  2. **Misleading statistics**: 2005 decline county-wide and not due to DBOC
  3. **Paradoxical assumption**: Richmond Bridge study shows opposite

Marine Mammal Commission meeting, February 21, 2010: outline of Dr. Corey Goodman's presentation

1) ***Background and overview***
    1) *Background and reason County Supervisors asked for scientific analysis*
    2) *NPS claims of environmental harm vs. NAS report: NPS misrepresented data*
    3) *Harbor seal population and haul-out subsites in Drakes Estero*
2) ***Disturbances to harbor seals in Drakes Estero***
    1) *Sources of disturbances of harbor seals in Drakes Estero*
    2) *Prior to 2007: Timeline of disturbances of harbor seals*
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3) ***80% harbor seal decline claim***
    1) *May 2007: NPS claim that DBOC caused 80% decline in seals in 2007*
    2) *July 2007 – June 2008: NPS retraction and reinstatement of 80% claim*
    3) *Sept 2008: NPS & Sierra Club Explanations of 80% Decline to NAS Panel*
4) ***NPS Becker I, II, & III papers***
    1) *Sept 2008: Becker I: 2000-2007 mariculture-related disturbances*
    2) *October 2008: Becker II: 1996-2007 mariculture-related disturbances*
    3) *February 2009: Becker III: 1982-2009 mariculture-related disturbances*
5) ***Conclusions and recommendations***

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5) ***Conclusions and recommendations***

Marine Mammal Commission meeting, February 21, 2010: Dr. Corey Goodman's background & involvement

1) Biology professor

1) *biology professor for 25 years at Stanford University and Univ. of California, Berkeley*
2) *co-founded Helen Wills Neuroscience Institute at U.C. Berkeley*
3) *Evan Rauch Chair in Neuroscience*
4) *Howard Hughes Medical Institute Investigator*
5) *currently Adjunct Professor at U.C. San Francisco*
6) *published over 200 peer-reviewed scientific publications; editor of several journals*
7) *studied marine biology at Hopkins Marine Station (SU) & Friday Harbor Lab (UW)*

2) Honors and awards

1) *elected member of National Academy of Sciences*
2) *elected member of American Academy of Arts & Sciences*
3) *elected member of American Philosophical Society*
4) *winner of Alan T. Waterman Award, Canada Gairdner International Award, March-of-Dimes Prize in Developmental Biology, and other scientific awards and honors*

(cont. on next page)

Marine Mammal Commission meeting, February 21, 2010: Dr. Corey Goodman's background & involvement (cont.)

3) Biotechnology entrepreneur

1) *Co-founder of three biotech companies: Exelixis, Renovis, and PhyloTech*
2) *Managing Director and co-founder of venBio, LLC*
3) *Chair of Board of Directors of four biotech co.'s; member of BOD of two others*
4) *former President of Pfizer's Biotherapeutics and Bioinnovation Center*

4) Public policy role

1) *former Chair of Board on Life Sciences, NAS (National Research Council) committee that oversees many environmental & biological studies for federal government*
2) *member of California Council on Science & Technology reporting to State gov.*
3) *member, Bay Area Science and Innovation Consortium; other advisory roles*

5) Involvement in oyster farm issue

1) *became involved on April 28, 2007 at request of Marin County Supervisors*
2) *West Marin resident; had not met Lunnys when testified on May 8, 2007*
3) *focus on scientific integrity – good science driving policy, rather than predetermined agenda driving misuse of science – conclusion: NPS misrepresented NPS data*

Scientific Integrity: restoring science to its rightful place

*"… we are **restoring science to its rightful place**."*

*"…**the days of science taking a back seat to ideology are over**. …To undermine scientific integrity is to undermine our democracy."*

*"I want to be sure that **facts are driving scientific decisions** – and not the other way around."*

President Barack Obama in speech to the National Academy of Sciences on April 27, 2009

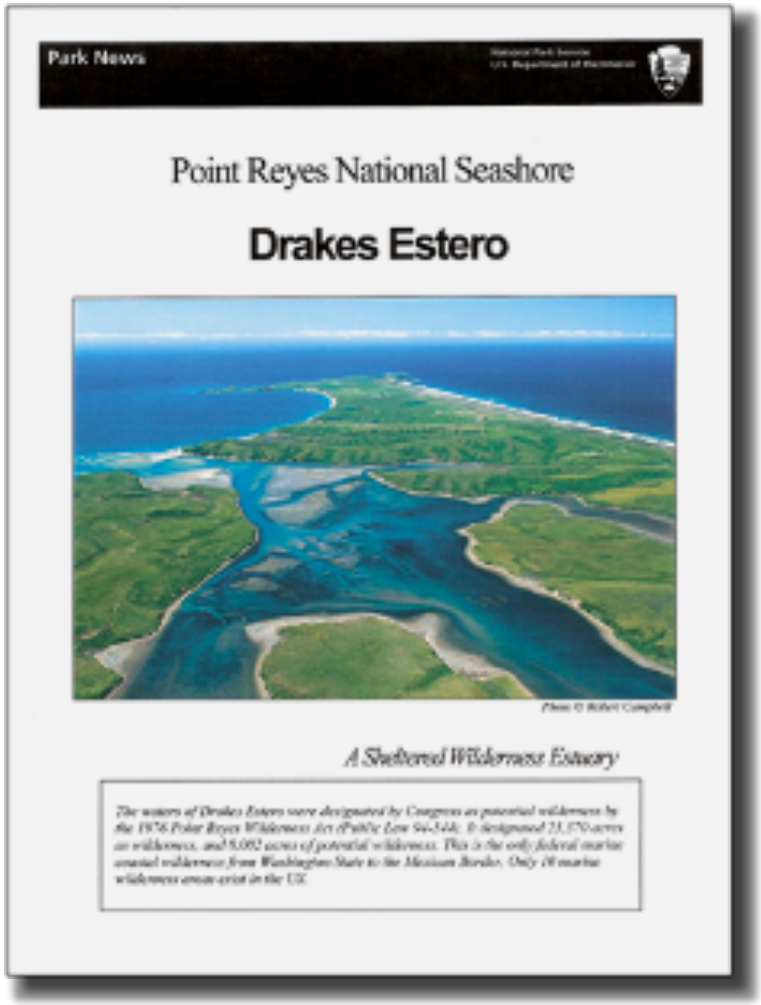
*"I believe that public policy decisions can and should be informed by quality science. But this must be science conducted rigorously, without agendas or conflicts-of-interest. **The political process can be dangerously misled by bad or misused science**. One of my greatest concerns when I see science being invoked in public policy debates is to make sure that it is good science and not pseudo-science or -- even worse -- a blatant misuse of science."*

Testimony from Dr. Corey Goodman on May 8, 2007 to Marin County Supervisors

Apr 28 2007: Dr. Goodman contacted by Marin County Supervisors, asked to examine NPS science vs. NPS claims, separate fact from fiction, and come testify on science in eight days at Supervisors hearing on May 8, 2007

Board of Supervisors
Public testimony
May 8 2007 hearing

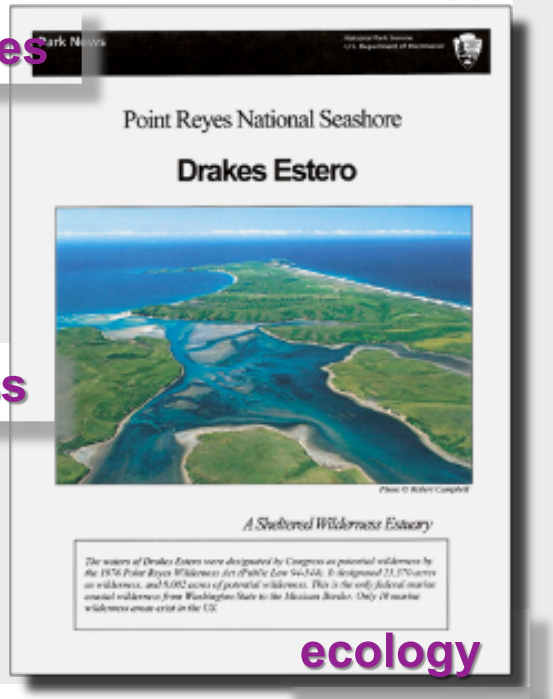
co.marin.ca.us



May 8 & May 11 2007: Neubacher featured claims in NPS Drakes Estero Report (*Drakes Estero, A Sheltered Wilderness Estuary)*

"USGS (Anima 1990) collected sediment cores from the estero and identified pseudo feces of oysters as the primary source for sediment fill ... An estimate 0.6 to 1.0 metric tons of fecal matter can be produced per year by a 60 meter square oyster raft." [May 8 and May 11 versions]

oyster feces



ecology

"Eelgrass beds are found in all suitable habitats with Drakes Estero, except between active oyster racks, where they do not exist due to shading and possibly other effects. In 2003, with 38 active oyster racks, this amounted to at least 1.5 acres of lost eelgrass cover." [May 8 and May 11 versions]

eelgrass

"Schooner Bay, where there are many oyster racks, supported a different fish community than Estero de Limantour where no mariculture occurs." [May 8 and May 11 versions]

fish

Concerning DBOC & harbor seals:

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%." [May 11]

harbor seals

"Specifically in Drakes Estero, ecological function has been degraded and altered over the past several decades due to activities associated with oyster farming ..." [May 8 & 11]

Many claims retracted in July 27 2007 secret version of NPS Drakes Estero Report

All major NPS claims retracted in NPS Sept 18 2007 "*Clarification*" document

ecology

Sept 18 2007: Jarvis & Neubacher issued "*clarification*" document, retracted all major NPS claims from May 2007

National Park Service
Clarification of Law, Policy,
and Science on Drakes Estero

September 18, 2007

The information provided in this document is a response to comments presented to the Marin County Board of Supervisors by Dr. Corey S. Goodman, a molecular biologist, in two letters (May 8, 2007 and May 29, 2007). We will present background on the legislative authority and responsibility of Point Reyes National Seashore, and we will respond to comments regarding the science presented by the park concerning oyster farming in Drakes Estero. Dr. Goodman's statements to the Marin County Board of Supervisors contain what we believe are a number of mischaracterizations. This document seeks to examine those points of disagreement, relying on expert opinion from nationally recognized ecologists, peer-reviewed published literature, and National Park Service studies.

We acknowledge the following scientists and experts in the field of marine ecology who reviewed this document for accuracy and completeness:

- Dr. James Byers of the University of New Hampshire,
- Dr. James Carlton of Williams College and Director of the Maritime Studies Program of Williams College and Mystic Seaport,
- Dr. Gary Fellers of the USGS-Biological Resources Division,
- Dr. Frances Gulland of The Marine Mammal Center and on the Scientific Advisory Committee of the US Marine Mammal Commission,
- Dr. Edwin Grosholz of UC Davis and Bodega Marine Laboratory,
- Dr. John Kelly, scientist at Cypress Grove Research Center, Audubon Canyon Ranch,
- Dr. Steven Morgan of UC Davis and Bodega Marine Laboratory,
- Dr. Ben Becker, Director of the Pacific Coast Science and Learning Center, Point Reyes National Seashore,
- David Press, Ecologist, Inventory and Monitoring Program, National Park Service,
- Gary Davis, Chief Scientist of the Oceans Program of the National Park Service, and
- Dr. David Graber, Chief Scientist of the Pacific West Region of the National Park Service.

Save Drakes Bay Coalition

logy, wildlife, and wilderness status of eashore

The Save Drakes Bay Coalition consists of the following

Environmental Action Committee of West Marin
Marin Audubon Society
National Parks Conservation Association
Sierra Club
Salmon Protection and Watershed Network (SPAWN)
Public Employees for Environmental Responsibility

Management

- Analysis by Dominique M. Richard, Ph.D on harbor seals reductions (download)
  - Conclusions support NPS testimony and refute claims of "misconduct" by Dr. Corey Goodman

- Harbor Seal report by National Park Service, published in Marine Mammal Science, 2008 (download)

- Wilderness protocols and guidelines for management in Drakes Estero, NPS Management Policies (download)

- National Academy of Sciences (NAS) website and scope of study (visit NAS website)

- California Coastal Commission memo, 9/11/07 (download)
* independent analysis on mariculture impacts in Drakes Estero
* conclusion confirms negative impacts
* recommendations provided to mitigate impacts

- National Park Service updated report, 9/18/07 (download)
* peer-reviewed by 7 non-NPS marine ecology experts
* Dr. Corey Goodman's analysis refuted by these experts

Sept 18 2007: Jarvis & Neubacher issued "*clarification*" document, retracted all major NPS claims from May 2007

oyster feces

- *"The NPS **incorrectly interpreted** the report by Dr. Roberto Anima ..."*
- *"The Elliott-Fisk et al. (2005) report notes **oyster feces are not a problem**…"*

eelgrass

- *"The current level of impact to eelgrass beds by the oyster operation **may or may not be significant** to the overall persistence of eelgrass within Drakes Estero."*

fish

- *"Dr. Goodman's review of Wechsler's thesis does point out **several inconsistencies** between Wechsler's results and…"* the Drakes Estero Report

harbor seals

- *"More focused analyses are required to determine **if oyster operations are affecting seal distribution** and productivity within Drakes Estero."*

ecology

- *"**Scientific studies to date are inconclusive** as to the extent to which oyster farming is altering natural resources within the Estero…"*

Nov 20 2007: Dr. Peter Gleick letter to Gordon Bennett (Sierra Club) concerning NPS "*clarification*" document

*"… it should be an **embarrassment to the Park Service**. It is a remarkable piece of **misleading fluffery** … the Park Service effectively acknowledges over and over that they were wrong and Goodman was right, over and over and over again, but couched in language that pretends the opposite."*

"The Park's science is not supported by these independent scientists, who over and over again agree with Goodman, point out that there is insufficient evidence of harm …"

" The NPS errors were NOT minor, but major and misleading, and now, given the responses, pretty obviously intentional. Nor were they corrected when pointed out …"

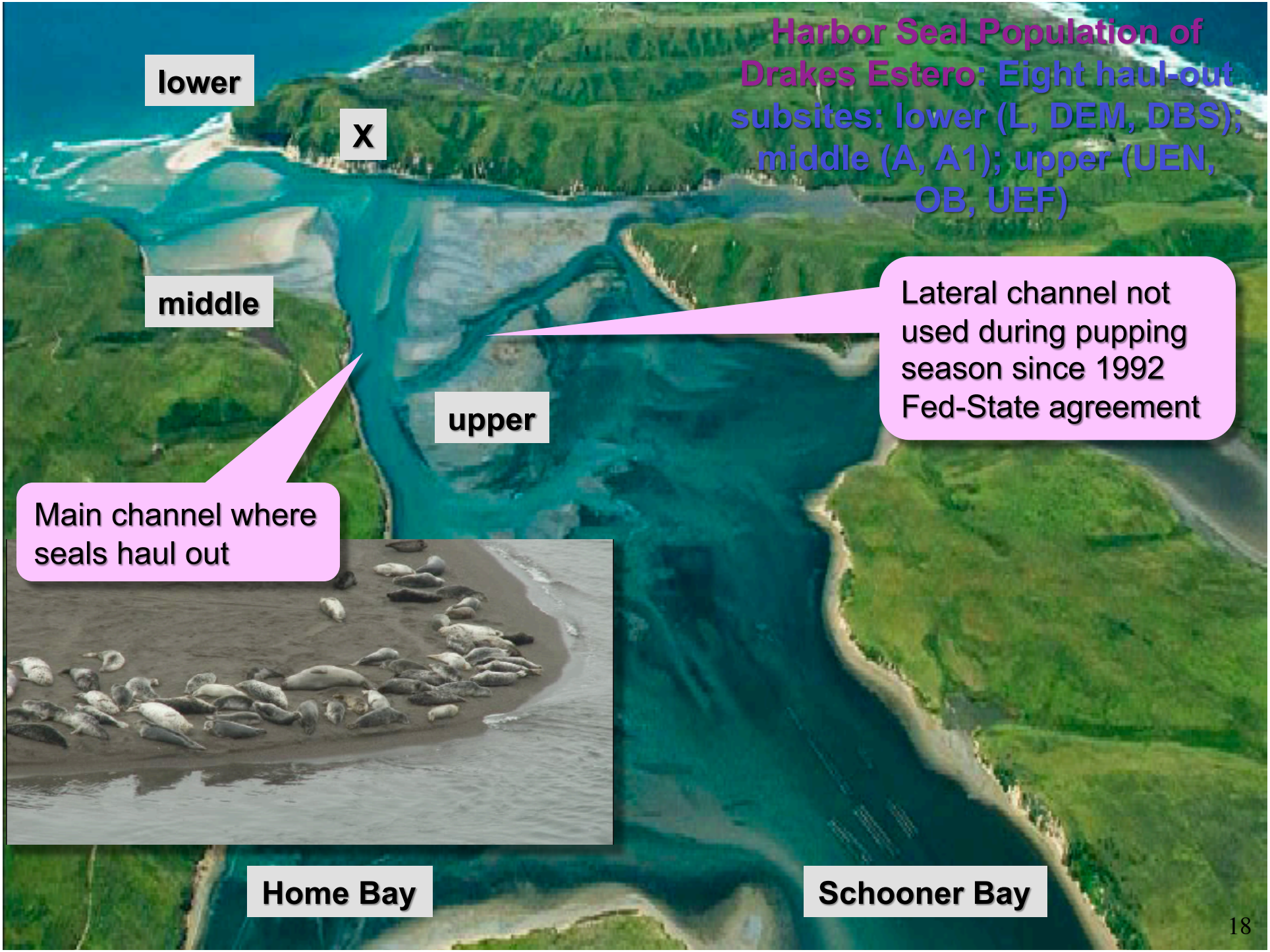
Dr. Peter Gleick:

- elected member National Academy of Sciences
- MacArthur Fellow
- President and co-founder, Pacific Institute
- world-renowned environmentalist and expert on scientific integrity
- Ph.D. from U.C. Berkeley, advisor Dr. John Holdren, President Obama's science advisor and Head of OSTP

May 5 2009: National Academy of Sciences panel report on "Shellfish Mariculture in Drakes Estero"

The National Park Service *"selectively presented, overinterpreted, or misrepresented the available scientific"* data.

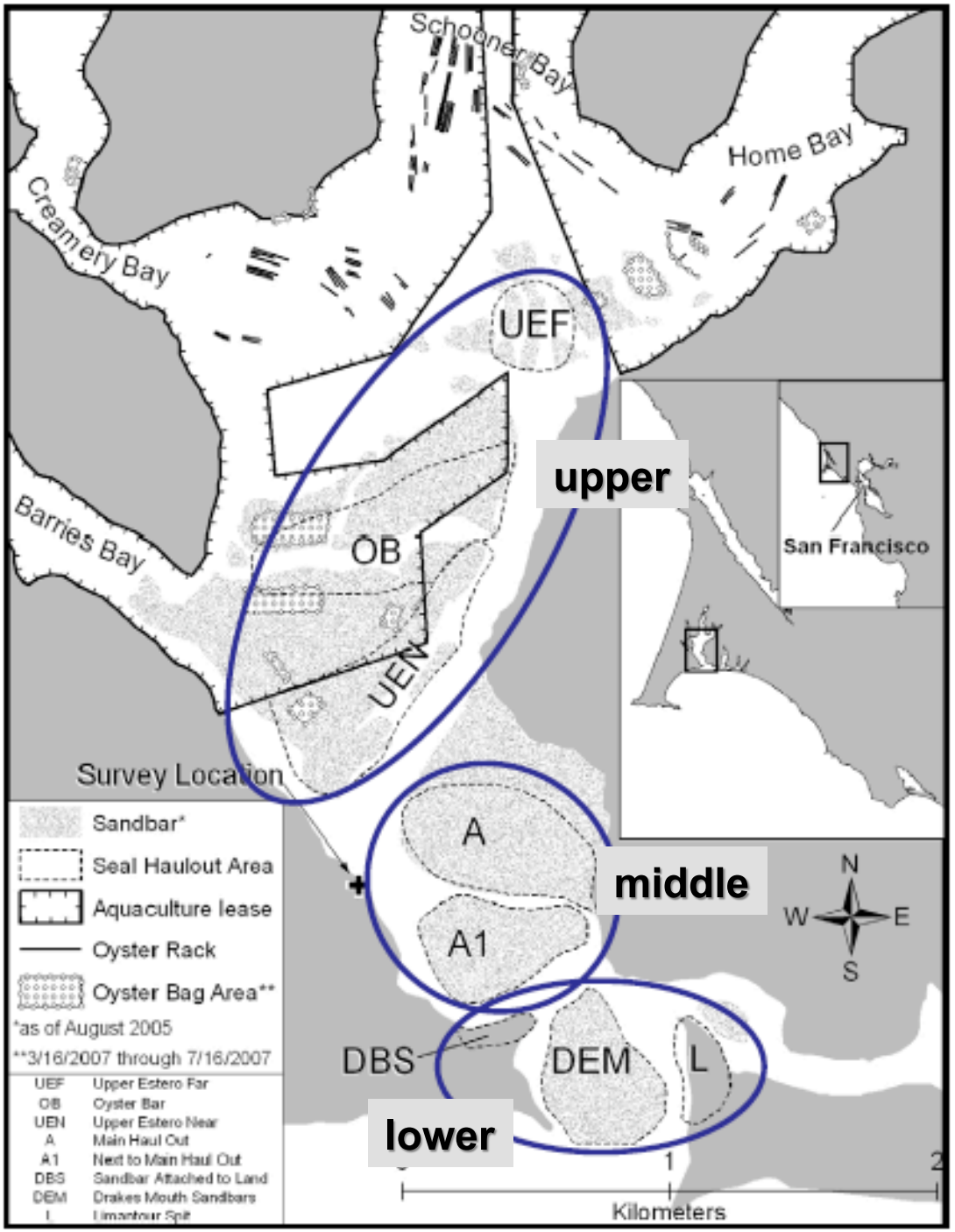
The NAS validated all of Dr. Goodman's assertions that the NPS had misrepresented their own data in every category of environmental harm, including harm to harbor seals.


Harbor Seal Population of Drakes Estero: Eight haul-out subsites: lower (L, DEM, DBS); middle (A, A1); upper (UEN, OB, UEF)
lower
X
middle
upper
Lateral channel not used during pupping season since 1992 Fed-State agreement
Main channel where seals haul out
Home Bay
Schooner Bay

Harbor seal subsites in Drakes Estero

- Upper:
  - Primarily pupping/breeding
  - Islands
- Middle & Lower
  - Generally year-round
  - Human, predator access

From NPS Dr. Ben Becker presentation (slide #4) to National Academy of Sciences panel on September 4, 2008



Sept 4, 2008: Dr. Grey Pendleton, biometrician & harbor seal expert, Alaska Dept. of Fish & Game, to NAS panel

"Based on the figures presented today about the estero, is it a population using all the seals in the estero or the individual subsites? That's pretty important because based on other data I've seen on harbor seals, ***these sites are close enough together that it would be expected that you would have seals move pretty readily among them****. … So, if you're interested in population change, its pretty important, particularly with the fact that they're very close together and we have a pretty high change, that questions about what you mean by population change versus availability change get to be pretty murky. …* ***Under the new protocol, its pretty clear to me that the whole of Drakes Estero would be considered one survey site.*** *When you talk about movements among subsites,* ***it would make more sense to think of the entire bay as one population.****"*

May 5 & 6 2007: NPS data shows day-to-day fluctuations at subsites in support of Pendleton's *"as one population"*

date	age	DBS	DEM	L	A	A1	UEN	OB	UEF	total
May 5 07	adult	0	2	194	12	169	168	61	30	**636**
May 5 07	pup	0	48	1	8	73	44	21	9	**204**
May 5 07	total	**0**	**50**	**195**	**20**	**242**	**212**	**82**	**39**	**840**
May 6 07	adult	71	125	87	0	157	218	74	0	**732**
May 6 07	pup	4	8	8	0	53	53	0	25	**151**
May 6 07	total	**75**	**133**	**95**	**0**	**210**	**271**	**74**	**25**	**883**
change	total	**+75**	**+83**	**-100**	**-20**	**-32**	**+59**	**-8**	**-14**	**+43**

These two days – May 5 & 6 2007 – during the peak pupping season before the Marin Supervisor hearing on May 8, are representative of the kind of day-to-day fluctuations at the eight subsites. These sort of seal movements from one subsite to another support Grey Pendleton's conclusion that *"it would make more sense to think of the entire bay as one population*.

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5) *Conclusions and recommendations*

2006 NPS Harbor Seal Annual Report indicated that Drakes Estero had high level of disturbances from kayaks & canoes, predators, birds, hikers & clam diggers; oyster farm was not mentioned

Allen's NPS 2006 Harbor Seal Report

"Drakes Estero had the highest pup and molt numbers, and one of the highest levels of disturbance, 0.97 disturbances per survey (Figure 8). Park regulations allow kayaks and canoes back in Drakes Estero after July 1st. After that date 50% of disturbances were a result of these non-motorboats. Prior to July 1st most disturbances were of unknown cause, 47%. Surveyors documented a bobcat and a coyote disturbing seals on sandbars in Drakes Estero. Other sources included low flying large birds such as turkey vultures, hikers and clam diggers on Limantour and Drakes Beaches, and kayaks after July at the end of the seasonal closure."

Harbor Seal Monitoring

San Francisco Bay Area

Annual Report
National Park Service
2006

Prepared by:

Jeannine Manna, Dale Roberts, Dave Press, and Sarah Allen

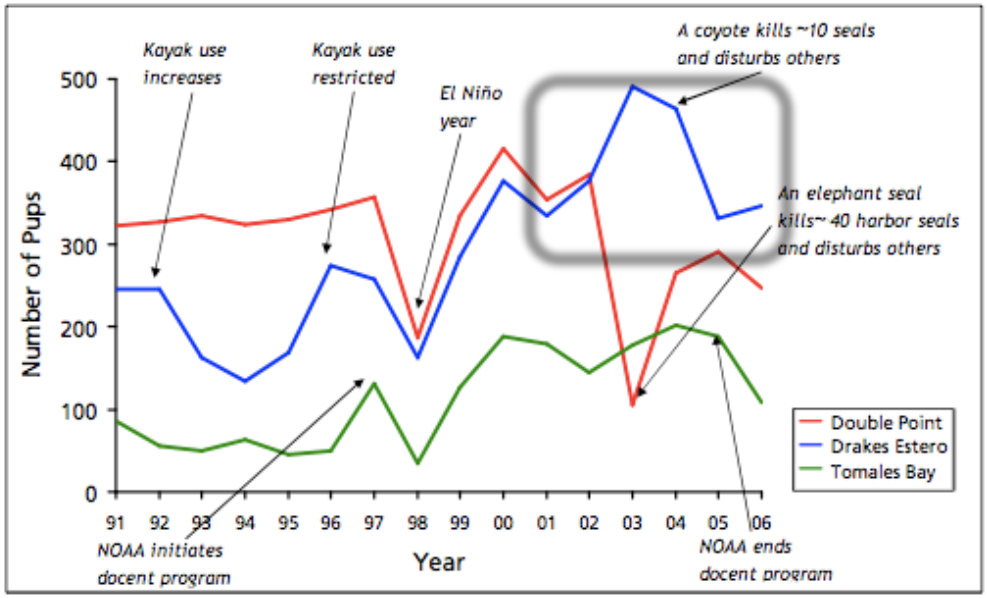
1

In 2005 & 2006 report, no mention of DBOC disturbing harbor seals

May 29 2007 NPS Sarah Allen's harbor seal report indicated that harbor seal population stabilized, Park visitors were primary cause of disturbances, oyster farm was not mentioned

National Park Service
U.S. Department of the Interior
Pacific Coast Science and Learning Center
Research Project Summary May 2007

Harbor Seal Monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area



The harbor seal pup population is sensitive to human disturbance, climate variability and interactions with other species. Different management approaches also affect the seal population.

Preliminary Results: *Harbor seal colonies are stable, but vulnerable to human disturbance and climate change.*

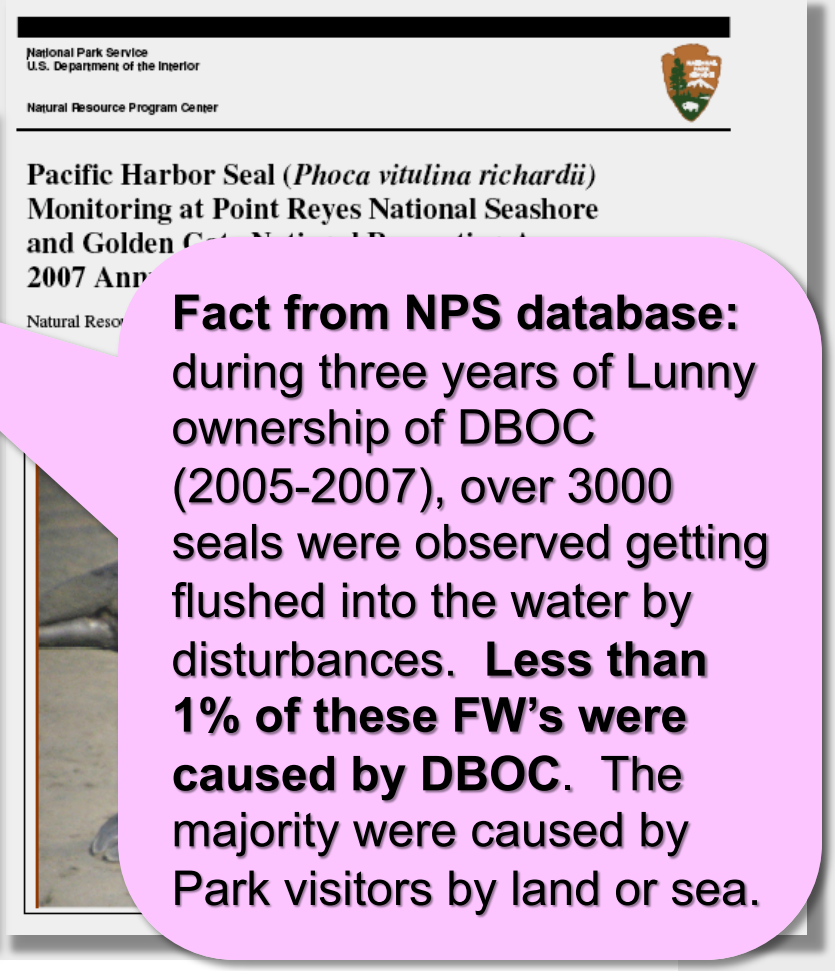
The harbor seal population at PORE has increased over the past 30 years. However over the past few years, the population has stabilized and may be at carrying capacity for haul-out space and/or food availability. The 2006 pup count was 6% lower than 2005, but still within the normal range of variation for the past 10 years. Humans on foot were the primary cause of 21% of all disturbances, non-motor boats were 13%, and motor boats were 11%. The park has adaptively managed seal colonies by restricting human activity in places where disturbances prevented seals from resting onshore. Boating, for example, is restricted from March through June in Drakes Estero to protect pupping seals.

In May 2007 report, no mention of DBOC disturbing harbor seals

June 2008 NPS annual 2007 PRNS harbor seal report indicated that harbor seal population in 2007 was within standard deviation from 2000-2007, most disturbances from Park visitors, oyster farm was mentioned lower on list as *"at times disturbed harbor seals"*

Allen's NPS 2007 Harbor Seal Report

"Most of the disturbances were from human sources and this included hikers, anglers, swimmers, horseback riders, and recreational clammers. Clamming is popular on Drakes Beach, where seals do not always haul out in large numbers, but the activities at times affect seals on nearby sandbars. Fishermen are frequently seen on the tip of Limantour Spit in the exact area where seals haul out during the molting season. In addition, activities associated with the oyster operation in Drakes Estero at times disturbed seals at the upper estero subsites."


National Park Service
U.S. Department of the Interior

Natural Resource Program Center

Pacific Harbor Seal (*Phoca vitulina richardii*)
Monitoring at Point Reyes National Seashore
and Golden
2007 Ann

Natural Reso

Fact from NPS database: during three years of Lunny ownership of DBOC (2005-2007), over 3000 seals were observed getting flushed into the water by disturbances. **Less than 1% of these FW's were caused by DBOC**. The majority were caused by Park visitors by land or sea.

In 2007 report issued in June 2008, mention of DBOC at times disturbing harbor seals at end of list of human disturbances

June 2008 NPS annual 2007 PRNS harbor seal report indicated that harbor seal population in 2007 was within standard deviation from 2000-2007, most disturbances from Park visitors, oyster farm was mentioned lower on list as *"at times disturbed harbor seals"*

Becker papers focus on change at sandbar OB from unusual high in 2004 vs. 2005; here same is seen for all of Marin County coast

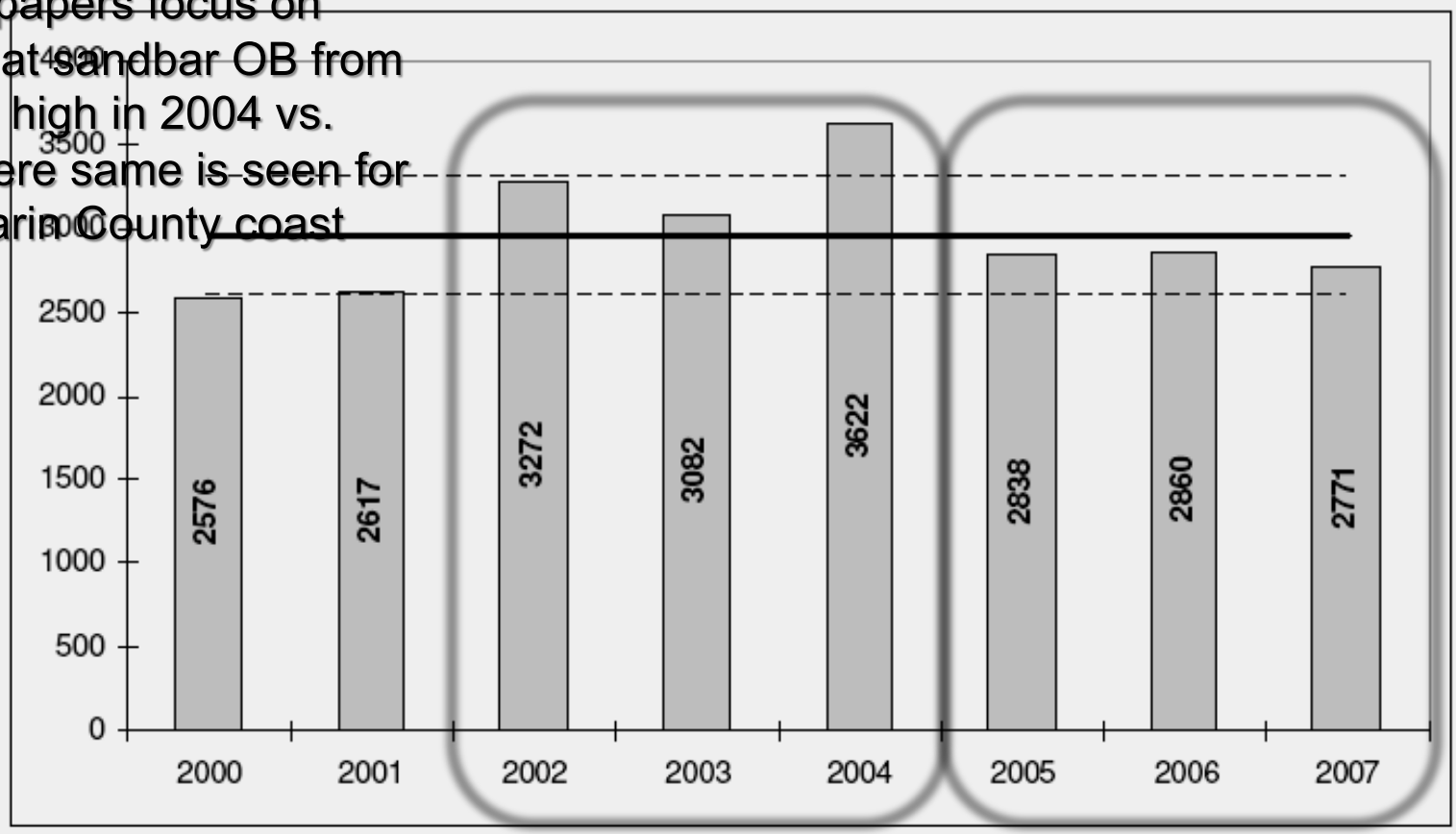


Figure 2. Maximum counts of harbor seal adults and immatures during the breeding season (March-May) at Marin County locations. The solid line on the graph represents the mean of the maximum adult counts from 2000-07 (2954.8), and the dashed lines represent one standard deviation from the mean (353.7).

Lunny years 2005-2007: No DBOC disturbances in 2005 or 2006; 1st event on April 26, 2007, 12 days before hearing

2005	J	F	M	A	M	J	J	A	S			
2006	J	F	M	A	M	J		A	S	O	N	D
2007	J	F	M	A	M	J	J	A	S	O	N	D

2 1/3 years: no DBOC harbor seal disturbances

April 5	33*	Neubacher: ***overwhelming harbor seal data***
April 24	14	Allen email: ***"no direct observations"***
April 26	12	Allen: Light article; ***1st event; TR; not in db***
April 29	9	Volunteers: 2nd DBOC disturbance event
May 1	7	Bennett: Coastal Post article
May 5	3	Allen: observed seal 80% decline
May 8	hearing	Neubacher and Allen: reported ***80% decline***
May 11	3+	New version Drakes Estero Report

*Days to May 8 Marin County Board of Supervisors hearing

Apr 5 2007: Superintendent Don Neubacher met with Marin Supervisor Steve Kinsey; Kinsey reported that Neubacher made ***"strong environmental accusations"*** against DBOC including overwhelming data of harm to harbor seals; claimed DBOC ***"committed environmental felonies"***

Apr 5 2007: Lunny owned DBOC for 2 1/3 years; NPS harbor seal database recorded over 2000 seal FW's (flushed in water, most serious disturbance) during seal pupping seasons, but not one caused by DBOC; as of Apr 5, **database provides no support for Neubacher's claim – zero data**; 33 days to Marin Supervisors hearing for Senator Feinstein

Apr 24 2007: PRNS Scientist Allen emails Joe Cardaro of NOAA, writing in response to his request for data; Allen wrote that NPS had ***"no direct observations"*** of DBOC causing seal disturbances; she was right -- NPS had no FW's caused by DBOC as of Apr 24 2007

Apr 26 2007: NPS Allen in Pt. Reyes Light makes 1st public harbor seal claims against DBOC, 12 days to hearing

*"This year, hundreds of oyster bags are located on harbor seal pupping sites and **seal presence there has dropped dramatically**."*

May 1 2007: Gordon Bennett of Sierra Club and others in Coastal Post makes even stronger claims against DBOC

*"In the past, as many as **300-500 seal pups were born annually in the Estero, 100-200 of which use the middle sandbars**. Now that oyster operations have expanded and oyster bags are placed in seal nursery areas, **baby seal numbers on the middle sandbars have been reduced to about fifty in 2006 and less than 10 pups so far in 2007**."*


Save Drake's Estero

Apr 26 2007: Sarah Allen's Trip Report

- 12 days before Supervisors hearing
- **first direct observation** in history of Lunny ownership (2005-2007) of oyster workers disturbing harbor seals
- made by NPS Dr. Sarah Allen who helped write protocols
- **did not follow NPS protocols**
- **not entered onto proper NPS harbor seal forms**
- **not entered into NPS database** in timely fashion
- recorded most FW's (flushed into water) at 4:55 pm
- **oyster boat was broken that day** due to engine problems
- **oyster workers had clocked out** on shore by 4:37 pm (payroll records); sandbars are 20 minutes away by boat
- If these data of 1st direct observation of DBOC disturbing seals was so important, why not in database?
- If so important, why not reported to CDFG and Lunny since pupping season still ongoing?
- why not mentioned 12 days later at County hearing?
- later in summer, put in DE Report when 80% claim removed

Apr 26 2007 Trip Report: 1st report of harm to harbor seals by DBOC; seal survey & disturbance data not recorded on proper forms & not entered into database in timely fashion

POINT REYES NATIONAL SEASHORE HARBOR SEAL SURVEY Page ____of ____

Date:_____ **Day of Week**_____**Year**_____ **Location:**_____

Start Time:_____**End Time**_____**Observers:**_____

Weather: Cloud Cover (%)____ Rain (Y/N)____ Low Tide Level closest to survey time _____

White Pelicans:_____ Brown Pelicans:_____

Time Survey every ½ hr	Sub-Site*	No. Adults & Imm	No. Live and Dead Pups	Subsite Total	No. Dead Pups	No. Red Seals	No. Shark Bite	Seals Disturb Y/N	Survey Total All subsites Each ½ hour	Comments

*SUBSITE:
OB=Oyster Ba
Double Point (
Tomales Point
Bolinas Lago

Page ____of____

POINT REYES NATIONAL SEASHORE HARBOR SEAL DISTURBANCE SURVEY

Date:_____ Year_____ Location:_____Observers:_____

Time	Sub-Site*	Source **	Seal Behavior ***	No. Before Disturbance	No. Adult Immature Seals Remain On site	No. pups Remain On site	No. Seals Flush Into Water	Seals Rehaul (Y/N) Time	Comments (vessel/aircraft identification)

Apr 26 2007 Trip Report: 1st report of harm to harbor seals

Trip Report
Drakes Estero
4/26/07
3:45-5:00 PM

Sarah Allen, Science Advisor

Why not enter on proper forms and into database in timely fashion?

I conducted a field survey of Drakes Estero on Thursday during the afternoon low tide to count harbor seals for the peak pupping season count.

I arrived at 3:45 PM and began counting the seals at A and A1 sandbars. At 3:50 PM I noted a white boat (@20 ft long) with outboard motor and two people aboard in the east end of the OB seal haul out site. The boat was fowled in eelgrass and the operators were poling throu
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water. Ther
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boat went b
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along the ch
the channel

and closer to the seals. During the interim time, 6 (2) seals hauled out at OB. When the boat proceeded back down the channel going east towards the seals at 4:55 PM, 5 seals flushed into the water included 2 mother-pup pairs at OB, another 3 mother pup pairs flushed at UEN sand bar, and around 75 seals alerted at UEN but did not enter the water. Additionally, around 200 black brant were flushed that were in the eelgrass beds in the channel after previously being flushed by the boat. At 4:58 P the boat then proceeded up into Home Bay. I terminated the survey at 5:00 PM.

Workers clocked out and gone home at 4:37 pm. Boat engine was broken.

A total of around 90 seals including around 50 pups were
these, I observed 14 seals including 7 pups directly flush
research, we know that females with pups are more distur
immature seals. Additionally, around 320 black brant were flushed while in eelgrass beds.

Apr 26 Trip Report: controversial, anecdotal, not in database

- April 26 Trip Report alleges that between 4:10 pm and 5:00 pm on April 26, two oyster workers were observed to ***"disturb 90 hauled out harbor seals, of which 7 adults and 7 pups flushed into the water."*** Most FW's observed at 4:55 pm. This represents first observation of seals getting flushed into water by DBOC during Lunny ownership years 2005-2007. Why weren't these data entered into NPS database? Why weren't these data reported at May 8 2007 Marin Supervisors hearing?
- **Neither DBOC nor CA Dept. Fish & Game were notified. Lunny was not notified.** Why not? Pupping season was not yet over. Procedures could have been changed.
- DBOC records show **white boat cited in Trip Report was not operational on April 26th due to engine problems**; engine was fixed the next day.
- DBOC payroll records show the **oyster workers clocked out on shore by 4:37 pm** (it is a 20+ min boat ride from sandbars UEN & OB) when Allen claims to have observed them disturbing seals in the Estero.

Apr 26 Trip Report: is not in Aug 13 '07 NPS database;

Jarvis to CSG: *"data entry and error checking … completed"* by Aug 13

April 26, 2007 Trip Report added to Jan 16 '08 NPS database

On what basis did NPS add controversial Apr 26 '07 data to database nine months later? QA/QC? Integrity of database? NPS broke their own protocols. Added just before submission of Becker paper.

Aug 13, 2007 NPS QA/QC harbor seal database

EventID
PORE_Pinniped_2007-Apr-01_12:30:00_DE
PORE_Pinniped_2007-Apr-06_09:00:00_DE
PORE_Pinniped_2007-Apr-20_08:55:00_DE
PORE_Pinniped_2007-Apr-21_10:15:00_DE
PORE_Pinniped_2007-Apr-21_10:15:00_DE
PORE_Pinniped_2007-Apr-21_10:15:00_DE
PORE_Pinniped_2007-Apr-21_10:15:00_DE
PORE_Pinniped_2007-Apr-22_09:15:00_DE
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PORE_Pinniped_2007-Apr-25_13:40:00_DE
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PORE_Pinniped_2007-Apr-29_09:30:00_DE
PORE_Pinniped_2007-Apr-30_14:30:00_DE

Jan 16, 2008 NPS "revised" harbor seal database

EventID
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0_DE
0 AM_DE
0 AM_DE
PM_DE
AM_DE
AM_DE
AM_DE
2007-Apr-20_08:55:00_DE
2007-Apr-21_10:15:00_DE
2007-Apr-21_10:15:00_DE
2007-Apr-21_10:15:00_DE
2007-Apr-21_10:15:00_DE
2007-Apr-22_09:15:00_DE
2007-Apr-23_09:30:00_DE
2007-Apr-25_13:40:00_DE
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PORE_Pinniped_2007-Apr-29_09:30:00_DE
PORE_Pinniped_2007-Apr-30_14:30:00_DE

Save Drakes Bay Coalition

logy, wildlife, and wilderness status of eashore

The Save Drakes Bay Coalition consists of the following

Environmental Action Committee of West Marin
Marin Audubon Society
National Parks Conservation Association
Sierra Club
Salmon Protection and Watershed Network (SPAWN)
Public Employees for Environmental Responsibility

Management

- Analysis by Dominique M. Richard, Ph.D on harbor seals reductions (download)
  - Conclusions support NPS testimony and refute claims of "misconduct" by Dr. Corey Goodman

- Harbor Seal report by National Park Service, published in Marine Mammal Science, 2008 (download)

- Wilderness protocols and guidelines for management in Drakes Estero, NPS Management Policies (download)

- National Academy of Sciences (NAS) website and scope of study (visit NAS website)

- California Coastal Commission memo, 9/11/07 (download)
* independent analysis on mariculture impacts in Drakes Estero
* conclusion confirms negative impacts
* recommendations provided to mitigate impacts

- National Park Service updated report, 9/18/07 (download)
* peer-reviewed by 7 non-NPS marine ecology experts
* Dr. Corey Goodman's analysis refuted by these experts

Sept 11 2007: Dr. John Dixon of Calif. Coastal Comm. No independent analysis; no mention of 80% decline; only cited Allen's observations from Apr 26 2007 Trip Report

"In Drake's Estero, both human presence and boat operation are potential sources of disturbance to birds and harbor seals. ***For example, an oyster operation boat was observed to disturb 90 hauled out harbor seals, of which 7 adults and 7 pups flushed into the water****, and around 300 black brant, which were flushed from an eelgrass bed where they were feeding (Allen 2007)"* Allen 2007 = Sarah Allen's Apr 26, 2007 Trip Report

From Dr. John Dixon's report to the California Coastal Commission on September 11, 2007 entitled: *Effects of Oyster Mariculture on the Natural Resources in Drake's Estero*

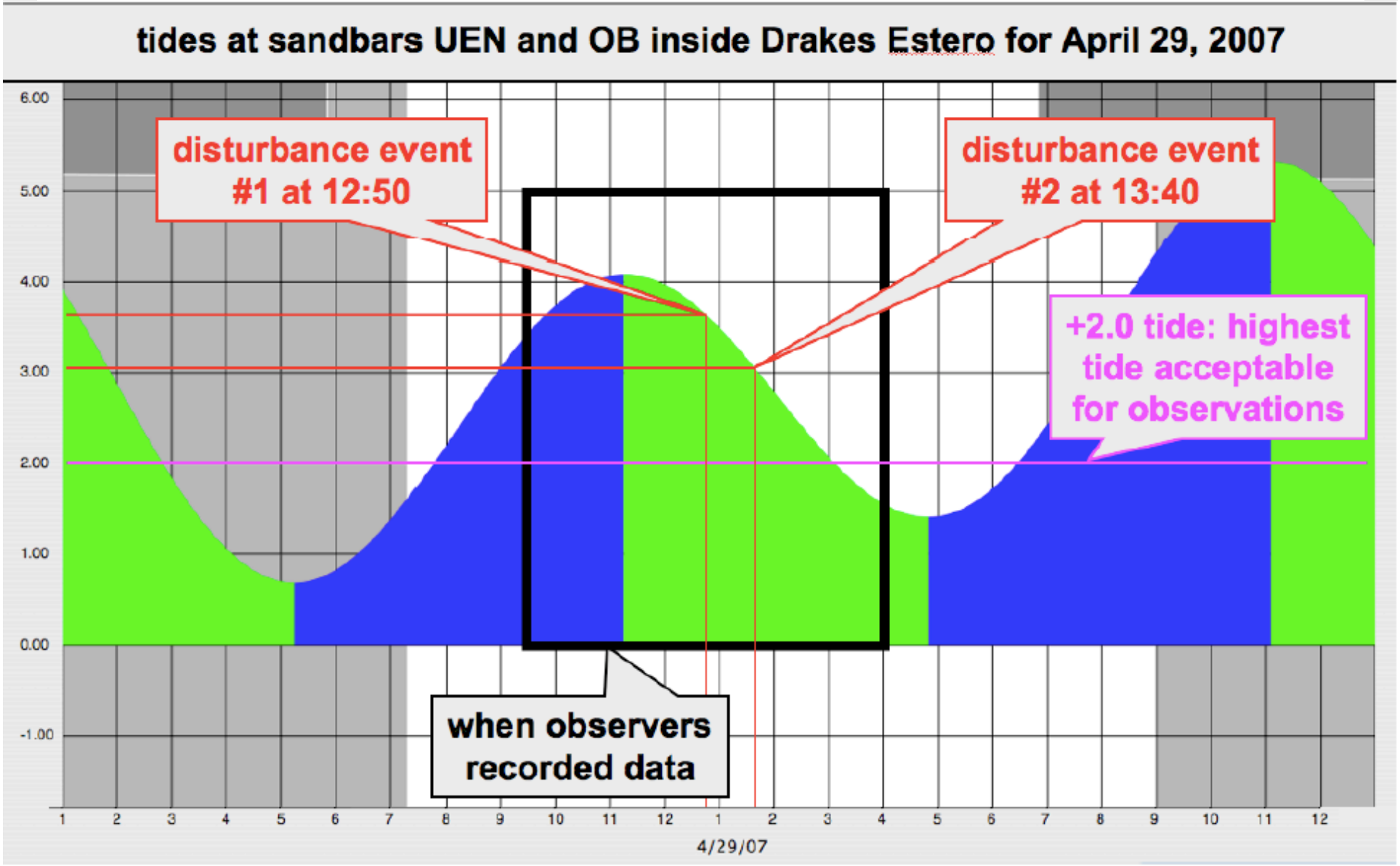
- **collected no harbor seal data of his own**. In contrast to statements by California Coastal Commission and Sierra Club, Dr. Dixon has no independent harbor seal data and no independent analysis of harbor seals.
- **visited the Estero only once** on July 17 2007.
- **never examined the NPS harbor seal database**. He did not know it existed.
- **only data for DBOC disturbing harbor seals were Allen's Apr 26 Trip Report**.
- **nevertheless made conclusions and policy recommendations** based on Allen's Apr 26 Trip Report -- one day's worth on anecdotal and controversial data.

Apr 29 2007:

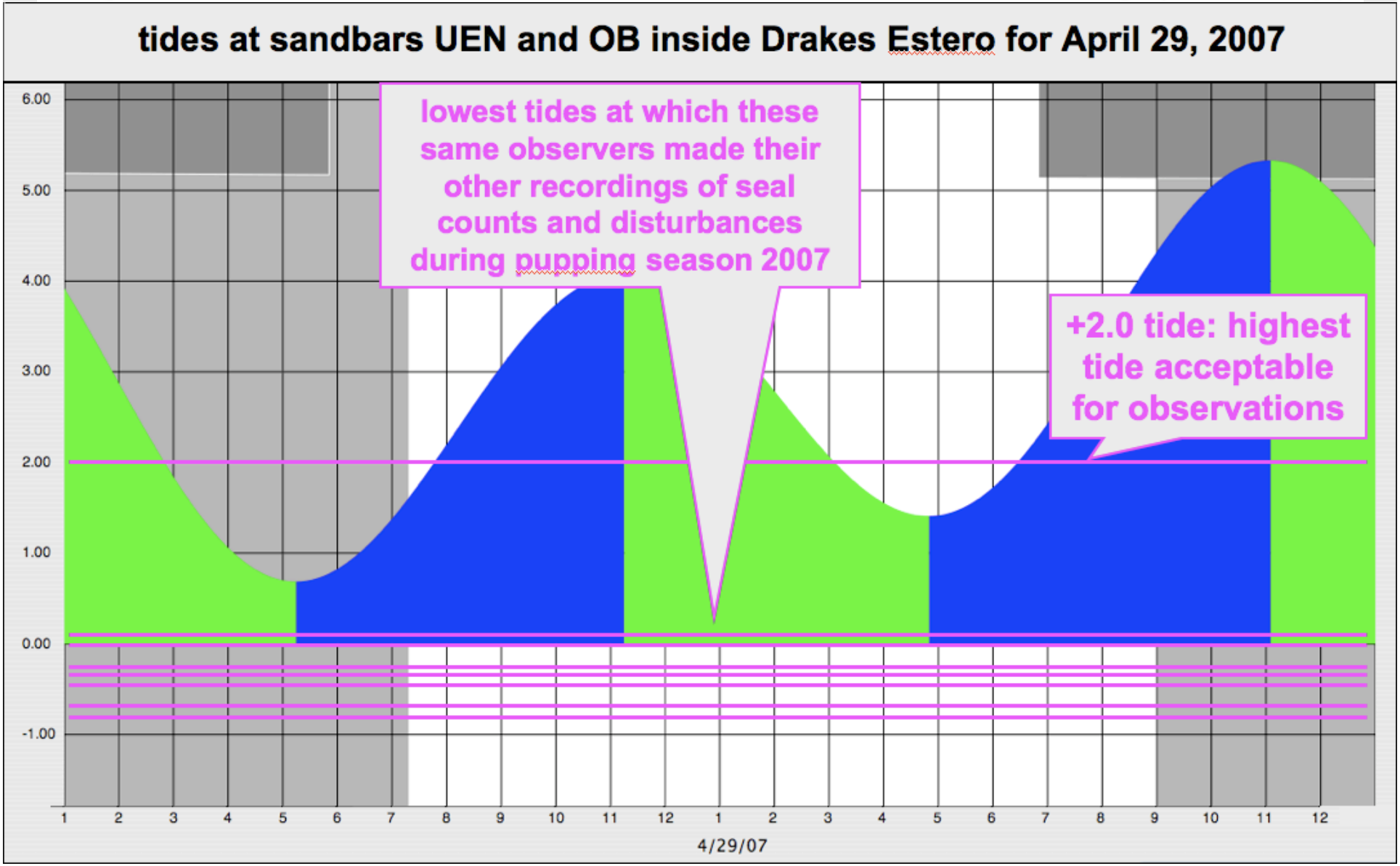
- 9 days before Supervisors hearing
- Sunday
- **Oyster workers not working** (confirmed by DBOC records),
- volunteers record 2nd direct observation of oyster workers disturbing seals in 2 1/3 year history of Lunny ownership
- **observations violate protocols**
- **tides were wrong that day for observations**
- **tides too high**
- **sandbars under water** by several feet

April 26 and April 29 2007: both records – the 1st and 2nd in Lunny's 2 1/3 year ownership -- of oyster farm disturbances are suspicious and occur in the two weeks before hearing. Prior to these events, there were no data of mariculture-related disturbances during Lunny ownership 2005-2007.

April 29 2007: observations violate protocols, tides too high, sandbars under water, workers not working (Sunday)

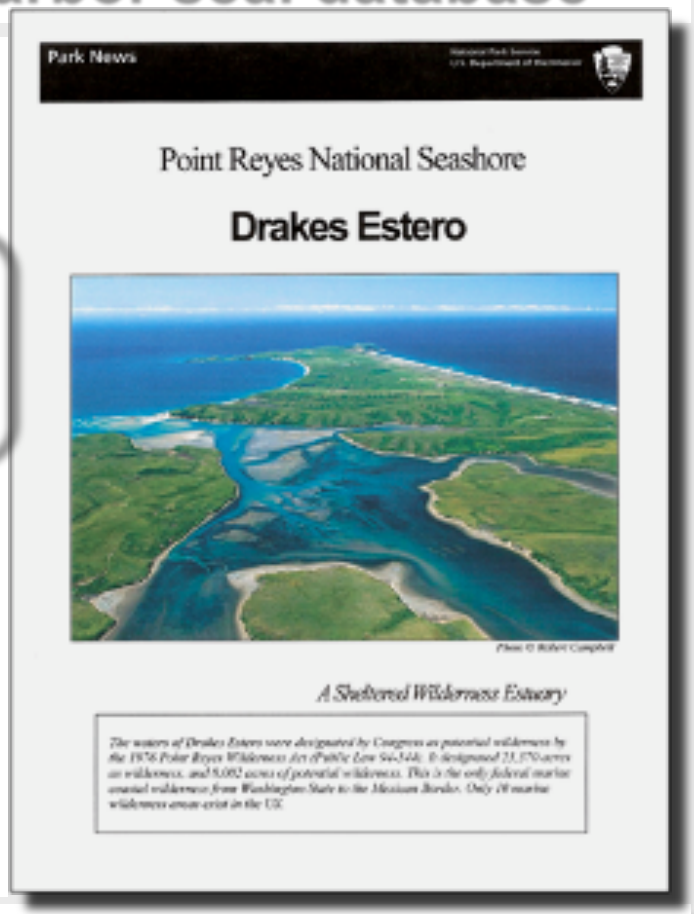


April 29 2007: observations violate protocols, tides too high, sandbars under water, workers not working (Sunday)



NPS Drakes Estero Report: mariculture-related disturbances listed in report do not exist in NPS harbor seal database

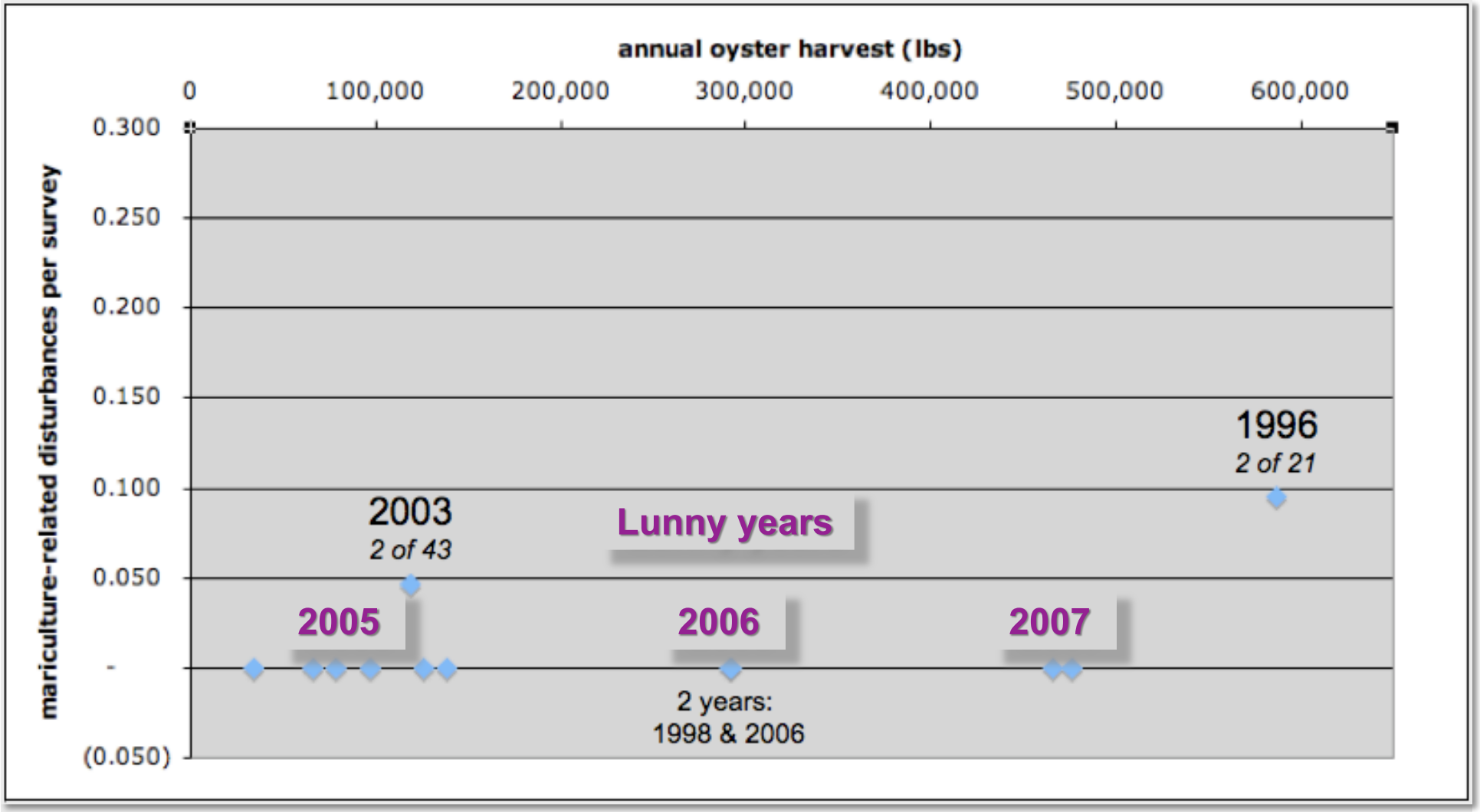
May 8 & May 11 versions: *"During the breeding season, researchers observed seals disturbed by motor boats associated with the oyster operation* ***six times in 1997 and once between 1998 and 2001. Disturbances to resting and breeding seals increased dramatically in 2007.*** *Since March, park biologists documented oyster boats disturbing mothers with pups, and oyster bags located on sandbars where seals would normally give birth and nurse their pups.* ***One area where 250 seals nursed more than 100 pups two years ago, have less than 50 this year, an 80% decline."***



NPS harbor seal database:

- no mariculture-related disturbances in 1997
- no mariculture-related disturbances between 1998 and 2001
- 80% decline in '07 occurred at middle sandbar A far from DBOC

NPS harbor seal data on mariculture-related disturbances



Marine Mammal Commission meeting, February 21, 2010: outline of Dr. Corey Goodman's presentation

1) *Background and overview*
    1) *Background and reason County Supervisors asked for scientific analysis*
    2) *NPS claims of environmental harm vs. NAS report: NPS misrepresented data*
    3) *Harbor seal population and haul-out subsites in Drakes Estero*
2) *Disturbances to harbor seals in Drakes Estero*
    1) *Sources of disturbances of harbor seals in Drakes Estero*
    2) *Prior to 2007: Timeline of disturbances of harbor seals*
    3) *April & May 2007: Timeline of disturbances of harbor seals*
3) ***80% harbor seal decline claim***
    1) *May 2007: NPS claim that DBOC caused 80% decline in seals in 2007*
    2) *July 2007 – June 2008: NPS retraction and reinstatement of 80% claim*
    3) *Sept 2008: NPS & Sierra Club Explanations of 80% Decline to NAS Panel*
4) *NPS Becker I, II, & III papers*
    1) *Sept 2008: Becker I: 2000-2007 mariculture-related disturbances*
    2) *October 2008: Becker II: 1996-2007 mariculture-related disturbances*
    3) *February 2009: Becker III: 1982-2009 mariculture-related disturbances*
5) *Conclusions and recommendations*

Apr 26 2007: NPS Allen in Pt. Reyes Light makes 1st public harbor seal claims against DBOC, 12 days to hearing

*"This year, hundreds of oyster bags are located on harbor seal pupping sites and **seal presence there has dropped dramatically**."*

May 1 2007: Gordon Bennett of Sierra Club and others in Coastal Post makes even stronger claims against DBOC

*"In the past, as many as **300-500 seal pups were born annually in the Estero, 100-200 of which use the middle sandbars**. Now that oyster operations have expanded and oyster bags are placed in seal nursery areas, **baby seal numbers on the middle sandbars have been reduced to about fifty in 2006 and less than 10 pups so far in 2007**."*


Save Drake's Estero

May 8 2007: strong claims on impact of DBOC on harbor seals in testimony to Marin Supervisors by PRNS Superintendent Neubacher and Scientist Allen

*"… the harbor seal pupping area in Drakes Estero is **seriously threatened** now. … we have some major problems because you can see from your handout that oyster bags have been recently put in pupping areas, you'll get statistics, but **it's amazing how many pups we have probably lost this year. We have a serious problem right now**."*

*" … **Marine Mammal Commission** -- wrote us a letter this morning, they're going to take it up. **This is a national issue**."*

Public testimony by Superintendent Don Neubacher to Marin Co. Supervisors on May 8, 2007

*"The harm is resulting in abandonment of one area where more than 250 seals, including 100 pups **2 years ago** occurred in that spot. **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**. I was out there on Saturday. This issue has been … **recognized by the Marine Mammal Commission** … it has **national significance**."*

Public testimony by PRNS Scientist Sarah Allen to Marin Co. Supervisors on May 8, 2007

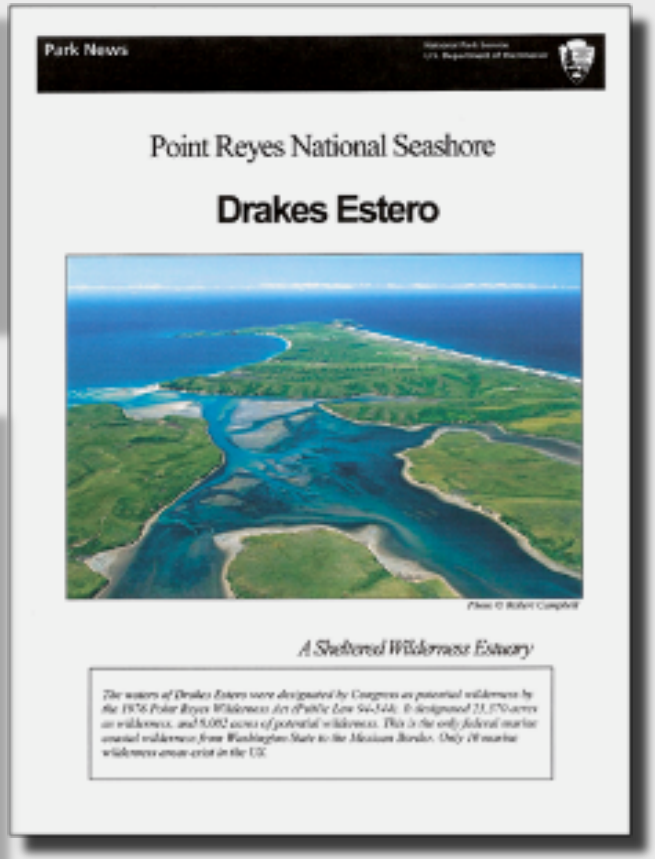
Drakes Estero Report: Neubacher claimed DBOC caused 80% reduction of harbor seals at one subsite. False. The NPS harbor seal database does not support claim.

Concerning DBOC and harbor seals:

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%." [May 11 version]

Concerning impact of DBOC on seals:

"One area where 250 seals nursed more than 100 pups two years ago, have around 50 total seals including around 25 pups in 2007, an 80% decline." [May 8 & 11 versions]


Park News

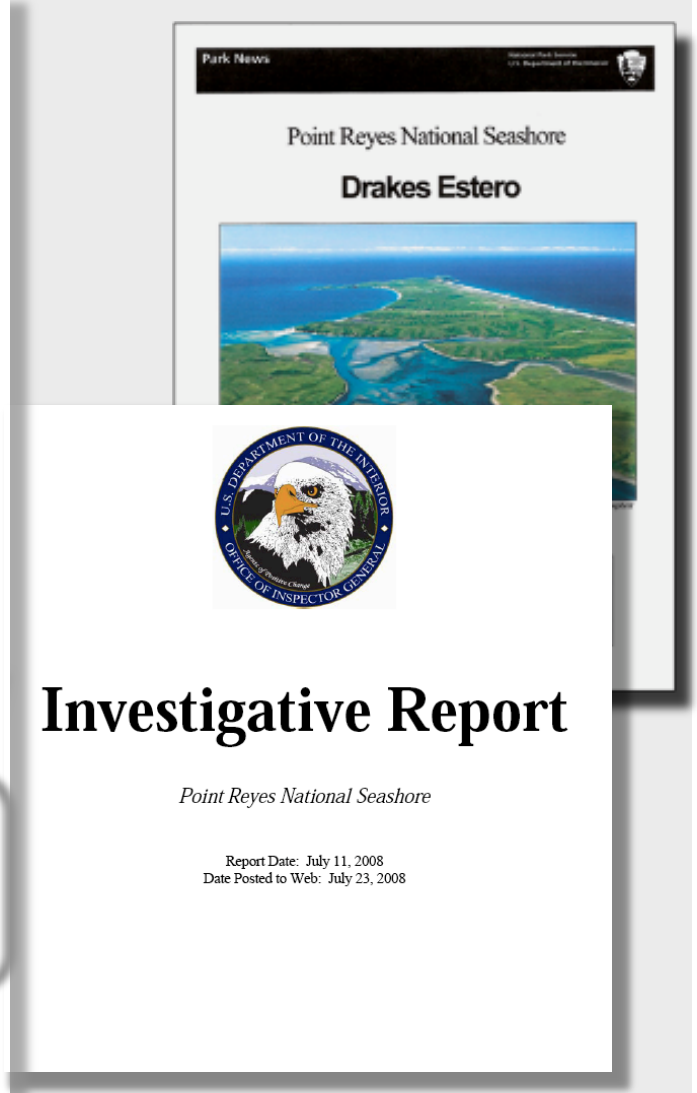
Point Reyes National Seashore

Drakes Estero

A Sheltered Wilderness Estuary

Inspector General Report: Sarah Allen and Don Neubacher told the IG that DBOC disturbances increased in 2007 resulting in an 80% decline in seals at one subsite in 2007

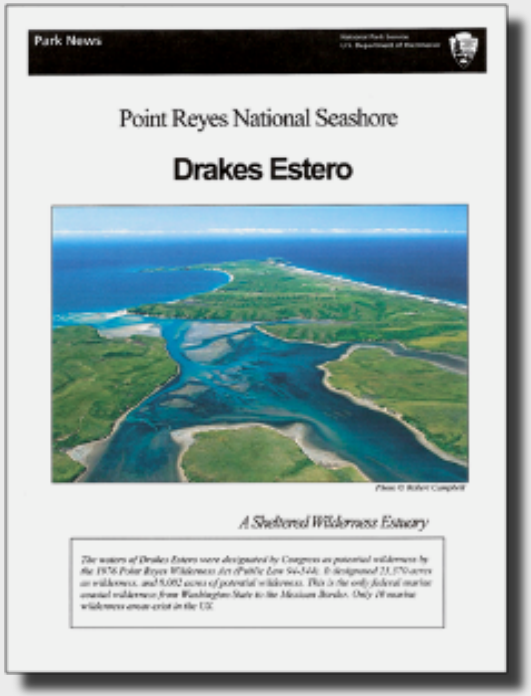
Pg 25 of Inspector General report: *"The updated version [of the Drakes Estero Report] of May 2007 stated that* ***disturbances to the seals had "increased dramatically" in 2007*** *and specified that one area of the estero had experienced an 80 percent decline in seals. Allen and Neubacher explained the* ***situation with the seals did not become an issue until 2007****, when DBOC began to expand its operation."*



Neubacher & Allen claimed that DBOC caused an 80% reduction of harbor seals at one subsite. What subsite? How measured? What is evidence caused by DBOC?

Concerning DBOC and harbor seals:

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%." [May 11 version]



Which of 8 subsites? Caused by DBOC: true or false?

- What site? Which of 8 subsites was cited?
- What measurement was reduced by 80% in 2007 vs. 2005?
- How does NPS calculate an 80% reduction?
- What is evidence that this reduction was caused by DBOC?

- May 9 2007: Goodman asked Sarah Allen by email about the harbor seal data she cited at the hearing on May 8th, but she never answered
- May 12 & May 13 2007: Goodman asked Neubacher by FOIA for access to NPS harbor seal data for Drakes Estero for 2007
- **June 13 2007: Jarvis denied Goodman's FOIA requests for 2007 seal data citing *"deliberative process privilege"***

*" We are withholding the draft records pending the final annual report under FOIA exemption 5 (5 USC 552(b)(5)) which is **designed to protect those inter-agency and intra-agency memorandums or letters which would not be available by law to a party in litigation with the agency**. This exemption includes information that would be protected under the deliberative process privilege.*

From response by Regional Director Jon Jarvis on June 13, 2007 to Dr. Corey Goodman's May 13 FOIA request for complete harbor seal data cited by Dr. Sarah Allen in her testimony

- Goodman never requested opinions that were pre-decisional
- Goodman requested data that is specifically excluded from exemption 5
- Why did Jarvis refuse access to NPS harbor seal data?
- Did NPS have something to hide?

June 13 2007: Jarvis denied Goodman's FOIA asking which subsite had 80% reduction as claimed in May '07

" (1) … Would you please clarify her [Sarah Allen's] *testimony of* ***what measurement was reduced by 80%?,***

what site?*, compared to what?, and* ***what is the evidence that this reduction is a result of the oyster operation?*** *How does Dr. Allen calculate an 80% reduction?"*

From FOIA request #2 from Dr. Corey Goodman to Superintendent Don Neubacher on May 13, 2007, in reference to Dr. Allen's testimony at May 8, 2007 Marin Supervisors hearing in which she said that oyster operations had caused 80% decline at one subsite

*" With respect to your May 13 request item (1), an individual may only obtain access to records written or transcribed to perpetuate knowledge or events. Therefore****, the FOIA neither requires an agency to answer questions disguised as a FOIA request nor create documents or opinions in response to any individual's request for information****."*

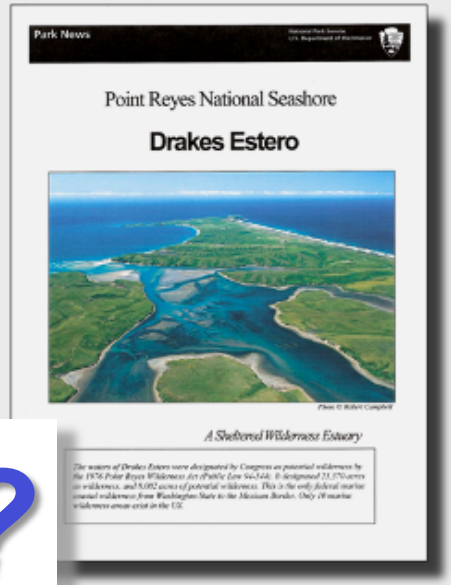
Response by Regional Director Jon Jarvis on June 13, 2007 to Dr. Corey Goodman's May 13 FOIA request for identify of which subsite Dr. Allen was citing in her May 8 testimony

Neubacher's PRNS Published Report

Drakes Estero, A Sheltered Wilderness Estuary

Conclusion concerning DBOC and seals:

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%"



Which subsite?

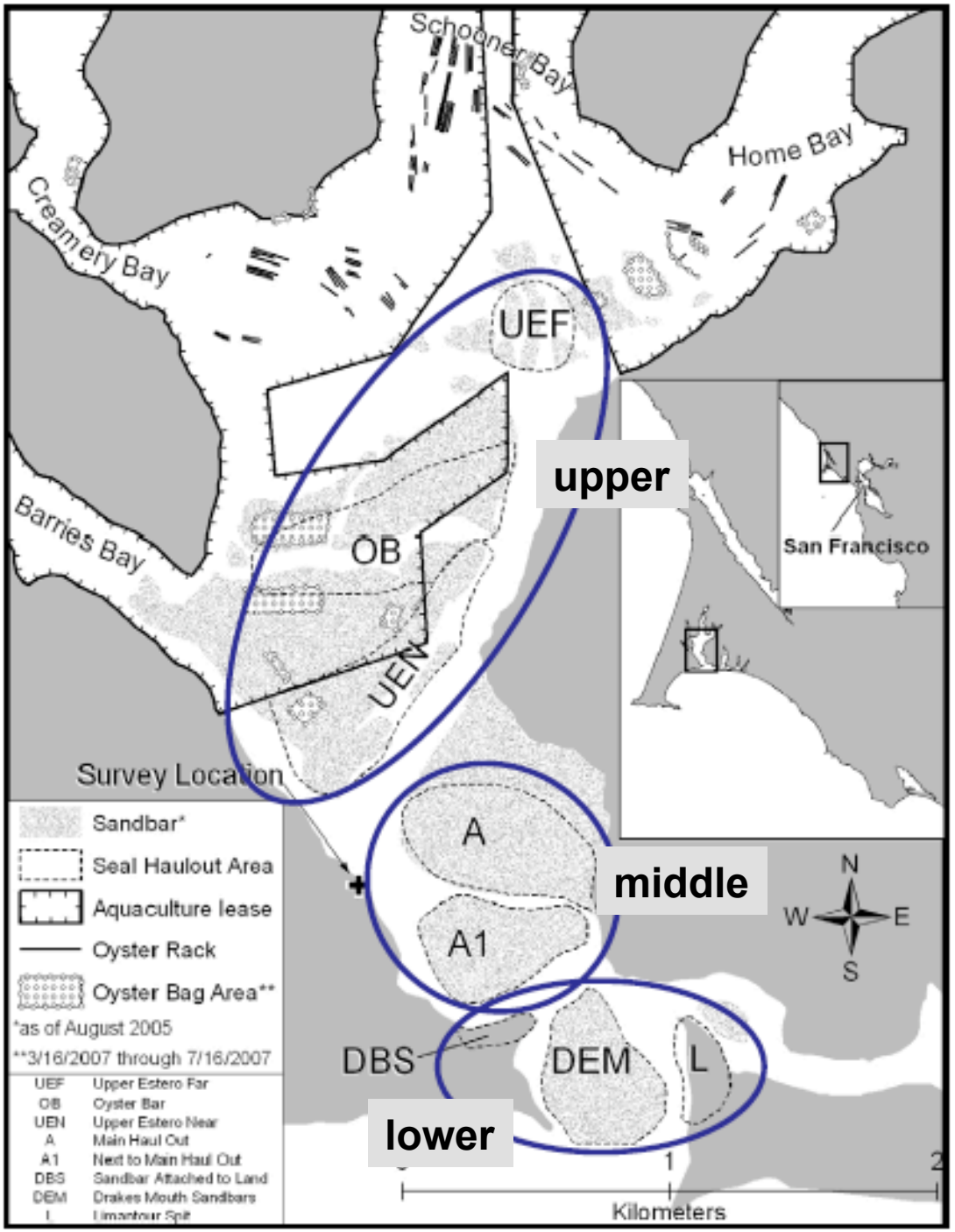
NPS monitors harbor seals at 8 subsites in Drakes Estero

- Neubacher & Allen made repeated public claims of 80% reduction of harbor seals at one subsite due to DBOC in May 2007
- **For 16 months from May 8 2007 until Sept 4 2008, NPS refused to identify which of 8 subsites they were citing**. Why? What hiding?
- **From Sept 4 to 24 2008**, and 16 months after making 80% decline claim, **NPS officials gave three different & equally untenable explanations**
- Is this normal NPS procedure for federally-funded research to not clarify data sampling site after making such a provocative public presentation?

Harbor seal subsites in Drakes Estero

- Upper:
  - Primarily pupping/breeding
  - Islands
- Middle & Lower
  - Generally year-round
  - Human, predator access

From NPS Dr. Ben Becker presentation (slide #4) to National Academy of Sciences panel on September 4, 2008



NPS harbor seal data (Aug 13 '07) vs. NPS claims: the site is sandbar A

author	location	2005		2007		2007
		Total seals	Seal pups	Total seals	Seal pups	decline
Bennett, Sierra Club, 5/1/07 Coastal Post	Middle sandbars		**100-200**		**<10**	
Sarah Allen, NPS, 5/8/07 BOS public testimony	One area	**>250**	**100**	**35** (May 5)		**-80%**
Don Neubacher, NPS, 5/11/07 NPS Report	One area, one sub colony	**350**	**>100**	**50**	**25**	**-80%**

NPS database

From left to right

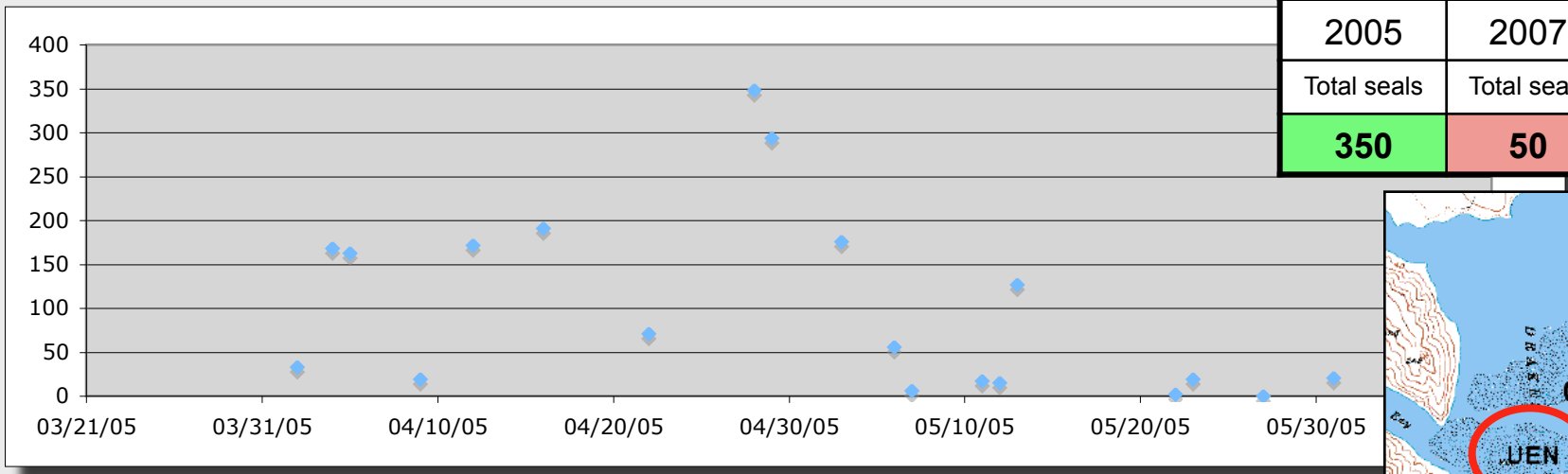
Fits criteria

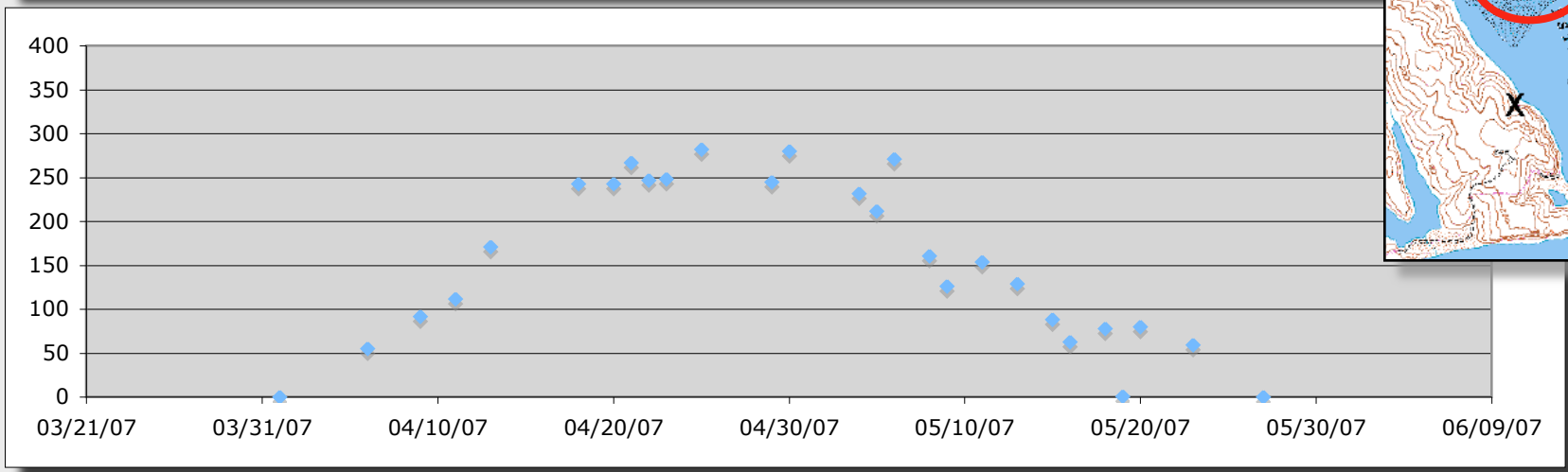
Does not fit

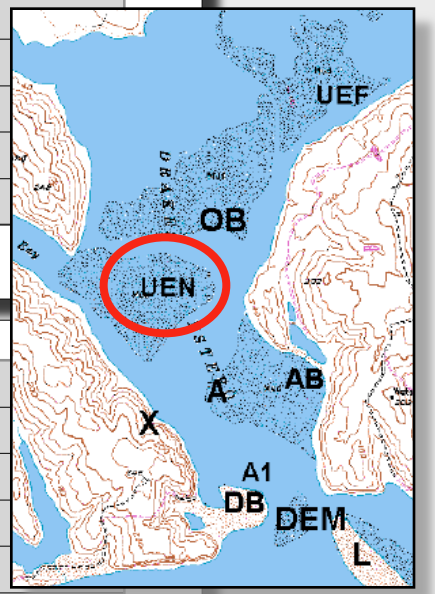
location	2005 (max numbers)		2007 (max numbers)		2007 change	
8 subsites	Total seals	Seal pups	Total seals	Seal pups	Total	pups
A	**321**	**104**	**39**	**16**	**-88%**	**-85%**
A1	**180**	**40**	**309**	**86**	**+72%**	**+115%**
DBS	**57**	**23**	**212**	**48**	**+272%**	**+109%**
L	**225**	**51**	**358**	**61**	**+59%**	**+20%**
DEM	**431**	**62**	**235**	**69**	**-45%**	**+11%**
OB	**167**	**62**	**157**	**38**	**-6%**	**-39%**
UEF	**128**	**26**	**62**	**18**	**-51%**	**-31%**
UEN	**348**	**109**	**282**	**102**	**-19%**	**-6%**

Number of **total seals** at **island UEN** in April & May '05 vs. '07

Neubacher's claim		
2005	2007	2007
Total seals	Total seals	decline
350	**50**	**80%**



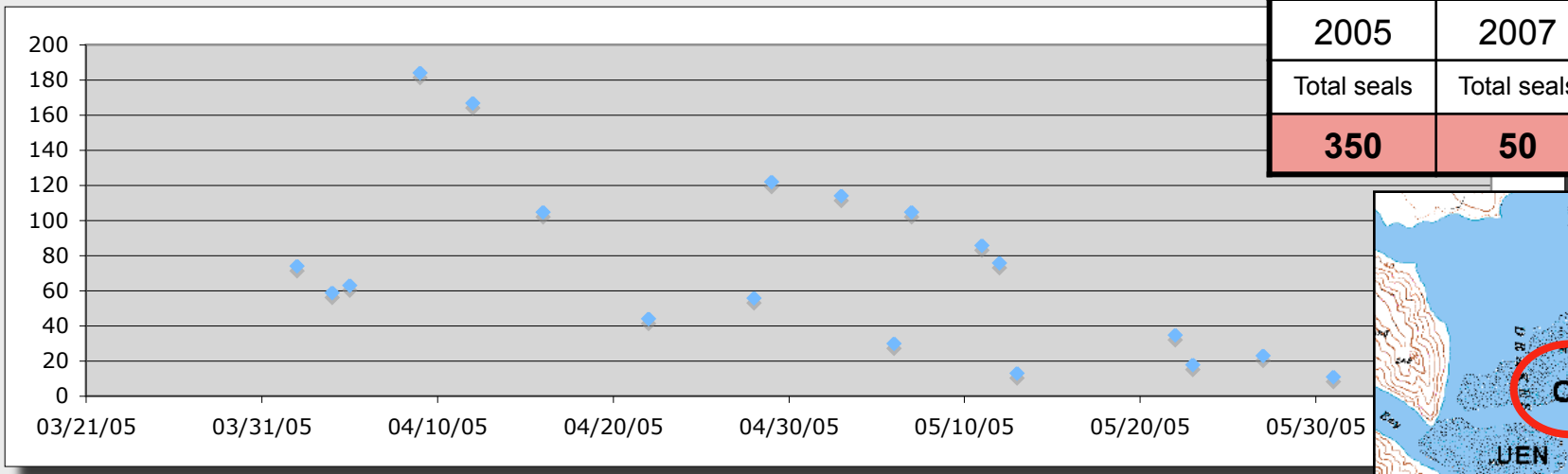


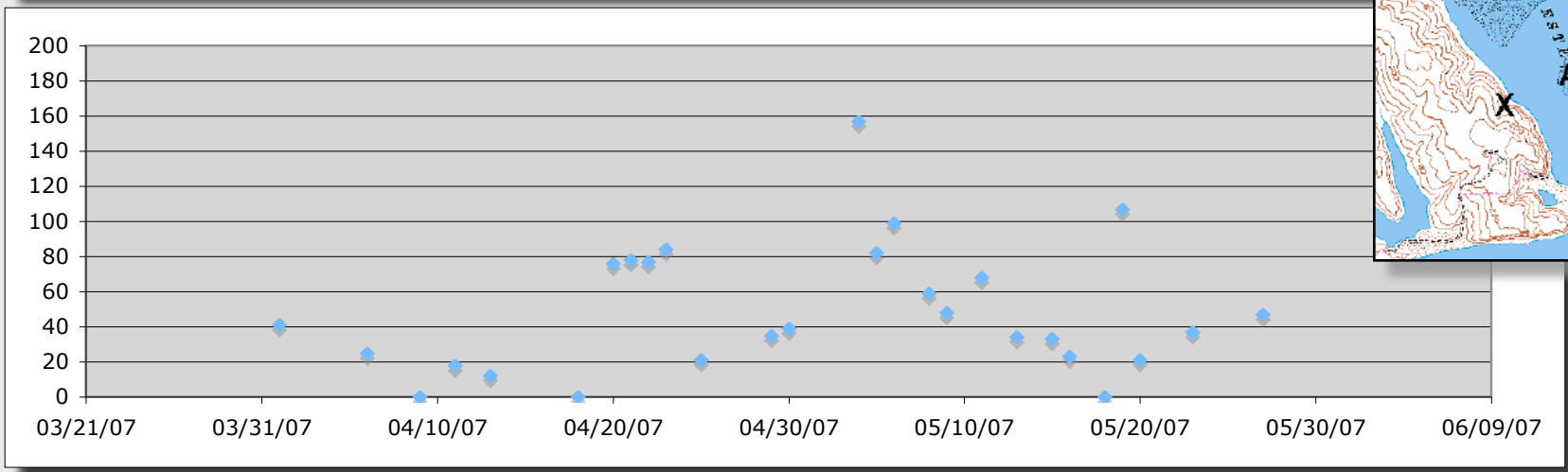


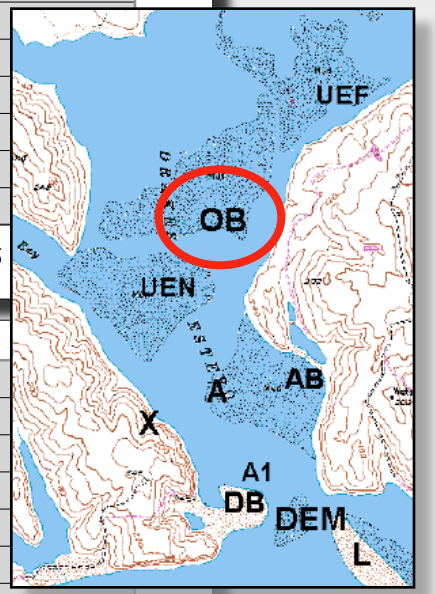
- This is NOT the decrease that Neubacher, Allen, & Bennett referenced in May '07
- NPS harbor seal data reveals identity of subsite as sandbar A

Number of **total seals** at **island OB** in April & May '05 vs. '07

Neubacher's claim		
2005	2007	2007
Total seals	Total seals	decline
350	**50**	**80%**



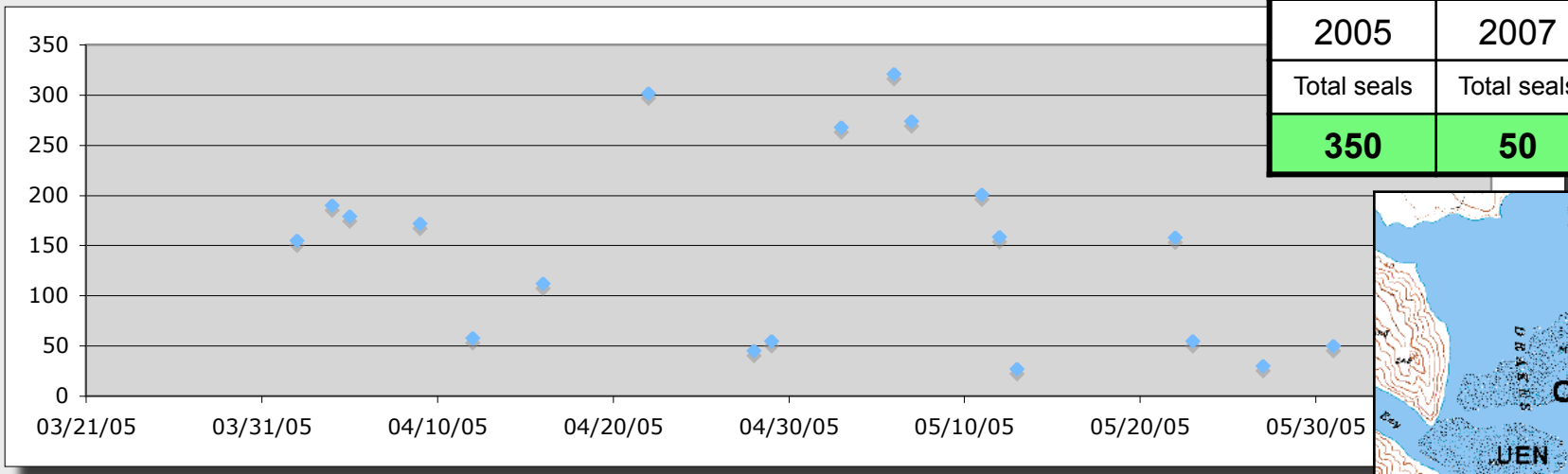


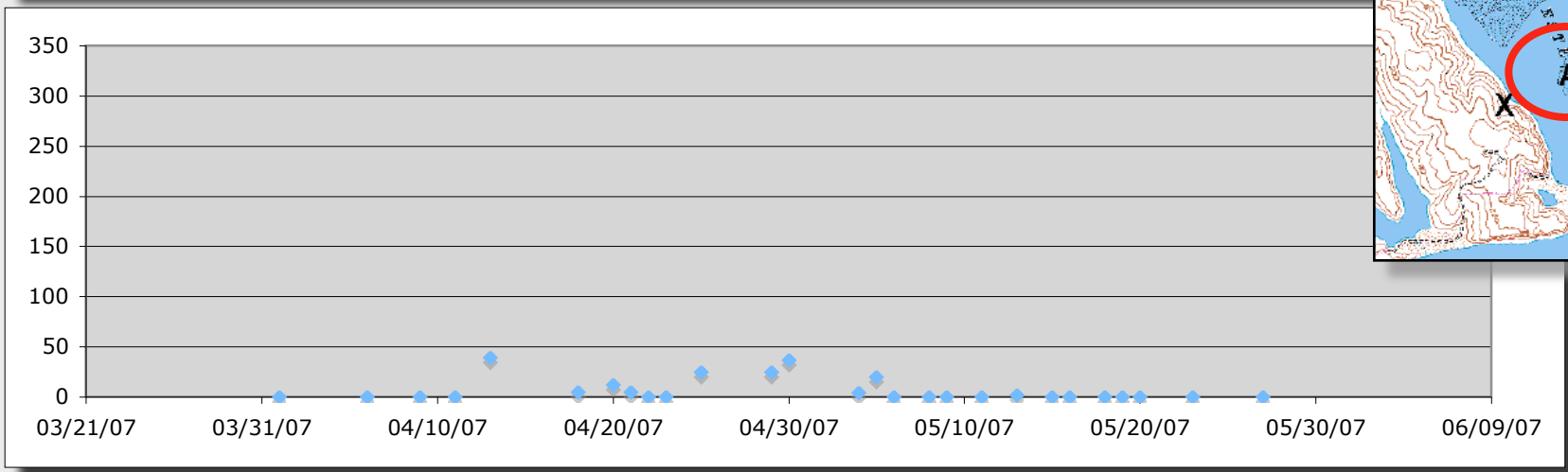


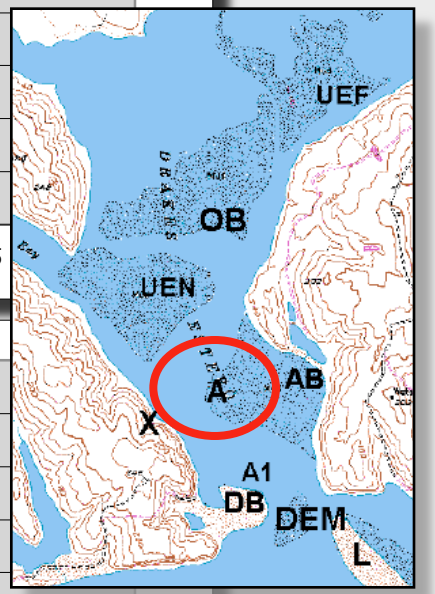
- This is NOT the decrease that Neubacher, Allen, & Bennett referenced in May '07
- NPS harbor seal data reveals identity of subsite as sandbar A

Number of **total seals** at **sandbar A** in April & May '05 vs. '07

Neubacher's claim		
2005	2007	2007
Total seals	Total seals	decline
350	**50**	**80%**



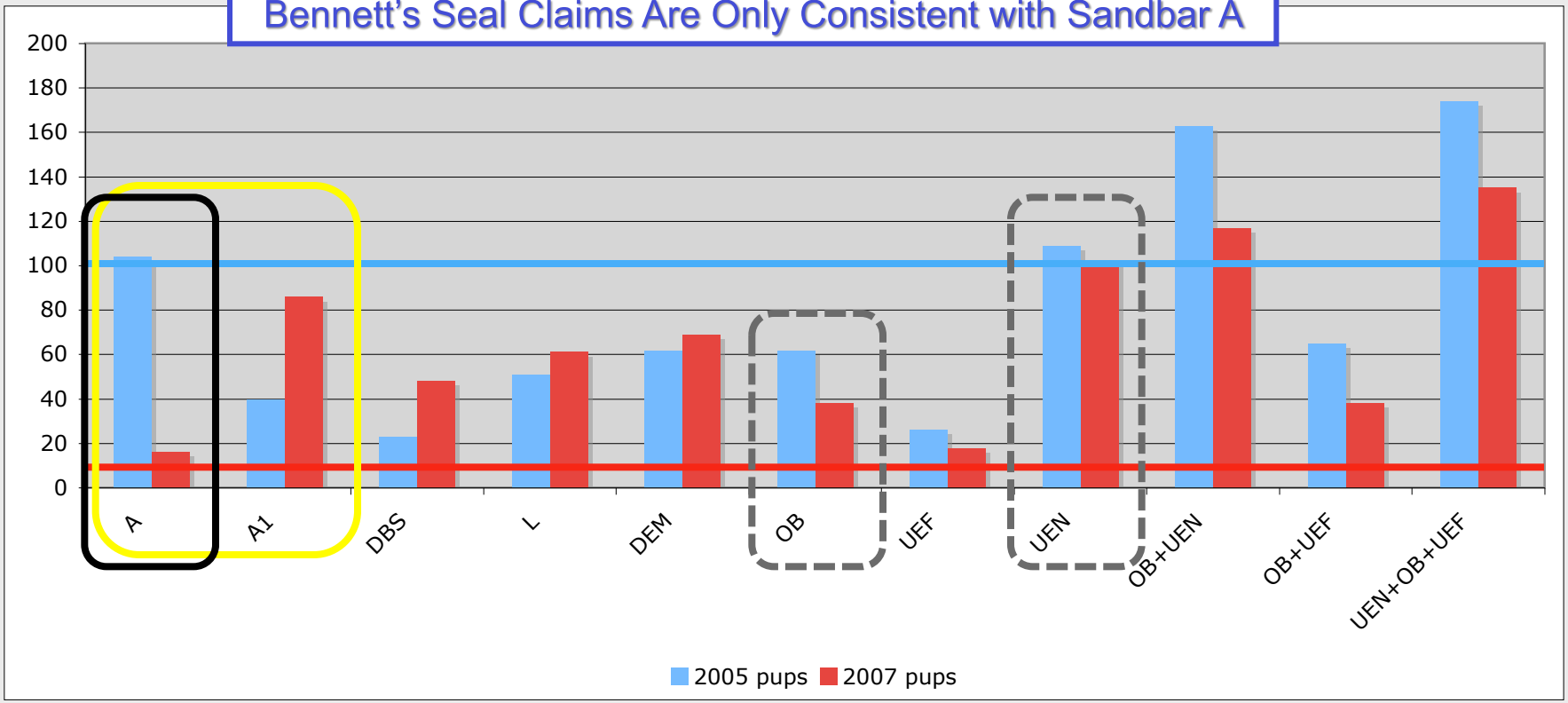




- This IS the decrease that Neubacher, Allen, & Bennett referenced in May '07
- NPS harbor seal data reveals identity of subsite as sandbar A

Harbor seal pups in 2005 vs. pups in 2007

(Bennett said "*middle sandbars*" which according to NPS are A and A1)

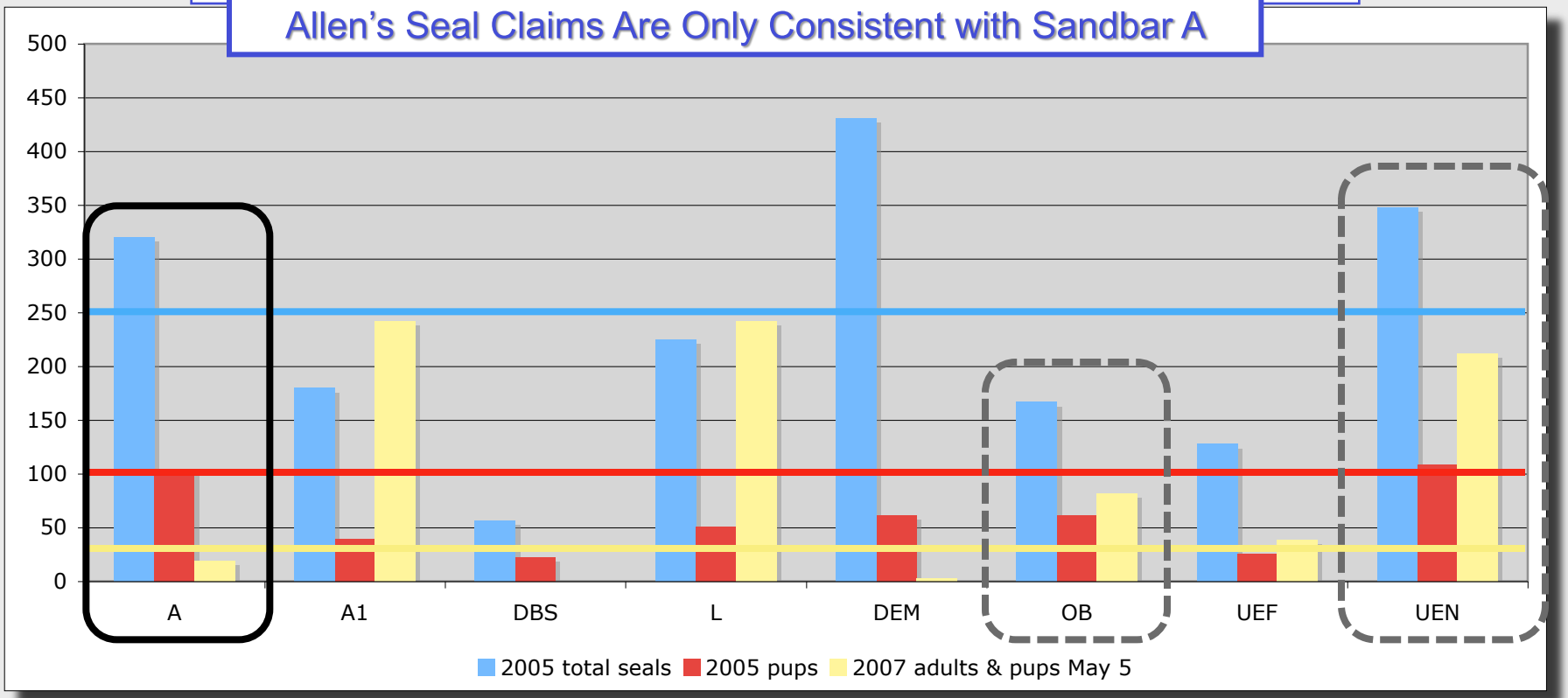


" In the past, as many as 300-500 seal pups were born annually in the Estero, 100-200 of which use the middle sandbars. Now that oyster operations have expanded and oyster bags are placed in seal nursery areas, baby seal numbers on the middle sandbars have been reduced to about fifty in 2006 and less than 10 so far in 2007."

From Gordon Bennett article by Sierra Club, EAC, and others in Coastal Post, May 1, 2007

Seals & pups in 2005 vs. total seals on May 5, 2007 (NPS harbor seal database)

Allen's Seal Claims Are Only Consistent with Sandbar A

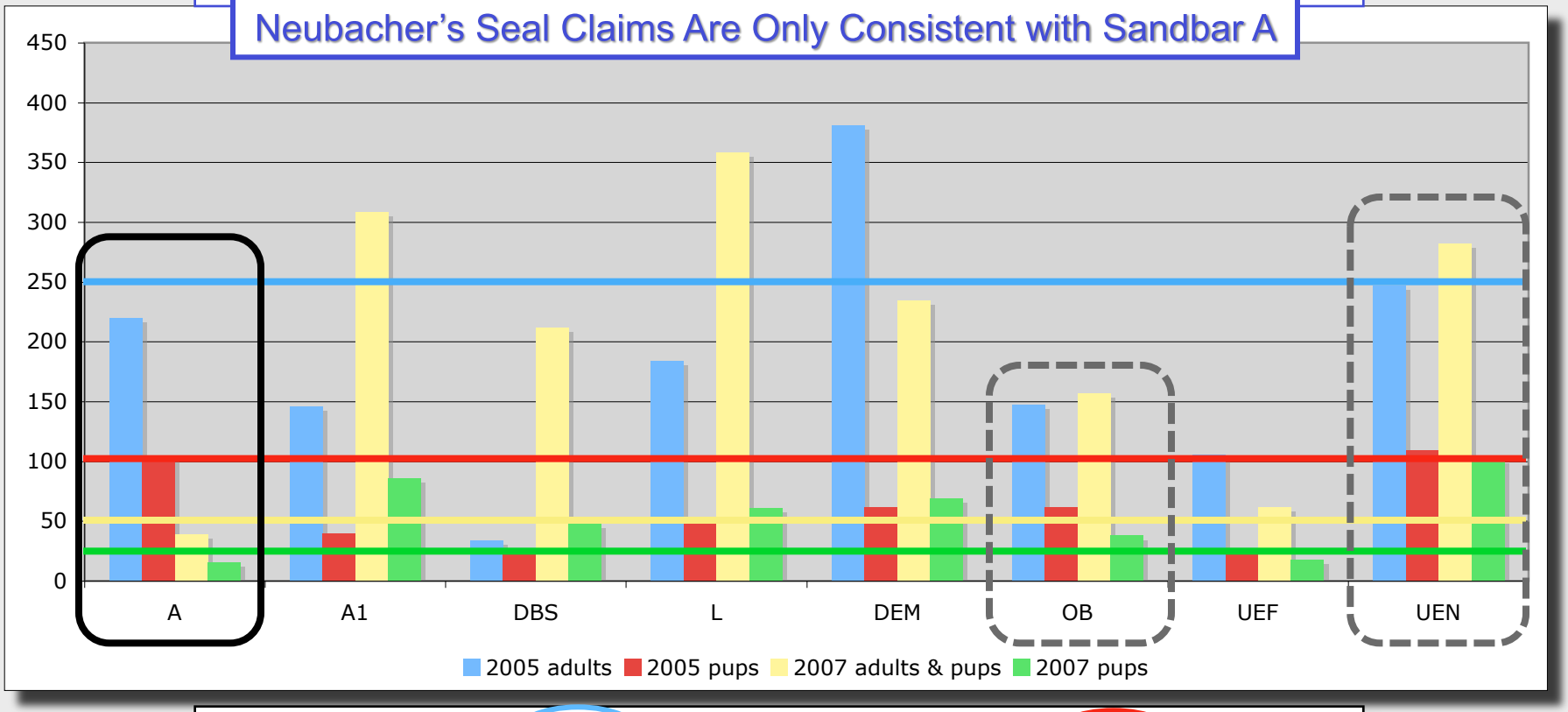


" The harm is resulting in abandonment of one area where more than 250 seals, including 100 pups 2 years ago occurred in that spot. This year chronic disturbance and placement of bags on the nursery area has caused an 80% reduction in the seals dropping to around 35 this last Saturday." [last Saturday = May 5, 2007]

From public testimony by Dr. Sarah Allen, PRNS, to Marin County Board of Supervisors at hearing on May 8, 2007

Seals & pups in 2005 vs. total seals and pups in 2007 (NPS harbor seal database)

Neubacher's Seal Claims Are Only Consistent with Sandbar A

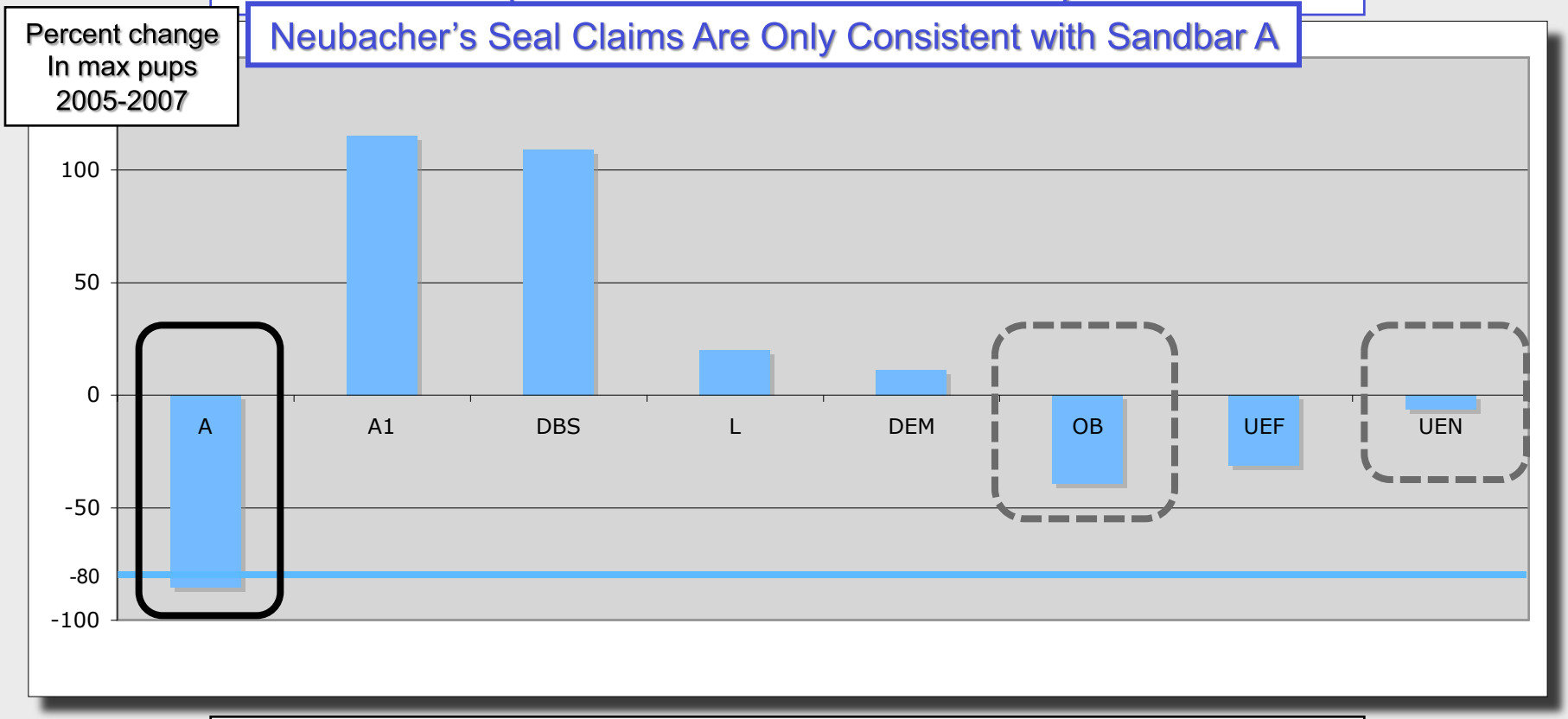


"One area where 250 seals nursed more than 100 pups two years ago, have around 50 total seals including around 25 pups in 2007, an 80% decline."

From May 8th & May 11th versions of Don Neubacher's NPS Report:
Drakes Estero: A Sheltered Wilderness Estuary

80% decline in pups at one subsite from 2005 to 2007 (NPS harbor seal database)

Neubacher's Seal Claims Are Only Consistent with Sandbar A



"One area where 250 seals nursed more than 100 pups two years ago, have around 50 total seals including around 25 pups in 2007, an 80% decline."

From May 8th & May 11th versions of Don Neubacher's NPS Report:
Drakes Estero: A Sheltered Wilderness Estuary

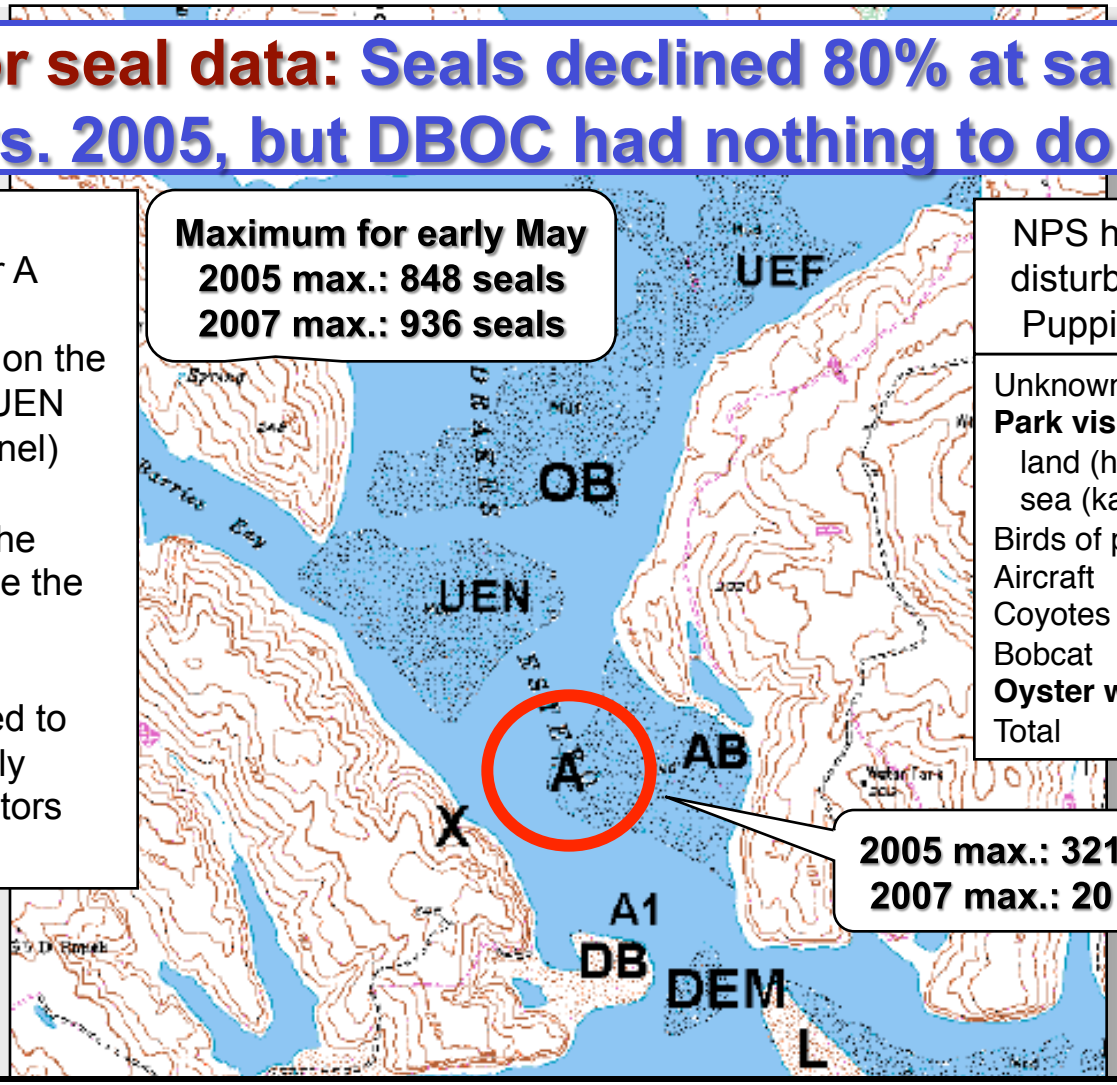
NPS harbor seal data: Seals declined 80% at sandbar A in 2007 vs. 2005, but DBOC had nothing to do with it

There are no oyster operations on sandbar A

Oyster operations are on the west sides of islands UEN and OB (at main channel)

Sandbar A is outside the DBOC lease and inside the wilderness area

Sandbar A is connected to the mainland and easily accessible to Park visitors and predators



NPS harbor seal database disturbances at sandbar A: Pupping season '05 to '07

Unknown	7	22%
Park visitors	**15**	**47%**
land (hikers)	5	16%
sea (kayaks)	10	31%
Birds of prey	5	16%
Aircraft	3	9%
Coyotes	1	3%
Bobcat	1	3%
Oyster workers	**0**	**0%**
Total	32	

#1: total number seals in Drakes Estero was similar in 2007 vs. 2005
#2: number seals at one subsite – sandbar A – dramatically declined in '07
#3: disturbances at sandbar A came from Park visitors and predators
#4: seals moved away from sandbar A in '07, possibly due to disturbances
#5: oyster operation had nothing to do with seals abandoning sandbar A

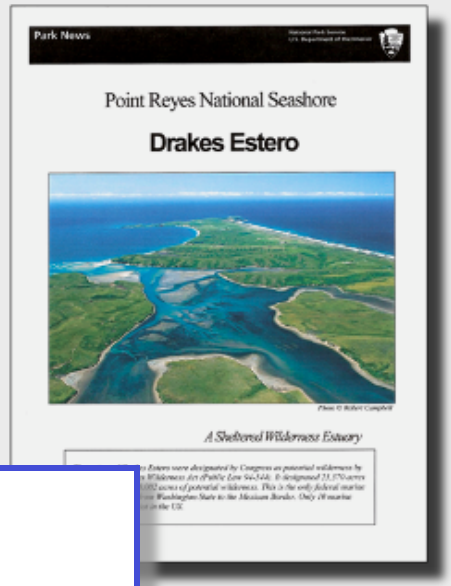
Neubacher's PRNS Published Report

Drakes Estero, A Sheltered Wilderness Estuary

May 11, 2007 version only (not in May 8 version)

Conclusion concerning DBOC and seals:

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%"



Q. Which subsite?
A. Middle sandbar A

- NPS monitors seals at 8 subsites in Drakes Estero
- NPS 2007 harbor seal data are unambiguous - 80% decline in 2007 occurred at one and only one site: sandbar A
- Middle sandbar A is outside DBOC lease; DBOC does not go near it
- Sandbar A is inside wilderness area; access to Park visitors
- NPS 2007 database shows primary source of disturbances at Sandbar A are from Park visitors, none are from DBOC

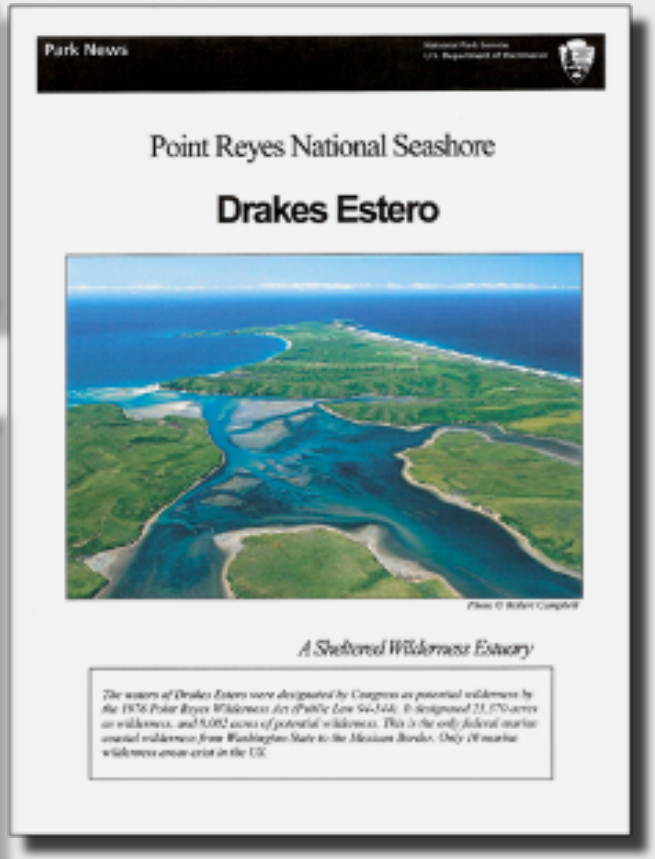
Drakes Estero Report: Neubacher claimed DBOC caused 80% reduction of harbor seals at one subsite. False. The NPS harbor seal database does not support 80% claim.

Concerning DBOC and harbor seals:

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%." [May 11 version]

Concerning impact of DBOC on seals:

"One area where 250 seals nursed more than 100 pups two years ago, have around 50 total seals including around 25 pups in 2007, an 80% decline." [May 8 & 11 versions]


Park News

Point Reyes National Seashore

Drakes Estero

A Sheltered Wilderness Estuary

Point Reyes National Seashore

Drakes Estero

July 27, 2007;

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National Park Service
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July 27, 2007 secret version of the Drakes Estero Report: how it differs from the May 11 public version of the Report, and what it tells us about the NPS knowledge of their false 80% harbor seal claim against the oyster farm

Point Reyes National Seashore

July 27, 2007;

Drakes Estero

- **July 21, 2007**: Senator Feinstein held Olema meeting, instructed NPS to take Drakes Estero Report off web site, to post corrections to false claims against oyster farm, to work with Dr. Goodman to get independent scientific review of claims, and to give Dr. Goodman the NPS harbor seal data. Jarvis was put in charge of all matters concerning oyster farm and Drakes Estero.
- **July 23, 2007**: NPS removed Drakes Estero Report from their web site
- **July 25, 2007**: NPS posted corrections of two false claims (oyster feces and fish), both previously shown by Goodman to be misrepresentations of data
- **July 27, 2007: six days after Olema meeting, NPS created a 5th revised or "corrected" version of the Drakes Estero Report. This version – "*not for distribution or public review*" – was hidden – undisclosed to the public – until the NPS submitted only this version (and not May 11 version) to the National Academy of Sciences** panel reviewing the Drakes Estero Report. The NAS released these documents to the public in late August, 2008, some 13 months after this secret version was created.

July 27, 2007; Version 3

May 11, 2007 (public version #4): False Claims in NPS Drakes Estero Report (*Drakes Estero, A Sheltered Wilderness Estuary)*

oyster feces

"USGS (Anima 1990) collected sediment cores from the estero and identified pseudo feces of oysters as the primary source for sediment fill ... An estimate 0.6 to 1.0 metric tons of fecal matter can be produced per year by a 60 meter square oyster raft."

eelg

"Eelgrass beds are found in all suitable habitats with Drakes Estero, except between active oyster racks, where they do not exist due to shading and possibly other effects. In 2003, with 38 active oyster racks, this amounted to at least 1.5 acres of lost eelgrass cover."

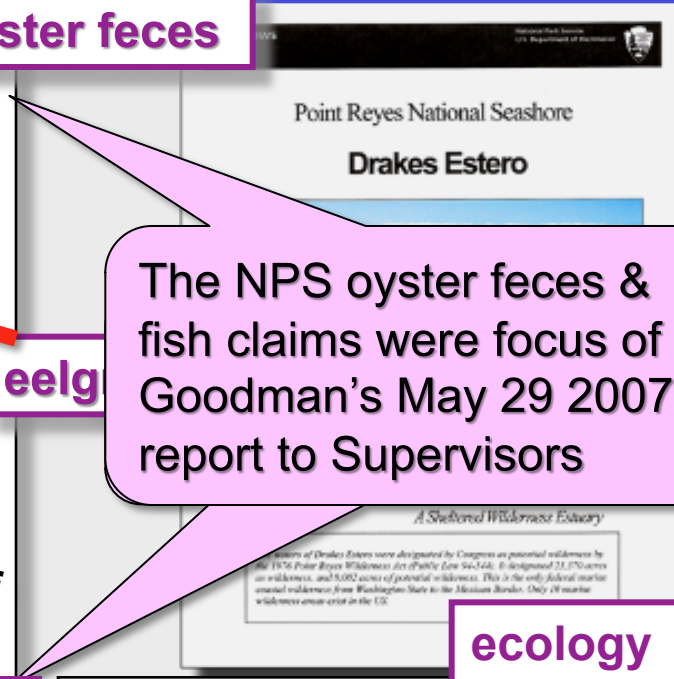
fish

"Schooner Bay, where there are many oyster racks, supported a different fish community than Estero de Limantour where no mariculture occurs."

harbor seals

Concerning impact of oyster farm:

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%."



The NPS oyster feces & fish claims were focus of Goodman's May 29 2007 report to Supervisors

ecology

"Specifically in Drakes Estero, ecological function has been degraded and altered over the past several decades due to activities associated with oyster farming and ranching."

Secret non-public version #5 dated 7/27/07 given to NAS: NPS deleted three major false claims from May 11 version

oyster feces

~~"USGS (Anima 1990) collected sediment cores from the estero and identified pseudo feces of oysters as the primary source for sediment fill ... An estimate 0.6 to 1.0 metric tons of fecal matter can be produced per year by a 60 meter square oyster raft."~~ [July 27 non-public version]

eelgrass

"Eelgrass beds are found in all suitable habitats with Drakes Estero, except beneath active oyster racks, where they do not exist due to shading and possibly other effects. In 2007, with 63 active oyster racks, this amounted to at least 8 acres of lost eelgrass cover." [July 27 non-public version]

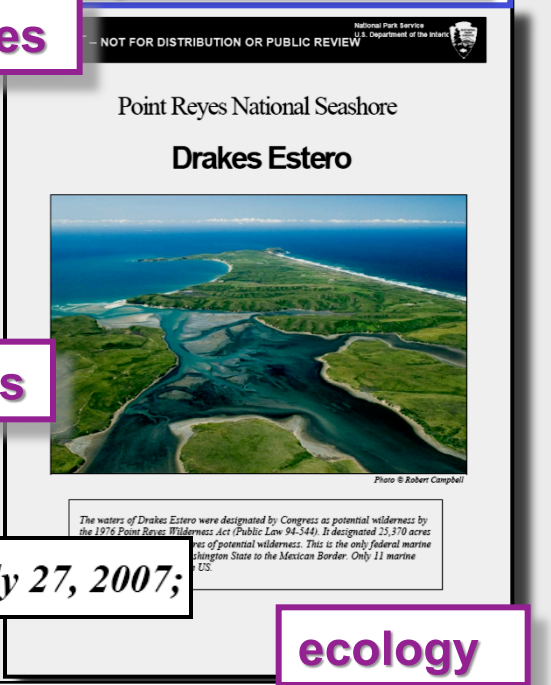
fish

~~"Schooner Bay, where there are many oyster racks, supported a different fish community than Estero de Limantour where no mariculture occurs."~~ [July 27 non-public version]

harbor seals

Concerning impact of oyster farm:

~~"In 2007, oyster bags and disturbance have reduced one sub colony by 80%."~~ [July 27 vers.]



ecology

"Specifically in Drakes Estero, the ecology has been altered over the past several decades due to activities associated with human activities including ranching and oyster farming." [July 27 version]

May 11, 2007 Conclusions

Oyster farming impacts on the ecological communities of Drakes Estero

- A USGS researcher stated that a source for sediment fill in the estero was from oyster f and from structures trapping sediment.
- Eelgrass beds are found in all suitable habitats within Drakes Estero, except between a oyster racks, where they do not exist due to shading and possibly other effects. In 2003 38 active oyster racks, this amounted to at least 1.5 acres of lost eelgrass cover
- Oyster racks and bags provide structural habitat that does not naturally occur in the este except in limited areas. The equipment and structures change the community composit abundance of species and provide habitat for invasive, non-native species.
  - Invasive organisms were found on the hard substrates provided by the oyster racks Schooner Bay. These organisms were limited in Estero de Limantour where no oys facilities exist.
  - The invasive non-native species, *Didemnum spp.,* is commonly present on oyster ra and is a highly aggressive, invasive species that could alter Drakes Estero ecology.
  - Schooner Bay, where there are many oyster racks, supported a different fish comm than Estero de Limantour where no mariculture occurs.
- Clam abundance is reduced under oyster racks, possibly due to changes in bottom sedi composition or increased predation by fish and decapod crustaceans attracted to the oys racks. In parts of Drakes Estero, clams are found in extremely high densities away from racks - up to 250 per meter squared.
- The oyster operation is a potential source for many invasive species because non-native species hitchhike on oysters and equipment that are brought to the estero.
- Placement of oyster bags and racks in intertidal mudflats and sand bars displace wildlife such as shorebirds and harbor seals because of spatial coverage of racks and disturbance by oyster operations. In 2007, oyster bags and disturbance have reduced one sub colony by 80%

July 27, 2007 Conclusions

Oyster farming impacts on the ecological communities

- Eelgrass beds are found in all suitable habitats within Drakes Estero, except beneath active oyster racks, where they do not exist due to shading and possibly other effects. In 2007, with 63 active oyster racks, this amounted to at least 8 acres of lost eelgrass cover. Approximately 50 additional acres were also affected, likely from boat propeller damage.
- Oysters that are grown in Drakes Estero likely play an important role in the deposition of fine-grained sediment, and in the trapping of sediment.
- Oyster racks and bags provide structural habitat that does not naturally occur in the estero except in limited areas. The equipment and structures may change the community composition and abundance of species and provide habitat for invasive, non-native species.
  - Invasive organisms were found on the hard substrates provided by the oysters and oyster racks in Schooner Bay.
  - The invasive non-native species, *Didemnum* sp. A, is commonly present on oyster racks and was discovered on natural habitat within the estero. Oyster processing methods have the potential to spread *Didemnum* by creating large numbers of fragments that can colonize new areas.
- The oyster operation is a potential source for invasive species because non-native species may hitchhike on oysters and equipment that are brought to the estero.
- Placement of oyster bags and racks in intertidal mudflats and sand bars displace wildlife such as shorebirds, black brant and harbor seals because of spatial coverage of racks and bags, and disturbance by oyster operations.

July 27, 2007;

False claims deleted in July 27, 2007 non-public version

- A USGS researcher stated that a source for sediment fill in the estero was from oyster feces and from structures trapping sediment.
  - Schooner Bay, where there are many oyster racks, supported a different fish community than Estero de Limantour where no mariculture occurs.

In 2007, oyster bags and disturbance have reduced one sub colony by 80%

May 11, 2007 (public version #4): False Claims in NPS Drakes Estero Report (*Drakes Estero, A Sheltered Wilderness Estuary)*

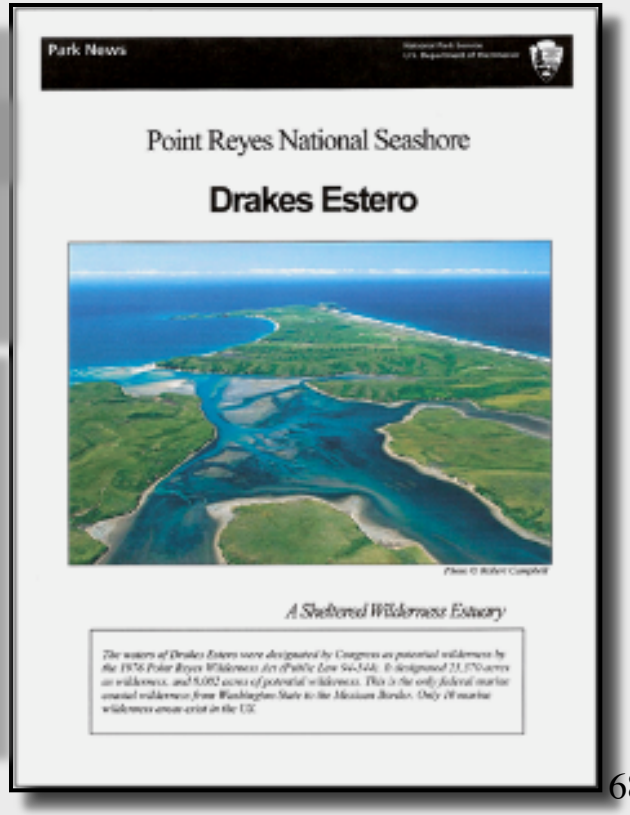
- At May 8, 2007 Marin Co. Supervisors hearing and in May 11, 2007 version of Drakes Estero Report, NPS Neubacher & Allen made provocative claim that DBOC caused *"80% decline"* in harbor seals at unnamed subsite in 2007 vs. 2005
- The NPS harbor seal database did not support this claim. The decline took place at middle sandbar A away from DBOC. DBOC had nothing to do with the decline.

Concerning impact of oyster farm:

harbor seals

"In 2007, oyster bags and disturbance have reduced one sub colony by 80%."

"One area where 250 seals nursed more than 100 pups two years ago, have around 50 total seals including around 25 pups in 2007, an 80% decline."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Point Reyes National Seashore

Drakes Estero

A Sheltered Wilderness Estuary

July 27 2007: six days after Olema meeting, NPS removed *"80% decline"* claim from Drakes Estero Report but *"not for distribution"*

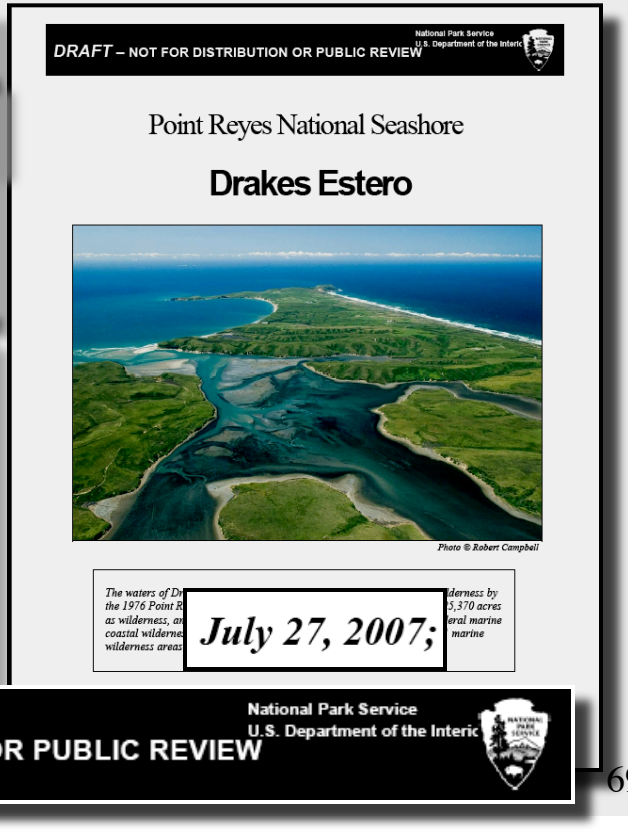
- NPS retracted claim of 80% decline in seals at one subsite due to oyster farm
- Learned of retraction 1 year later because NPS provided only this version to NAS
- NPS never told community that PRNS/NPS retracted *"80% decline"* claim
- After July 27, 2007, NPS and supporters continued to push this claim publicly; NPS knew this was a false claim: why didn't NPS tell the public the truth?

Concerning DBOC and harbor seals:

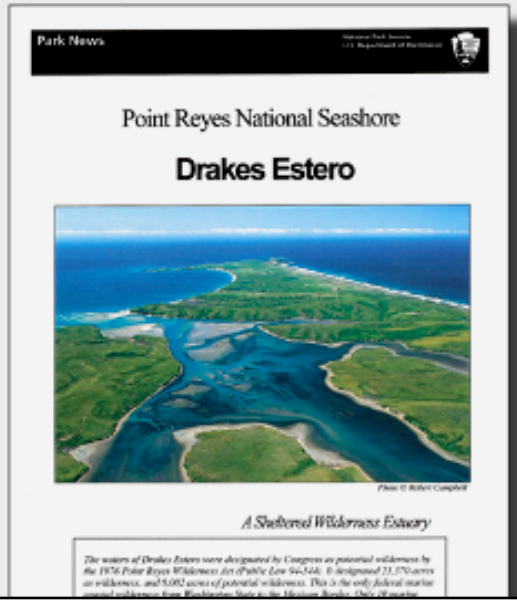
~~*"In 2007, oyster bags and disturbance have reduced one sub colony by 80%."* [July 27 non-public version]~~

harbor seals

~~*"One area where 250 seals nursed more than 100 pups two years ago, have around 50 total seals including around 25 pups in 2007, an 80% decline."* [July 27 non-public version]~~



The NPS claim that in 2007 vs. 2005, the oyster farm had caused an 80% decline in harbor seals at one unnamed subsite, so prominent in May 11, 2007 public version, was secretly deleted from the July 27, 2007 non-public version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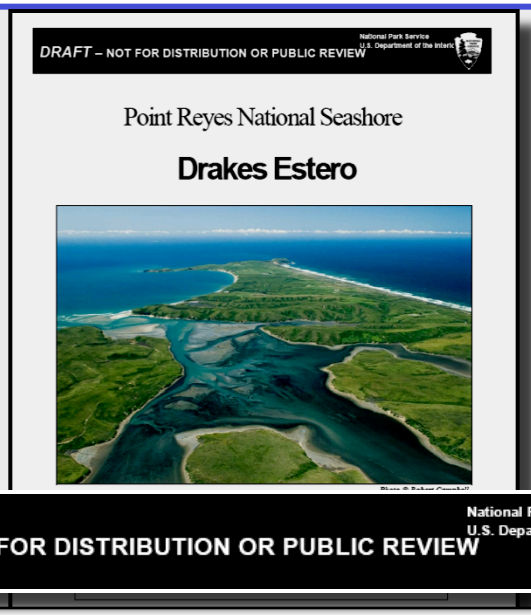
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Drakes Estero

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Impact of oyster farm on seals:

"One area where 250 seals nursed more than 100 pups two years ago, have around 50 total seals including around 25 pups in 2007, an 80% decline." [May 11, 2007]

HARBOR SEAL CLAIM DELETED – 80% HARBOR SEAL DECLINE CLAIM IS COMPLETELY ABSENT FROM SECRET VERSION OF THE REPORT

[July 27, 2007 non-public version]

NPS Drakes Estero Report: different versions contain different accounts of maricultur-related seal disturbances

Non-public July 27 2007 version: *"During the breeding season, researchers observed seals disturbed by motor boats* ***several times in 1997 and once between 1998 and 2001****. Since March 2007, park biologists have documented oyster boats disturbing mothers with pups, and they noted that hundreds of oyster bags were located on or adjacent to sandbars where seals would normally give birth and nurse their pups. Two oyster bag arrays (approximately 5 acres) were within a regular harbor seal haul out site, and one other oyster bag site was within 50 meters of a regular harbor seal haul out site* ***(NPS Trip Reports April 13 and 26, 2007)****."*

Major changes from May 8 & May 11 versions:
- six disturbances in 1997 changed to several: why? Truth is zero
- removed claim of 80% decline in 2007
- 80% decline claim replaced by April 26 2007 Trip Report

Dec 28 2007: even though NPS retracted 80% decline claim in July 27 2007 non-public version of Drakes Estero Report, and in a misleading way in Sept 18 2007 "*clarification*" document, in public interviews, NPS continued to make 80% claim and defended it in September 2008

San Francisco Chronicle
NORTHERN CALIFORNIA'S LARGEST NEWSPAPER

"There are some inherent differences of opinion about wh[illegible]
positive or negative effect on eel[illegible]
quality," said [illegible] of the [illegible] indicate there are some ne[illegible]

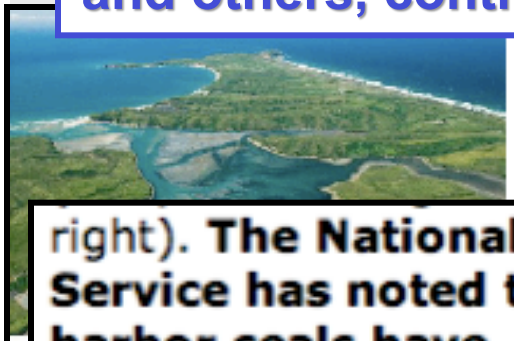
Don't acknowledge retraction

Park service officials recently complained that Lunny expanded his operation to an area historically used by female harbor seals and their pups and that oyster boats were observed scaring off seals in the area. ***The park service said harbor seals declined from 250 to 50 in the area Lunny recently developed.***

Park service officials deny any misrepresentations were made and have stood firmly behind their research."

Article by staff writer Peter Fimrite in SF Chronicle on December 28, 2007 entitled:
"Dispute over oysters in Drakes Bay pits harvester against park service"

Save Drakes Bay Coalition, sponsored by Bennett (Sierra Club), EAC, and others, continues NPS claim of 80% seal decline caused by DBOC



Save Drakes Bay Coalition

working to protect and preserve the ecology, wildlife, and wilderness status of Drakes Estero in Point Reyes Na

Aug 2008

The Save Drakes Bay Coalition consists of the following organizations:

Environmental Action Committee of West Marin
Marin Audubon Society
National Parks Conservation Association
Sierra Club

right). **The National Park Service has noted that harbor seals have declined 80% in the area that the oyster company recently started operating in.**

Jewel of the Ecosystem

commercial oyster farming has been documented at Drakes Estero and elsewhere. Harbor seals have been affected by oyster operations because of direct disturbance to seals resting

What data?

bags on right). **The National Park Service has noted that harbor seals have declined 80% in the area that the oyster company recently started operating in.**

Save Drakes Bay Coalition

logy, wildlife, and wilderness status of eashore

The Save Drakes Bay Coalition consists of the following

Environmental Action Committee of West Marin
Marin Audubon Society
National Parks Conservation Association
Sierra Club
Salmon Protection and Watershed Network (SPAWN)
Public Employees for Environmental Responsibility

Management

- Analysis by Dominique M. Richard, Ph.D on harbor seals reductions (download)
  - Conclusions support NPS testimony and refute claims of "misconduct" by Dr. Corey Goodman

- Harbor Seal report by National Park Service, published in Marine Mammal Science, 2008 (download)

- Wilderness protocols and guidelines for management in Drakes Estero, NPS Management Policies (download)

- National Academy of Sciences (NAS) website and scope of study (visit NAS website)

- California Coastal Commission memo, 9/11/07 (download)
* independent analysis on mariculture impacts in Drakes Estero
* conclusion confirms negative impacts
* recommendations provided to mitigate impacts

- National Park Service updated report, 9/18/07 (download)
* peer-reviewed by 7 non-NPS marine ecology experts
* Dr. Corey Goodman's analysis refuted by these experts

NPS & Sierra Club Sept 2008 explanations of May 2007 80% claim:

NPS provided three different explanations over three week period, Sierra Club provides a fourth, all based on common theme: decline at sandbar OB between 2004 - 2005 rather than decline in 2007

1) Sept 4, 2008: NPS Dr. Ben Becker explanation to NAS panel
2) Sept 9, 2008: PRNS Superintendent Neubacher explanation to press
3) Sept 17, 2008: Dr. Dominique Richard explanation for Bennett (Sierra Club)
4) Sept 24, 2008: Regional Director Jon Jarvis explanation to NAS panel

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.

Dominique M. Richard, Ph.D. September 17, 2008

NPS & Sierra Club Sept 2008 explanations of May 2007 80% claim:

NPS provided three different explanations over three week period, Sierra Club provides a fourth, all based on common theme: decline at sandbar OB between 2004 - 2005 rather than decline in 2007

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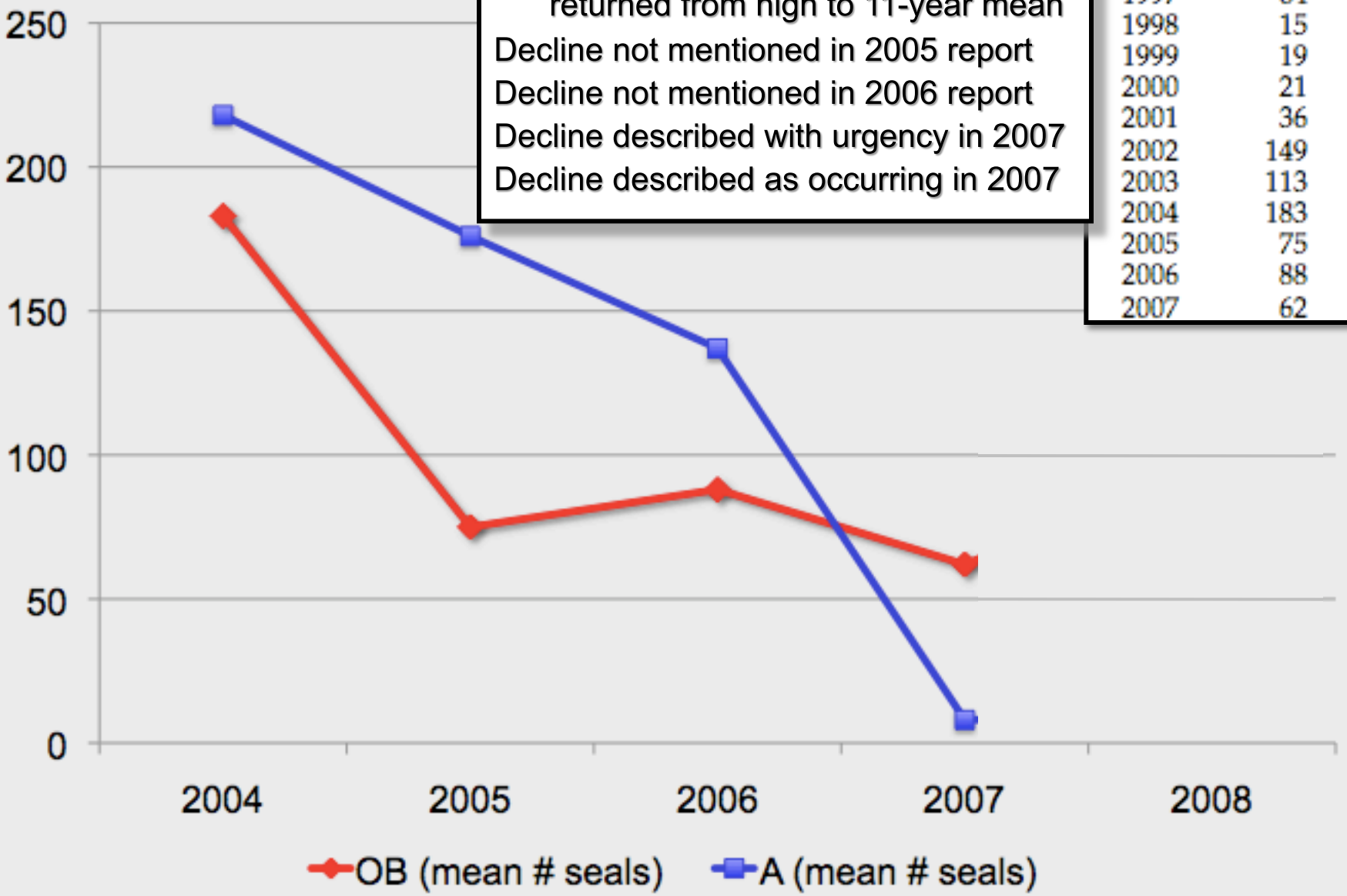
All four explanations, given 16 months after original claim on May 8 2007, are different and **equally untenable**, but all have some common features:

- **None described change in 2007**; rather all described change in 2005
- None accounted for data on **Saturday May 5** from Allen's testimony
- None accounted for Bennett's claim of decline at **middle sandbars**
- Richard ignored Drakes Estero Report: *"Dr. Allen's testimony was presented informally and verbally, rather than in a formal written scientific report"*
- All gave explanations for why Allen & Neubacher meant 2004 and thus **three years ago and not two years ago** as cited in NPS Drakes Estero Report
- Becker suggested Allen's latest data point (based on Allen) was May 6, Neubacher suggested latest data point was May 3, Richard suggested latest data point was April 23, and Jarvis suggested latest data point was May 3
- All described what was a **decrease at sandbar OB between 2004 & 2005**

Sandbar A vs. Sandbar OB from 2004 to 2008

- Decline at middle sandbar A in 2007
- Decline at sandbar OB in 2005, as OB returned from high to 11-year mean
- Decline not mentioned in 2005 report
- Decline not mentioned in 2006 report
- Decline described with urgency in 2007
- Decline described as occurring in 2007

Year	Mean seals at OB (Apr 15 - May 15)
1997	64
1998	15
1999	19
2000	21
2001	36
2002	149
2003	113
2004	183
2005	75
2006	88
2007	62



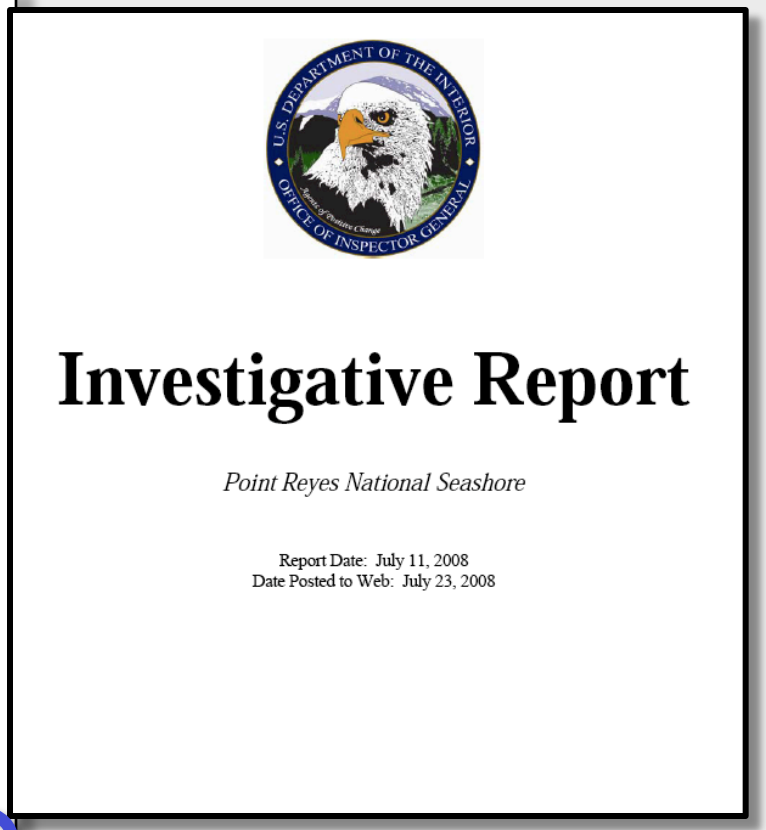
NPS and Sierra Club September 2008 explanations of May 2007 80 percent claim: NPS provides three different explanations over three week period, and Sierra Club provides a fourth, all based on a common theme: a decline at sandbar OB between 2004 and 2005

topic	claim	Sandbar A	Sandbar OB
Year of decline	2007	2007	2005
Compared to	Two years ago	Two years ago	Three years ago
Percent decline	80%	80%	55%
Location	Middle sandbars	YES	NO
May 5, 2007	Around 35 seals	33 seals	82 seals
Urgency in 2007	*"this year" "Right now" "in 2007" "national issue" "national significance" "increased dramatically in 2007"*	2007	2005
Testimony in Inspector General Report	*"situation with the seals did not become an issue until 2007"*	2007	2005

Inspector General Report: Sarah Allen and Don Neubacher told the IG that DBOC disturbances increased in 2007 resulting in an 80% decline in seals at one subsite in 2007

Pg 25 of IG report:

"The updated version [of the Drakes Estero Report] of May 2007 stated that ***disturbances to the seals had "increased dramatically" in 2007*** *and specified that one area of the estero had experienced an 80 percent decline in seals. Allen and Neubacher explained the* ***situation with the seals did not become an issue until 2007****, when DBOC began to expand its operation."*



U.S. DEPARTMENT OF THE INTERIOR
OFFICE OF INSPECTOR GENERAL

Investigative Report

Point Reyes National Seashore

Report Date: July 11, 2008
Date Posted to Web: July 23, 2008

Sept 24, 2009: Dr. Peter Gleick on Richard's explanation

- elected member National Academy of Sciences
- MacArthur Fellow
- President and co-founder, Pacific Institute
- world-renowned environmentalist and expert on scientific integrity

" …unworthy of even being called a statistical analysis, much less any sort of intelligent assessment of the impacts of the oyster farm on seals …

All this is, is ***an attempt to find SOME way to come up with a seal reduction even close to 80%****, somewhere, somehow, to justify a previous, now challenged statement. And the only way to do it is to twist and contort the data even more …*

Pick a different sandbar (admittedly ignoring others that had no significant declines). ***Cherry pick dates and numbers of pups. Cherry pick the year…***

On top of this, it ***completely ignores causes. It completely ignores whether impacts in the Estero are mirrored, or different from, impacts outside in other parts of the Park*** *(which would indicate other causes of fluctuations in seal populations) …*

This is not science; it is not even statistical analysis. This is post-hoc creative accounting to get the predetermined numbers you want, to support an unsupportable statement made two years ago."

HOME | DRAKES ESTERO WILDERNESS | THREATS TO DRAKES BAY | TAKE ACTION! | IMPLICATIONS NATIONWIDE | CONTACT

Save Drakes Bay Coalition

working to protect and preserve the ecology, wildlife, and wilderness status of Drakes Estero in Point Reyes National Seashore

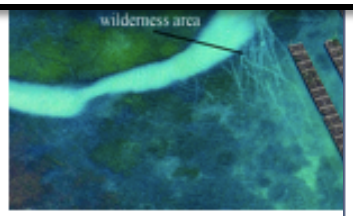
Drakes Estero: A Crown Jewel of the Ecosystem

See below for information and r… bitat, and the threats to them

Disturbance of the larger fauna by commercial oyster farming has been documented at Drakes Estero and elsewhere. Harbor seals have been affected by oyster operations because of direct disturbance to seals resting onshore and displacement by oyster bags where seals rest and nurse their young (see photo of bags on right). **In 2007, there was a ~65% reduction of harbor seal pups in the area that the oyster company recently started operating in. (an initial reduction of ~80% was reported before the pupping season concluded Click here to see how the 80% number was derived)**

Oyster operation structures

In 2007, there was a ~65% reduction of harbor seal pups in the area that the oyster company recently started operating in. (an initial reduction of ~80% was reported before the pupping season concluded Click here to see how the 80% number was derived)



Oyster bag debris in Drak… Estero. These types of ba…

Wildlife and Habitat Significance

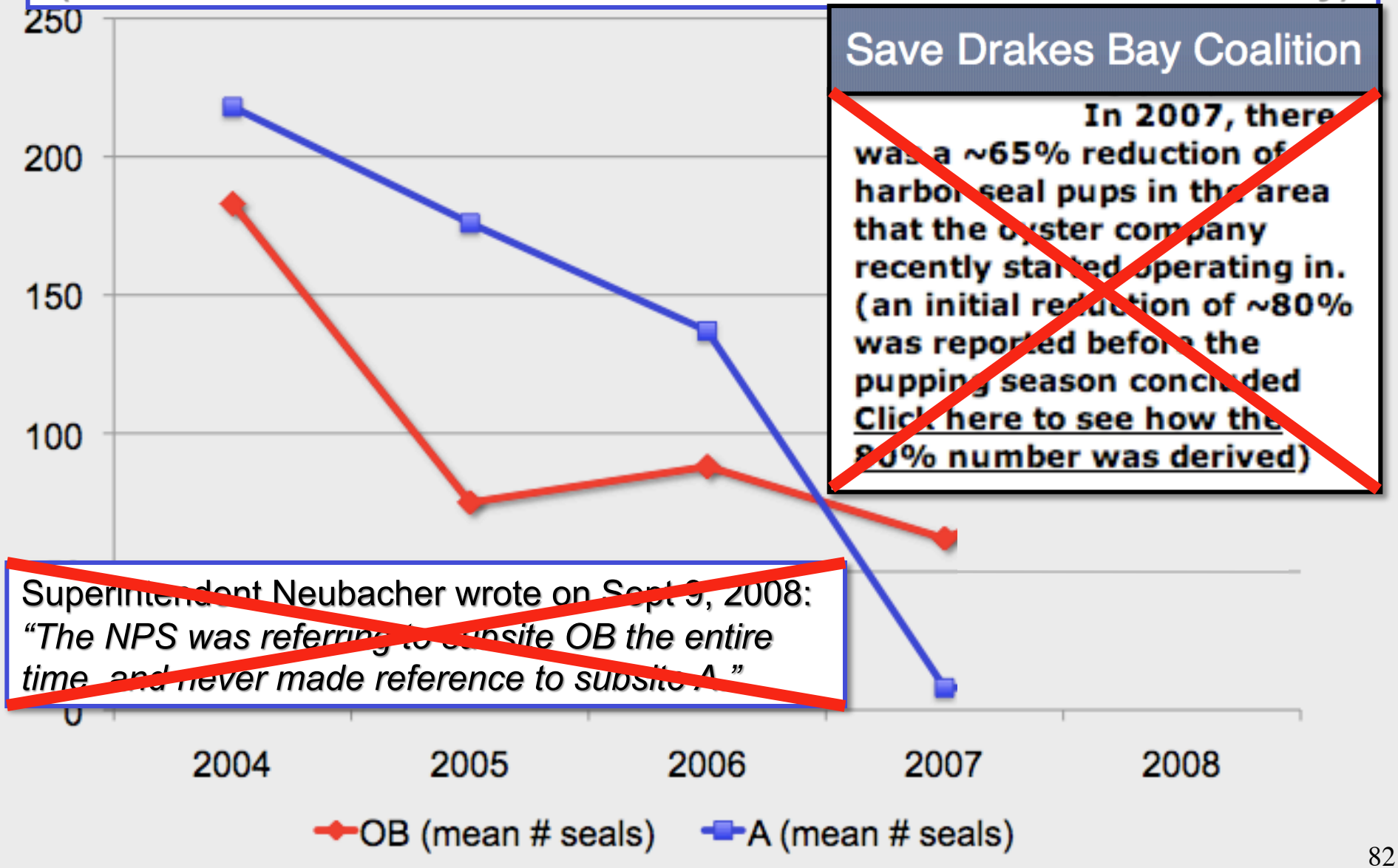
In North America, one third of our waterbird species are in decline; worldwide, 90% of all the fish species have been depleted. More than 60% of our coastal waters are moderately to severely degraded. Despite commendable efforts to conserve land resources, only .01 % of the ocean is

The Save Drakes Bay Coalition consists of the following …

Environmental Action Committee of West Marin
Marin Audubon Society
National Parks Conservation Association
Sierra Club
Salmon Protection and Watershed Network (SPAWN)
Public Employees for Environmental Responsibility

Save Drakes Bay Coalition statement is false: 65% reduction at OB occurred in 2005, not in 2007

(coincided with similar reduction in Drakes Estero and Marin County)



Save Drakes Bay Coalition

In 2007, there was a ~65% reduction of harbor seal pups in the area that the oyster company recently started operating in. (an initial reduction of ~80% was reported before the pupping season concluded Click here to see how the 80% number was derived)

Superintendent Neubacher wrote on Sept 9, 2008:
"The NPS was referring to subsite OB the entire time, and never made reference to subsite A."

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Save Drakes Bay Coalition

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Public Employees for Environmental Responsibility

Management

The NPS explanations and Richard's are all post-hoc and equally untenable

?

- Analysis by Dominique M. Richard, Ph.D on harbor seals reductions (download)
  - Conclusions support NPS testimony and refute claims of "misconduct" by Dr. Corey Goodman

- Harbor Seal report by National Park Service, published in Marine Mammal Science, 2008 (download)

- Wilderness protocols and guidelines for management in Drakes Estero, NPS Management Policies (download)

- National Academy of Sciences (NAS) website and scope of study (visit N

CCC relied solely on Apr 26 2007 Trip Report; no independent analysis

- California Coastal Commission memo, 9/11/07 (download)
  * independent analysis on mariculture impacts in Drakes Estero
  * conclusion confirms negative impacts
  * recommendations provided to mitigate impacts

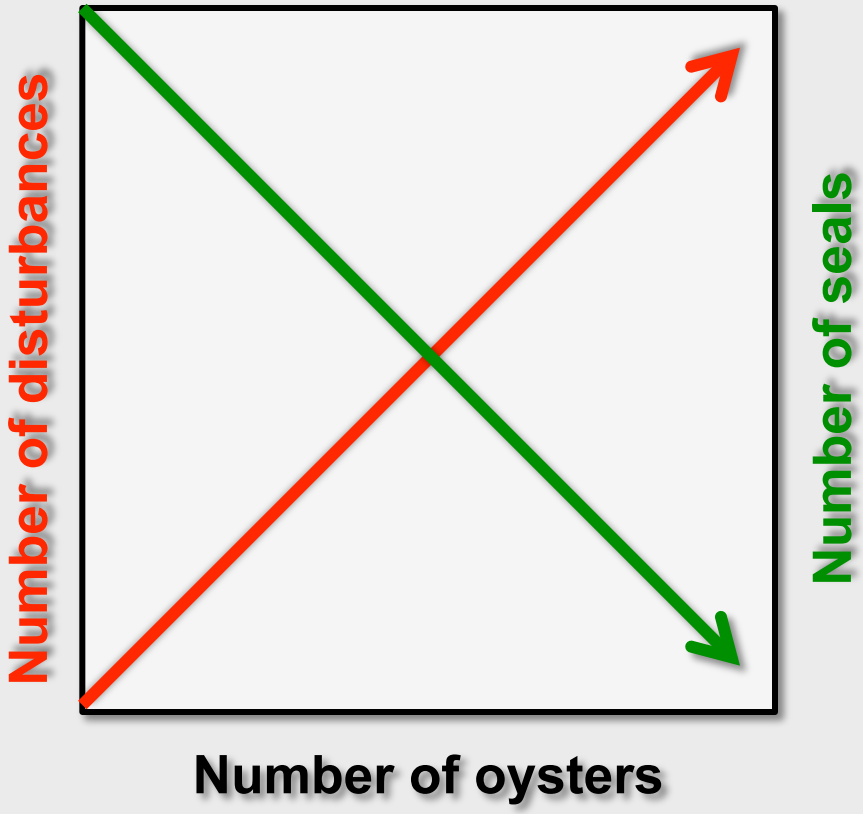
NPS retracted all major claims; outside scientists agreed with Goodman

- National Park Service updated report, 9/18/07 (download)
  * peer-reviewed by 7 non-NPS marine ecology experts
  * Dr. Corey Goodman's analysis refuted by these experts

Marine Mammal Commission meeting, February 21, 2010: outline of Dr. Corey Goodman's presentation

1) *Background and overview*
    1) *Background and reason County Supervisors asked for scientific analysis*
    2) *NPS claims of environmental harm vs. NAS report: NPS misrepresented data*
    3) *Harbor seal population and haul-out subsites in Drakes Estero*
2) *Disturbances to harbor seals in Drakes Estero*
    1) *Sources of disturbances of harbor seals in Drakes Estero*
    2) *Prior to 2007: Timeline of disturbances of harbor seals*
    3) *April & May 2007: Timeline of disturbances of harbor seals*
3) *80% harbor seal decline claim*
    1) *May 2007: NPS claim that DBOC caused 80% decline in seals in 2007*
    2) *July 2007 – June 2008: NPS retraction and reinstatement of 80% claim*
    3) *Sept 2008: NPS & Sierra Club Explanations of 80% Decline to NAS Panel*
4) ***NPS Becker I, II, & III papers***
    1) *Sept 2008: Becker I: 2000-2007 mariculture-related disturbances*
    2) *October 2008: Becker II: 1996-2007 mariculture-related disturbances*
    3) *February 2009: Becker III: 1982-2009 mariculture-related disturbances*
5) *Conclusions and recommendations*

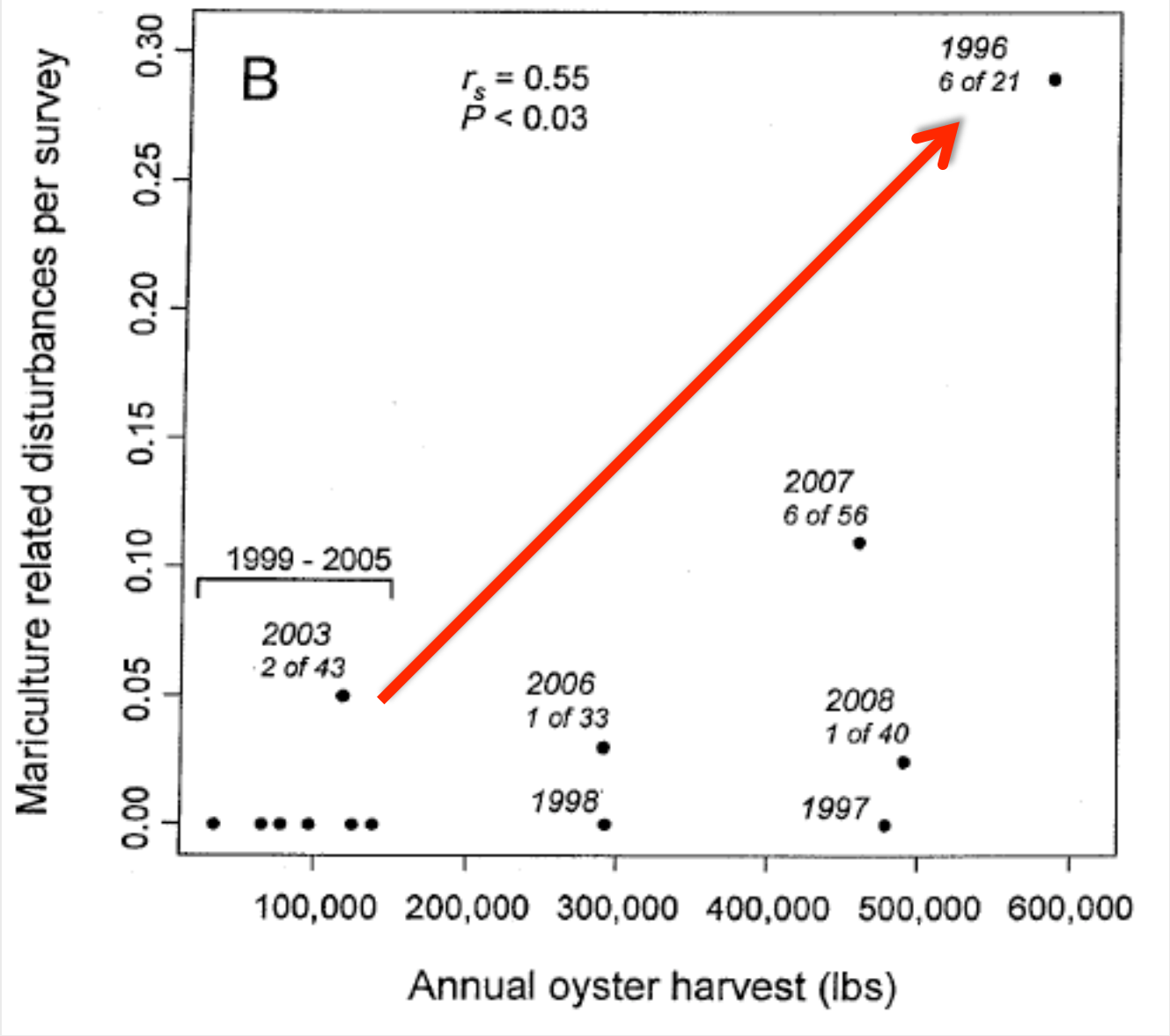
NPS Becker I & II papers: increasing oysters leads to increasing seal disturbances leads to decreasing seals



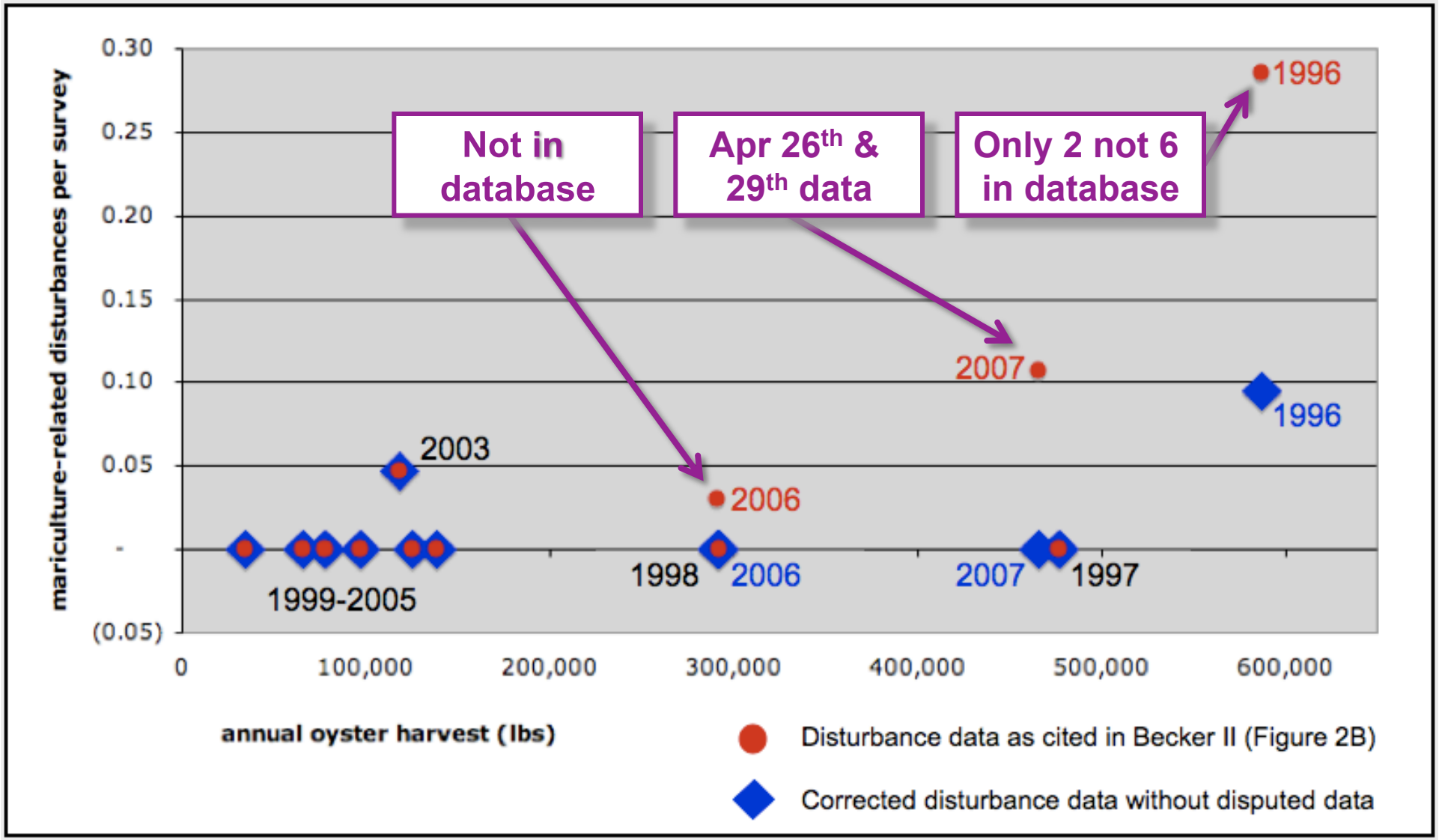
Becker I and II lead to following two conclusions concerning subsite OB:

- As number of oysters in Drakes Estero increases, leads to an increase in mariculture-related disturbances at sandbar OB (positive correlation)
- As number of oysters in Drakes Estero increases, leads to a decrease in the number of seals at sandbar OB (negative correlation)

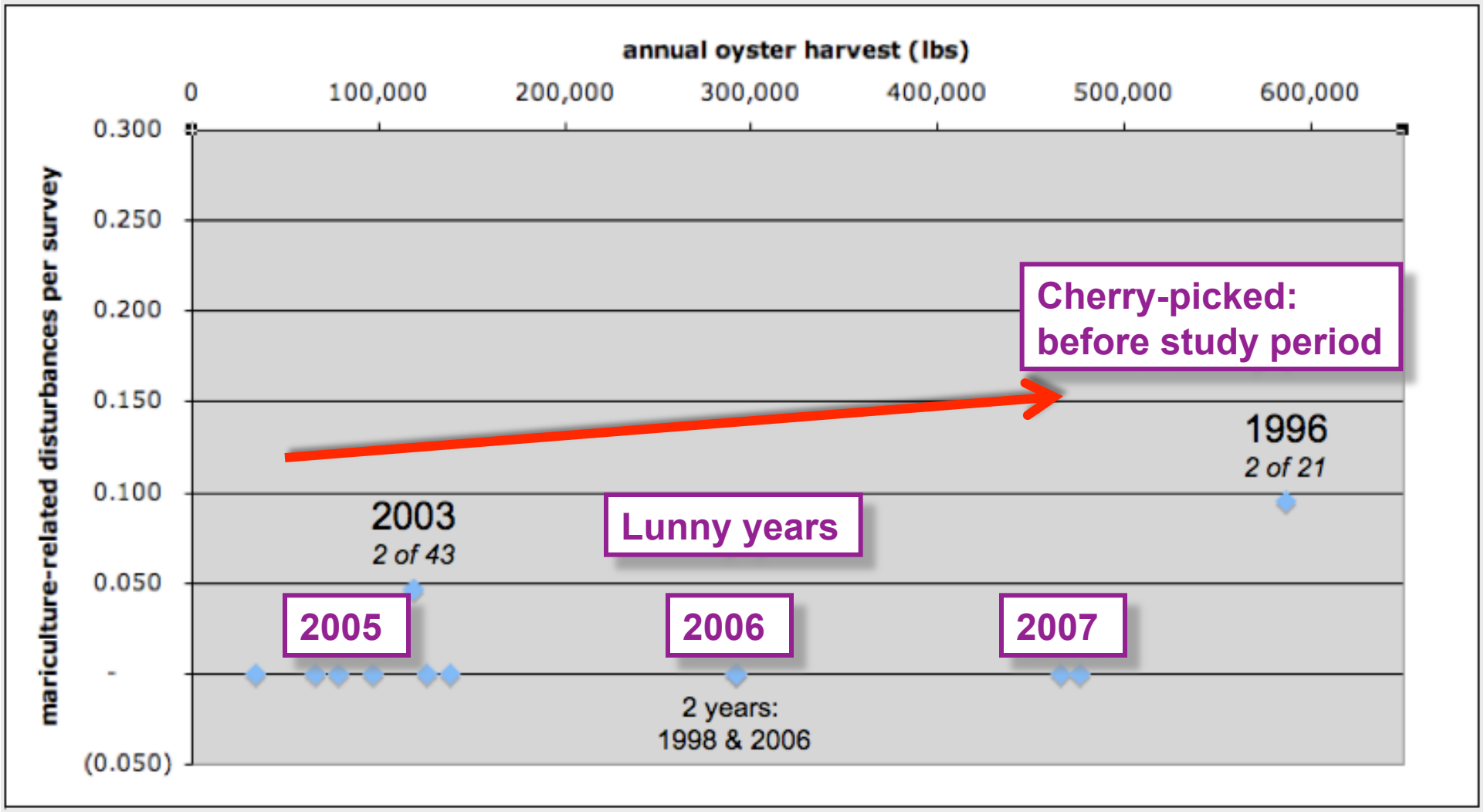
Analysis of conclusion 1 from NPS Becker II paper: increasing oysters leads to increasing seal disturbances



NPS Becker et al. paper vs. NPS harbor seal database



NPS Becker II graph using real NPS harbor seal data



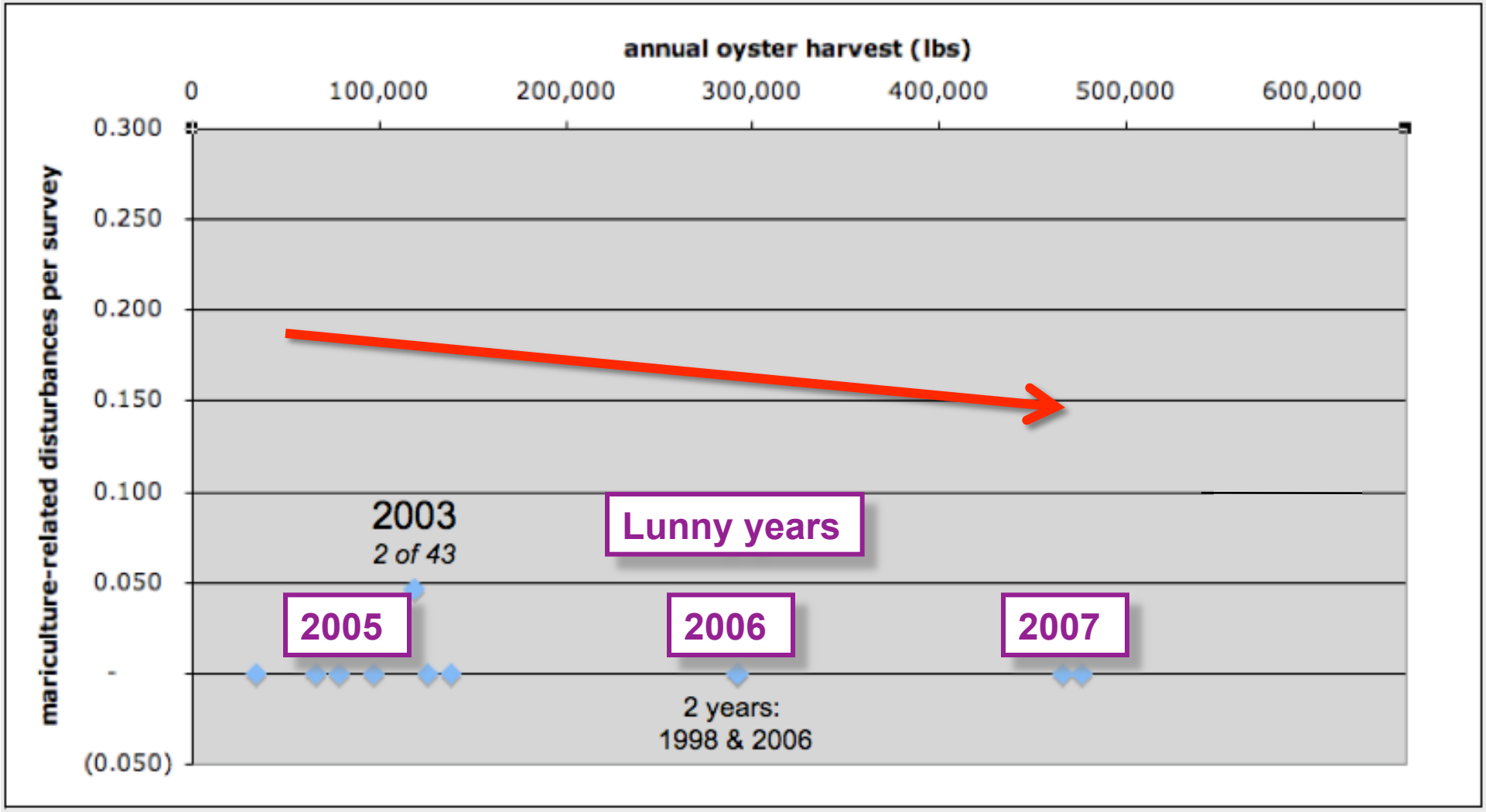
Cherry-Picking: Becker II paper studied 1997-2007, yet Becker included (wrong) 1996 disturbance data to derive positive correlation between disturbances and oysters

- The title of the Becker II paper is: *"Modeling the effects of El Nino, density-dependence, and disturbance on harbor seal counts in Drakes Estero, California: **1997—2007**"*

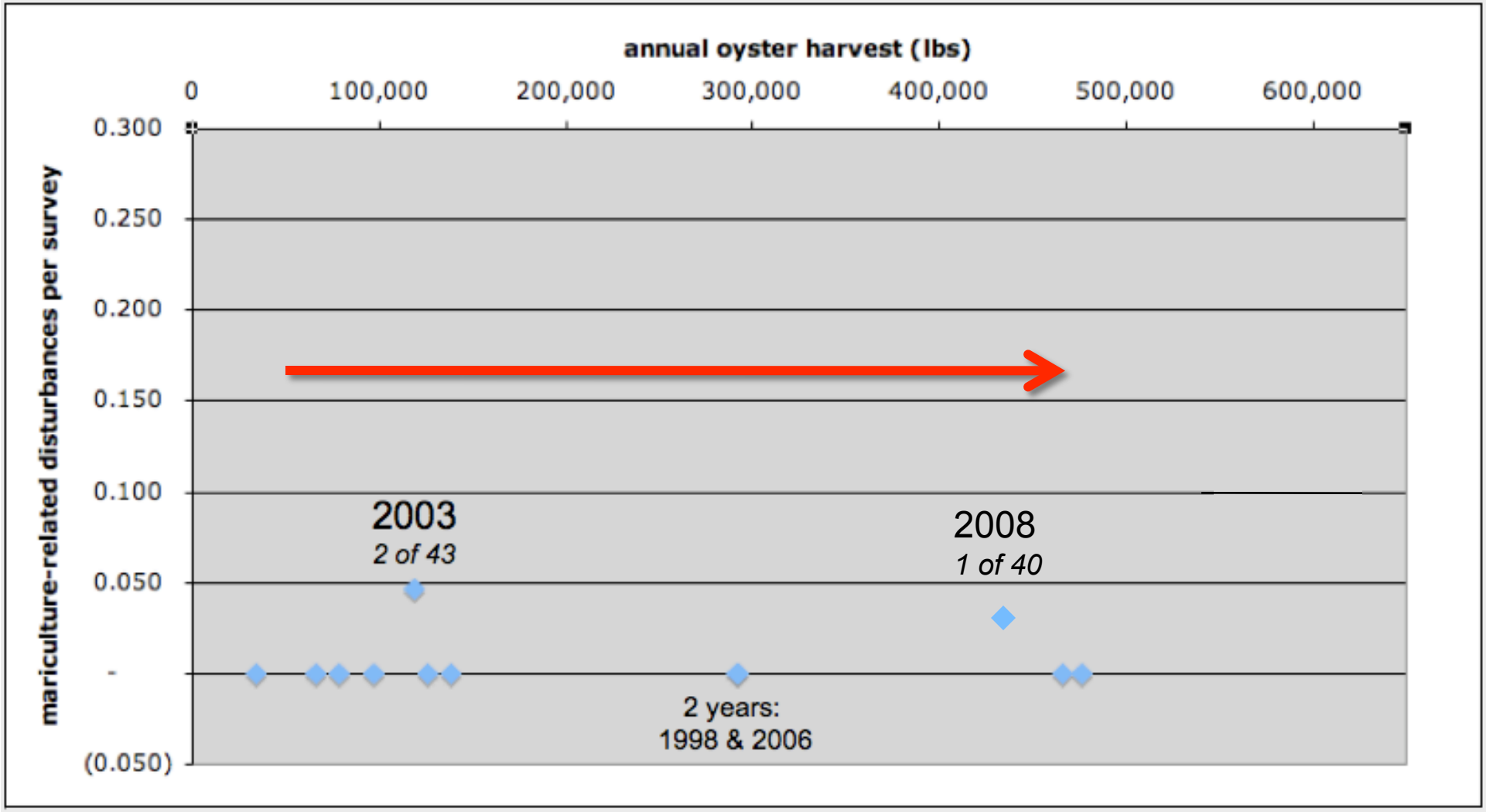
- The years 1997-2007 were reinforced in the abstract: *"Here, we use an 11-yr (**1997-2007**) study of a seal colony located near a mariculture operation in Drakes Estero …"*

- If Becker had stuck to the study 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**. Becker **cherry-picked the 1996 data**, but never changed his title or abstract, which still began with 1997. The only way he could get his positive correlation, if he used the appropriate data, was to include the year before the study period – 1996. And even then, **he claimed six disturbance events in 1996 when only two exist in NPS database**.

NPS Becker II graph using NPS harbor seal data 1997-2007



NPS Becker II graph using NPS harbor seal data 1997-2008



January 9 2009: leaked email from Dr. Pete Peterson, Chair of NAS panel, to other NAS panel members, while revising draft report

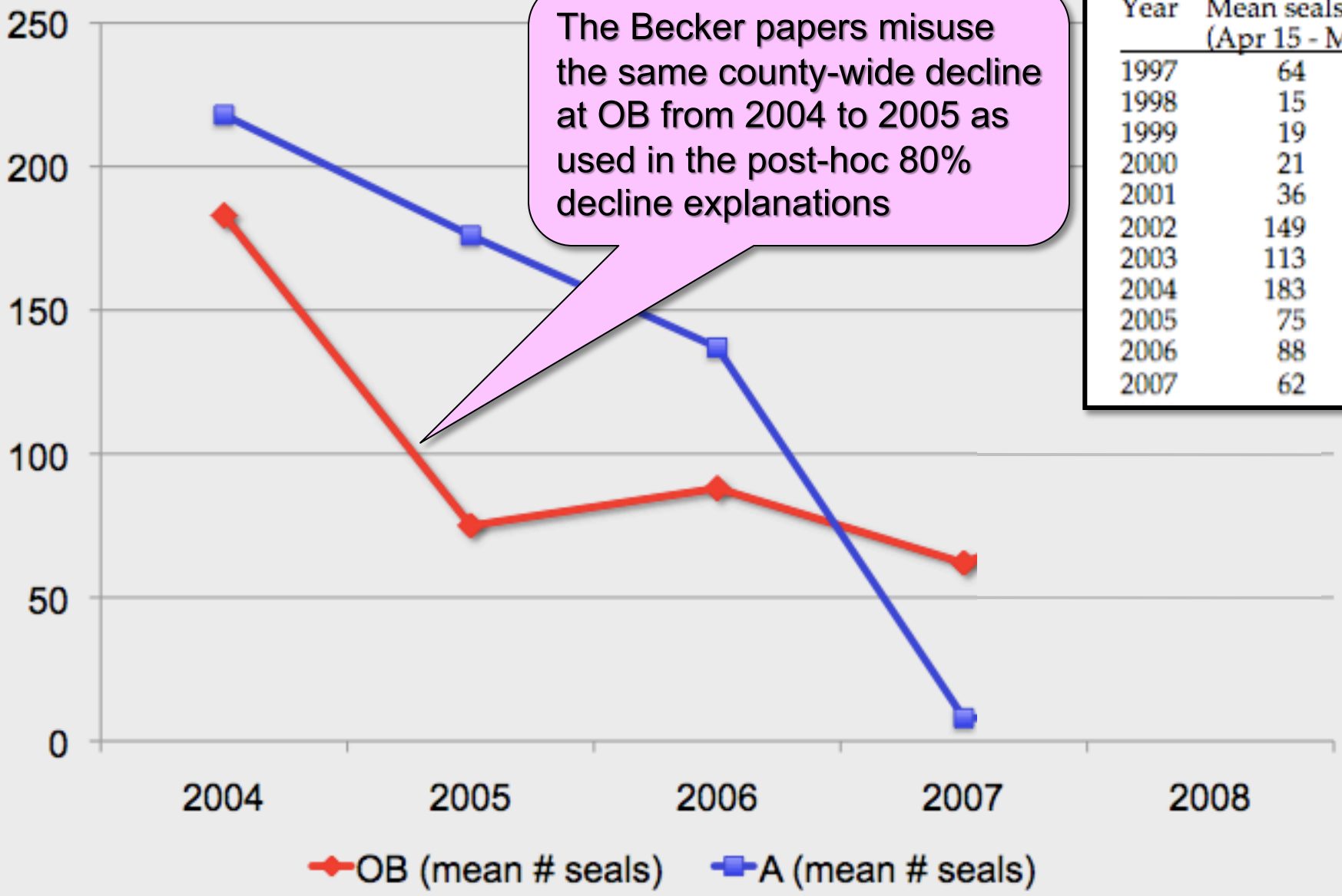
"I understand this issue about the implication of the word misrepresentation. I agree that it implies intent. ***I personally have no doubt that there was intent, based upon the directional bias of the putative impacts of the oyster farm reported by NPS.*** *However, I would agree that it may not serve our charge or the good of the process to be so judgmental."*

"I certainly agree that the HA (Head Alert) category is of little importance to a seal and included it only to match Becker's inclusion of this response. That column could be excluded. I agree that there are serious biases in the observations, as well articulated by Paul [Thompson]. *However, even given the biases****, the low fraction of all observed disturbances to hauled-out seals attributable to mariculturists would seem to be relatively robust to the biases,*** *even though the absolute percentage is surely unreliable."*

"… ***that would still speak to how important other sources of seal disturbances are.****"*

"… I agree that there are biases and anything we say must be conditioned by acknowledgement of those biases and I agree that this ***Becker et al. paper is not truly rigorous****."*

Analysis of conclusion 2 from NPS Becker II paper: increasing oysters leads to decreasing seals



The Becker papers misuse the same county-wide decline at OB from 2004 to 2005 as used in the post-hoc 80% decline explanations

Year	Mean seals at OB (Apr 15 - May 15)
1997	64
1998	15
1999	19
2000	21
2001	36
2002	149
2003	113
2004	183
2005	75
2006	88
2007	62

NPS annual 2007 harbor seal report provides data which point out key flaw in all of the Becker papers: statistics focus on change from 2004 to 2005 at upper sandbars (e.g., OB) and falsely attribute this to increased oyster bag activity, whereas change was across all of Marin County

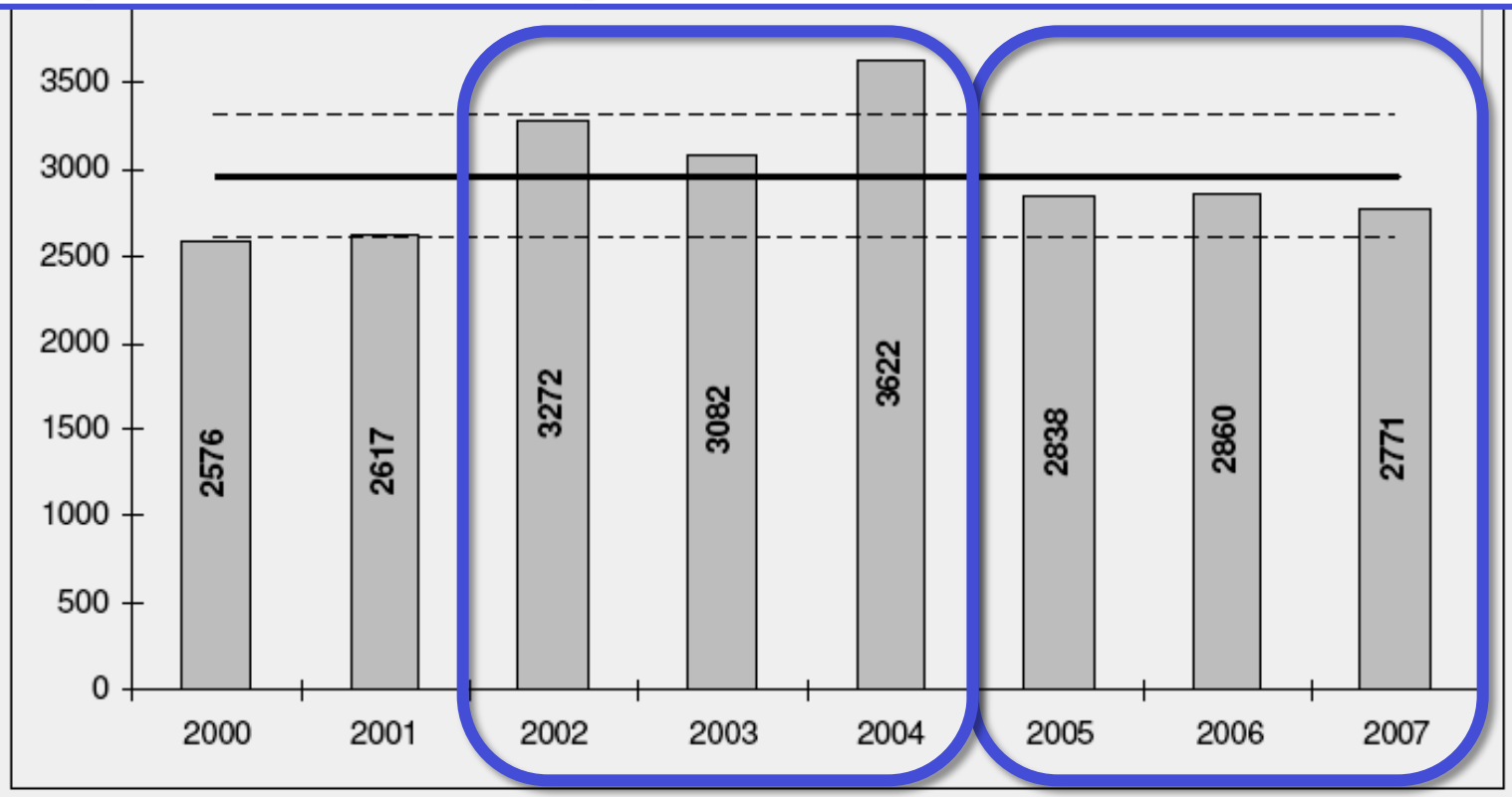
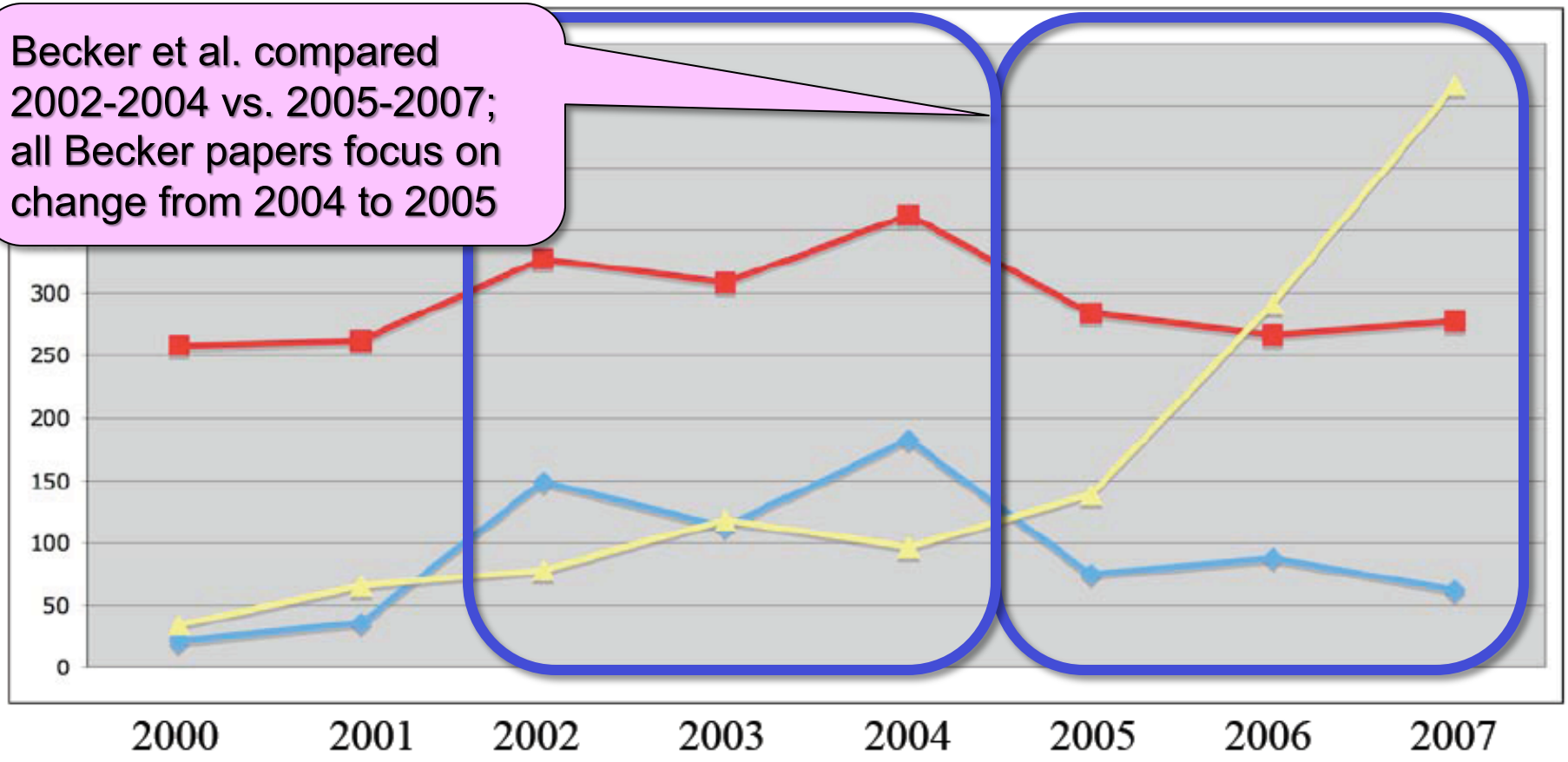


Figure 2. Maximum counts of harbor seal adults and immatures during the breeding season (March-May) at Marin County locations. The solid line on the graph represents the mean of the maximum adult counts from 2000-07 (2954.8), and the dashed lines represent one standard deviation from the mean (353.7).

Analysis of conclusion 2 from NPS Becker II paper: increasing oysters leads to decreasing seals

Comparison of seals at subsite OB and surrounding combined PORE populations vs. oyster production from 2000 to 2007

Becker et al. compared 2002-2004 vs. 2005-2007; all Becker papers focus on change from 2004 to 2005



red = maximum adults in combined Pt. Reyes National Seashore (PORE) sites (X 10)
blue = mean number of seals at subsite OB (Apr 15 – May 15)
yellow = oyster production in pounds (X 1000)

Sandbars OB, A, and oyster production from 2004 to 2007

Year	Mean seals at OB (Apr 15 - May 15)
1997	64
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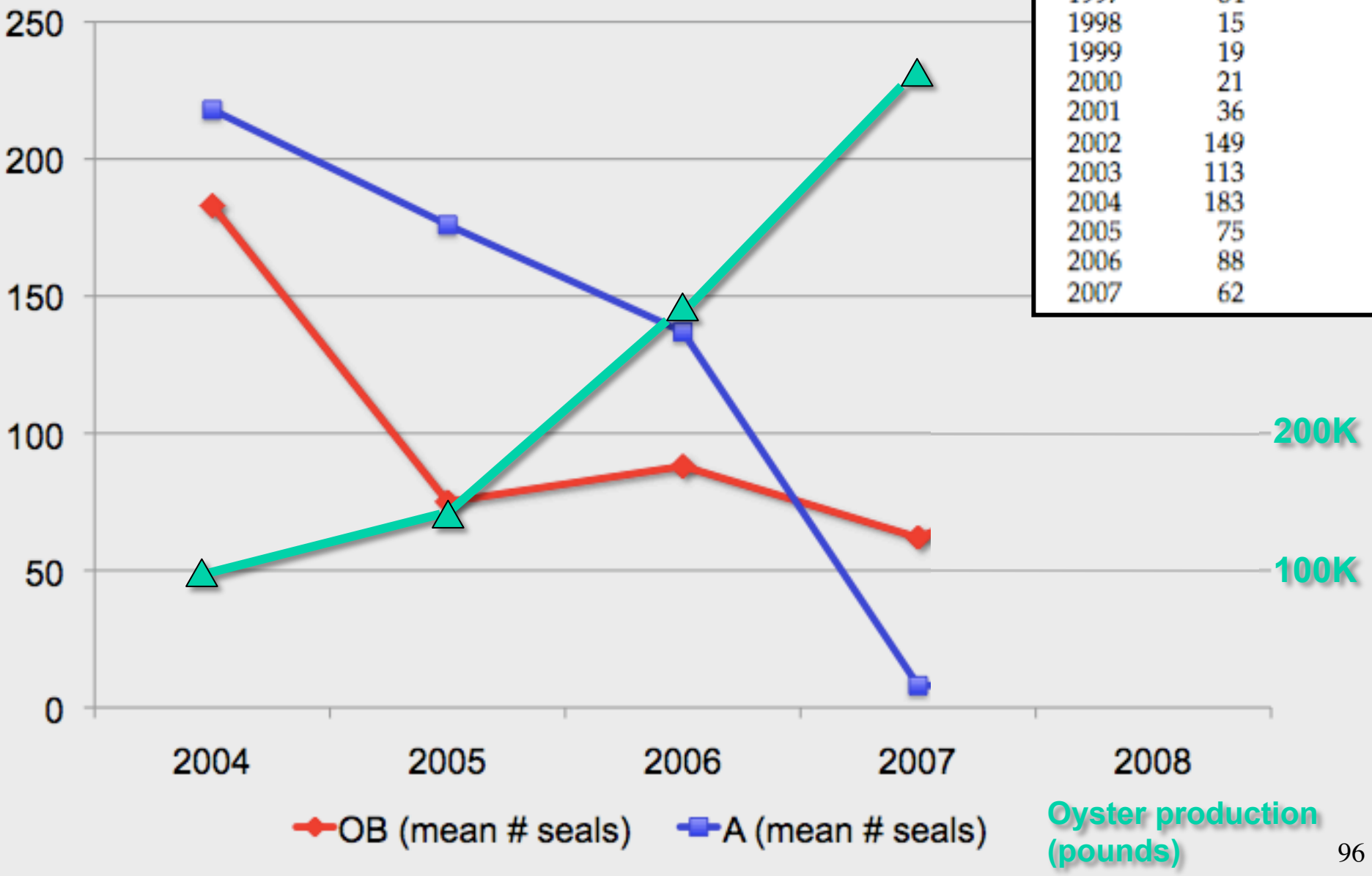

Sandbars OB, A, and oyster production from 2004 to 2008

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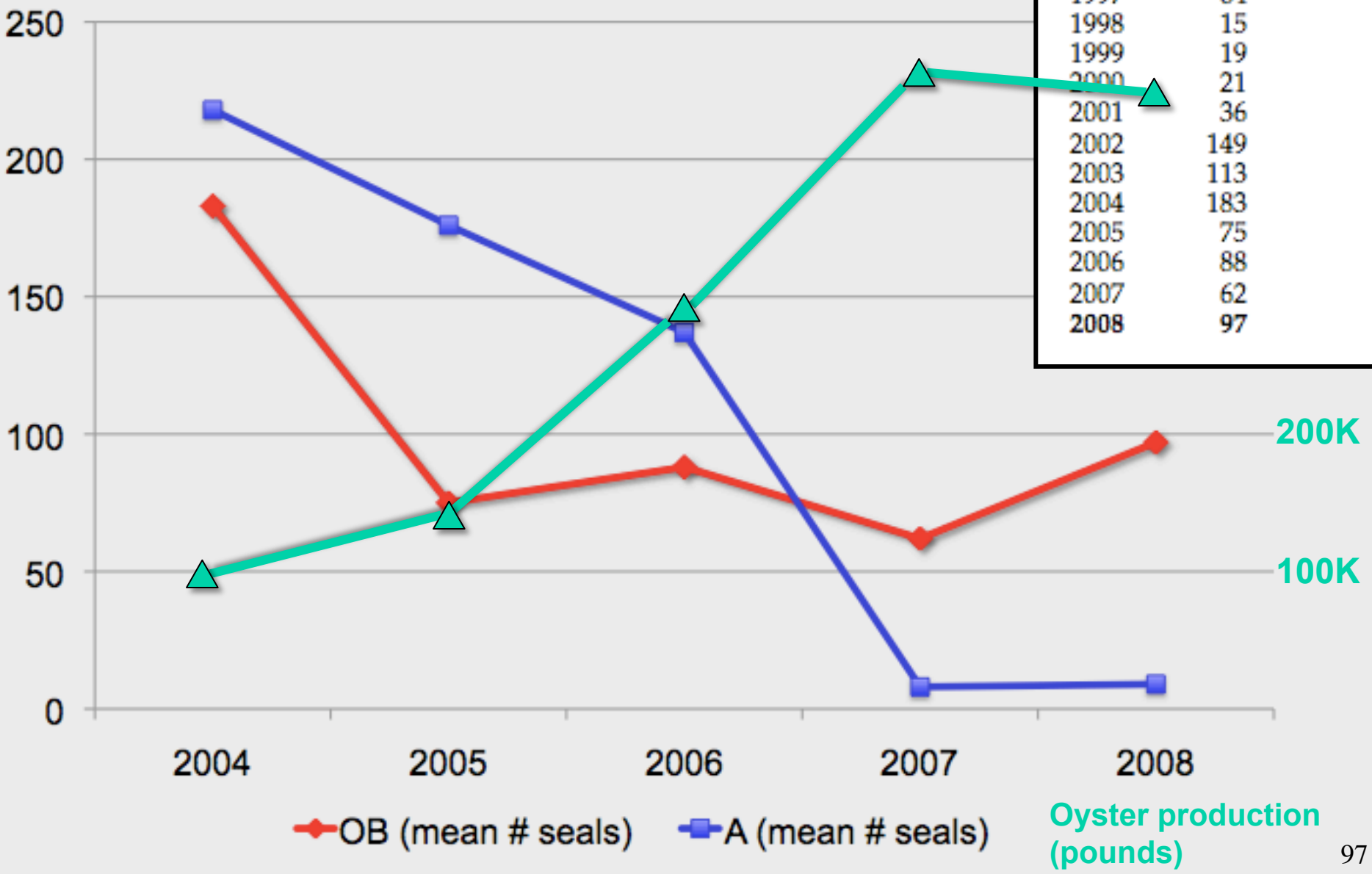
2007	62
2008	**97**



Analysis of conclusion 2 from NPS Becker II paper: increase in oysters DOES NOT LEAD to decrease in seals

A simple statistical analysis to show how one can derive false correlations and mislead the public into false sense of causality

Pearson's correlation: to be meaningful, correlation coefficient > +/- 0.80

Here look at correlation of pounds of oysters vs. number of seals

Years	**sandbar OB** correlation coefficient
1997-2007	- 0.18
2000-2007	- 0.11
2000-2008	- 0.07
2004-2008	- 0.60
2005-2008	0.00

Analysis of conclusion 2 from NPS Becker II paper: increase in oysters DOES NOT LEAD to decrease in seals

A simple statistical analysis to show how one can derive false correlations and mislead the public into false sense of causality

Pearson's correlation: to be meaningful, correlation coefficient > +/- 0.80

Here look at correlation of pounds of oysters vs. number of seals

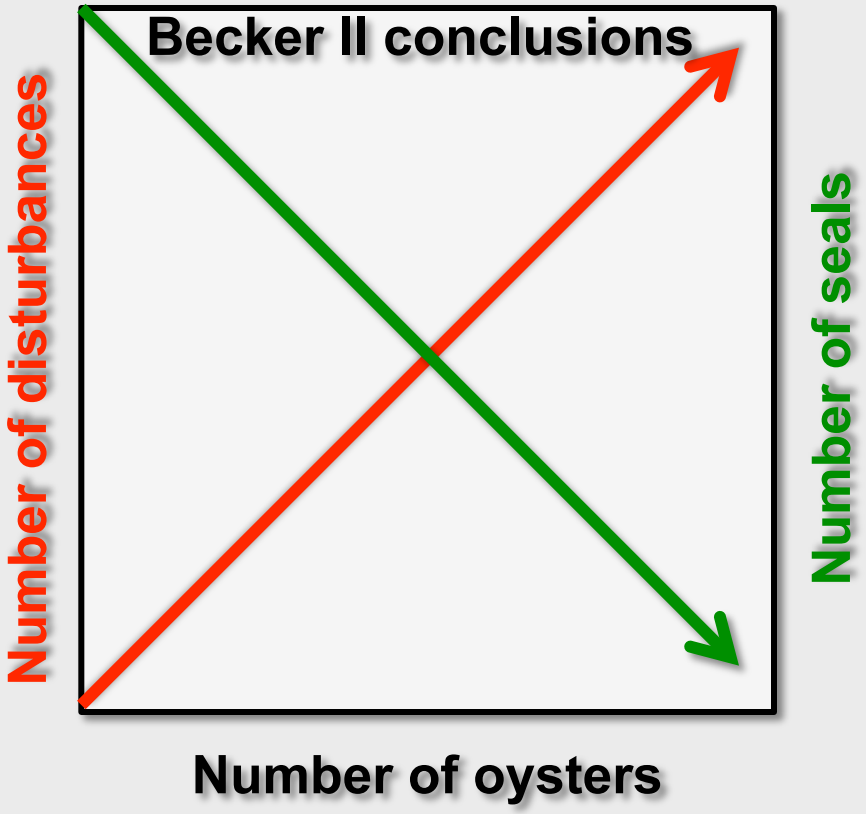
Years	sandbar OB correlation coefficient	sandbar A
1997-2007	- 0.18	
2000-2007	- 0.11	
2000-2008	- 0.07	
2004-2008	- 0.60	- 0.99
2005-2008	0.00	- 0.98

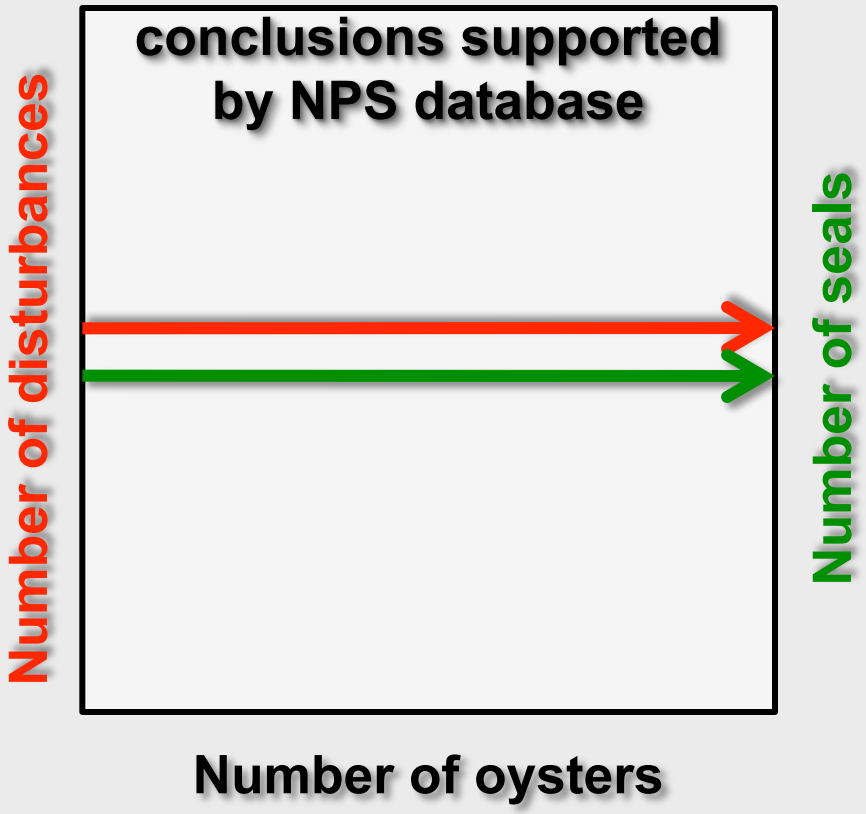
Sandbar A has much better correlation with oysters than OB; but concluding causality would be false; oysters get nowhere near sandbar A

May 5 2009: National Academy of Sciences report, page 57

Concerning the Becker et al. 2009 paper: *"First, it is important to recognize that the analysis showing a relationship between mariculture activities and a decline in the mean seal attendance at two of three haul-out subsites in Drakes Estero does not demonstrate cause and effect. Second, the use of oyster production level as a proxy for mariculture activities that displace or disturb seals may be confounded by changes in culture methods or management practices. Third, demonstrating changes in mean attendance at seal haul-out subsites is not equivalent to demonstrating a decline in the seal population at Drakes Estero.* ***The entire estero should be considered as one unit for population analyses*** *for comparison to trends at other nearby locations occupied by harbor seals.* ***For these reasons, the Becker et al. (2009) paper has limited value for understanding the long-term trends in seal counts in Drakes Estero.***"

NPS Becker I & II papers: increasing oysters leads to increasing seal disturbances leads to decreasing seals





NPS Becker III paper: claims seals move away from human disturbances; Becker uses statistical analysis of data from 1982-2009 to claim seals move away from oyster bags

- **Appropriateness of data**
- **Assumptions driving statistics**
- **Vigilance vs. habituation**

02/06/2010

Spatial use of Drakes Estero, California, by harbor seals correlated to anthropogenic disturbance and natural variation during 1982-2009

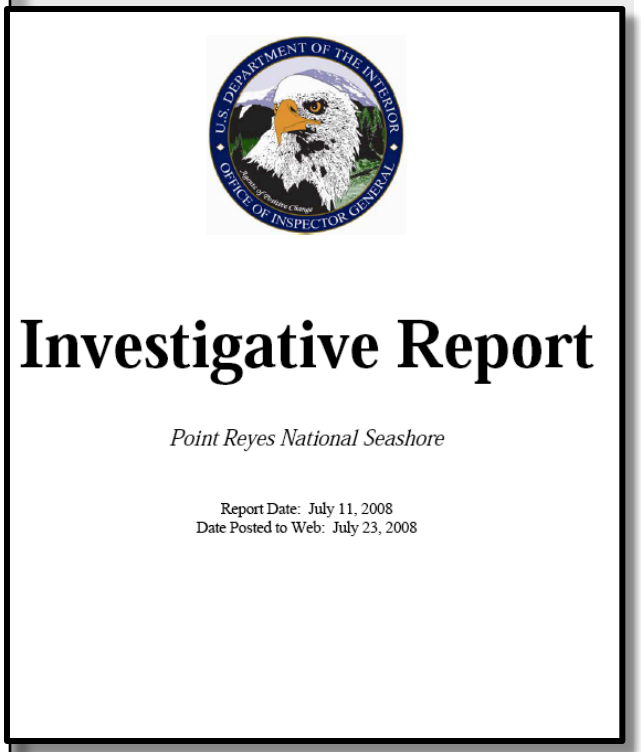
Benjamin H. Becker[1], David T. Press, and Sarah G. Allen

Point Reyes National Seashore

Point Reyes Station, CA 94956

Harbor seal data for prior to 1996: Goodman requested data prior to 1996 by FOIA in May 2007; NPS said did not exist; IG confirmed did not exist; now suddenly exists

IG Report: *"Goodman had surmised that PRNS had raw data from 1973 through the present because NPS claimed **"over 25 years of [harbor seal] data"** … During the hearing before the MCBS in May 2007, Allen began her presentation with the following introduction: "My name is Sarah Allen, and I'm a scientist with the NPS. And, more specifically, I've been studying the ecology of Drakes Estero for almost 30 years. …The damage of the commercial oyster operations on Drakes Estero is more easily documented, because the Park Service has **over 25 years of continuous monitoring data** from Drakes Estero."*



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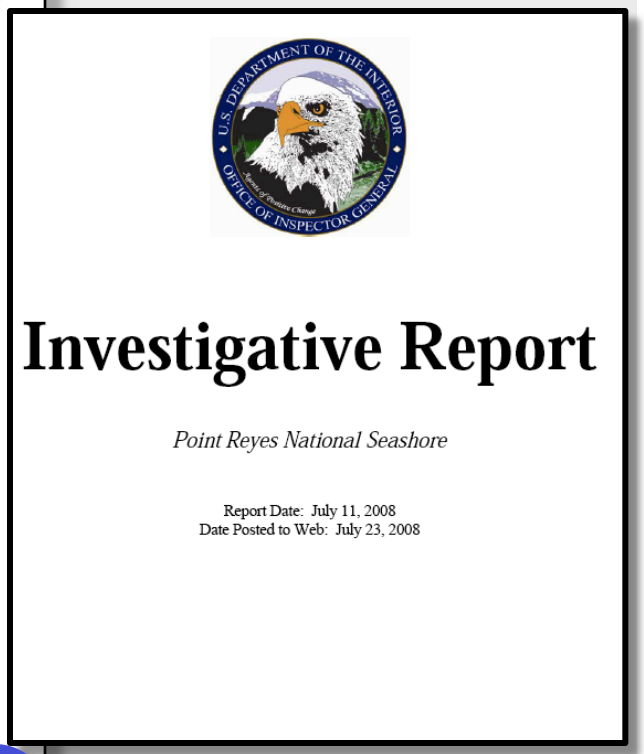
Harbor seal data for prior to 1996: Goodman requested data prior to 1996 by FOIA in May 2007; NPS said did not exist; IG confirmed did not exist; now suddenly exists

Jarvis: *"Primary data for years prior to 1996 is not contained in the records of the NPS."*

FOIA Officer Bundock: *"… we have given [Goodman] everything that exists in our files."*

Allen: *"The data was collected prior to my working in the NPS, and they're either with PRBO when I worked there or part of my thesis. So we gave him reports that represented those data,* ***but I didn't have a database*** *…"*

PRNS Ecologist: ***"Any of the claims made by NPS about the impact of DBOC upon seals in DE are based upon data that has already been given to Goodman."***



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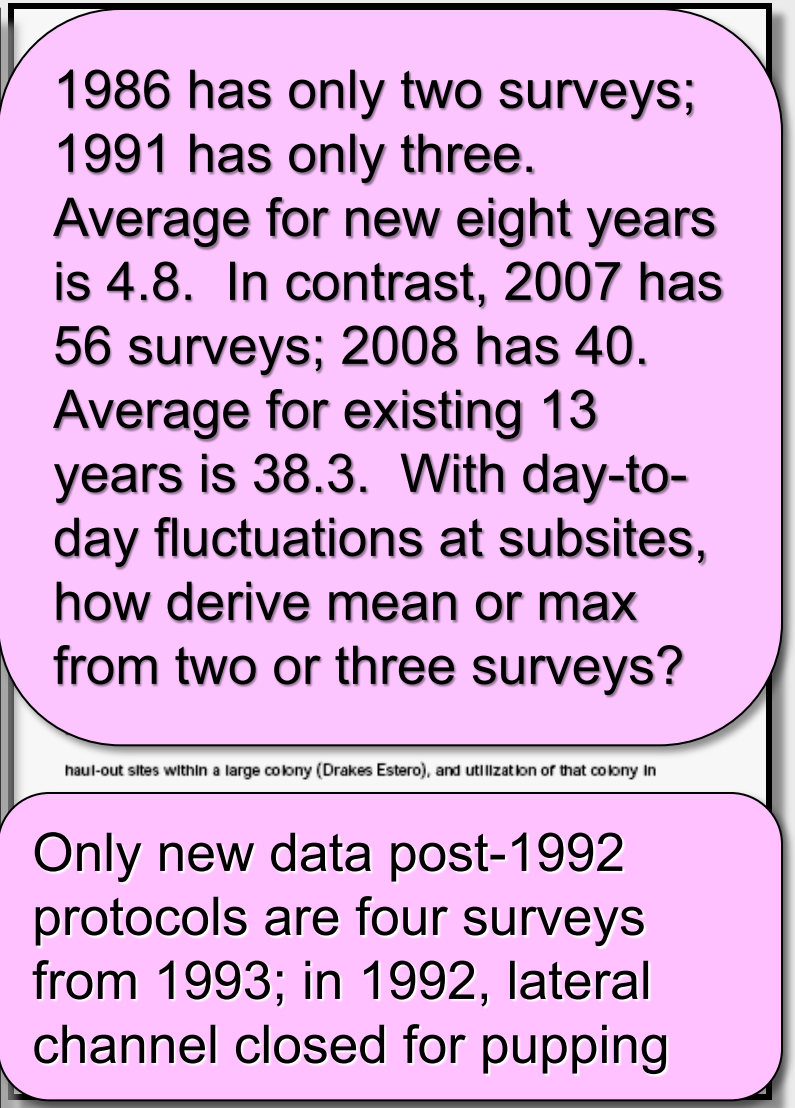
NPS Becker III paper: recent paper claims that seals move away from human disturbances; Becker uses statistical analysis to claim that seals move away from oyster bags

Data availability: Goodman requested data prior to 1996 in May 2007 and was denied; NPS said it did not exist; now it exists and was not given to Goodman

Data quality: Gap of 6 of 14 years (why?); very few days sampled – some years have only two or three total surveys

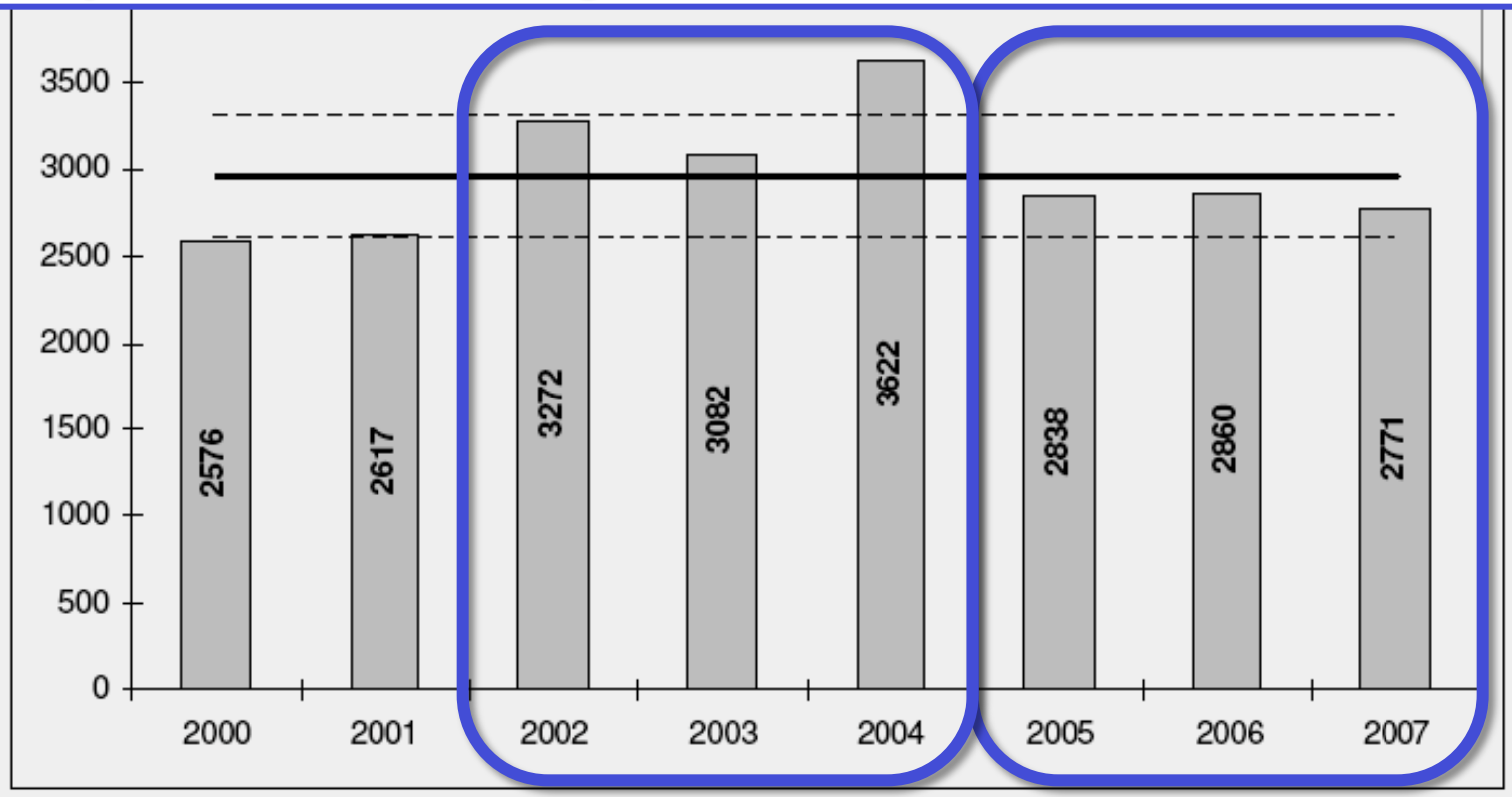
Data relevance: Data prior to Federal-State oyster farm protocol of 1992 is not relevant; database begins in 1996

1986 has only two surveys; 1991 has only three. Average for new eight years is 4.8. In contrast, 2007 has 56 surveys; 2008 has 40. Average for existing 13 years is 38.3. With day-to-day fluctuations at subsites, how derive mean or max from two or three surveys?


haul-out sites within a large colony (Drakes Estero), and utilization of that colony in

Only new data post-1992 protocols are four surveys from 1993; in 1992, lateral channel closed for pupping

NPS annual 2007 harbor seal report provides data which point out key flaw in all of the Becker papers: statistics focus on change from 2004 to 2005 at upper sandbars (e.g., OB) and falsely attribute this to increased oyster bag activity, whereas change was across all of Marin County



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NPS Becker III paper: like Becker I and Becker II, statistics are based largely on boundary of low 2004 vs. high 2005

Table 1. Sources and inferences for level of oyster harvest activity on or near subsites OB, UEF, and/or UEN. Data from. CDFG and NRC. "Analysis scale" summarizes the years where complete seal count or disturbance data available and subsequently modeled in each of the three scales of analysis presented. Data sources: A&H: Allen and Huber 1984a, 1984b; SGA: Sarah G. Allen field notes; NPS: NPS pinniped database.

				Analysis scale			
Year	Oyster harvest (lbs)	Inferred level of mariculture use of sandbars near seals	Source(s) of inference	Haul-out site	Intra-colony	Regional	Seal data source
1982	360,004	high	harvest data		x	x	SGA / A&H
1983	440,139	high	harvest data		x	x	SGA / A&H
1986	437,043	high	harvest data		x		SGA
1987	634,869	high	harvest data, aerial image of bags		x		SGA
1989	549,953	high	harvest data		x		SGA
1991	442,745	high	harvest data		x		SGA
1992	606,484	high	harvest data		x		SGA
1993	662,388	high	harvest data		x		SGA
1997	476,791	high	harvest data	x	x	x	NPS
1998	292,188	high	harvest data, higher than 2005	x	x	x	NPS
1999	125,749	modeled high & low	slightly higher than 2000-2004, declining	x	x	x	NPS
2000	34,094	low	lower than 2002-2004	x	x	x	NPS
2001	65,676	low	lower than 2002-2004	x	x	x	NPS
2002	78,064	low	DTP, pers. obs, harvest data	x	x	x	NPS
2003	118,643	low	DTP, pers. obs, harvest data	x	x	x	NPS
2004	96,754	low	DTP, pers. obs, harvest data	x	x	x	NPS
2005	138,958	high	aerial image of bags, increasing activity	x	x	x	NPS
2006	291,538	high	increasing harvest, bags in '05	x	x	x	NPS
2007	468,000	high	aerial image of bags	x	x	x	NPS
2008	438,000	high	aerial image of bags	x	x	x	NPS
2009	450,000*	high	aerial image of bags	x	x	x	NPS

*Harvest estimate based on 2007-2008. Official data likely available in mid-2010. Only affects inferred mariculture level if harvest was less than ~138,000 lbs.

NPS Becker III paper: like Becker I and Becker II, statistics are based largely on boundary of low 2004 vs. high 2005

Year	(lbs)	sandbars near seals	Source(s) of inference
1982		high	
1983		high	
1986		high	
1987		high	
1989		high	
1991		high	
1992		high	
1993		high	
1997	476,791	high	
1998	292,188	high	
1999	125,749	deled high & low	than 2000-2004, declining
2000	34,094	low	an 2002-2004
2001	65,676	low	r than 2002-2004
2002	78,064	low	DTP, pers. obs, harvest data
2003	118,643	low	DTP, pers. obs, harvest data
2004	96,754	low	DTP, pers. obs, harvest data
2005	138,958	high	aerial image of bags, increasing activity
2006	291,538	high	increasing harvest, bags in '05
2007	468,000	high	aerial image of bags
2008	438,000	high	aerial image of bags
2009	450,000*	high	aerial image of bags

2005 should be **low not high** according to DBOC records and NPS historic acquaculture map (see slide 112)

Why is 2005 called "high"? DBOC's 1st year of operation. Just beginning new oyster seed in Home Bay. Takes 18 months to mature and go into bags on upper sandbars. NPS correctly states elsewhere that increase in oyster bags occurred in 2007 (see later NPS map showing low activity in 2005).

NPS Becker III paper: like Becker I and Becker II, statistics are based largely on boundary of low 2004 vs. high 2005

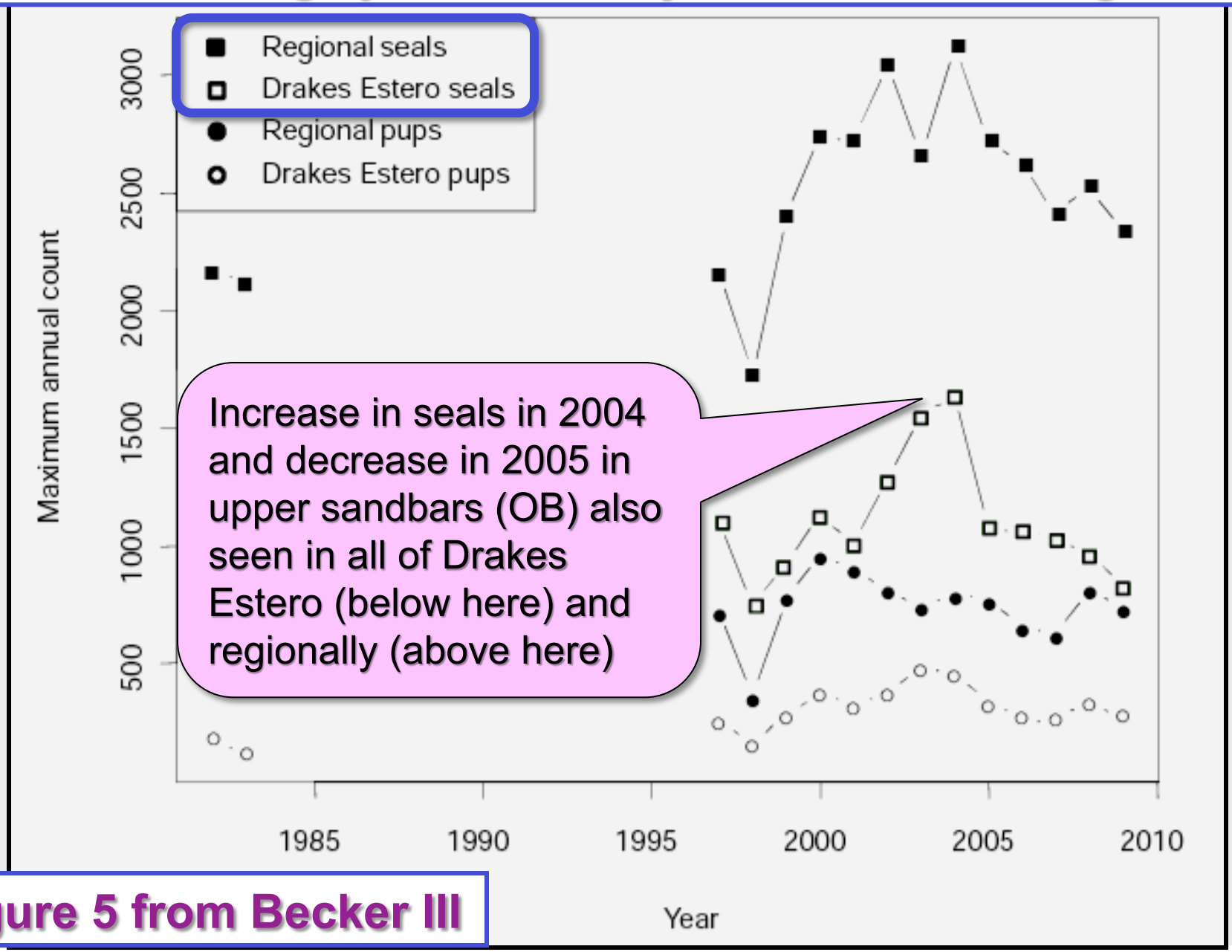
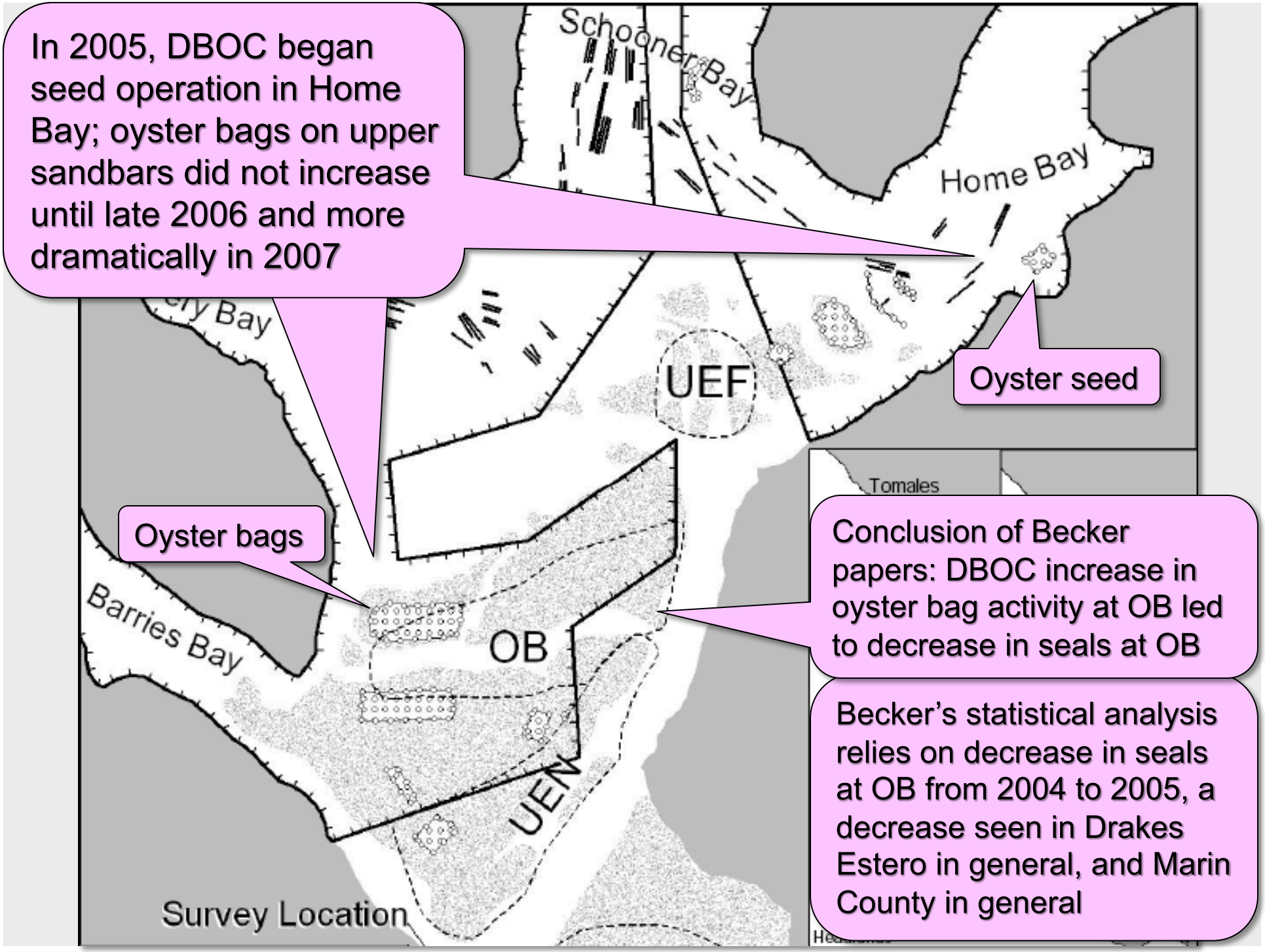
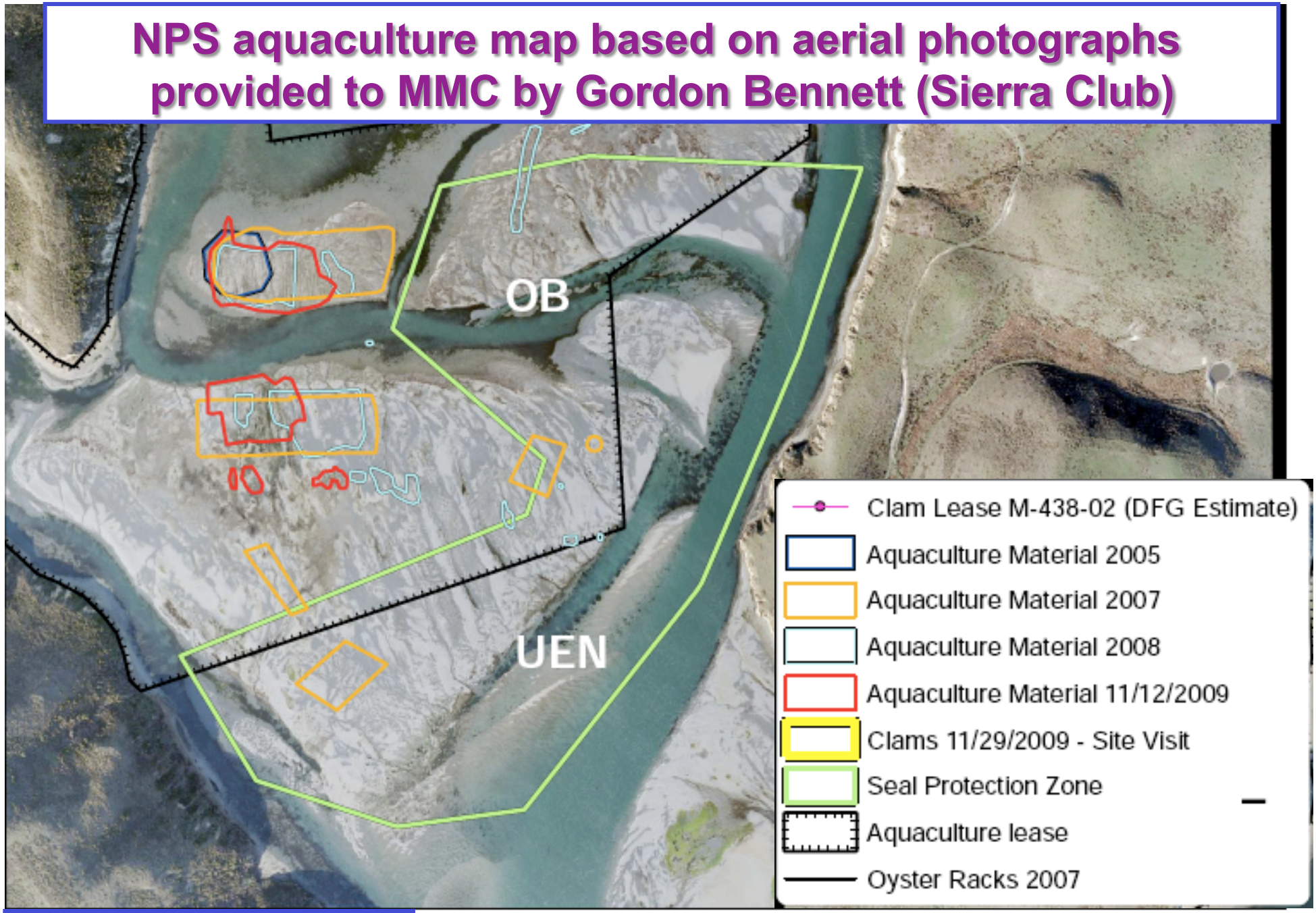


Figure 5 from Becker III

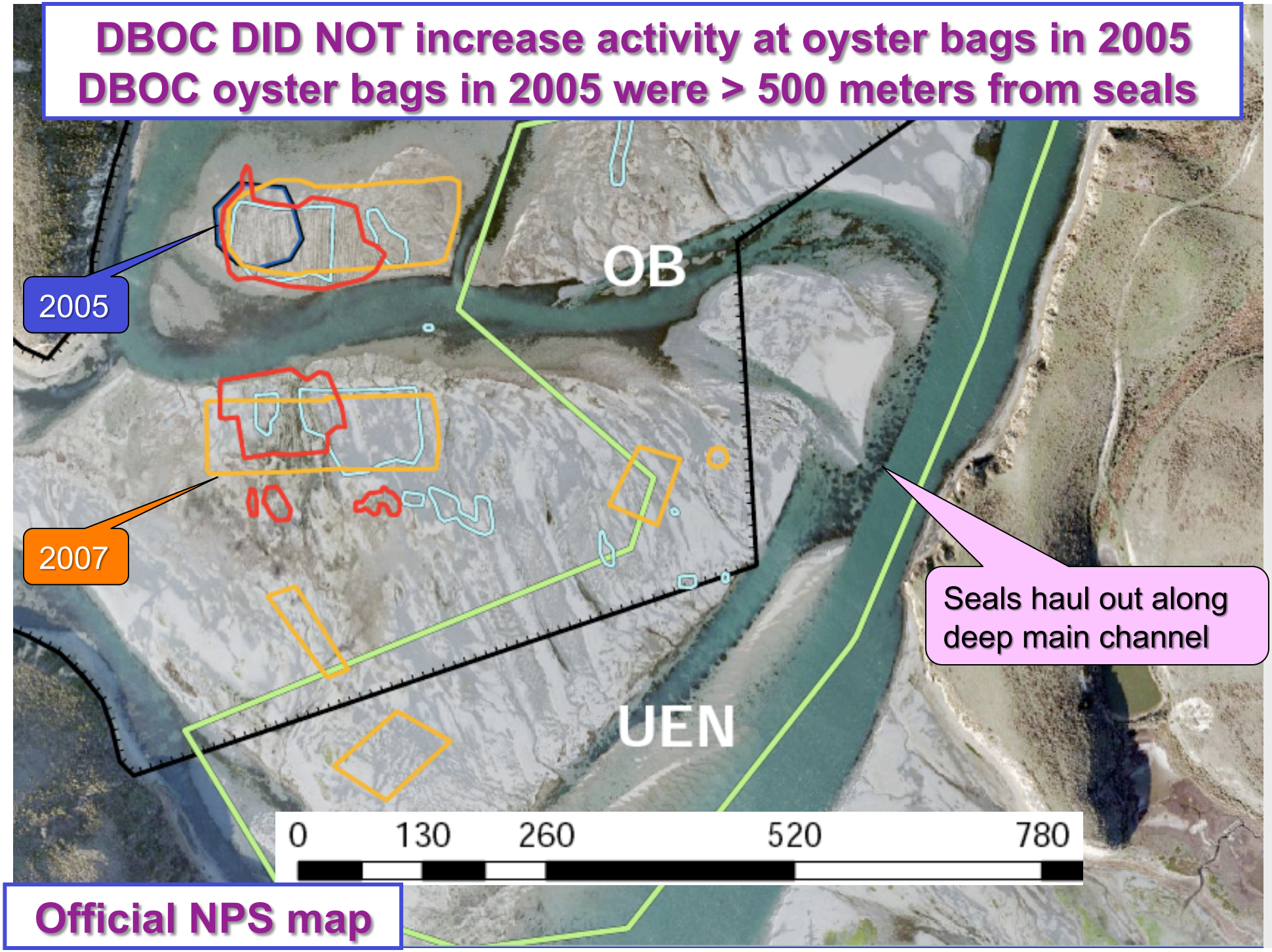

In 2005, DBOC began seed operation in Home Bay; oyster bags on upper sandbars did not increase until late 2006 and more dramatically in 2007
Schooner Bay
Home Bay
UEF
Oyster seed
Oyster bags
Barries Bay
OB
UEN
Tomales
Conclusion of Becker papers: DBOC increase in oyster bag activity at OB led to decrease in seals at OB
Becker's statistical analysis relies on decrease in seals at OB from 2004 to 2005, a decrease seen in Drakes Estero in general, and Marin County in general
Survey Location

NPS aquaculture map based on aerial photographs provided to MMC by Gordon Bennett (Sierra Club)



Official NPS map

DBOC DID NOT increase activity at oyster bags in 2005
DBOC oyster bags in 2005 were > 500 meters from seals

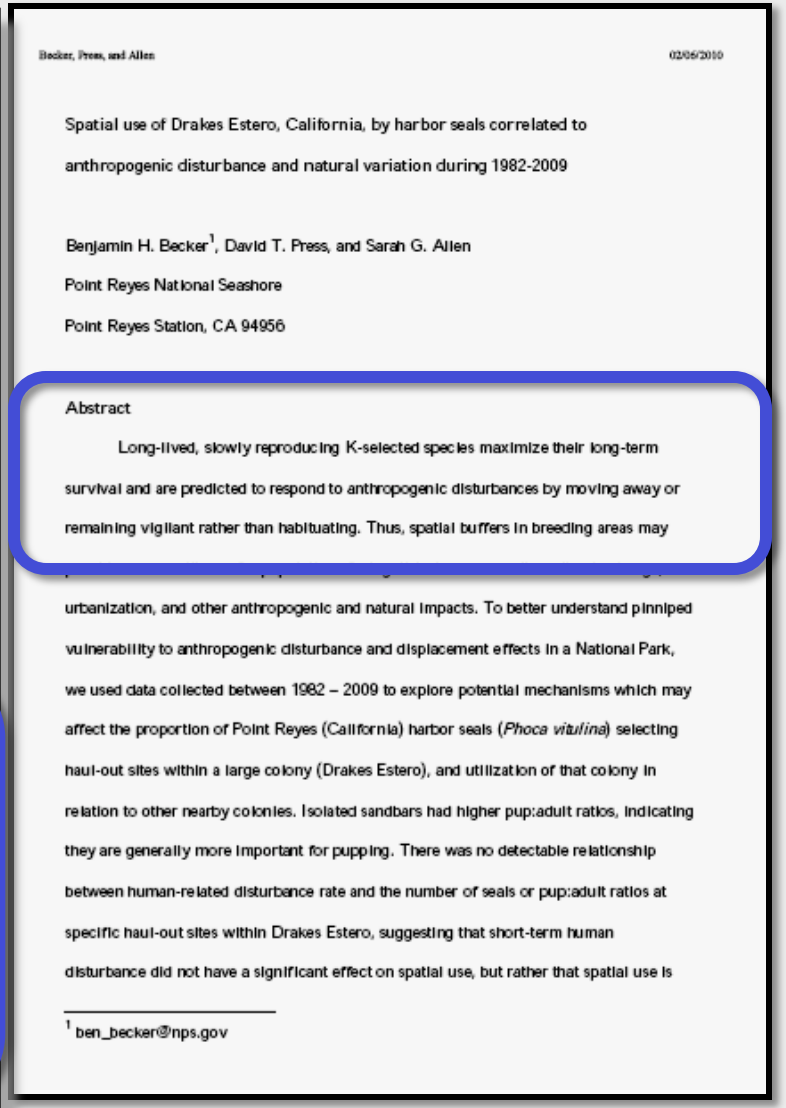


Official NPS map

NPS Becker III paper: claims seals move away from human disturbances; Becker uses statistical analysis of data from 1982-2009 to claim seals move away from oyster bags

Abstract: *"Long-lived, slowly reproducing K-selected species maximize their long-term survival and are predicted to respond to anthropogenic disturbances by* ***moving away or remaining vigilant rather than habituating.***"

Introduction: ***"Thus, we expect seals to move away from, or remain vigilant to, disturbance sources rather than habituate …"***



Becker, Press, and Allen 02/06/2010

Spatial use of Drakes Estero, California, by harbor seals correlated to anthropogenic disturbance and natural variation during 1982-2009

Benjamin H. Becker[1], David T. Press, and Sarah G. Allen
Point Reyes National Seashore
Point Reyes Station, CA 94956

Abstract

Long-lived, slowly reproducing K-selected species maximize their long-term survival and are predicted to respond to anthropogenic disturbances by moving away or remaining vigilant rather than habituating. Thus, spatial buffers in breeding areas may

urbanization, and other anthropogenic and natural impacts. To better understand pinniped vulnerability to anthropogenic disturbance and displacement effects in a National Park, we used data collected between 1982 – 2009 to explore potential mechanisms which may affect the proportion of Point Reyes (California) harbor seals (*Phoca vitulina*) selecting haul-out sites within a large colony (Drakes Estero), and utilization of that colony in relation to other nearby colonies. Isolated sandbars had higher pup:adult ratios, indicating they are generally more important for pupping. There was no detectable relationship between human-related disturbance rate and the number of seals or pup:adult ratios at specific haul-out sites within Drakes Estero, suggesting that short-term human disturbance did not have a significant effect on spatial use, but rather that spatial use is

[1] ben_becker@nps.gov

NPS Becker III paper: in claiming harbor seals will remain vigilant rather than habituate, did not cite 2006 paper on retrofit construction at Richard Bridge by same author

Monitoring the Potential Impact of the Seismic Retrofit Construction Activities at the Richmond San Rafael Bridge on Harbor Seals (*Phoca vitulina*): May 1, 1998 –September 15, 2005

Deborah Green
Project Manager

Emma Grigg
Field Coordinator

Sarah Allen & Hal Markowitz
Principal Investigators

Richmond Bridge Harbor Seal Survey
Final Report to the California Department of Transportation
January 2006; Contract 04A0628

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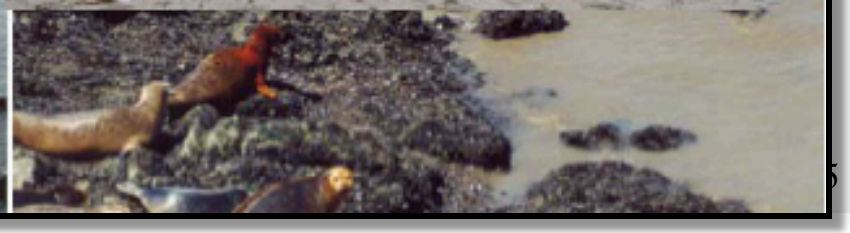
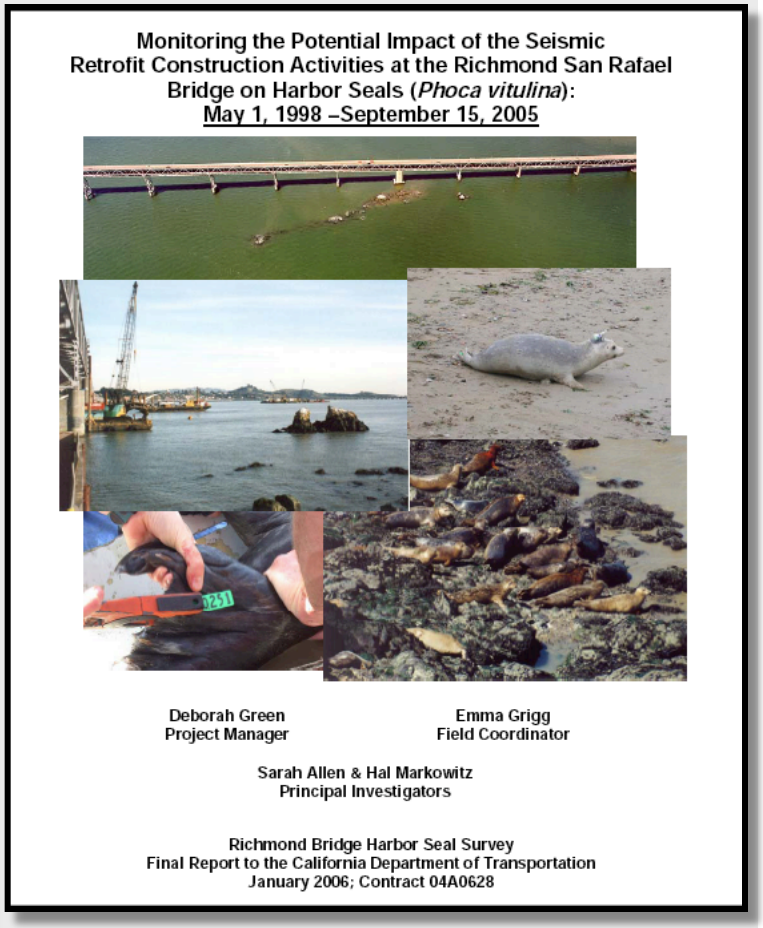


Allen's Richmond Bridge paper: data shows that local population of harbor seals clearly habituated to much more serious disturbances at much closer distances

"Construction-related disturbances at Castro Rocks were attributed to two main factors; watercraft in the area of the haul-out site and ***construction activities such as jackhammering, rivet work, hammering and the movement of cranes on barges near the haul-out site.***"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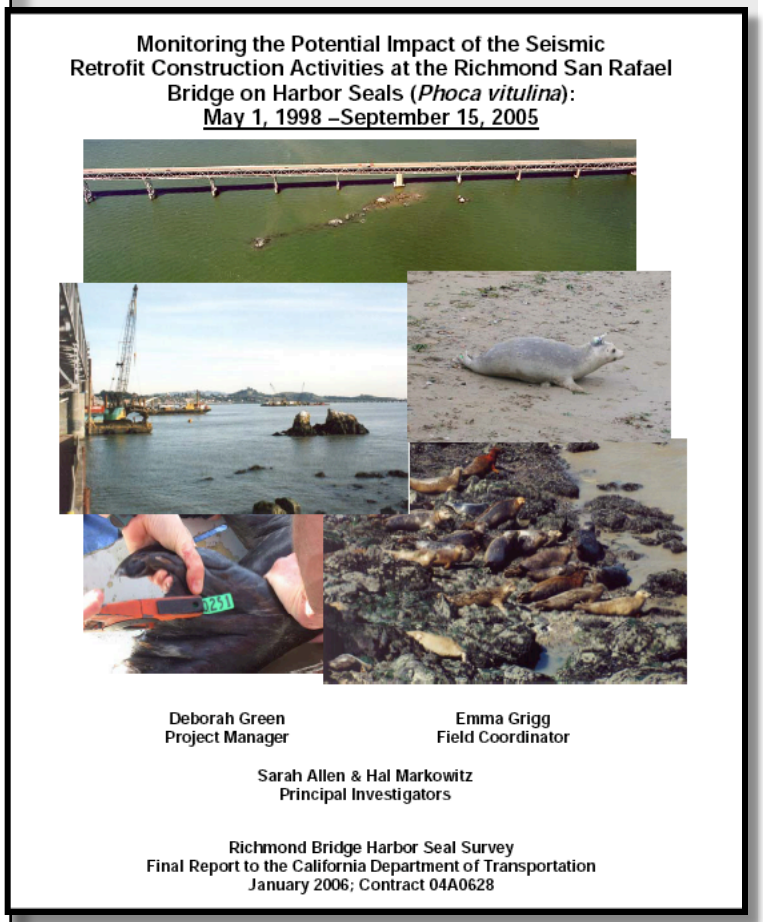
"During pupping season, subsite A at ***Castro Rocks remains preferred by females with pups****, regardless of year (including construction years), with 85% using subsite A during the daytime, 98% using subsite A during the nighttime. …*

During the four "work periods" of the construction … ***the total number of seals hauling out on Castro Rocks did not decrease*** *…*



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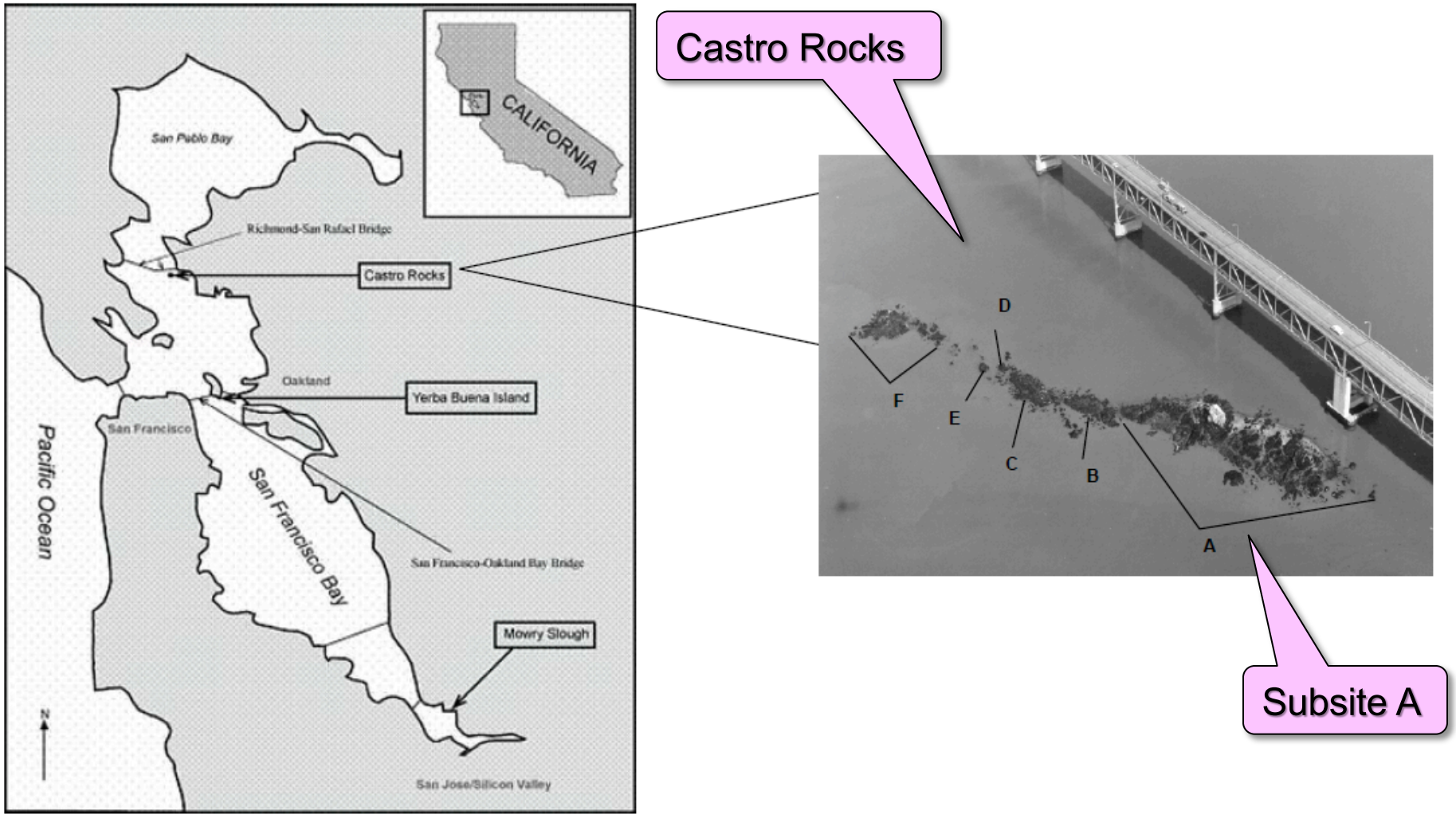

Figure 1. Map of study sites: Castro Rocks, Yerba Buena Island and Mowry Slough, with additional mapping of subsites A-F at Castro Rocks, Richmond-San Rafael Bridge (San Francisco Bay, CA).

Allen's Richmond Bridge paper: data shows population of harbor seals habituating to more serious disturbances at closer distance: Castro Rocks seals go up and not down

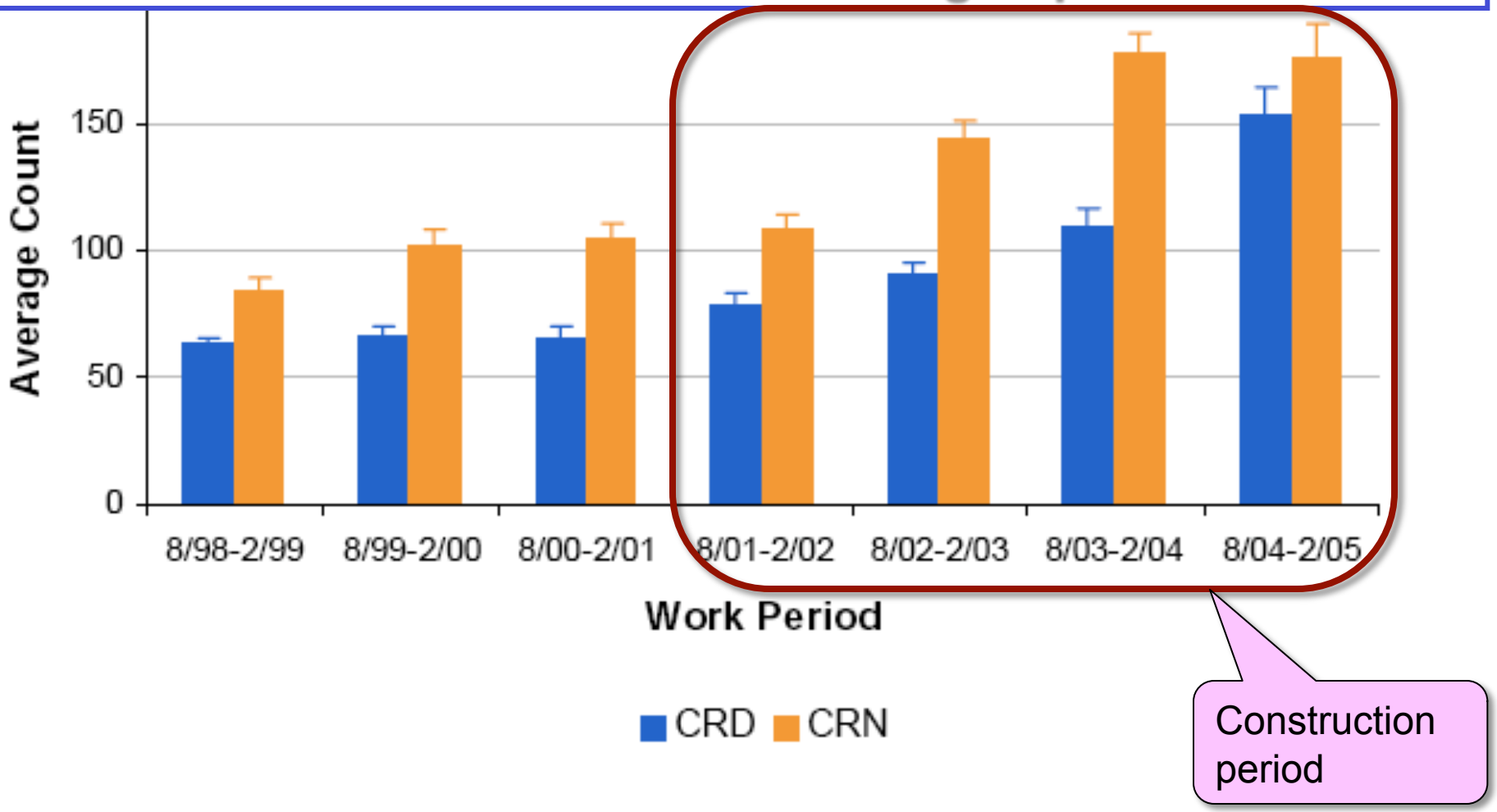

Figure 9. Average counts (±SE) at Castro Rocks Day (CRD) and Night (CRN) during construction work periods. Construction activities did not begin until the end of the 2000-2001 work period. All averages were calculated using only those surveys taken at tide heights of ≤2 ft.

Allen's Richmond Bridge paper: data shows population of harbor seals habituating to more serious disturbances at closer distance: Castro Rocks seals go up and not down

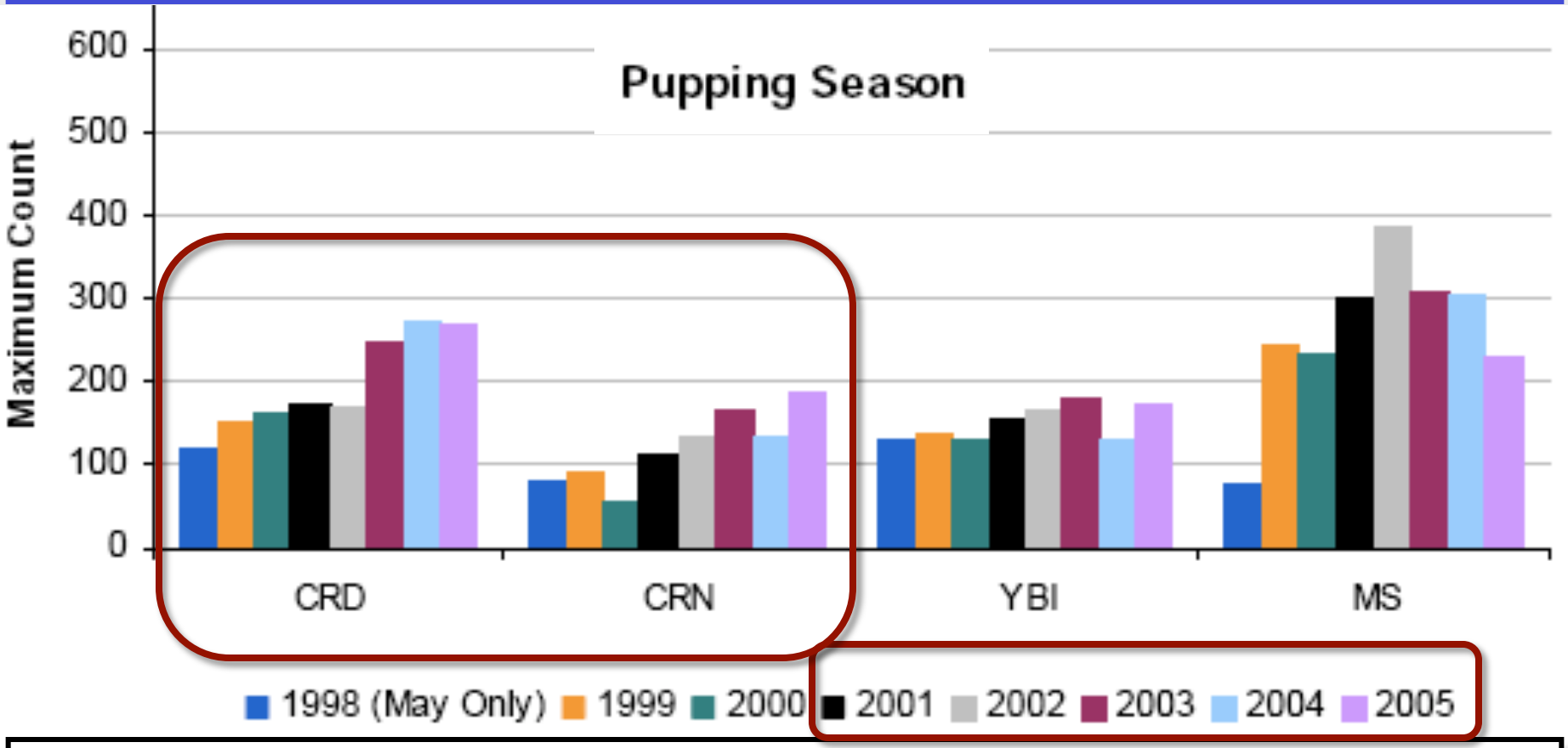

Figure 7: maximum seasonal harbor seal counts at Castro Rocks Day (CRD), Castro Rocks Night (CRN), Yerba Buena Island (YBI), and Mowry Slough (MS): June 1998 – mid-August 2005.

Allen's Richmond Bridge paper: data shows population of harbor seals habituating to more serious disturbances at closer distance: subsite A seals go up and not down

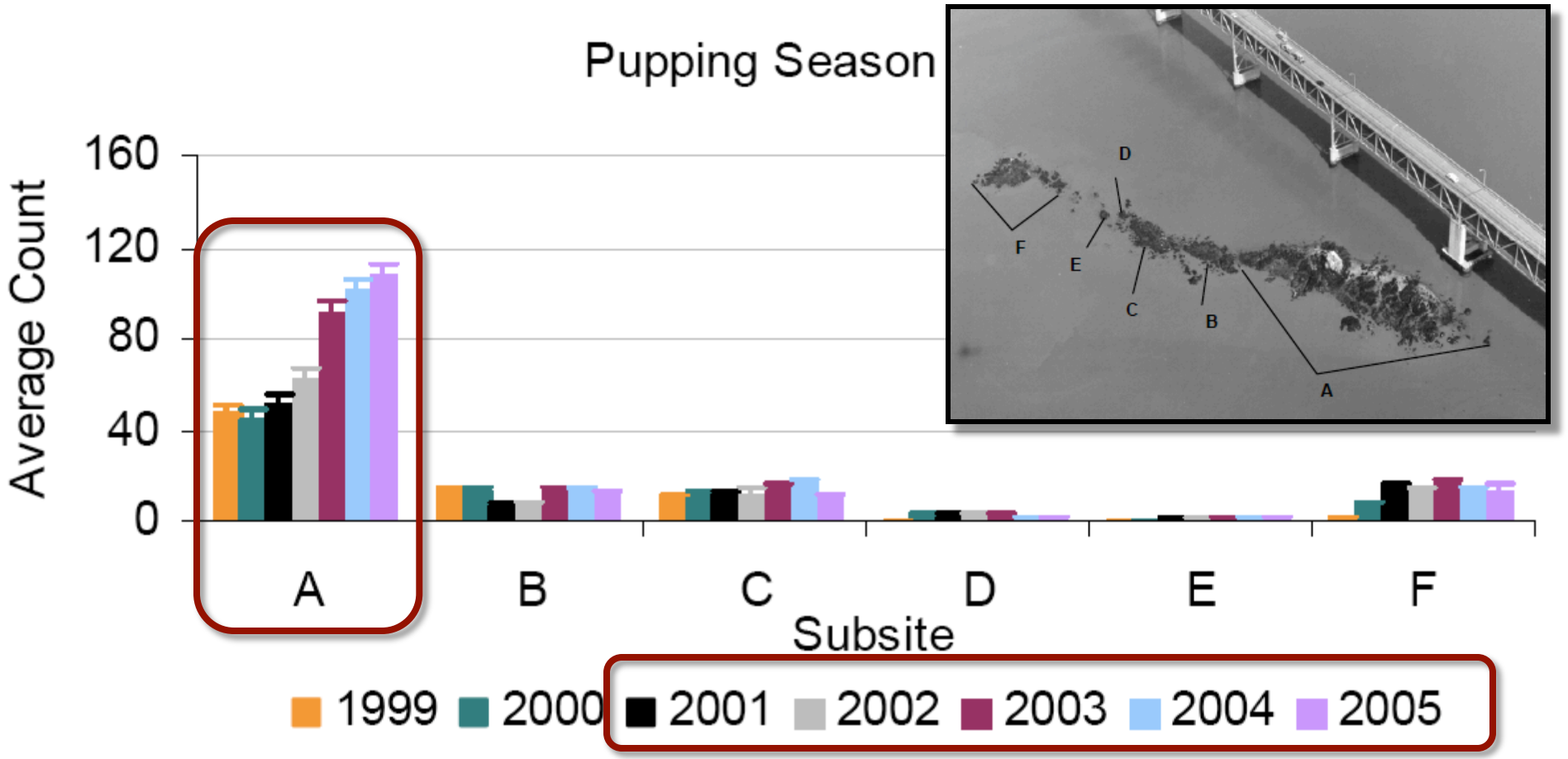

Figure 8B: Average number (+/- SE) of seals hauled out on each subsite at Castro Rocks Day during each season: June 1998 – mid-August 2005. Only those surveys taken when the survey tide height was < 2 ft were used.

NPS Becker III paper: lack of habituation contradicted in part by Sarah Allen's testimony in a 2005 lawsuit in San Diego (Children's Pool Beach case)

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSHPERIC ADMINISTRATION

In the Matter of:

LILO MARIA CREIGHTON,

Respondent

Docket No: SW030133

INITIAL DECISION AND ORDER

Issued: April 20, 2005

Issued by:

Hon. Parlen L. McKenna
Administrative Law Judge
Alameda, California

FOR THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Paul Ortiz, Esq.
Enforcement Attorney, NOAA
Southwest Regional Office
Long Beach Federal Building, Suite 4470
Long Beach, CA 90802
Telephone (562) 980-4069
Fax (562) 980-4084

Telephone (858) 454-8720

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Court decision: "Dr. Allen testified that seals habituate (or anthropomorphizing) to disturbance sources that are determined not to be a threat."

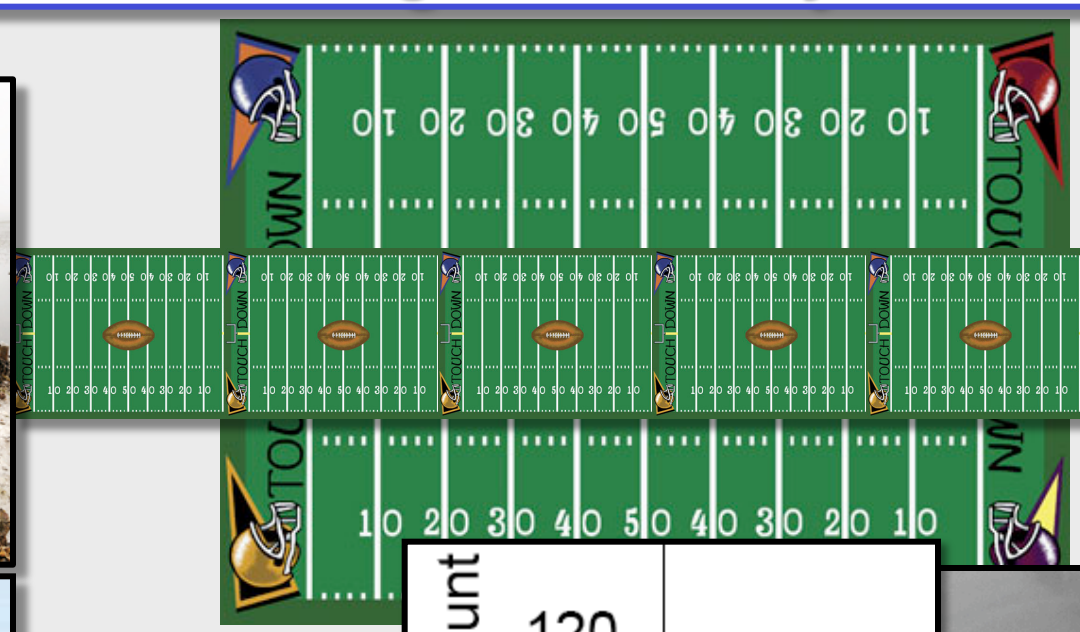
NPS Becker III paper: claims seals move away from human disturbances; Becker uses statistical analysis of data from 1982-2009 to claim seals move away from oyster bags

- **Appropriateness of data**
  1. Issues of data availability, quality, and relevance prior to 1992 protocol
  2. Data prior to 1996 should not be used; use NPS database 1996-2008
  3. Becker ignores other subsites & sources of disturbances, conditions
- **Assumptions driving statistics**
  1. Decrease in seals from 2004 to 2005 attributed as if specific to Upper sandbars but occurred across Drakes Estero and Marin County coast
  2. Assumes DBOC increased oyster bag activity at Upper sandbars in 2005, but DBOC only increased oyster seed in Home Bay in 2005
  3. Decrease in seals from 2004 to 2005 not due to DBOC but to some other broader factor impacting all of Marin County coast
- **Vigilance vs. habituation**
  1. Vigilance rather than habituation may not be true for local harbor seals
  2. Richmond Bridge construction study by same author shows habituation
  3. Paradox: outside Estero, seals habituate; inside NPS says they don't

Sunday Gridiron Model

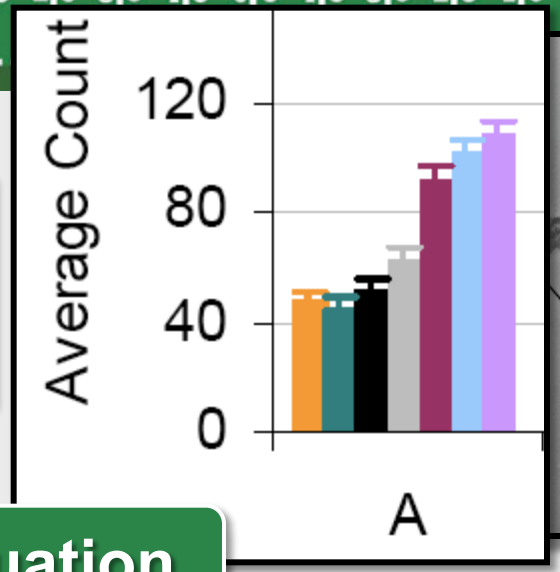
2005: Lunny's oyster bags > 600 yards from haul-out site

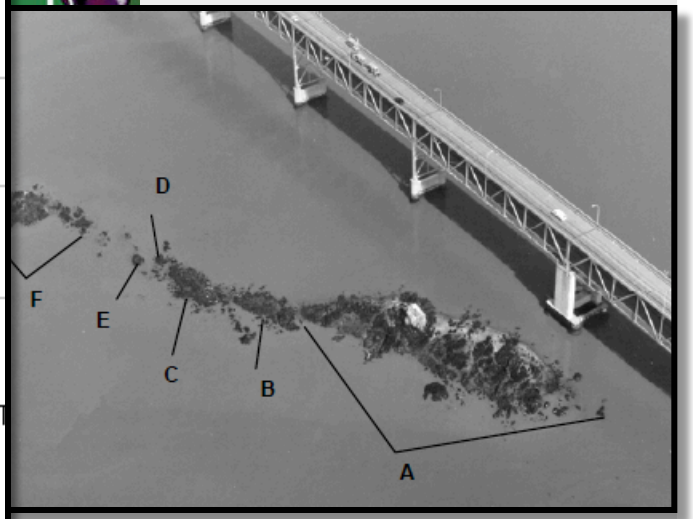
2005: Richmond Bridge crane ~20 yard from haul-out site



vigilance?

habituation

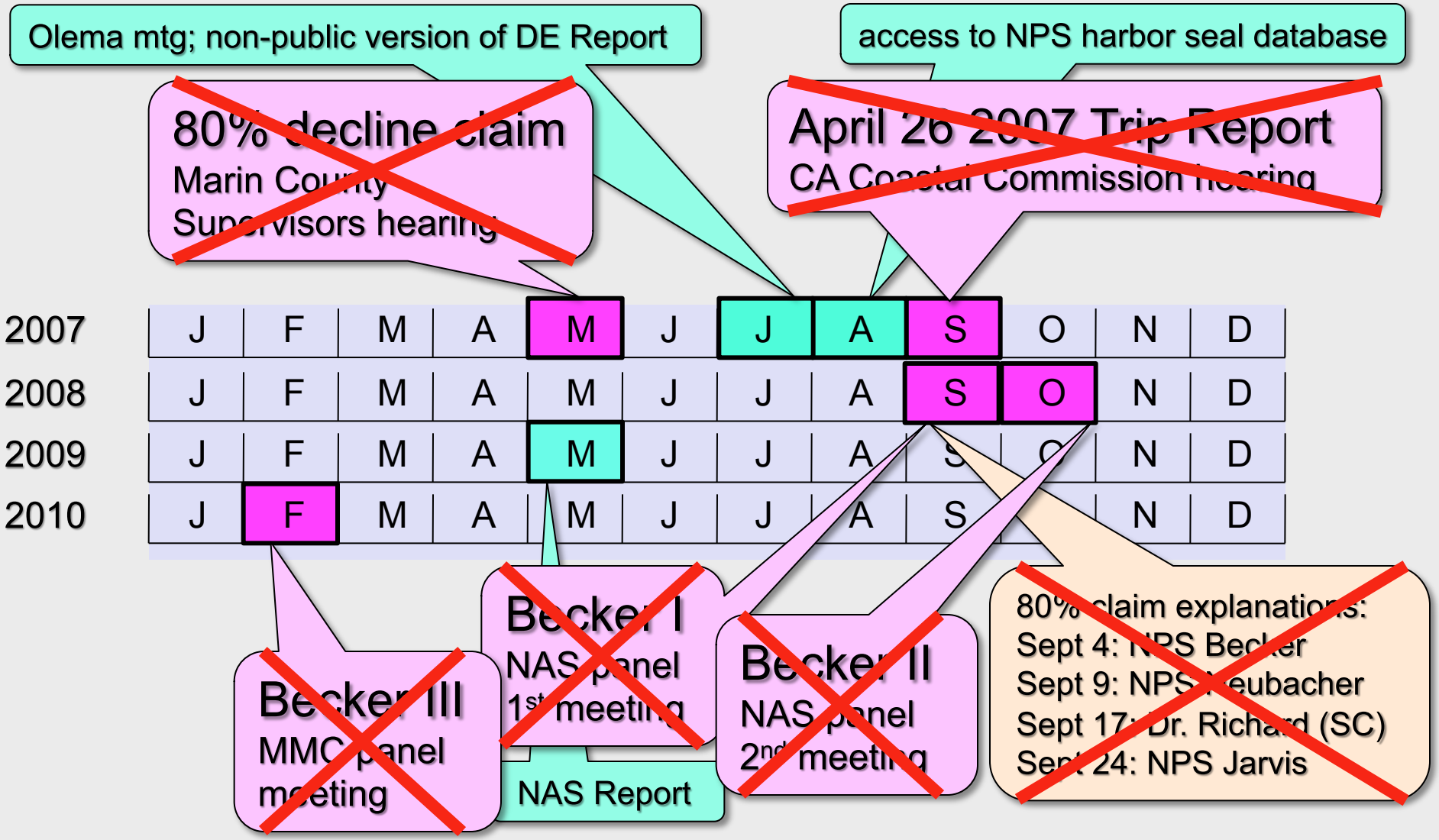




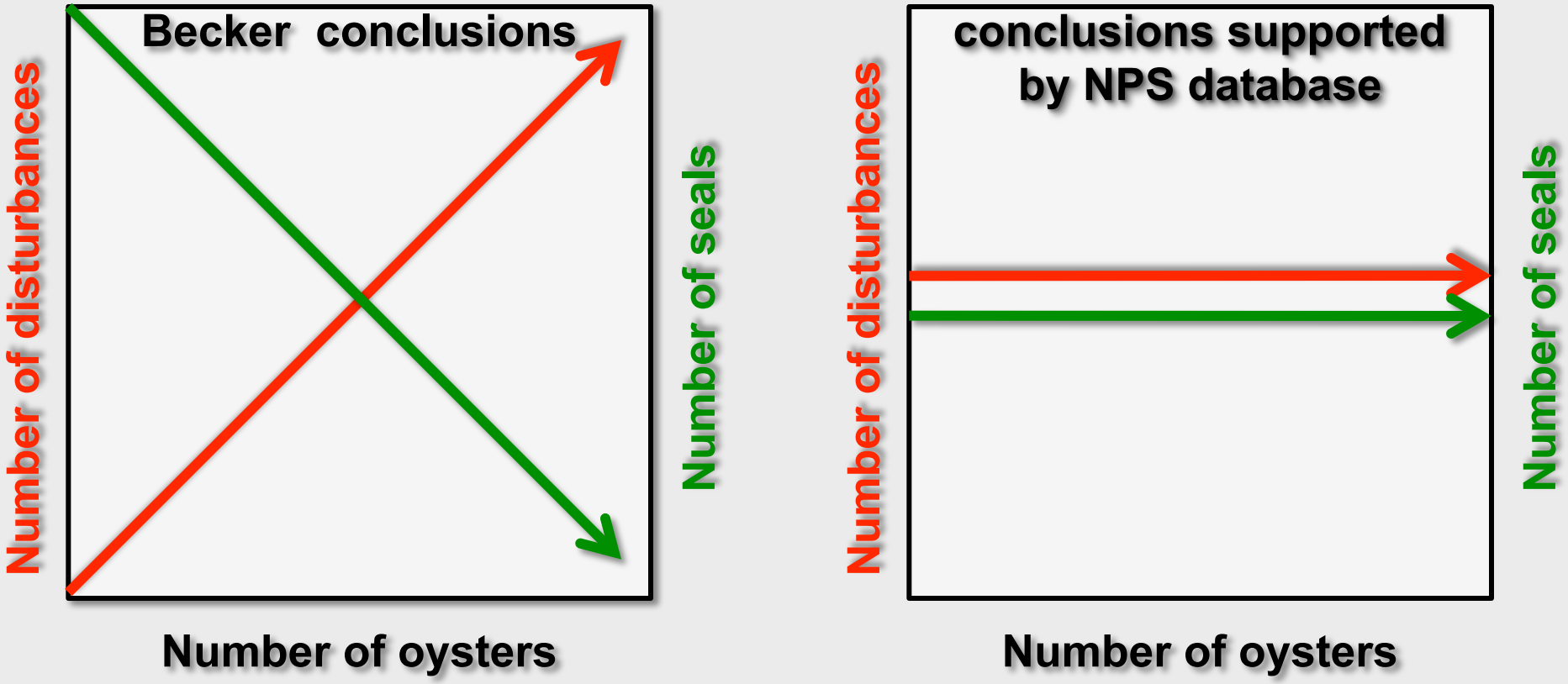
Marine Mammal Commission meeting, February 21, 2010: outline of Dr. Corey Goodman's presentation

1) *Background and overview*
    1) *Background and reason County Supervisors asked for scientific analysis*
    2) *NPS claims of environmental harm vs. NAS report: NPS misrepresented data*
    3) *Harbor seal population and haul-out subsites in Drakes Estero*
2) *Disturbances to harbor seals in Drakes Estero*
    1) *Sources of disturbances of harbor seals in Drakes Estero*
    2) *Prior to 2007: Timeline of disturbances of harbor seals*
    3) *April & May 2007: Timeline of disturbances of harbor seals*
3) *80% harbor seal decline claim*
    1) *May 2007: NPS claim that DBOC caused 80% decline in seals in 2007*
    2) *July 2007 – June 2008: NPS retraction and reinstatement of 80% claim*
    3) *Sept 2008: NPS & Sierra Club Explanations of 80% Decline to NAS Panel*
4) *NPS Becker I, II, & III papers*
    1) *Sept 2008: Becker I: 2000-2007 mariculture-related disturbances*
    2) *October 2008: Becker II: 1996-2007 mariculture-related disturbances*
    3) *February 2009: Becker III: 1982-2009 mariculture-related disturbances*
5) ***Conclusions and recommendations***

Uncomfortable Truth: the NPS harbor seal claims keep changing, particularly when challenged, but one thing remains the same -- they are not supported by NPS data



Invalid Conclusion in all Three Becker Papers: increasing oysters leads to decreasing seals



- Decrease in seals at upper sandbar OB from 2004 to 2005 was seen in all of Drakes Estero population and across Marin County coast in 2005
- Change was regional, not local at upper sandbars
- Change had nothing to do with DBOC which had only increased seed in Home Bay, not oyster bags on upper sandbars (confirmed by NPS map)

Conclusions and Recommendations:
NPS harbor seal claims are not supported by NPS data
Federal-State 1992 harbor seal protocols are working

- MMC should use **best available science**; NPS has not
- Precautionary principle is subjective distraction from best available science; data since 1996 are solid and extensive
- Data are clear: **seal population not decreased by DBOC**
- **80% seal claim was false; post-hoc explanations false**
- April 26 Trip Report is controversial and anecdotal at best
- **Becker I, II, & III papers based on county-wide seal decline between 2004 and 2005**, not due to DBOC seed in Home Bay
- Discussion dominated for nearly three years by false harbor seal claims made by NPS against DBOC; **time for NPS to stop**
- **MMC should reject false science** and false claims by NPS
- **MMC should conduct its own statistical analysis** based on NPS database from 1996-2008 with predetermined questions