

Update on the PFC Seal Pilot Study

Meg Sedlak - San Francisco Estuary Institute
Denise Greig - The Marine Mammal Center
April 3rd, 2008

01.16.2007 13:36



Overview of Perfluorinated Compounds



- Widely-used
- Hydrophobic and oleophobic (oil-repelling)
- Detected worldwide
 - Persistent
 - Bioaccumulative
 - Long-range transport
- Deleterious health effects

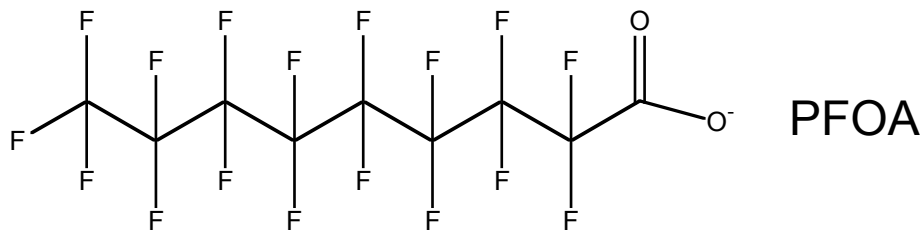


insecticide

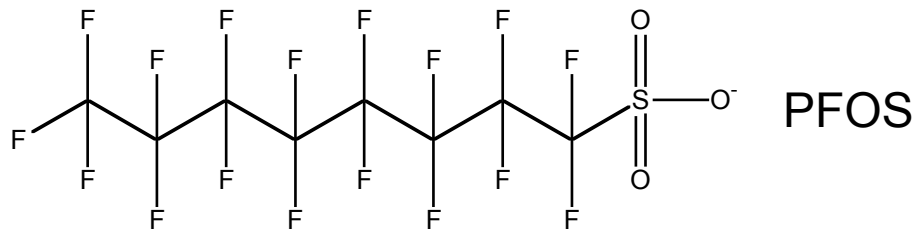


Draft data – do not cite or quote

Perfluorinated Compounds



Perfluorinated carboxylic acids



Perfluorinated alkyl sulfonates

- ◆ Long-chained compounds
- ◆ 2000 PFOS voluntary ban
- ◆ 2006 PFOA 95% reduction by 2010
- ◆ Precursors still available

Draft data – do not cite or quote

Why Look at Seals?



- Apex predators – trophic magnification
- Estuaries excellent habitat for seals
- SF Bay population declined in 90s
 - Currently stable but not increasing
 - Reasons not well understood
 - Disturbances at haul-out sites
 - Reduction in sites and prey
 - Contamination?

Draft data – do not cite or quote



Pilot Study of Apex Predators

- Collaborating with Marine Mammal Center
 - Chemical analysis of 21 harbor seals
 - Blood targeted matrix
 - Part of larger study examining health and well being



Draft data – do not cite or quote



Study Design

- RMP PS/SS analyzing seal blood
 - PFCs
 - Limited sample
 - PBDEs & HBCD
- Perfluorinated
 - Binds to blood proteins

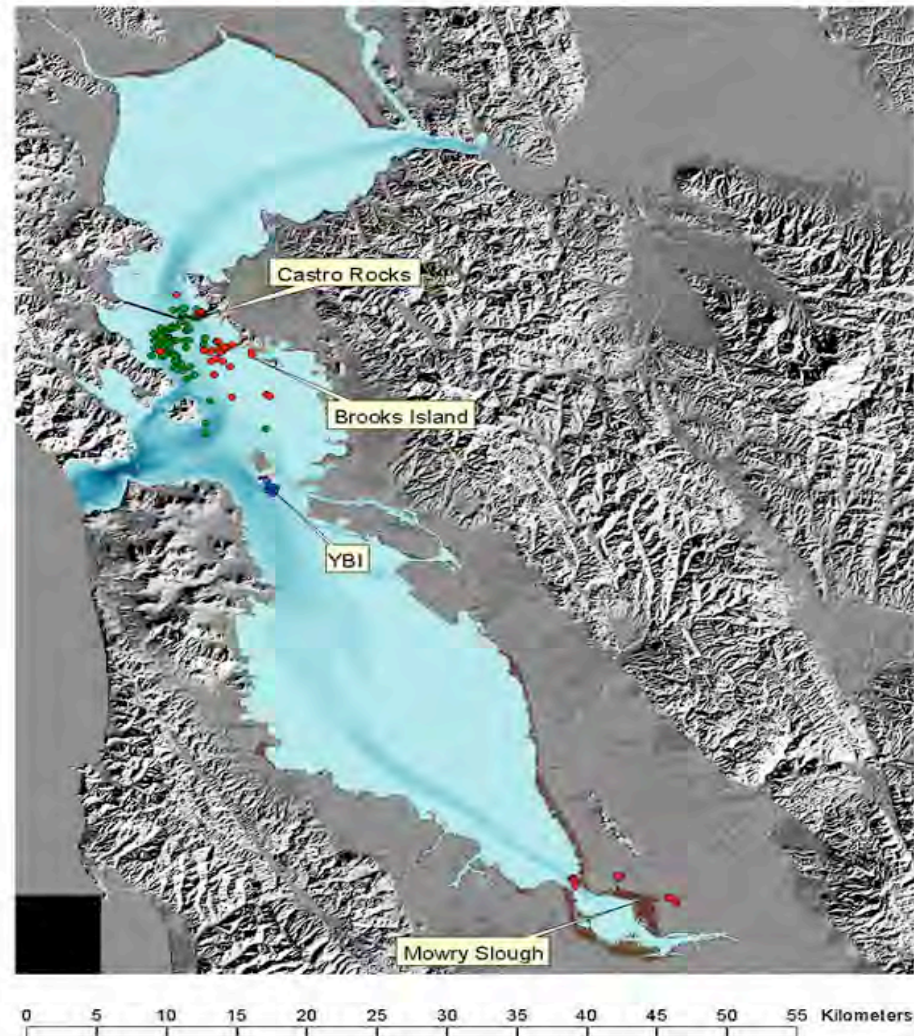


Draft data – do not cite or quote

Source: SWFS.NOAA

Seal Haul-out Sites

- Three major sites:
 - Richmond Bridge/Castro Rocks
 - Mowry Slough
 - Yerba Buena Island



Radiotagged harbor seals in San Francisco Bay, Jan-Feb 2001

• immature female 1 • adult redcoat female • immature female 2

Draft Interim Report to NOAA Fisheries/NMFS, April 2001.

<http://userwww.sfsu.edu/~halmark/tagging.htm>

Draft data – do not cite or quote

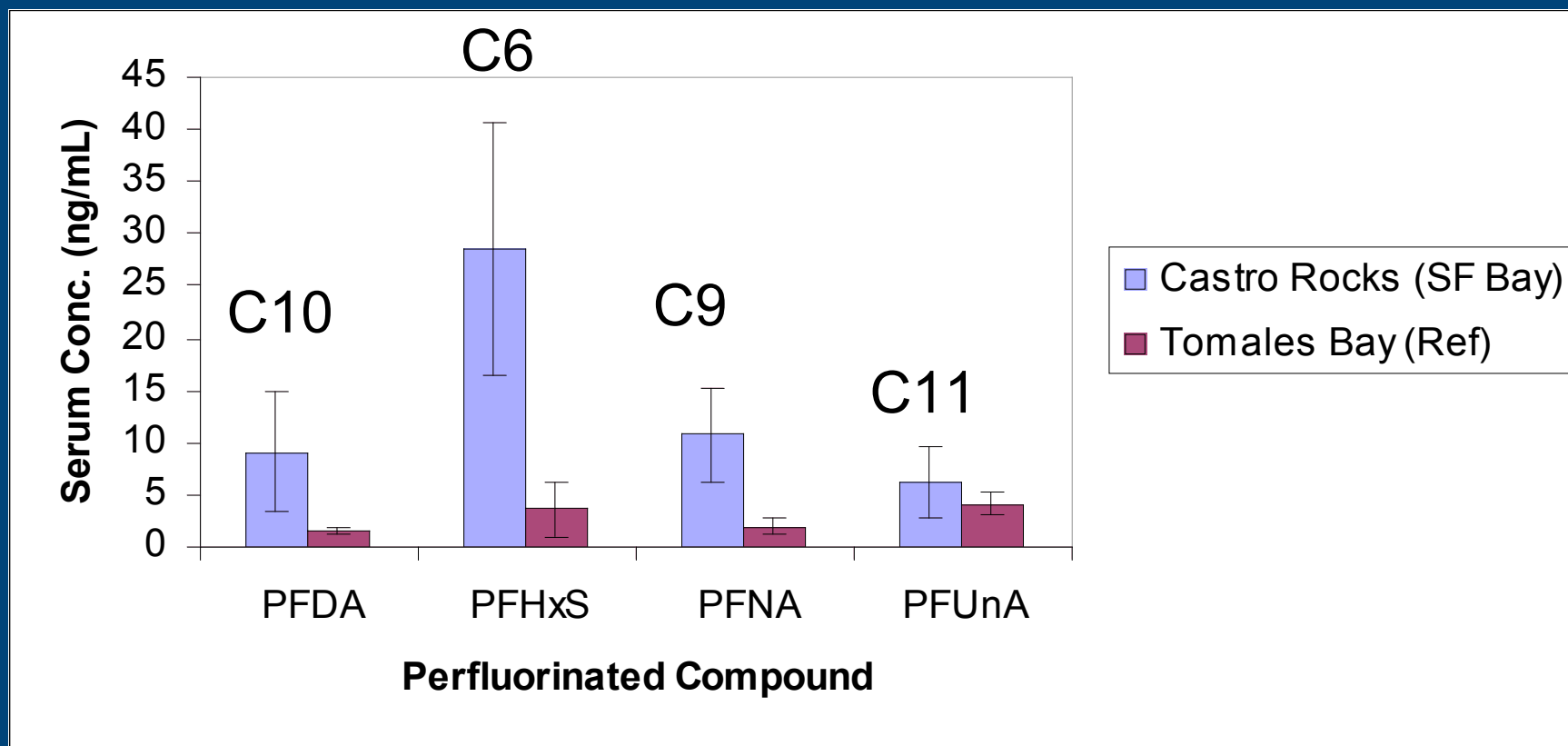
Sampling 2006 & 2007

- 21 seals sampled
 - 14 in SF Bay
 - Castro Rocks
 - 7 males; 7 females
 - 7 at Tomales
 - 3 males; 4 females
- Four age classes
 - Weaner (1 to 12 months)
 - Yearling
 - Subadult (older than yr)
 - Adult



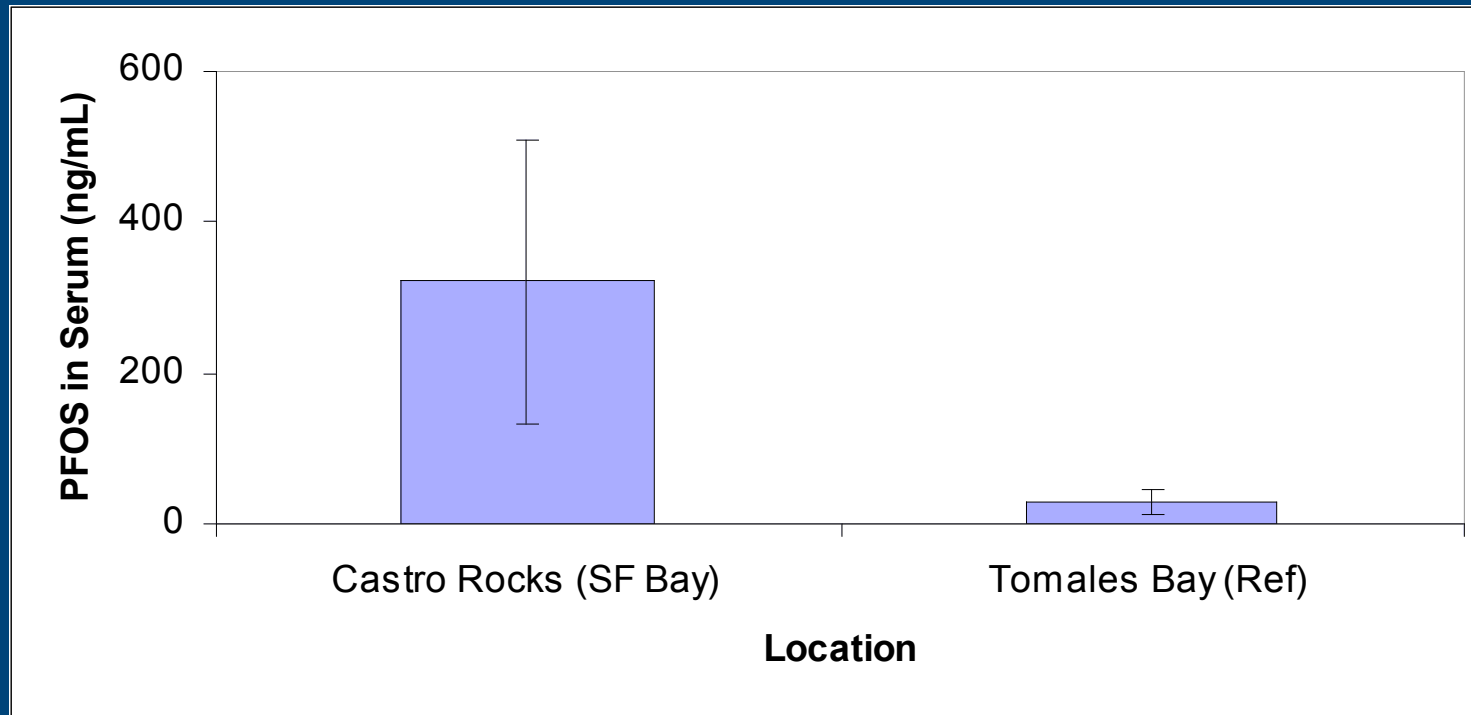
Draft data – do not cite or quote

What compounds were detected?



Draft data – do not cite or quote

PFOS is major PFC detected



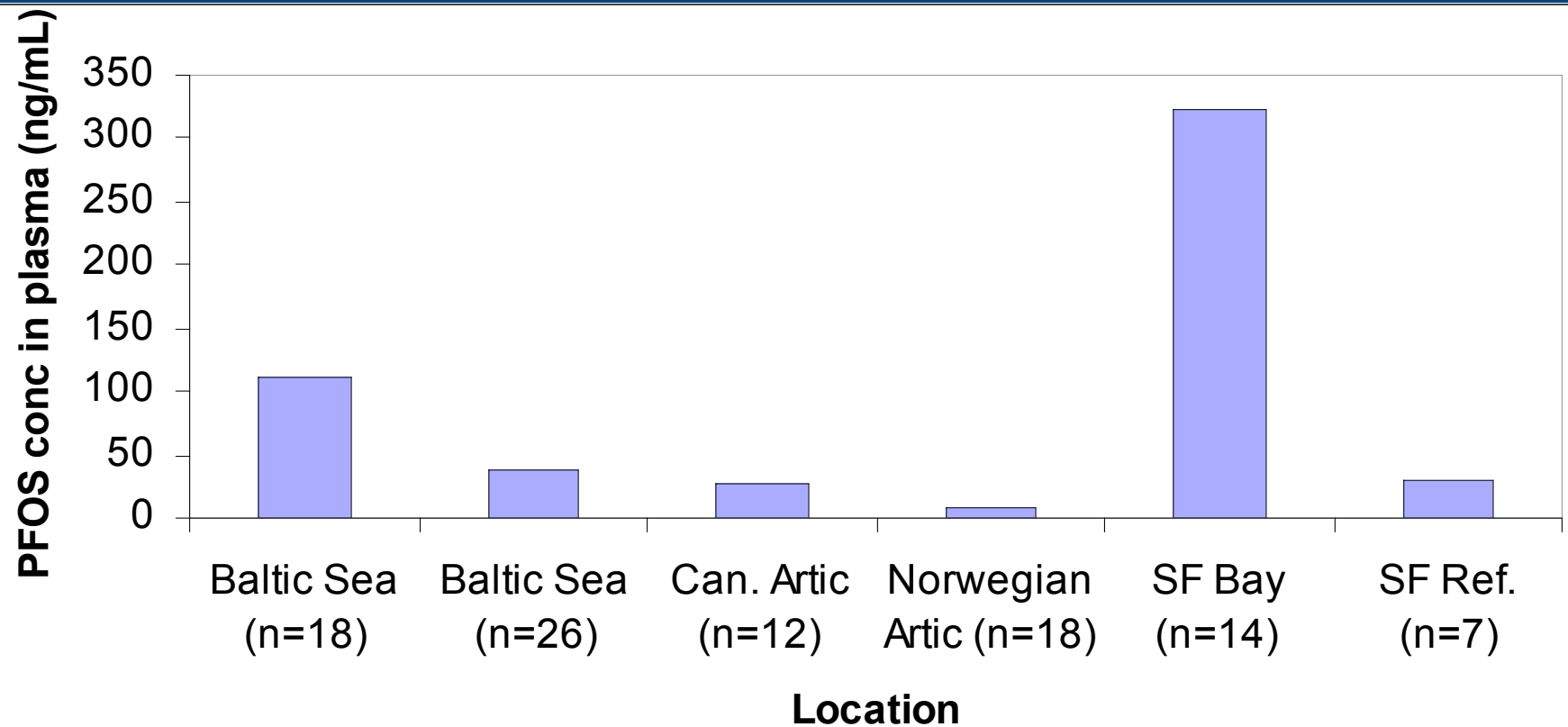
Location is statistically significant

Too few samples to ascertain whether gender is significant (470 vs 174 ng/mL)

Benchmark dose associated with change in response
29 to 59 ug/mL / LOAEL 62 ug/mL

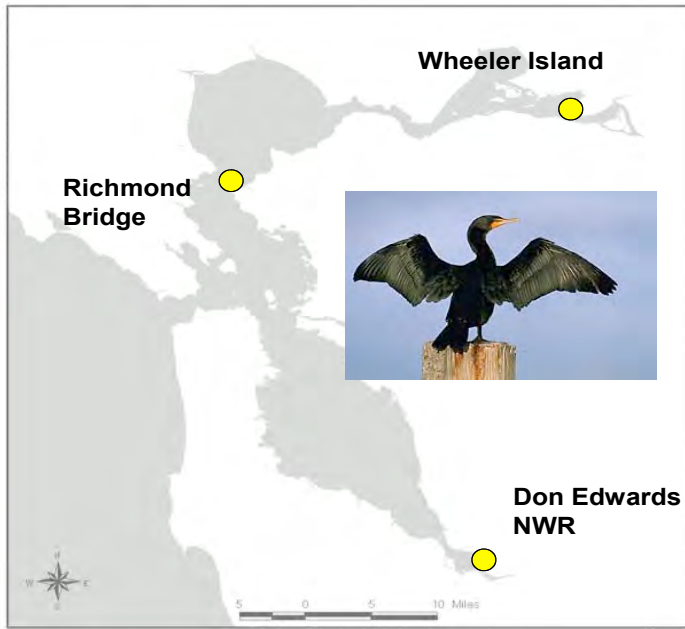
Draft data – do not cite or quote

PFOS in SF Bay Seals and Elsewhere

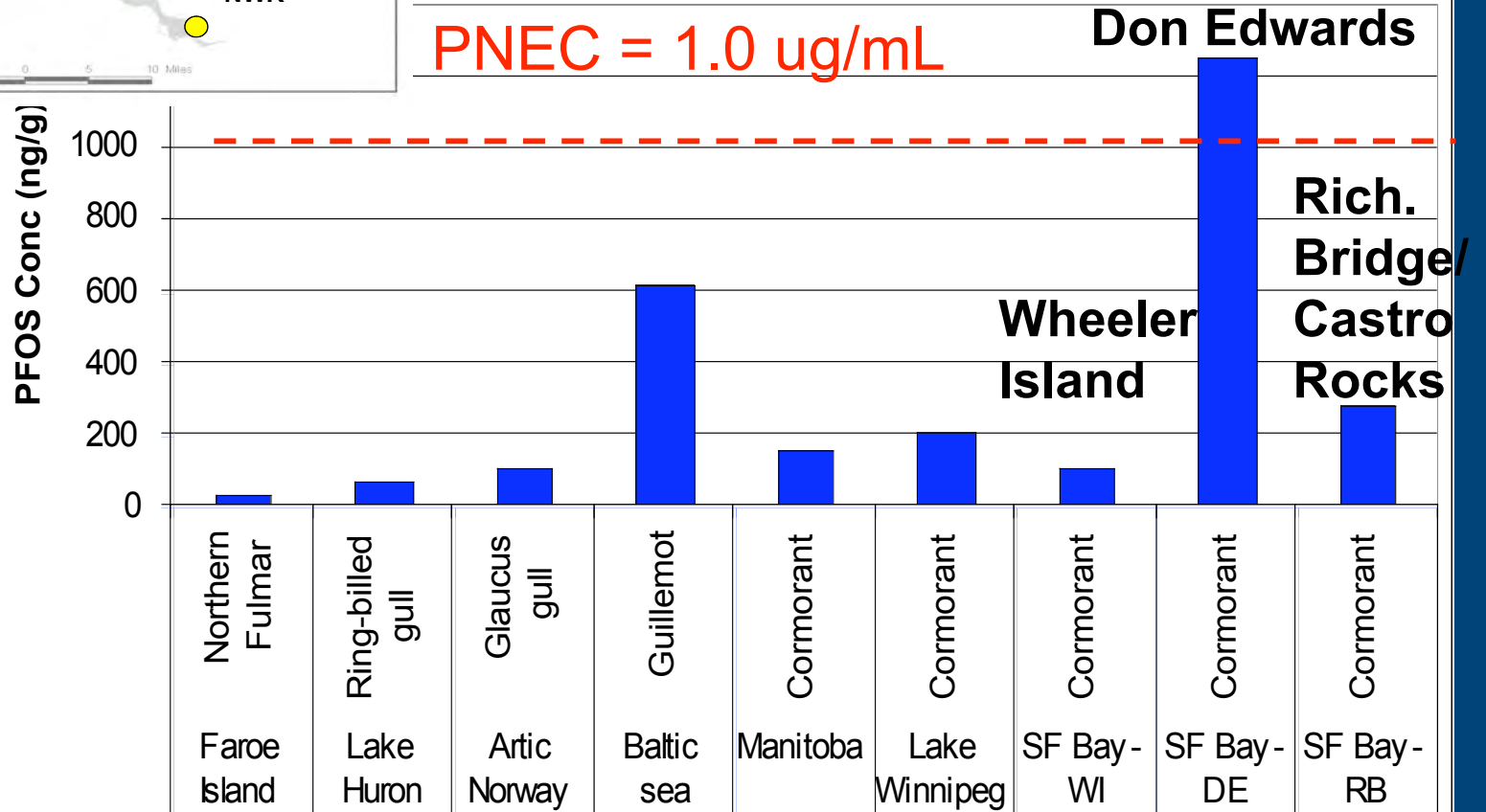


Draft data – do not cite or quote

PFOS in Cormorant Eggs



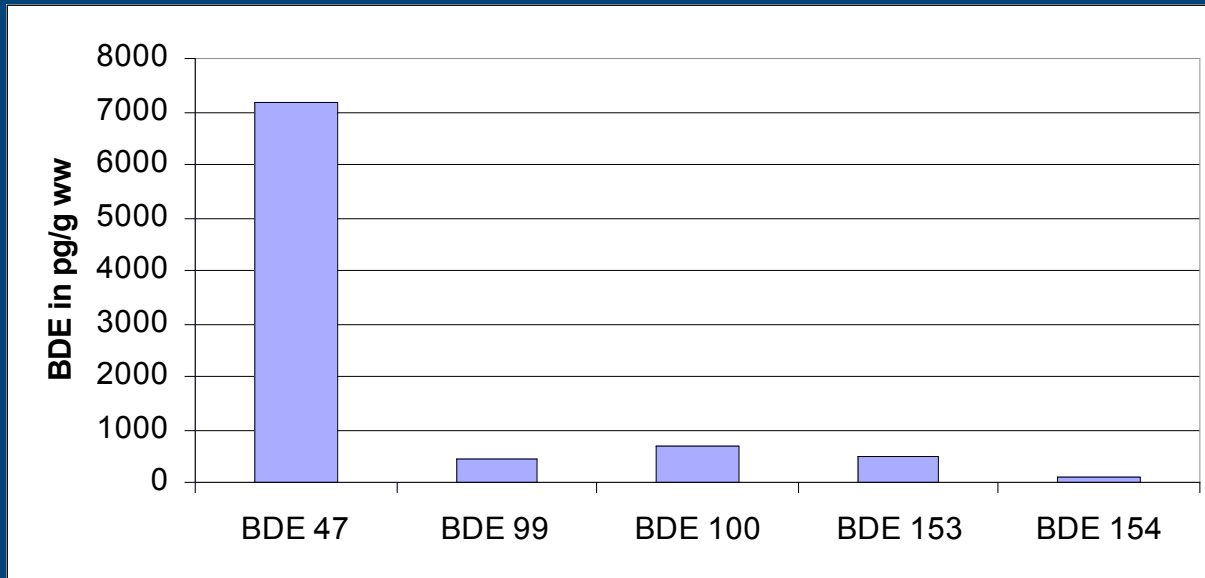
PNEC = 1.0 ug/mL



Draft data
– do not
cite or
quote

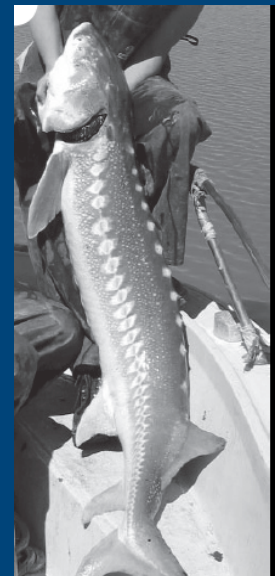


PBDEs in Seal Blood



- 3 in 2006; 5 in 2007
 - Concentration 4.2 to 30.2 ng/g ww
 - Previous SF Bay seal study 2.8 ng/g ww (Neale, Greig, et al. 2005)
- Similar to sportfish results
 - 47 > 99 & 100 > 153

Draft data – do not cite or quote



HBCD

- Subset analyzed for HBCD
 - 4 samples – ND
- 2008 PS/SS in blubber

Draft data – do not cite or quote

Plans for 2008

- Additional 2007 and 2004 samples submitted for analysis:
 - Tomales Bay and Castro Rocks (10) – characterize in gender and age
 - Mowry (6) – better understand geographical distribution
- Spring of 2008 to collect 20 additional samples

Draft data – do not cite or quote