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PFAS Bioaccumulation in Ecosystems

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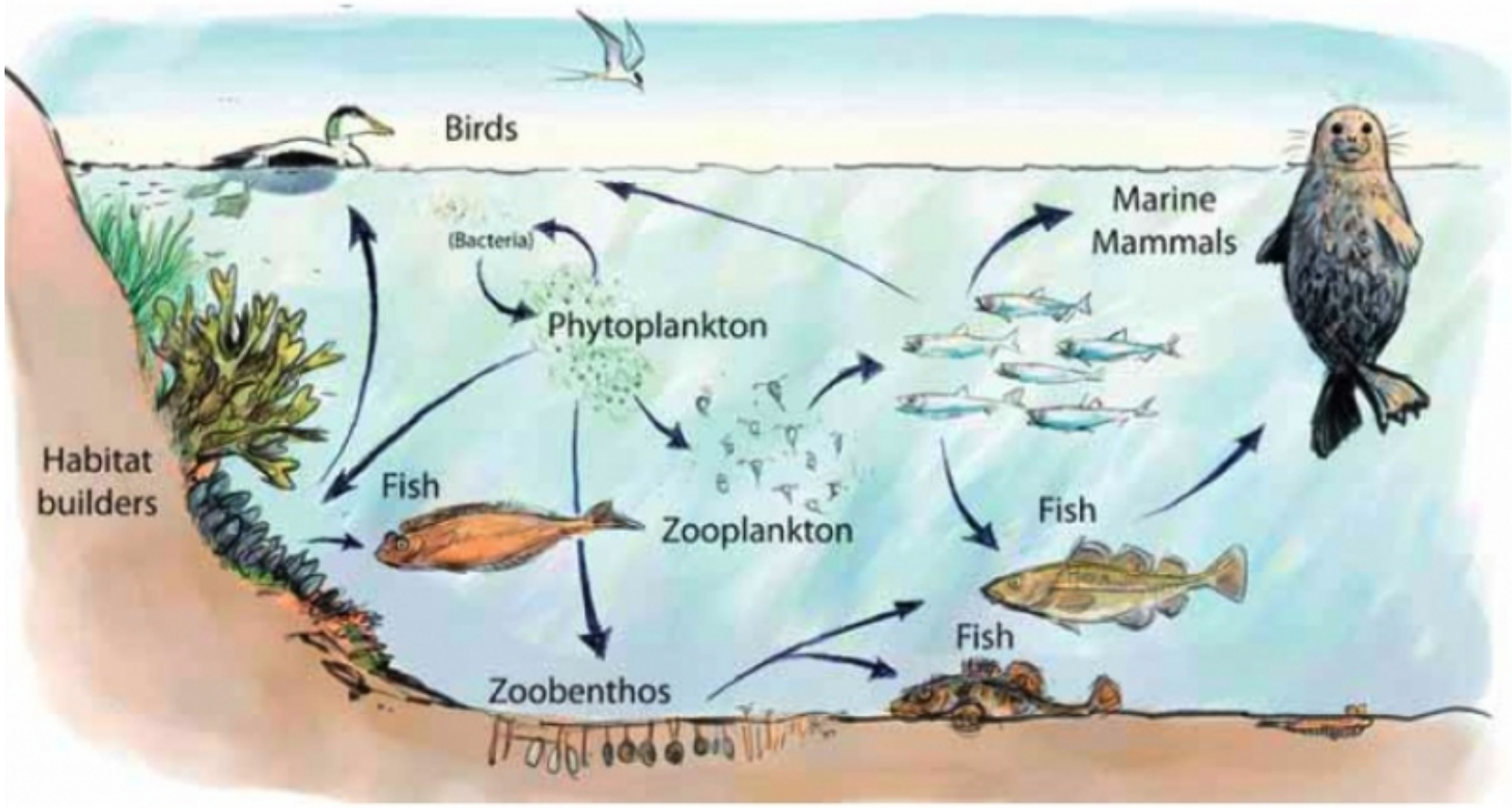
Sedlak et al., 2017
Chemosphere

PFAS Bioaccumulation in the Bay Food Web



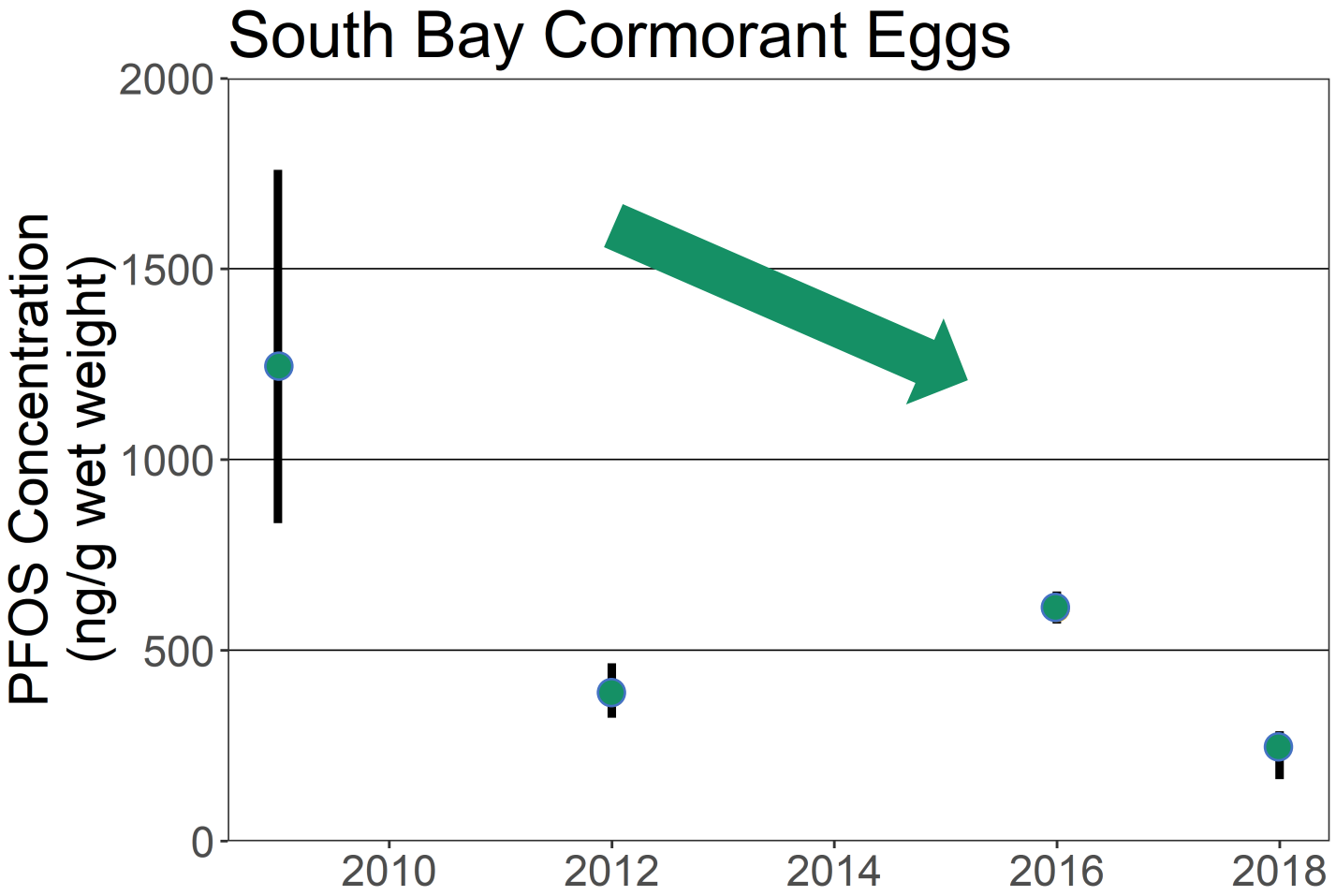
HELCOM (2010): Ecosystem Health of the Baltic Sea.

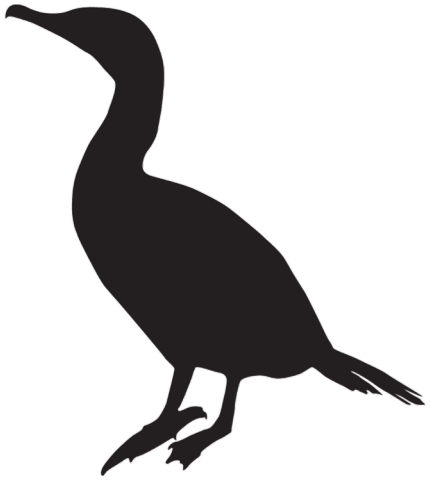
Bioaccumulation

An organism's net contaminant accumulation from all sources

- Air
- Water
- Sediment
- Food

PFOS in SF Bay Bird Eggs



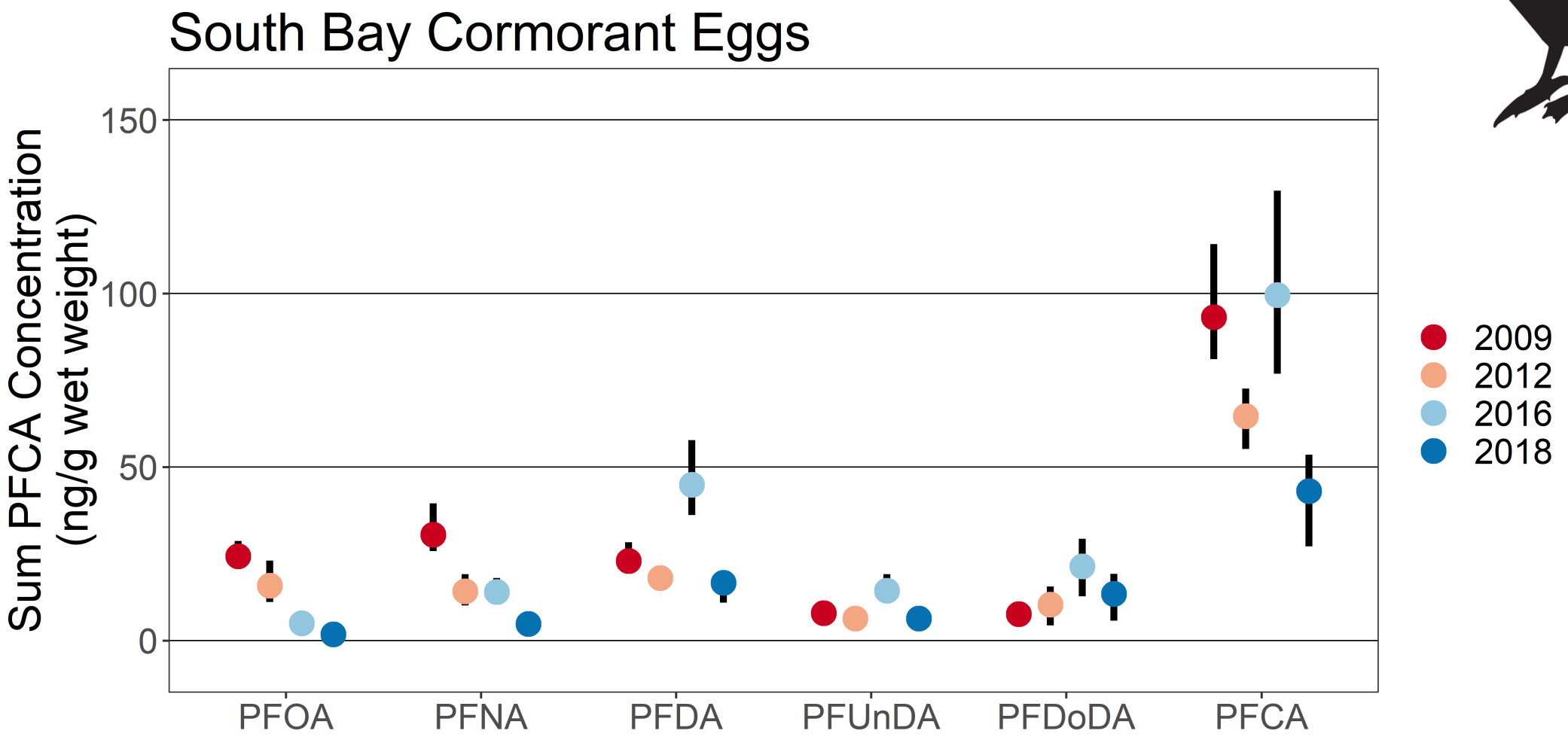


PFOS is most abundant

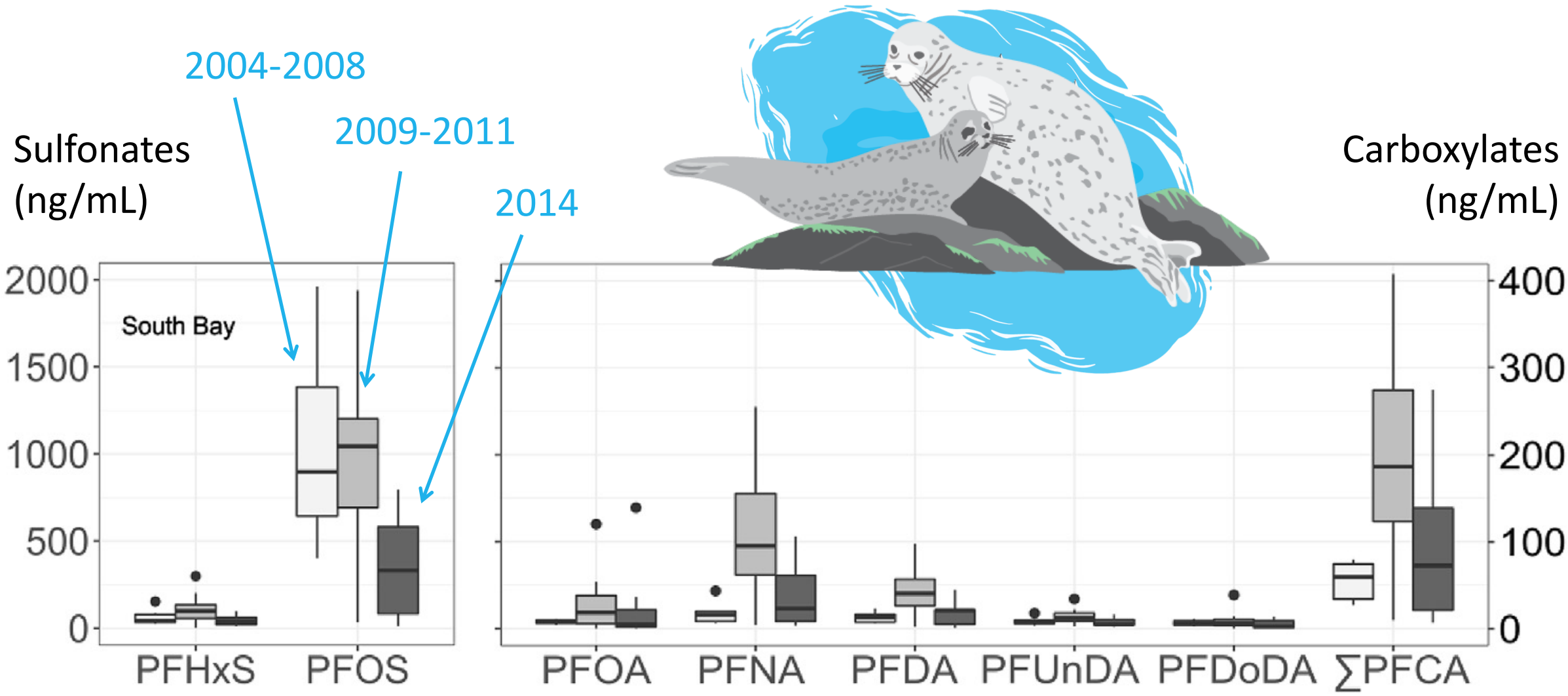
- Developmental toxicity
- PNEC 1000 ng/mL (yolk)

Similar levels observed in other urban areas near PFAS sources

PFOA and Long-chain Carboxylates



PFAS in SF Bay Harbor Seal Serum

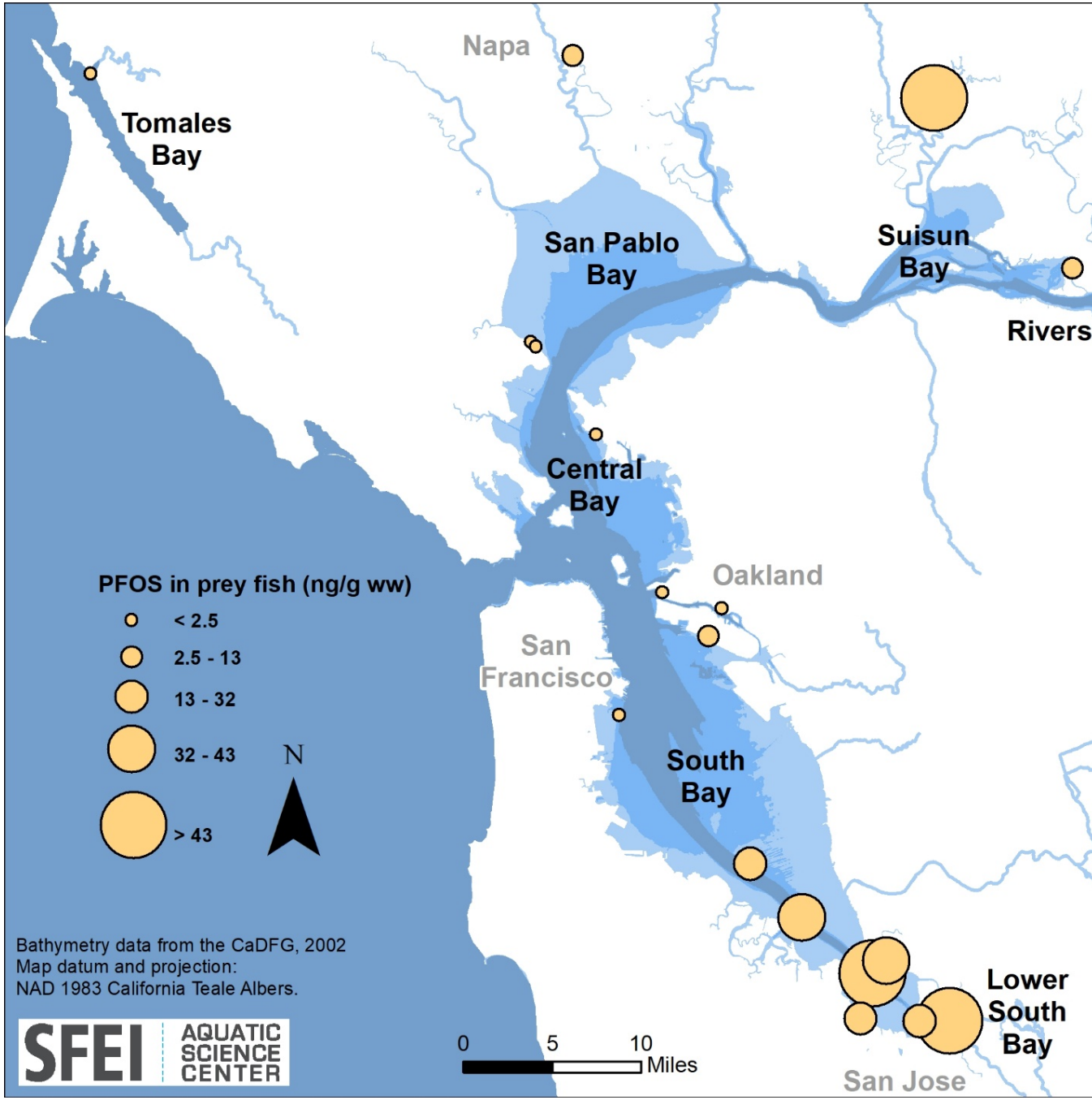


PFOS in Prey Fish

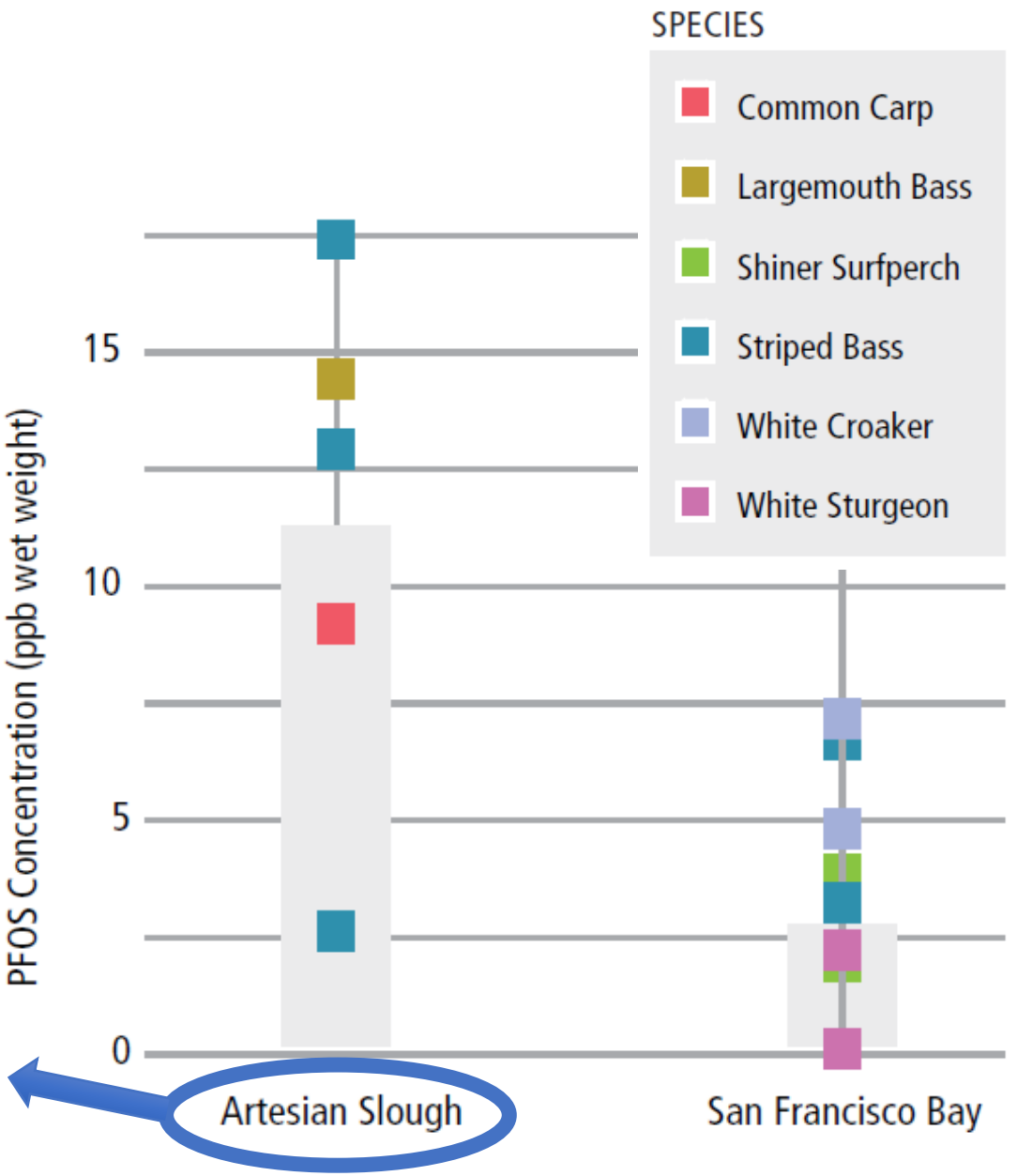
Canada's Federal Environmental Quality Guidelines for PFOS in Wildlife Diet

- To protect birds:
  8.2 ng/g ww (whole prey fish)
- To protect mammals:
  4.6 ng/g ww (whole prey fish)

SF Bay small (prey) fish:
up to **240** ng/g ww



PFOS in Sport Fish

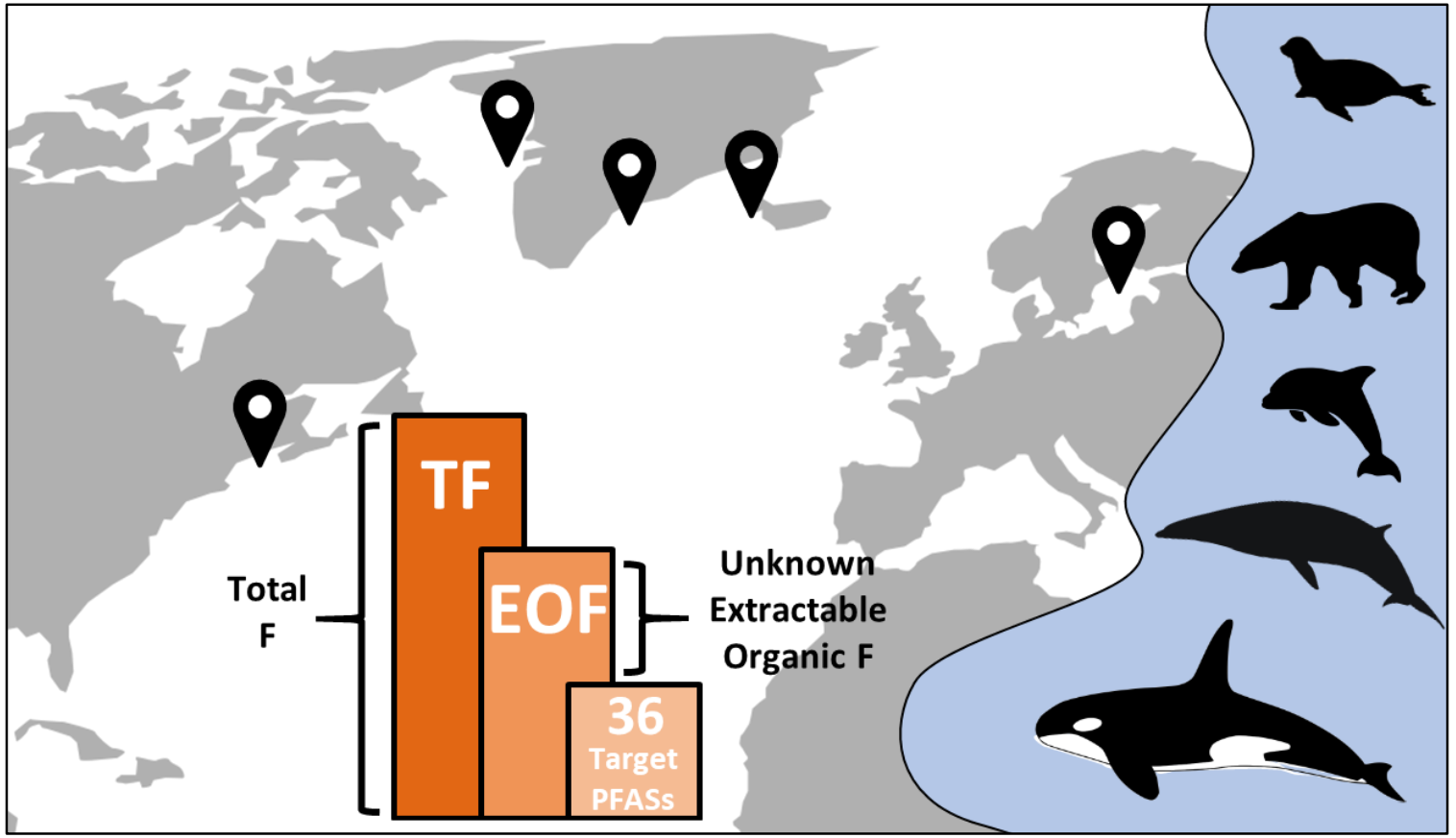


Uncertainties: Occurrence and Impacts of Many More PFAS, Alone and in Mixtures

Fluorine mass balance:

- PFOS dominates but…
- Dozens more PFAS are present, including many not routinely measured

What are the impacts of these mixtures?



(Spaan et al. 2019)

Take-home Messages

PFAS are widespread in Bay food web

PFOS is most abundant

- May pose risks to wildlife, though levels are declining

Occurrence, impacts of many other PFAS unknown

SF Bay Research Priorities:

- Stormwater, wastewater monitoring
- Bay water, sediment monitoring
- Fluorine mass balance on Bay wildlife
- Research to promote greener substitutes

Thank you

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