



Understanding Mercury in the San Francisco Bay watershed

Synthesis of scientific findings
from Calfed funded projects

Hypothesis

- Unfiltered methylmercury in water is an important factor in determining mercury concentrations in organisms
 - Methylmercury is the critical form that is accumulated by organisms
 - Physical speciation is important in determining transport and bioaccumulation

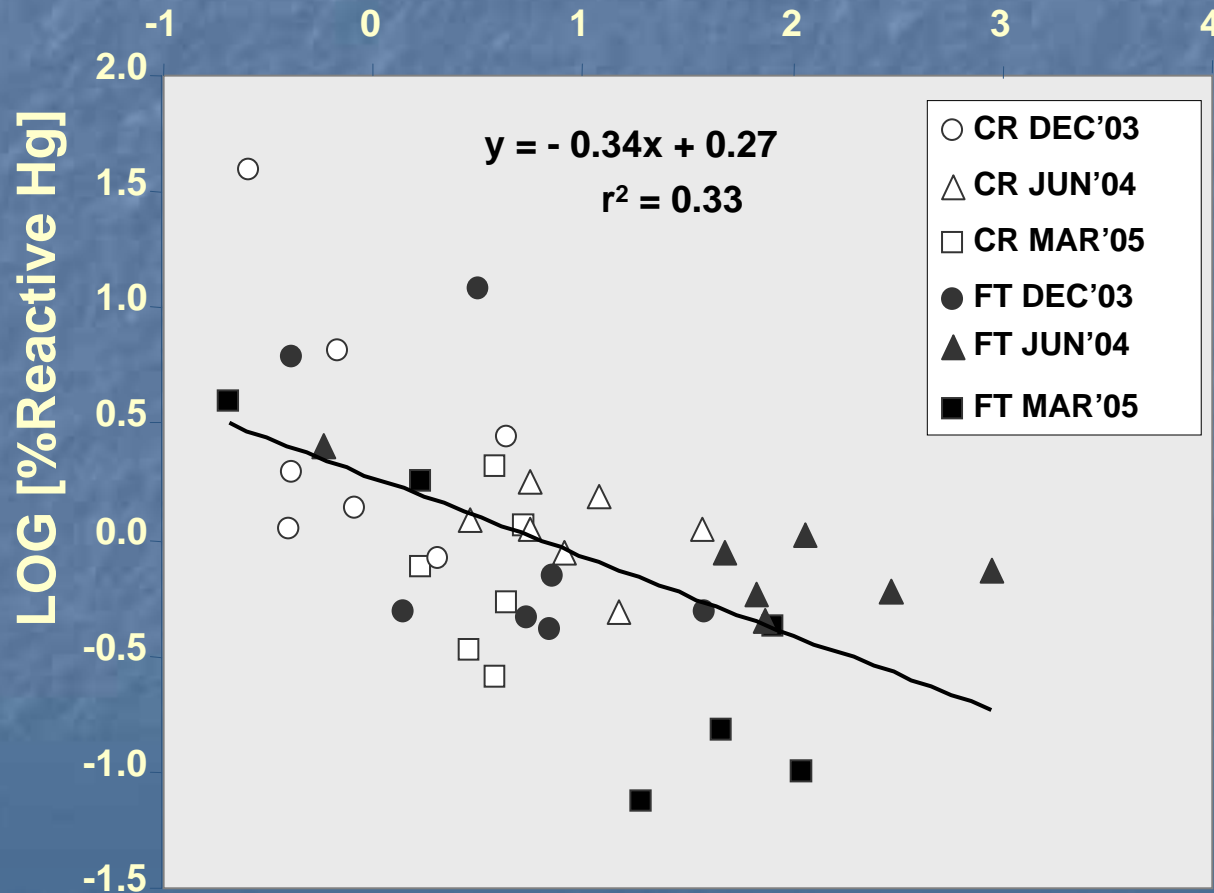
Hypothesis

Aquatic habitats with elevated methylmercury OR are sources of methylmercury to the environment typically have these characteristics:

- Sulfate plus low sulfide
- Inorganic mercury available for methylation
- Reactive organic matter
- High vegetation density and/or shallow water

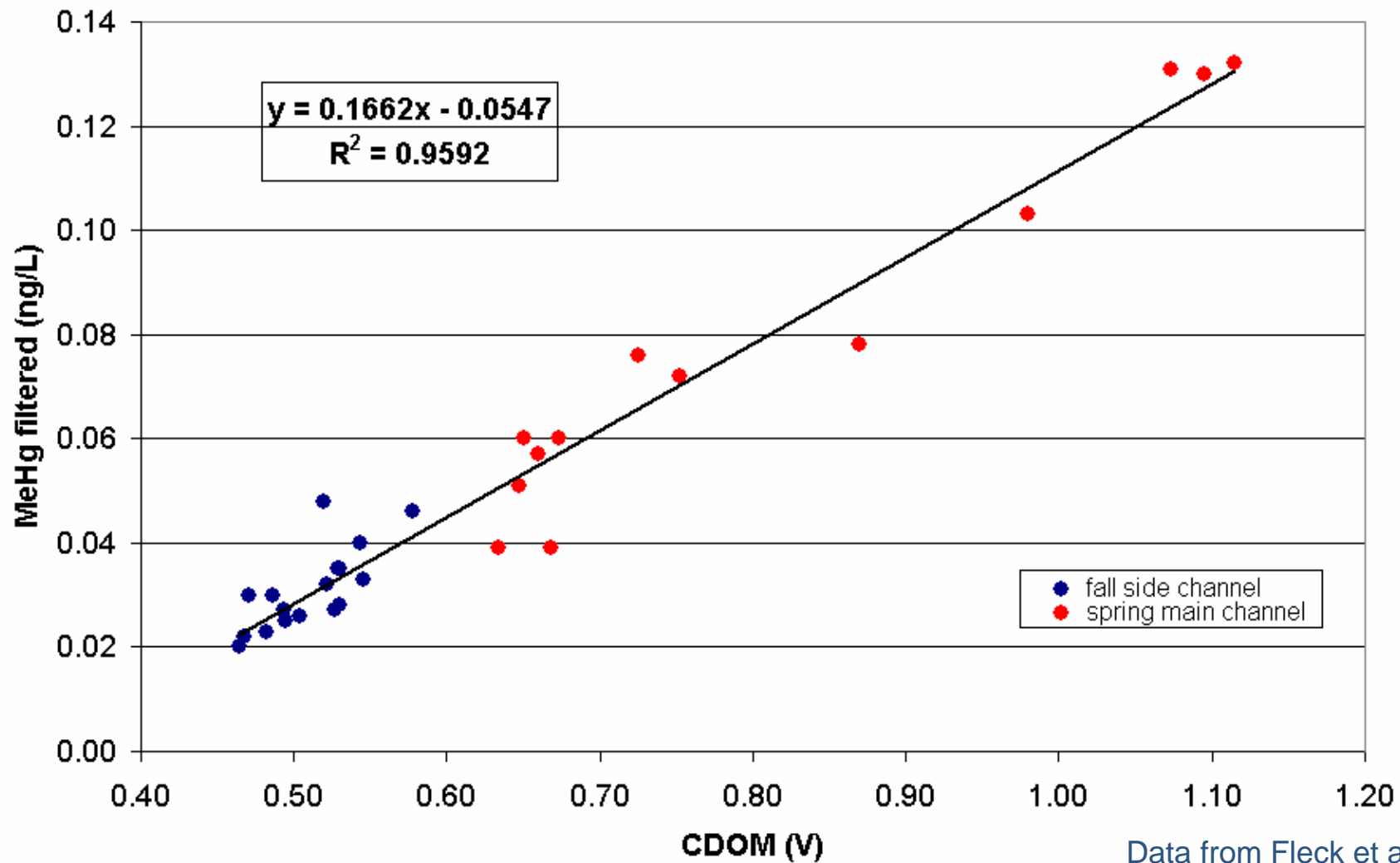
More reactive inorganic mercury is associated with more sulfate reduction
= more methylmercury

LOG [Sulfate Reduction Rate]



Data from M. Marvin-DiPasquale et al.

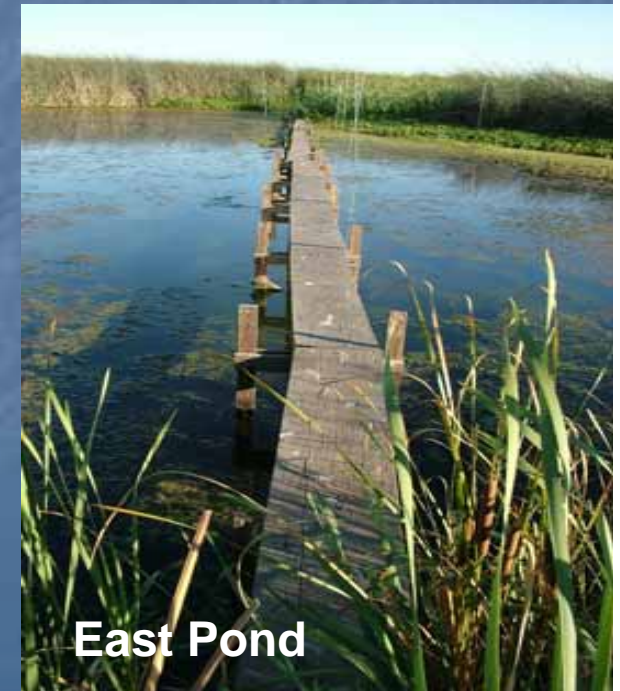
Dissolved organic matter and methylmercury are strongly correlated



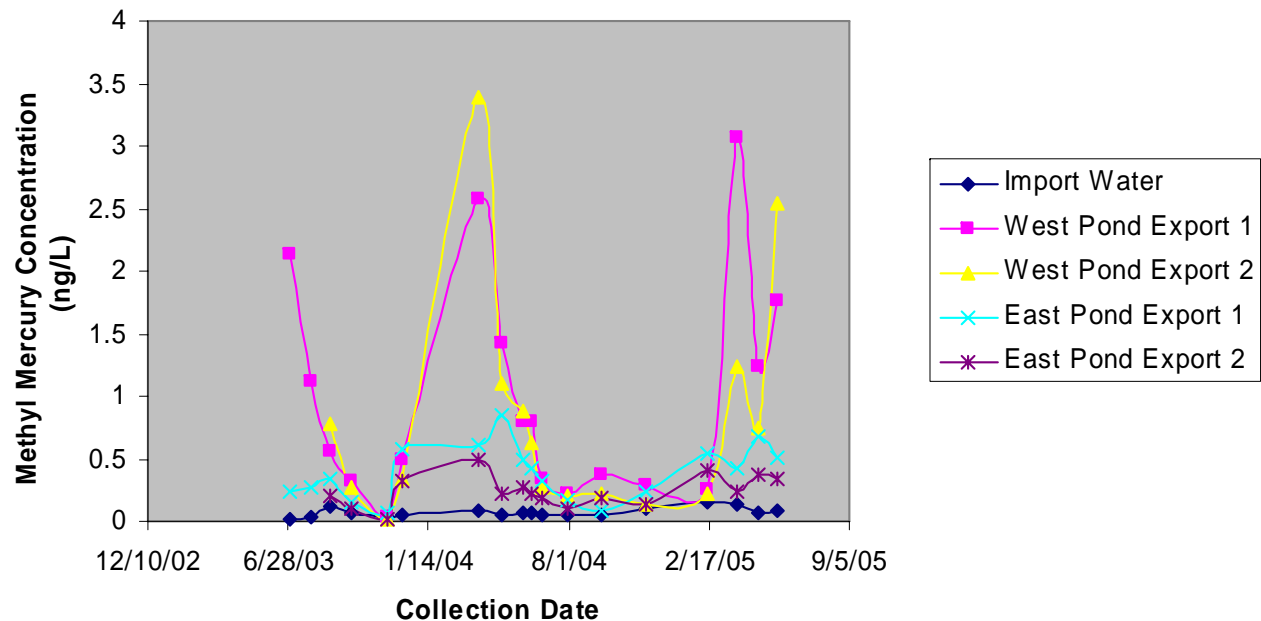
Data from Fleck et al.

Methylmercury is released from ponds with dense vegetation and low water depth

Data from M. Stephenson et al.



Twitchell Island West and East Pond Methyl Mercury Concentrations vs. Time

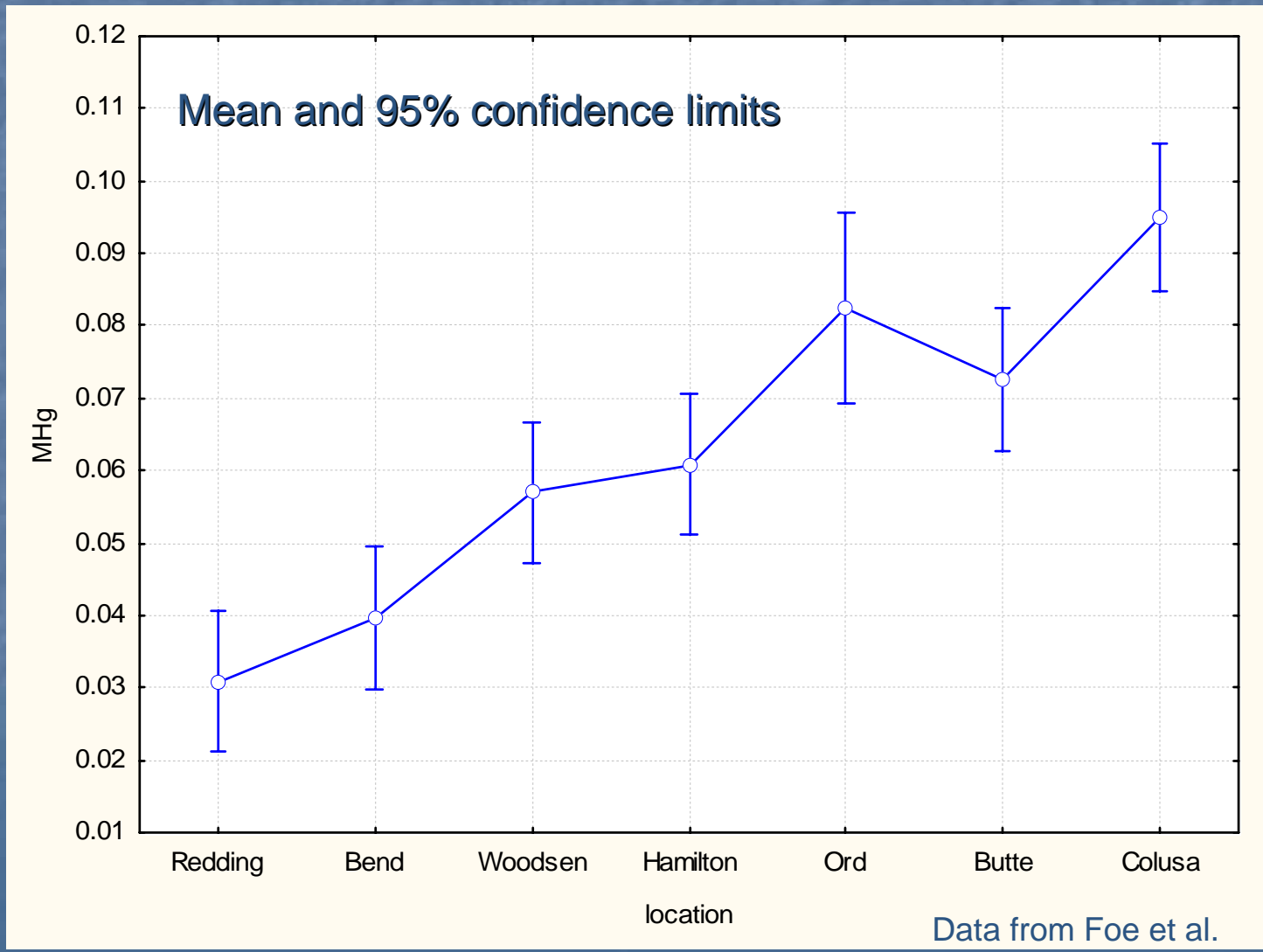


Hypothesis

- Rivers are a major source of methylmercury to the Delta. There is minimal loss of MeHg through chemical or biological reactions during transport.

Caveat: large, deep water areas may act as sinks for MeHg.

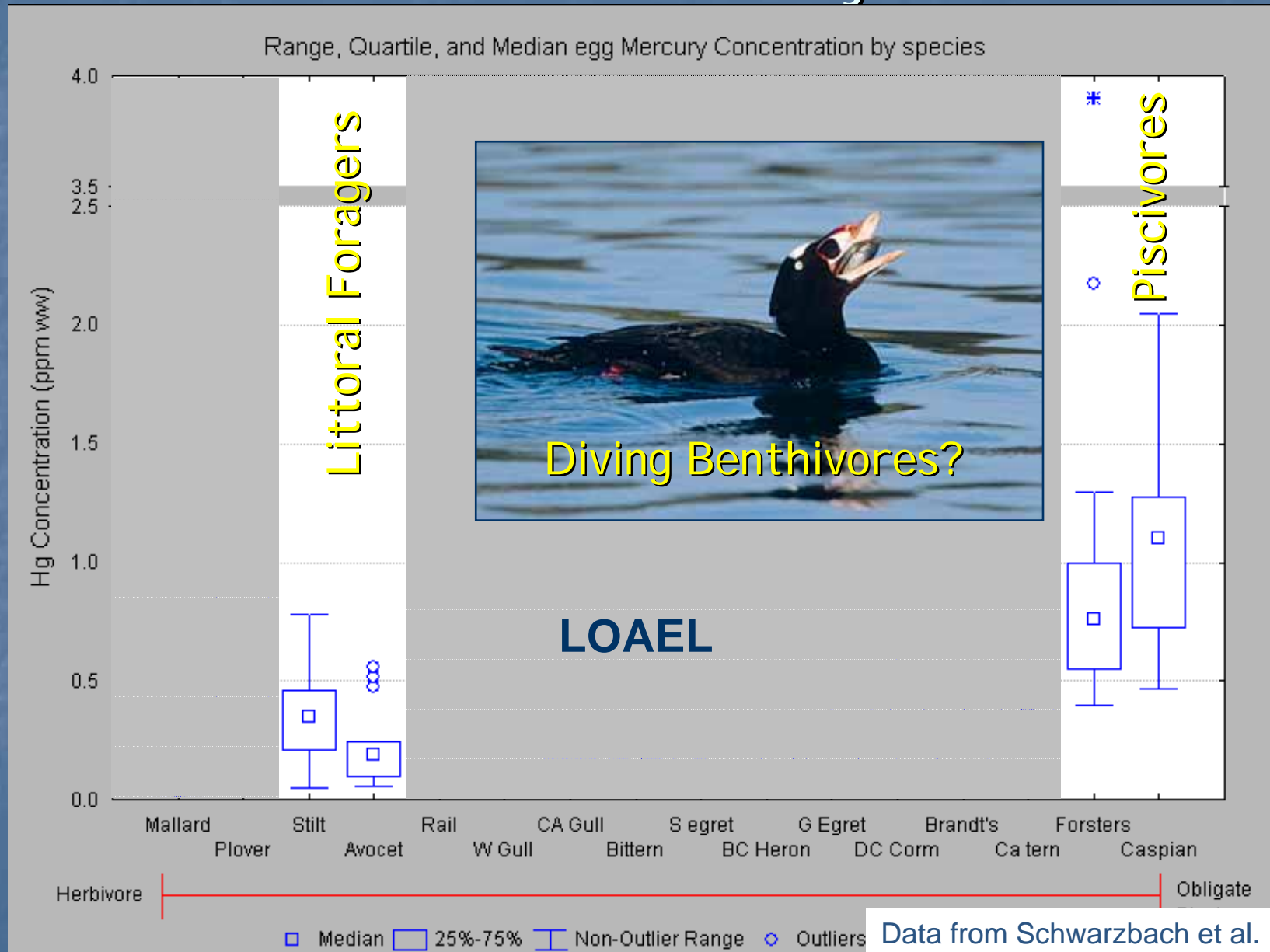
Methylmercury concentrations in the upper Sacramento River increase as you move downriver



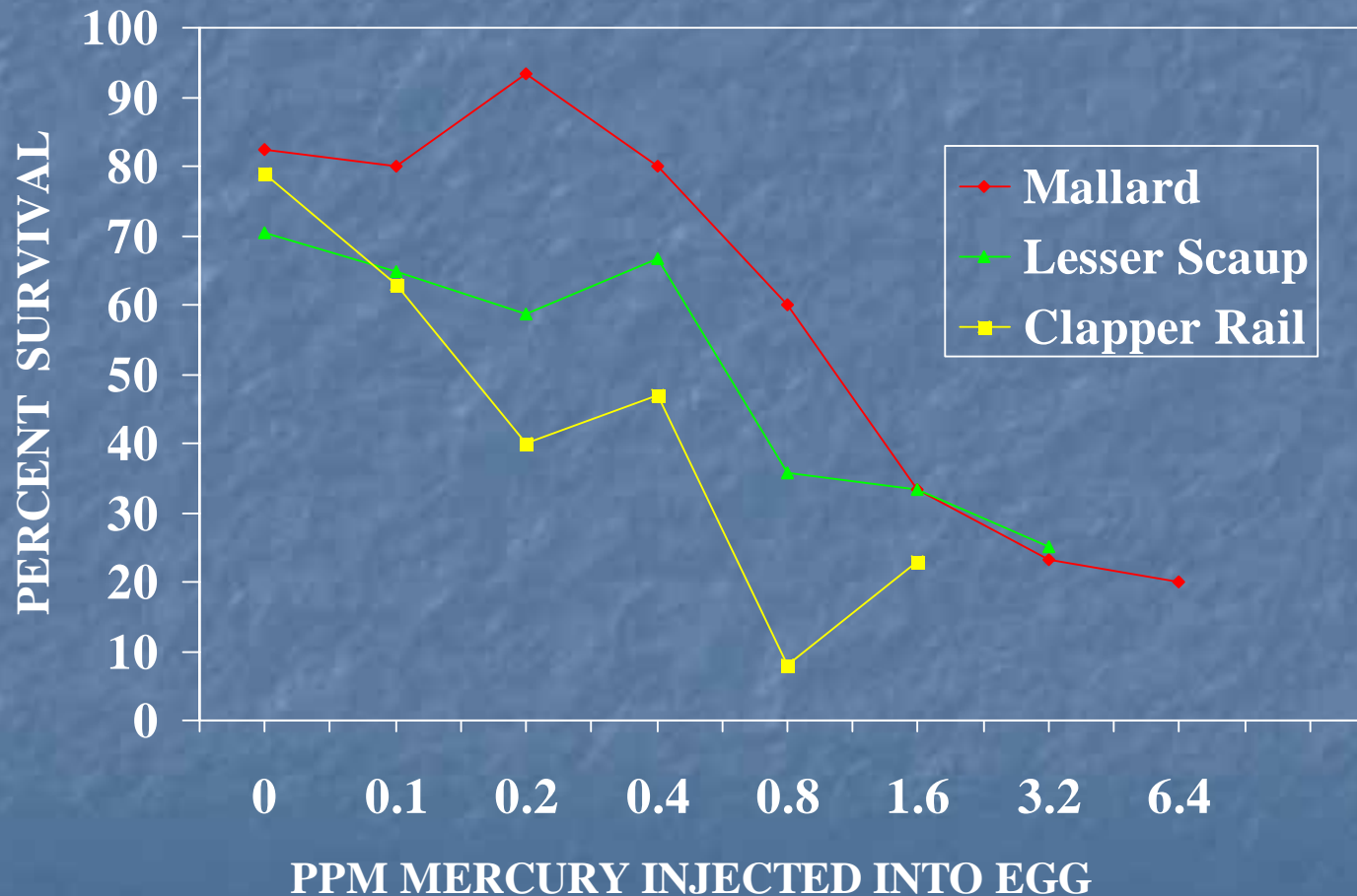
Hypothesis

- Methylmercury levels in aquatic biota from the San Francisco Bay watershed are sufficiently high to affect wildlife and are a concern for human health
 - Methylmercury concentrations in fish exceed human health advisory levels.
 - Fish-eating birds are more vulnerable to mercury toxicity
 - Bird eggs contain methylmercury levels higher than LOAELS (especially terns, rails)
 - Tern chicks show reduced growth at high levels of MeHg in muscle

Mercury concentrations in birds vary based on what they eat



Some bird species are more sensitive than others to mercury exposure



Data from Heinz et al.



Photo by M. Marvin-DiPasquale