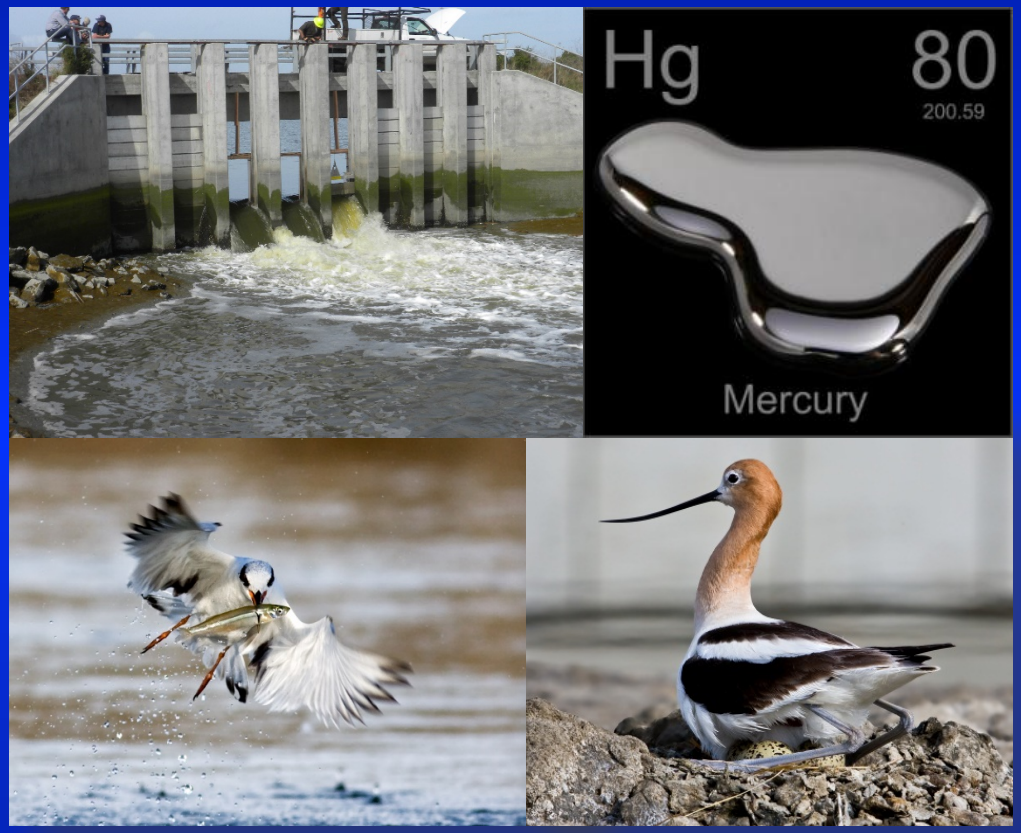
Will the South Bay Salt Pond Restoration Project Increase Mercury in Fish and Wildlife?



Josh Ackerman, Mark Herzog, Alex Hartman, Collin Eagles-Smith, Darell Slotton, and Mark Marvin-DiPasquale

U.S. Geological Survey & UC Davis

(October 22, 2015)

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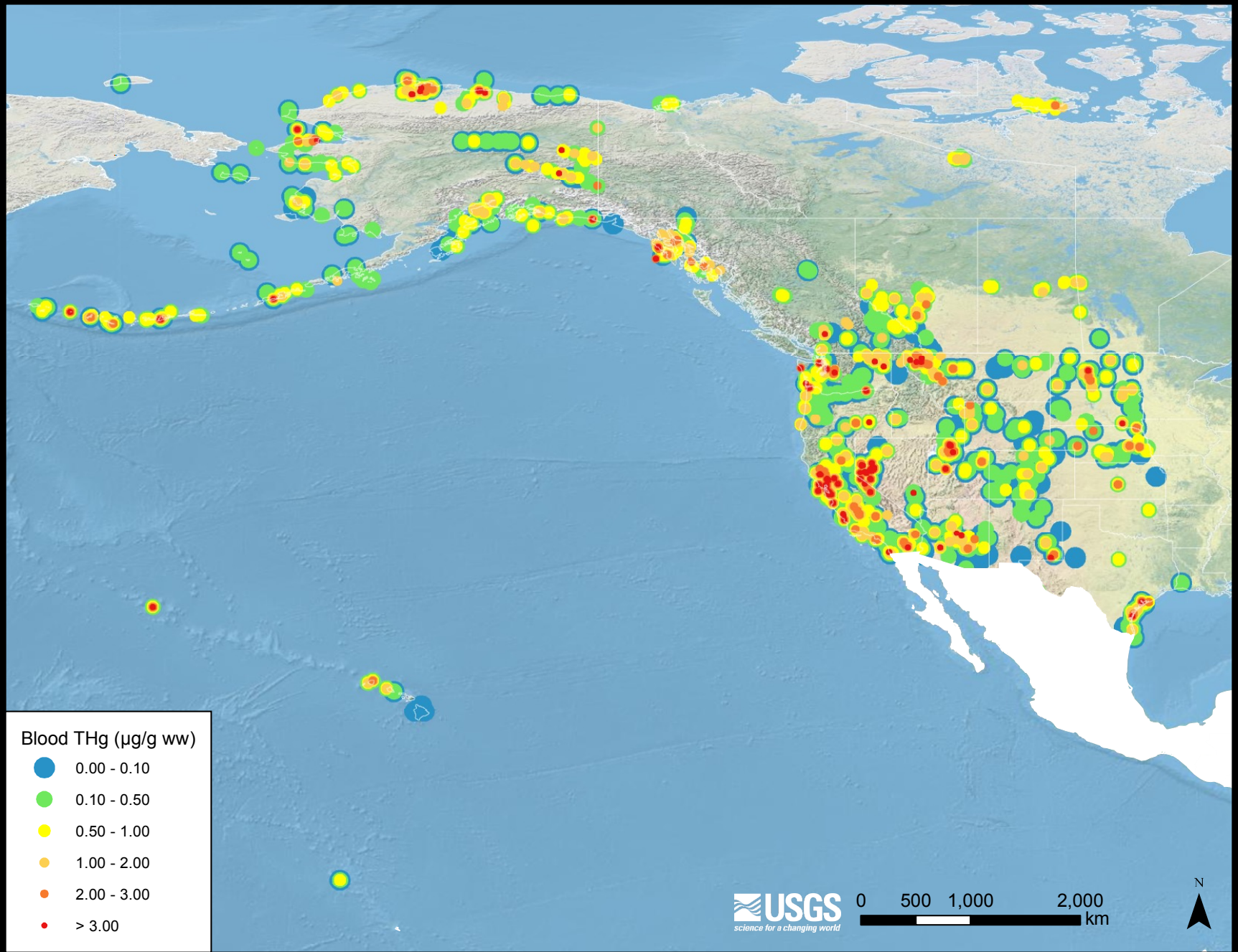
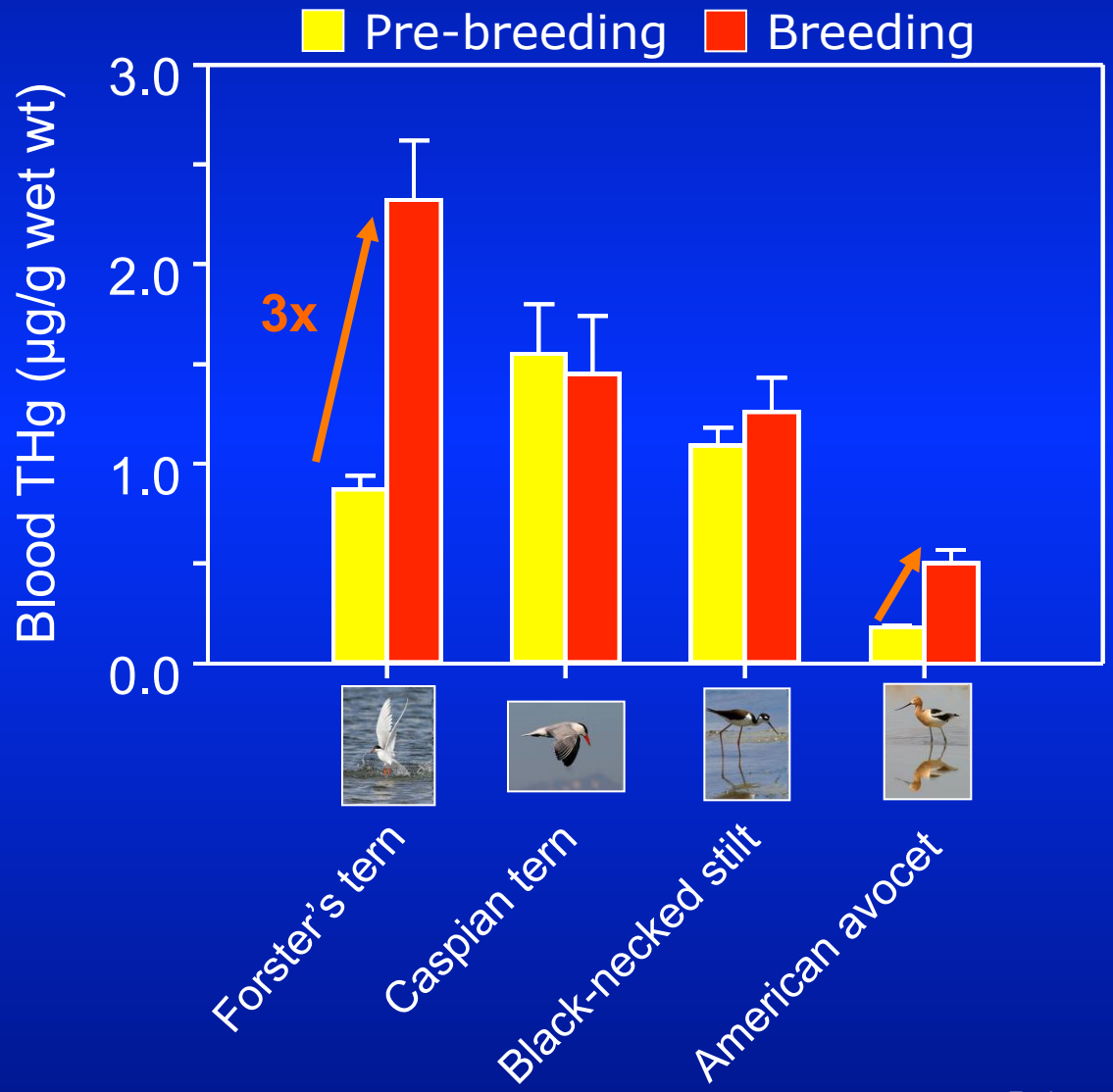
Photos by Ken Phenicie, Michael Kern, Cheryl Strong

Mercury Exposure and Risk to Birds in Western North America



Bird Mercury Increases after Arrival in Estuary



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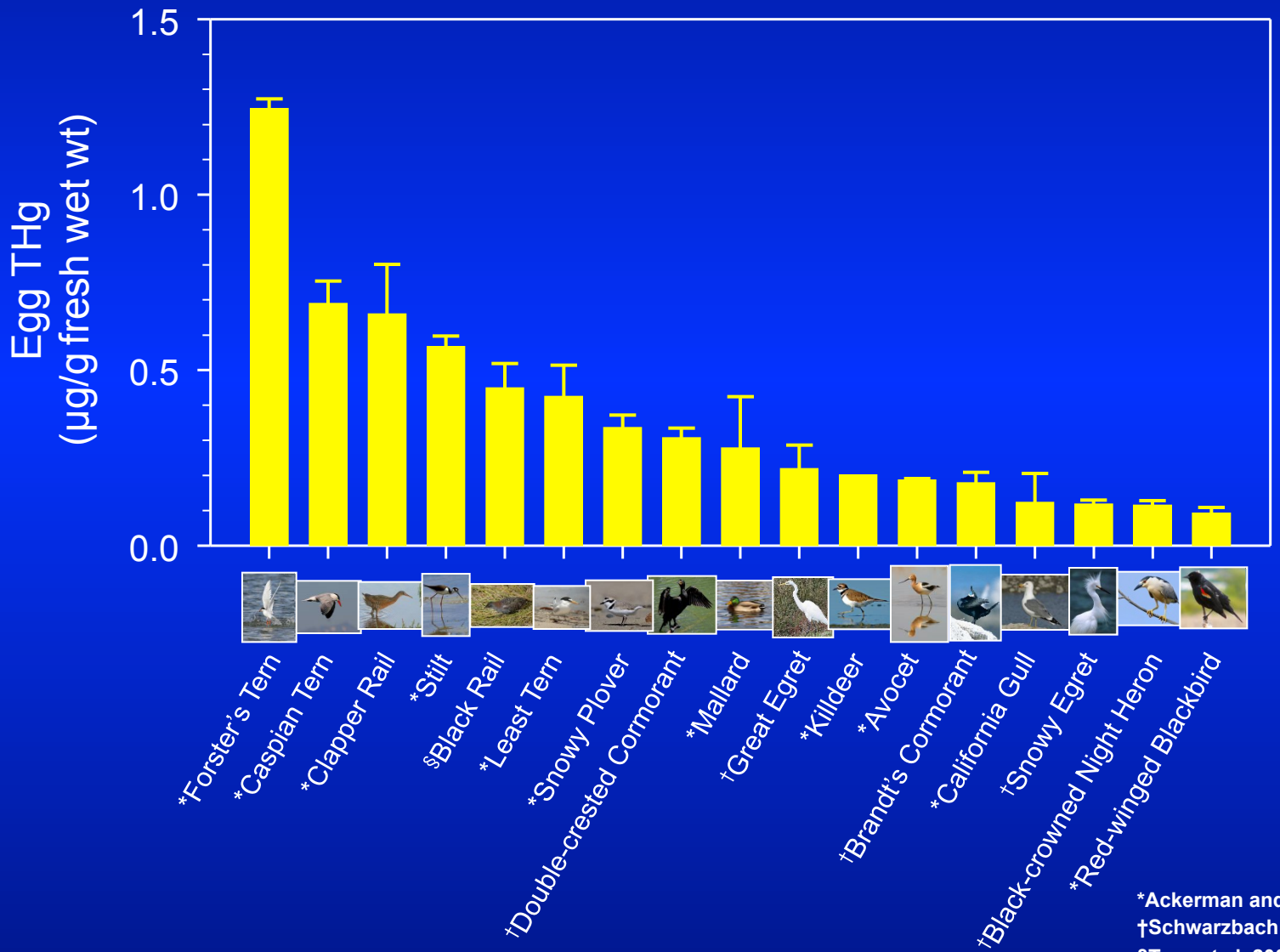
Environmental Pollution 2009; 157: 1993-2002

Bird Mercury Exposure in San Francisco Bay

17 species



*Ackerman and Eagles-Smith 2008
†Schwarzbach and Adelsbach 2003
§Tsao et al. 2008

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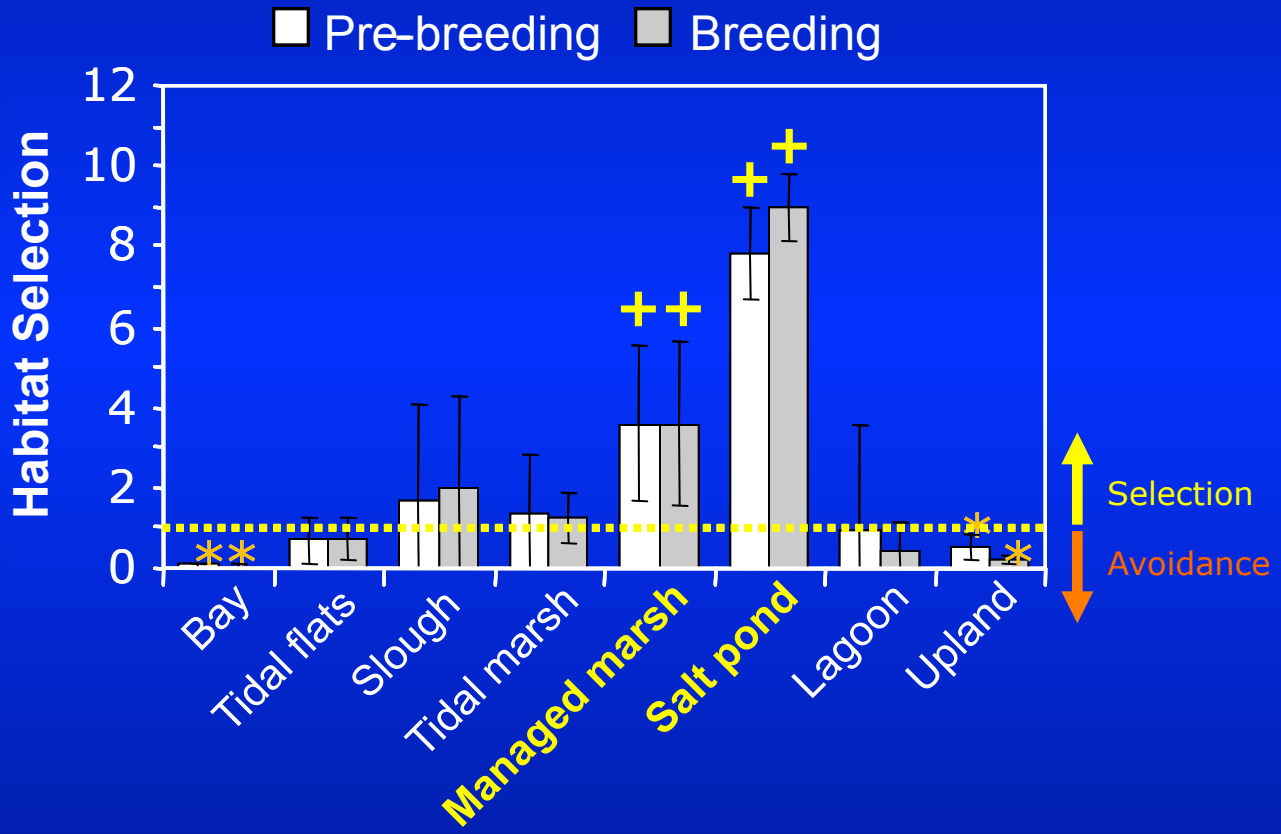
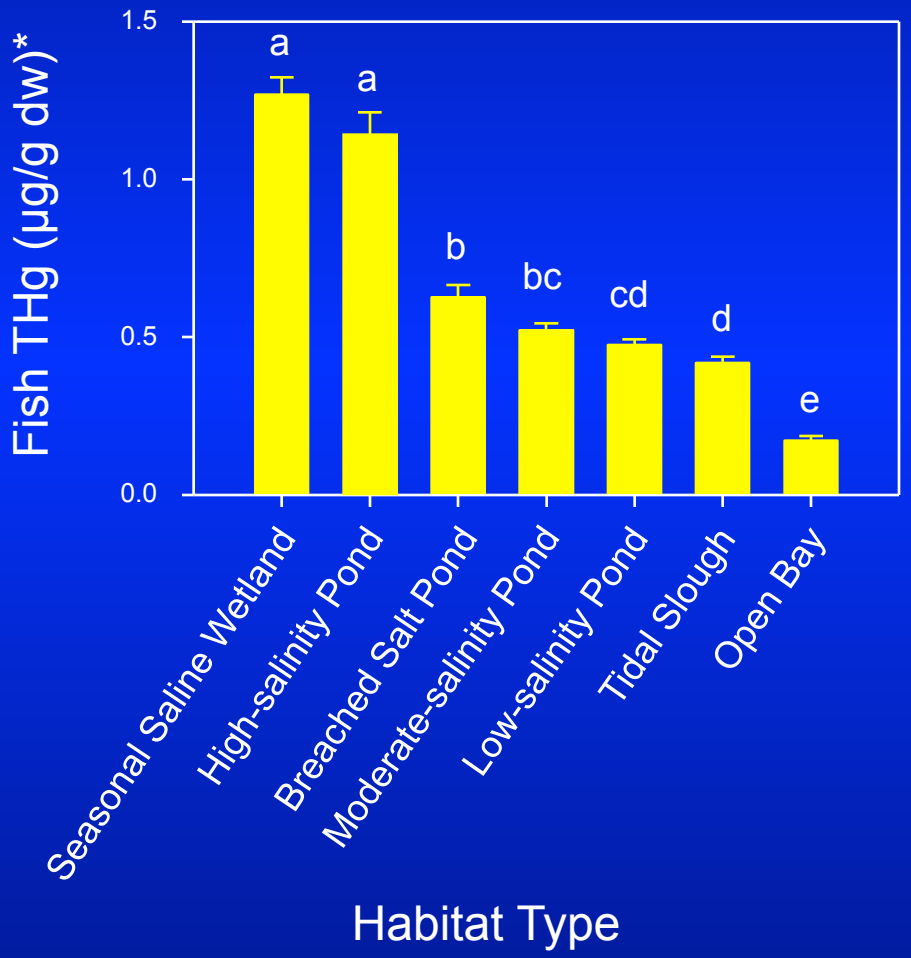
Habitat Use by Terns in San Francisco Bay



Fish Mercury Among Wetland Habitats



*least-square means controlling for region, wetland [region], date^2, and year.

*Concentrations are normalized to species-specific mean length.

*0.8=fish effects; 1.2=bird effects

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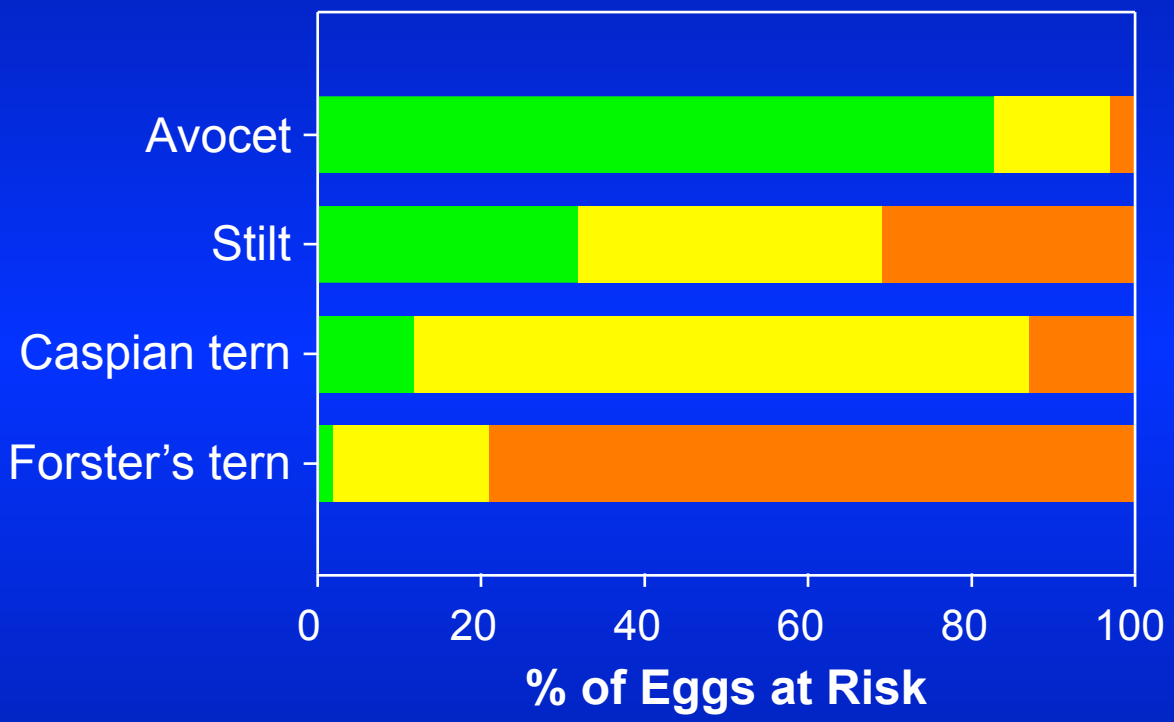
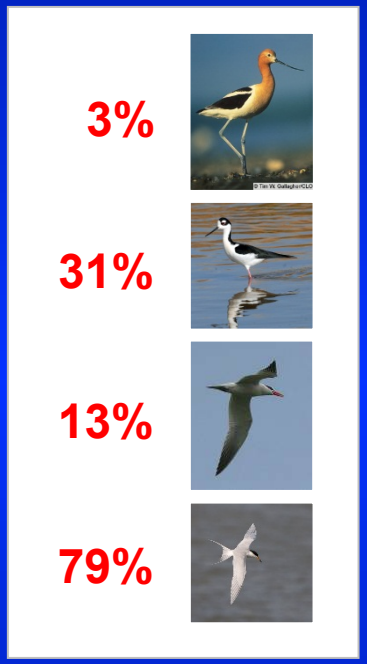
Environmental Pollution 2014; 193: 147-155

Percent of Eggs at Risk to Mercury Toxicity



% at High Risk



Low Risk (<0.5) Moderate Risk (0.5-1.0) High Risk (>1.0)

Egg THg (µg/g fresh wet wt)

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Pond A12 Water Management

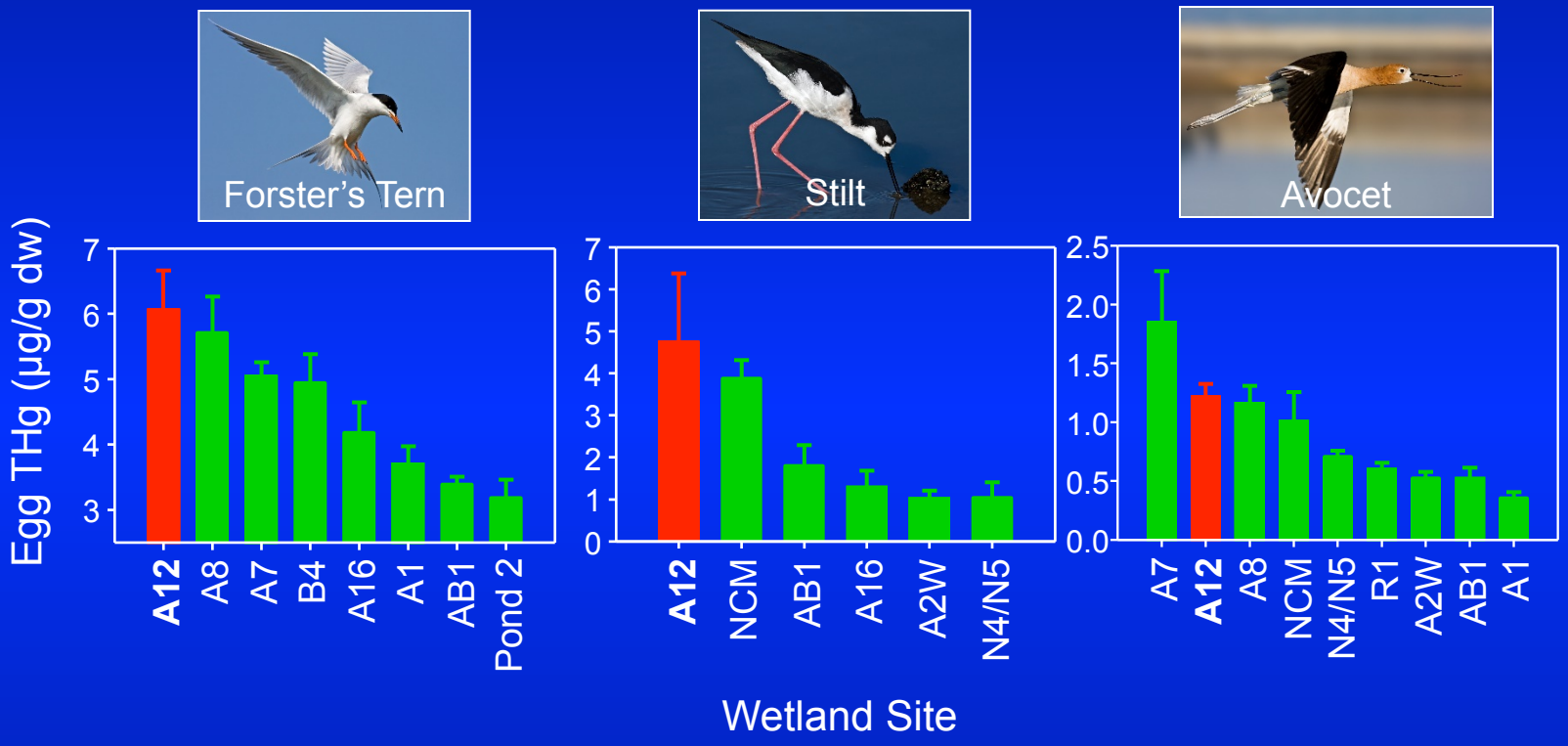
Before

- High-salinity
- Deep water
- No nesting habitat
- No prior history of nesting

After

- Water levels lowered
- Exposed substrate suitable for nesting islands

Mercury Bioaccumulation in Waterbird Eggs



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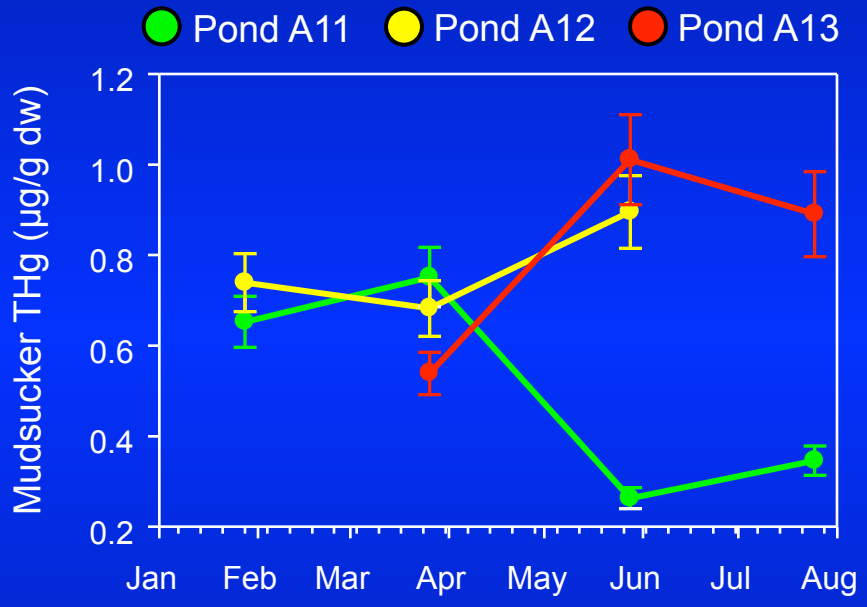
Mercury Bioaccumulation in Fish



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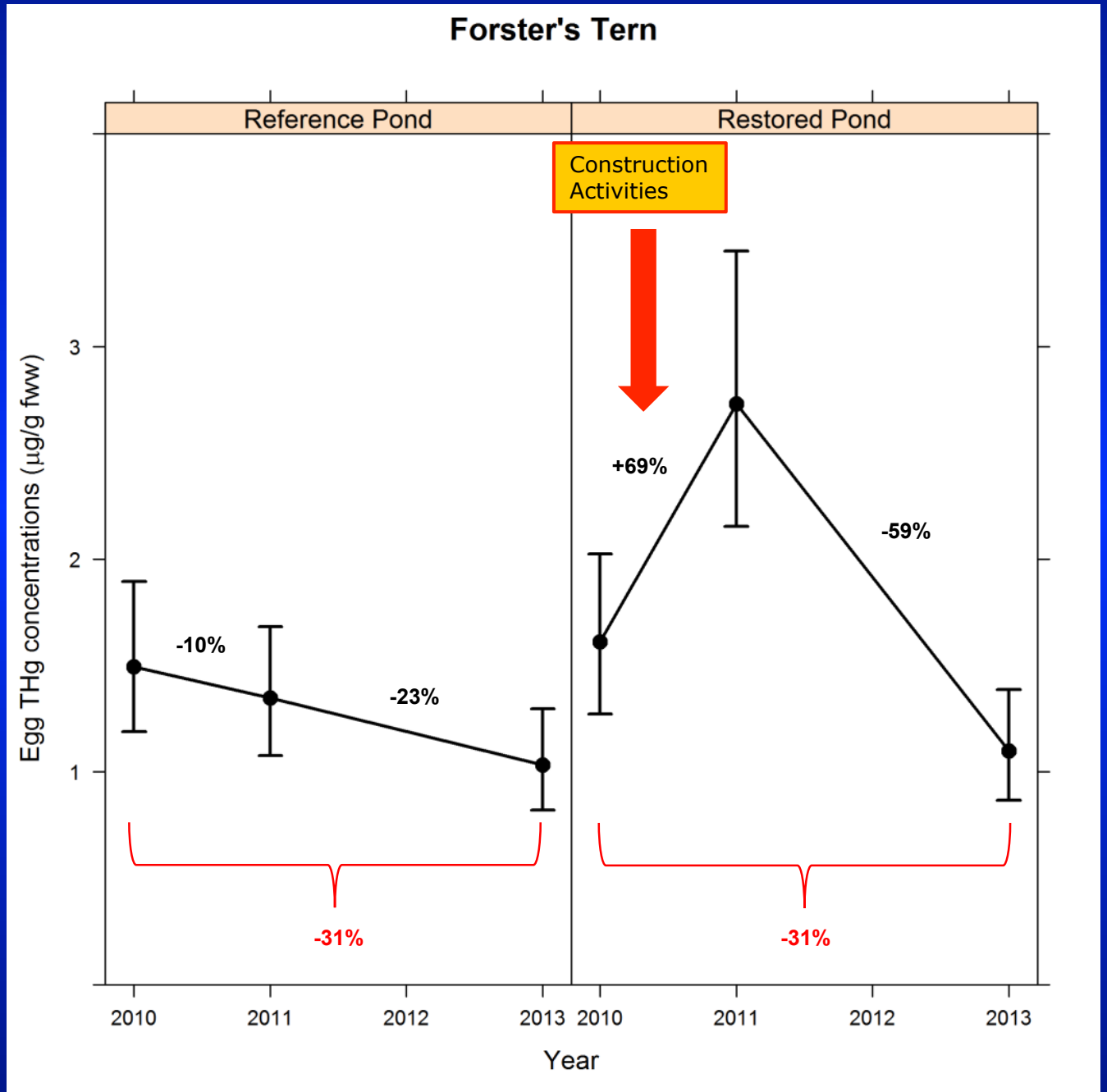
Pond A8 Management

Bird Egg Mercury Response to Wetland Restoration



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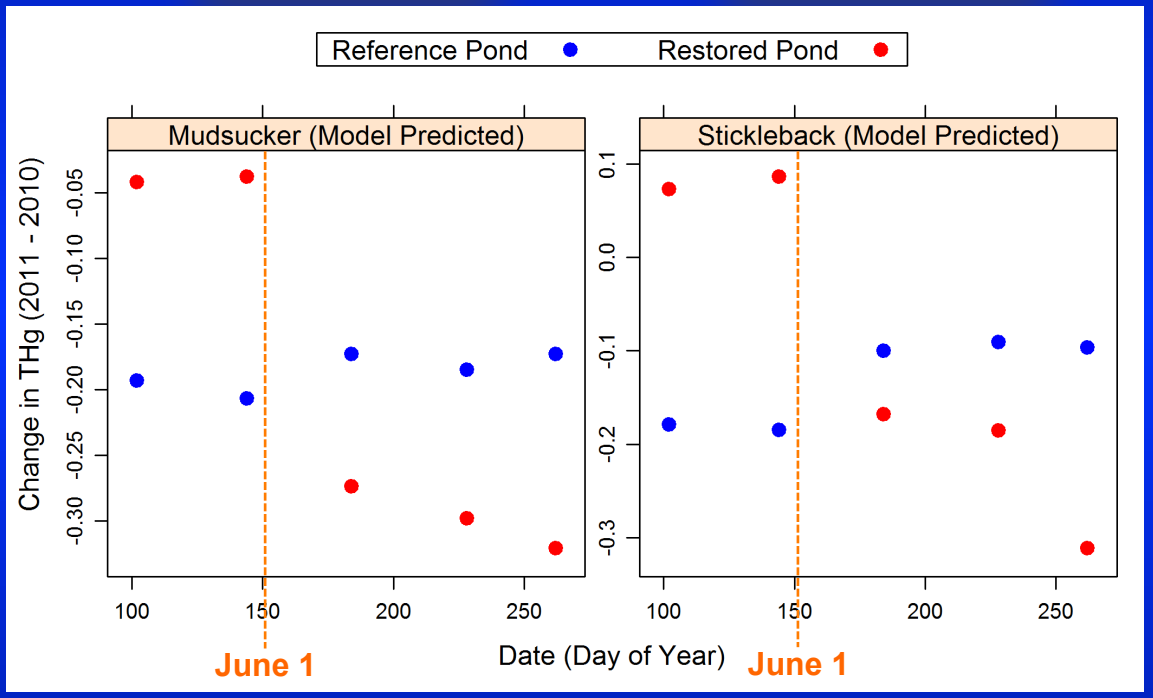
Fish Mercury Response to Wetland Restoration



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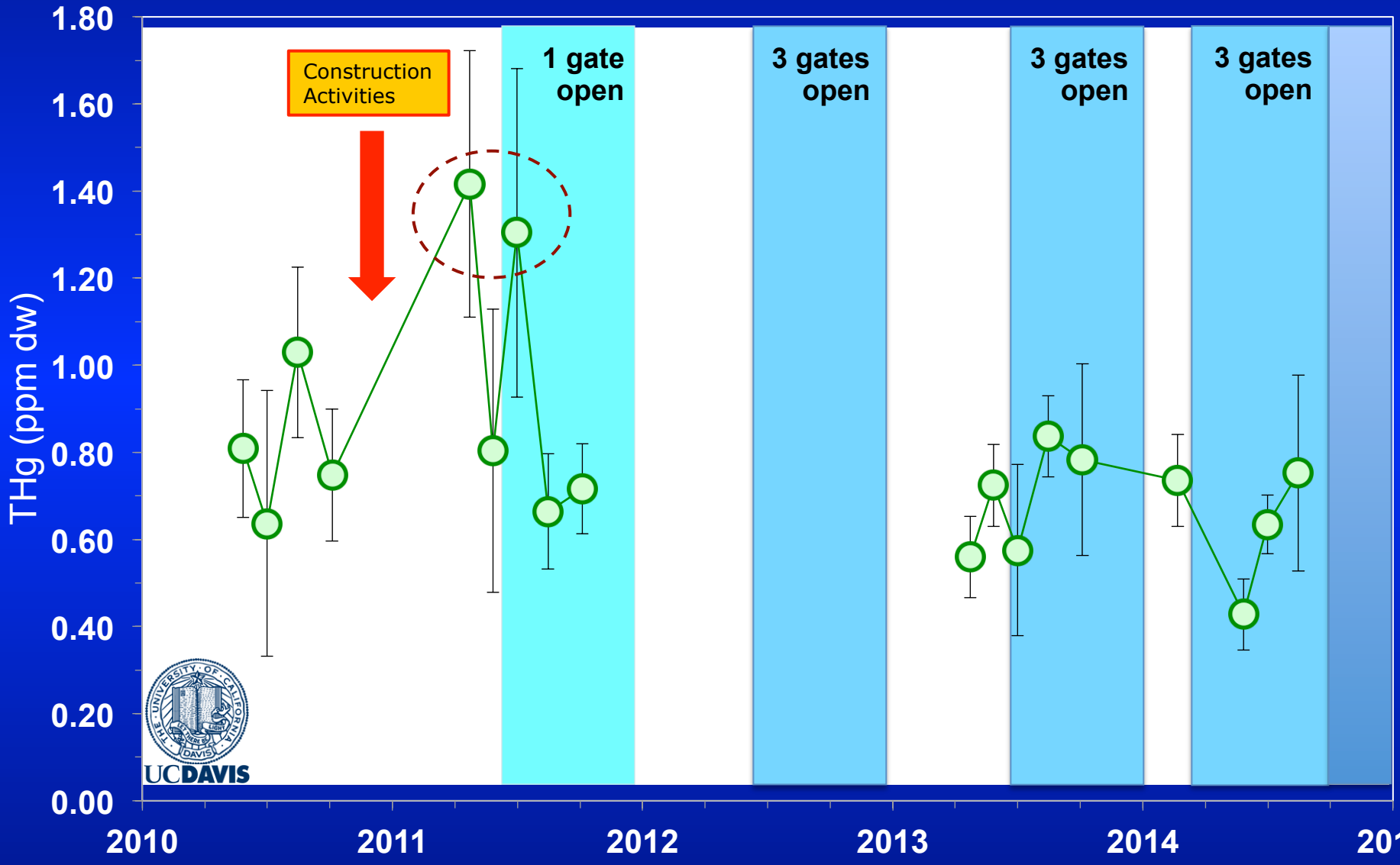
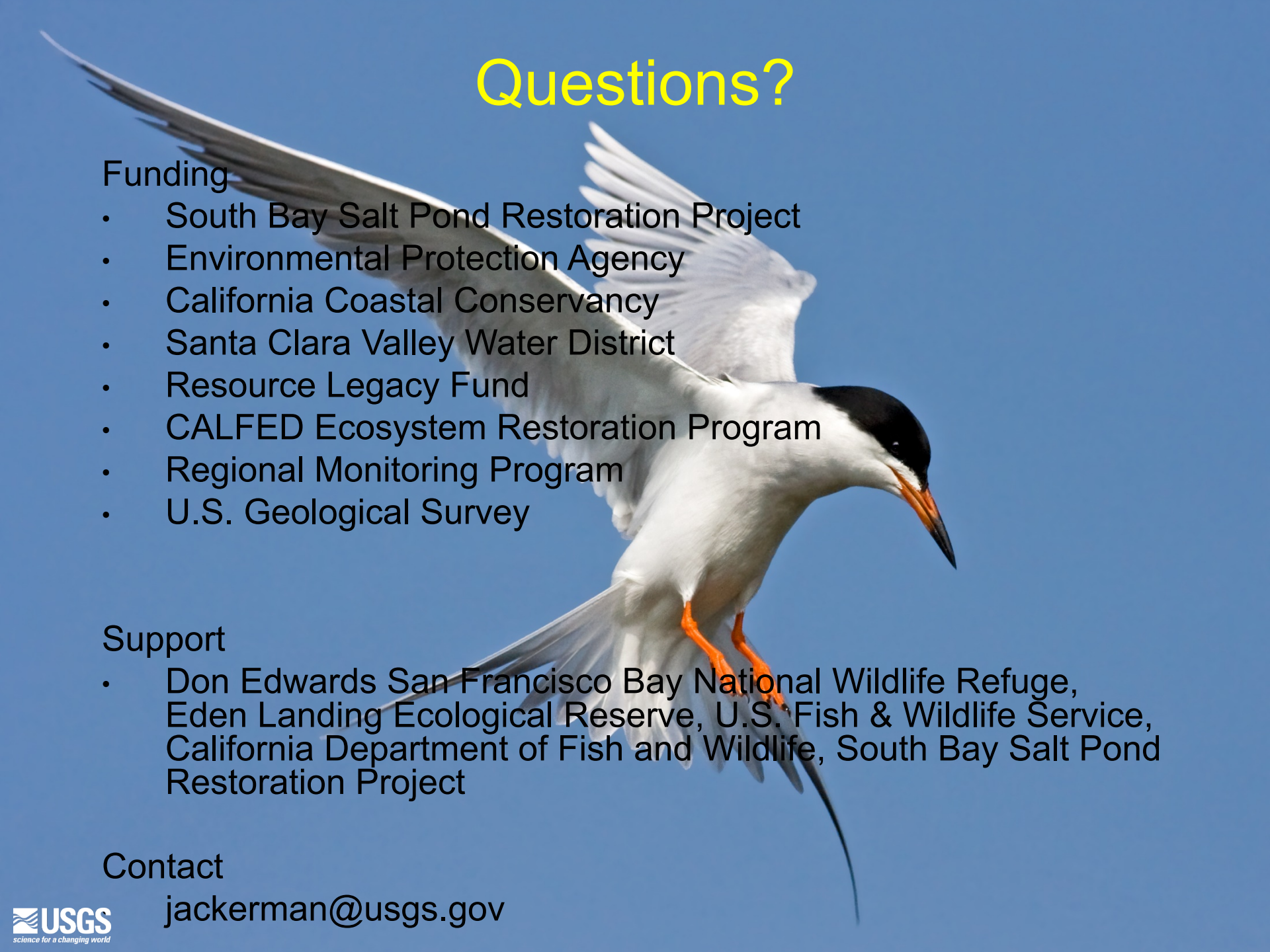
Alviso Slough Fish Response to Wetland Restoration



Will the South Bay Salt Pond Restoration Project Increase Mercury in Fish and Wildlife?

- Some restoration actions do increase mercury over the short term (e.g., A8 and A12)
- Over the long term, mercury may stabilize and even decline (e.g., A8)
- Management actions can have both a positive and negative effect on mercury in animals; this provides an opportunity
- We are working to understand which management actions can reduce mercury in animals (e.g., salinity, timing of gate opening, water levels)

Questions?



Funding

- South Bay Salt Pond Restoration Project
- Environmental Protection Agency
- California Coastal Conservancy
- Santa Clara Valley Water District
- Resource Legacy Fund
- CALFED Ecosystem Restoration Program
- Regional Monitoring Program
- U.S. Geological Survey

Support

- Don Edwards San Francisco Bay National Wildlife Refuge, Eden Landing Ecological Reserve, U.S. Fish & Wildlife Service, California Department of Fish and Wildlife, South Bay Salt Pond Restoration Project

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