



Green sturgeon, longfin smelt, and dredging operations in the San Francisco Estuary



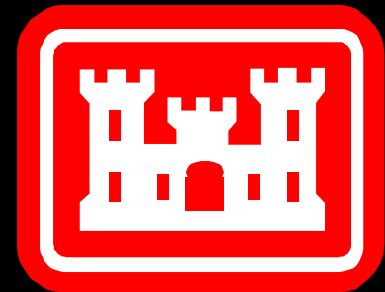
**Kat Ridolfi, Ben Greenfield,
and Bronwen Stanford**

SAN FRANCISCO ESTUARY INSTITUTE



Overview

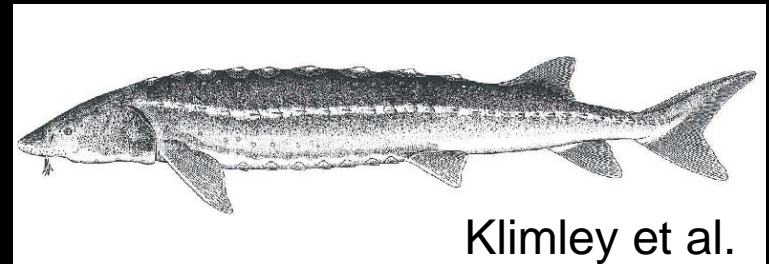
- Purpose of symposium
- Management history
- State of knowledge
- Impacts of dredging
- Recommendations



US Army Corps of Engineers
San Francisco District

Endangered Species Act

- Green sturgeon: federally “threatened” under ESA since 2006
- Longfin smelt state “threatened” in 2009
- Two major requirements:
 - Take permit
 - Mitigation
- Federal ESA provides
 - Broader definition of “take”
 - Consultation



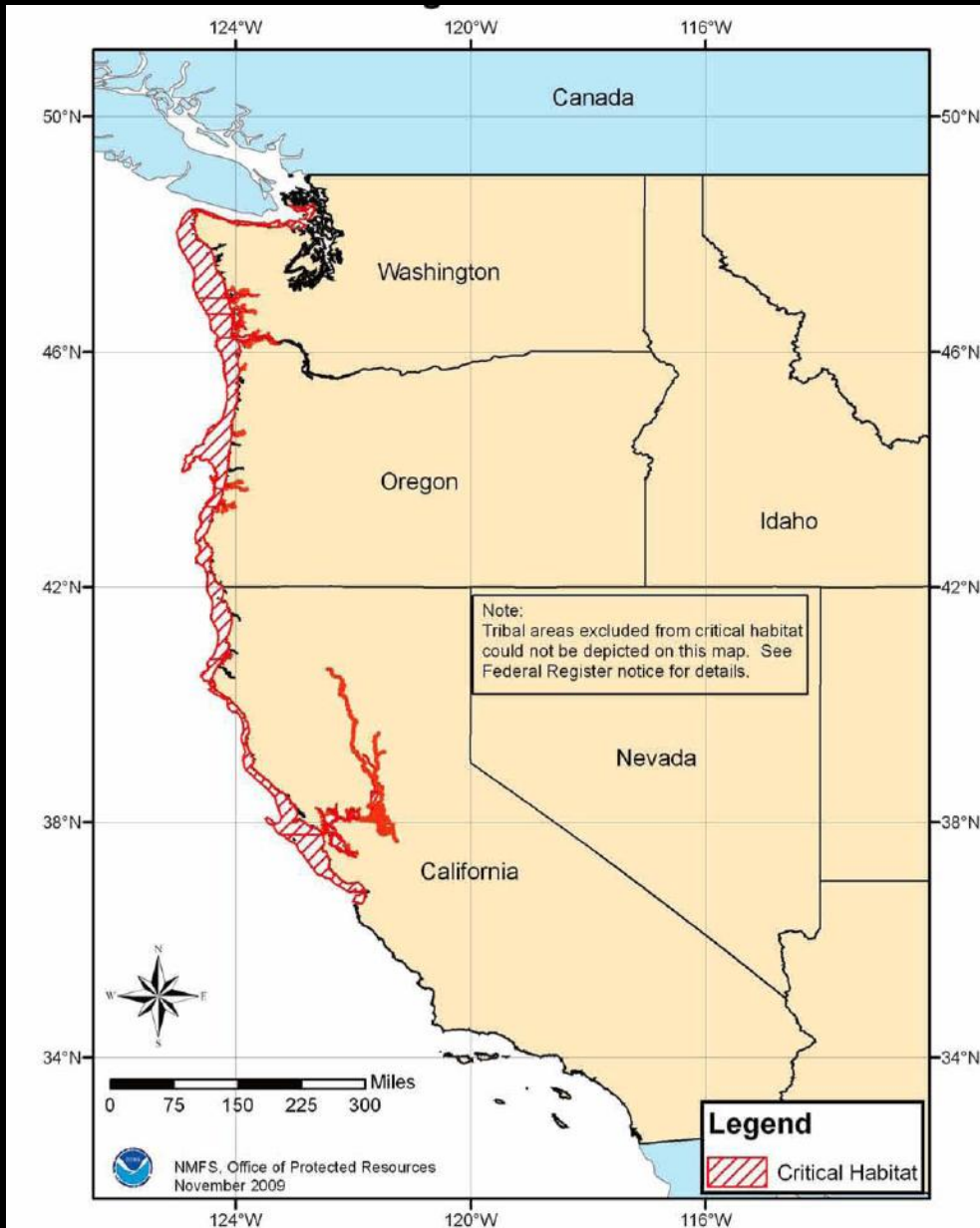
Jon Rosenfield

Purpose of Symposium

- 2 day symposium in Oakland
- Disseminate current knowledge
- Review management guidelines
- Develop future study plans

Green Sturgeon: Current State of Knowledge

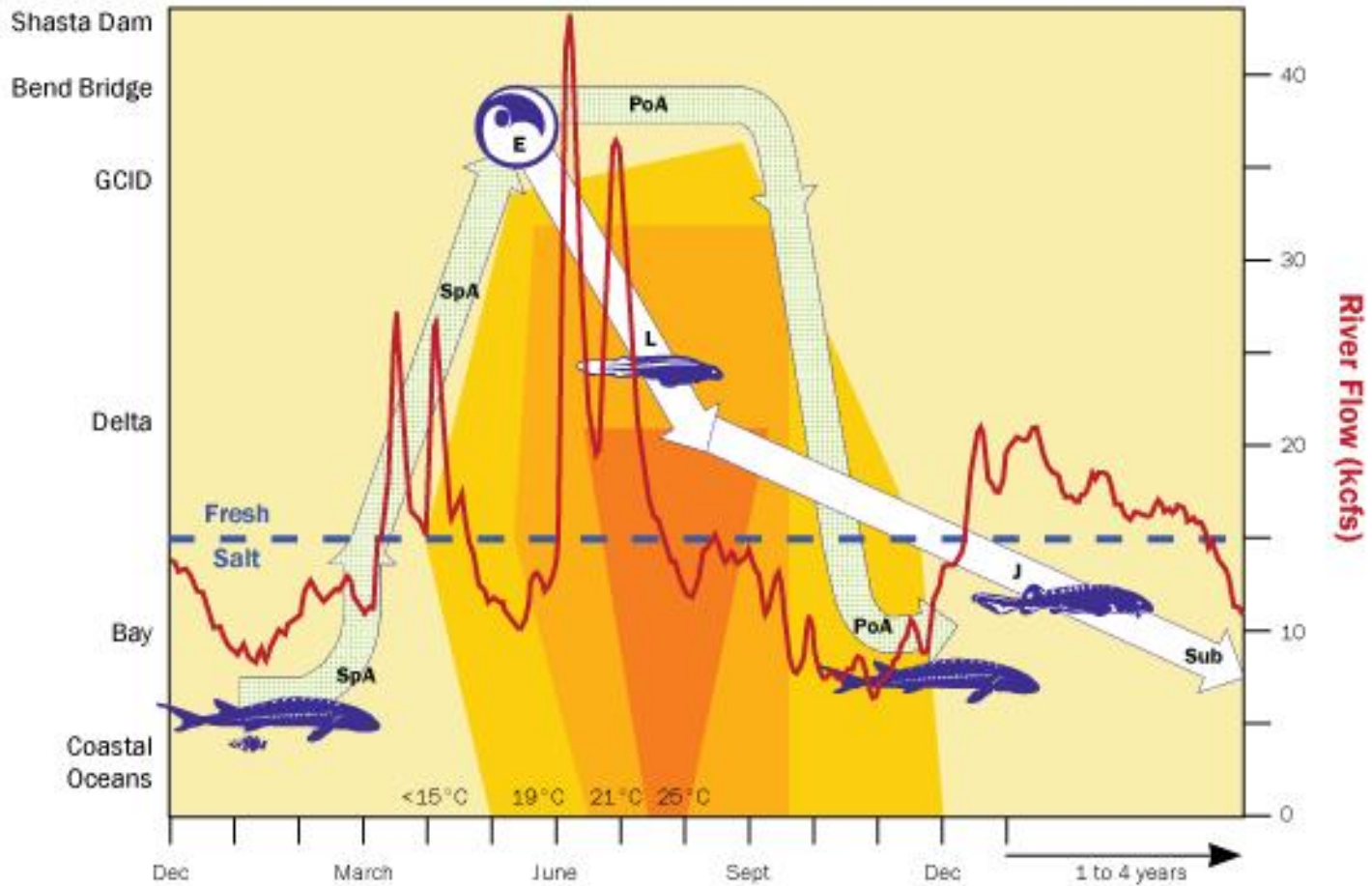
- Benthic dwellers
- Low reproductive rate



Thomas Dunklin



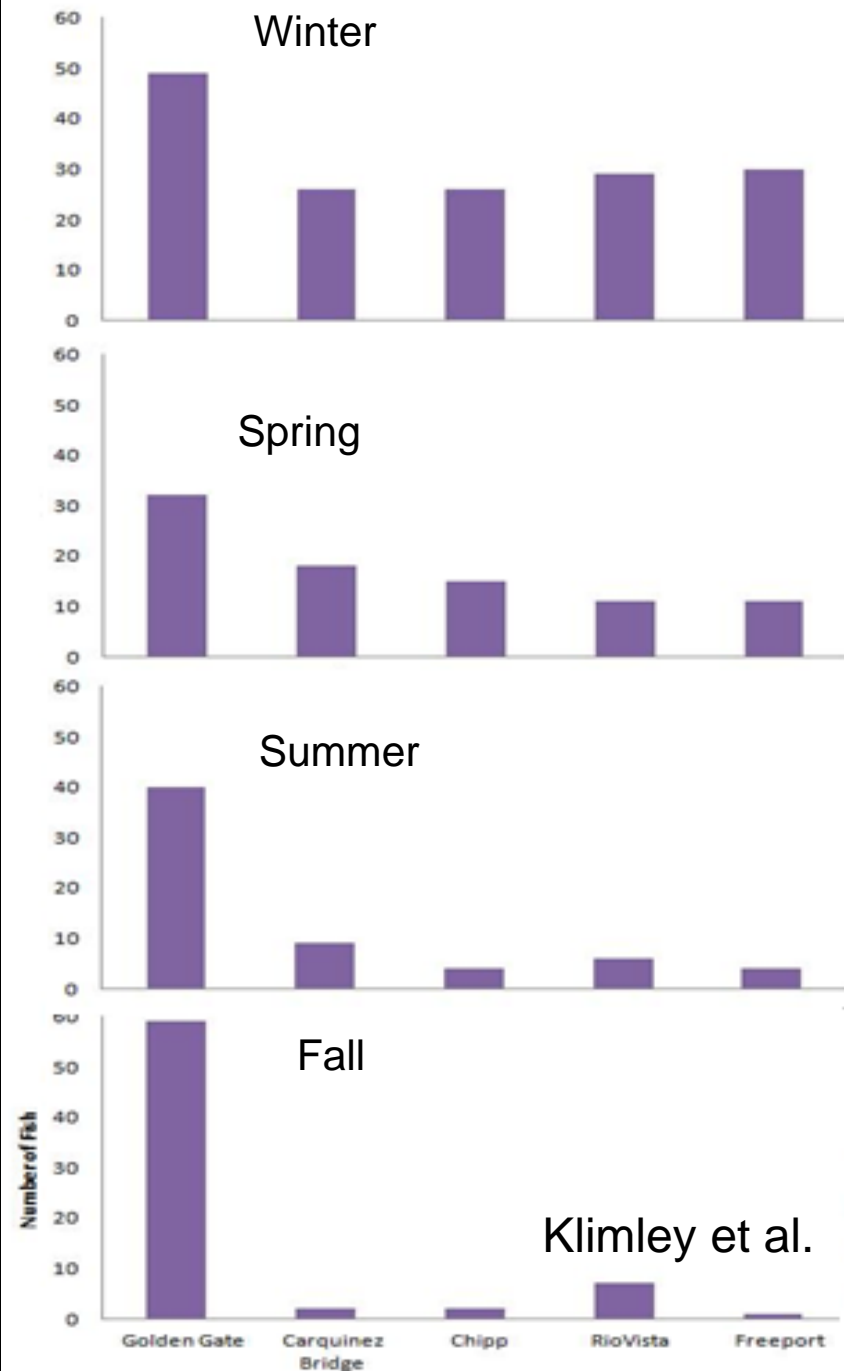
Life History Ecology: Green Sturgeon



Graphic: DRERIP

Green Sturgeon: Seasonal and daily movement

- Feed in nearshore
- Travel in deep water channel



Green Sturgeon: Impacts of Dredging

- Little time spent at dredging sites
- Little known about direct impacts
- Indirect impacts are potentially greatest risk:
 - Invasive species
 - Propeller strikes



Longfin Smelt: Current State of Knowledge

- Listed as threatened by state ONLY
- Distinct population in SF Bay?
- Little is known



Jon Rosenfield

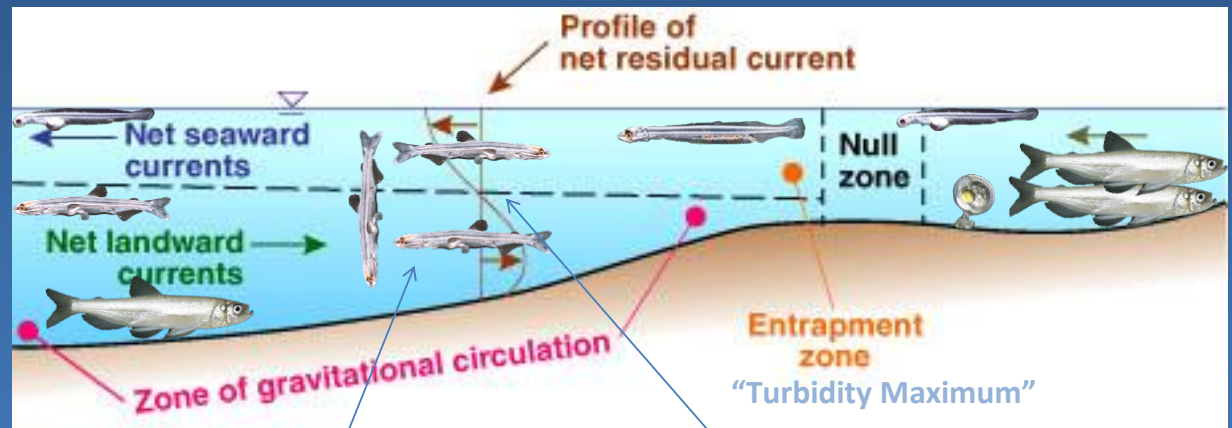


Longfin Smelt: Life History

- Adults mainly between Suisun and Central Bays
- Abundance correlated with freshwater flows, salinity, turbidity

Longfin Smelt Life-Cycle Conceptual Model

Saltwater-Ocean-Estuary → Freshwater



Vertical Migration

Salinity Stratification

$f \times x = \text{flow, tidal energy and depth}$

James Hobbs

Longfin Smelt: Positive Impacts of Dredging

- Increased turbidity
- Channel deepening (good for vertical migration)
- Invasive species capture



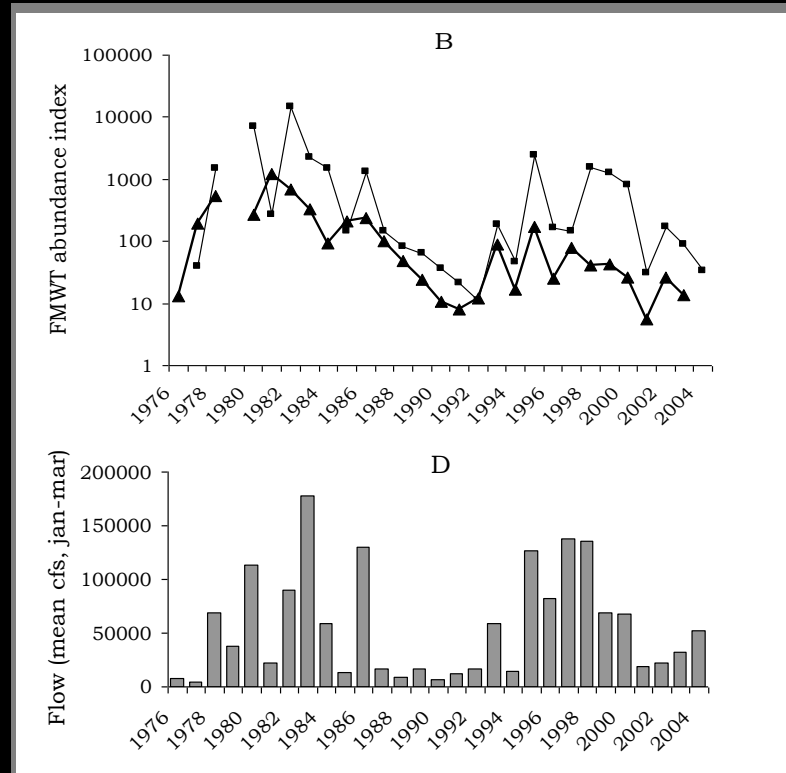
Longfin Smelt: Negative Impacts of Dredging

- Entrainment in hydraulic dredges
- Possibly indirect impacts (e.g. mobilized contaminants, invasive species)



Longfin Smelt: Other Potential Threats

- Shrimp trawling by-catch
- Surface water contaminants



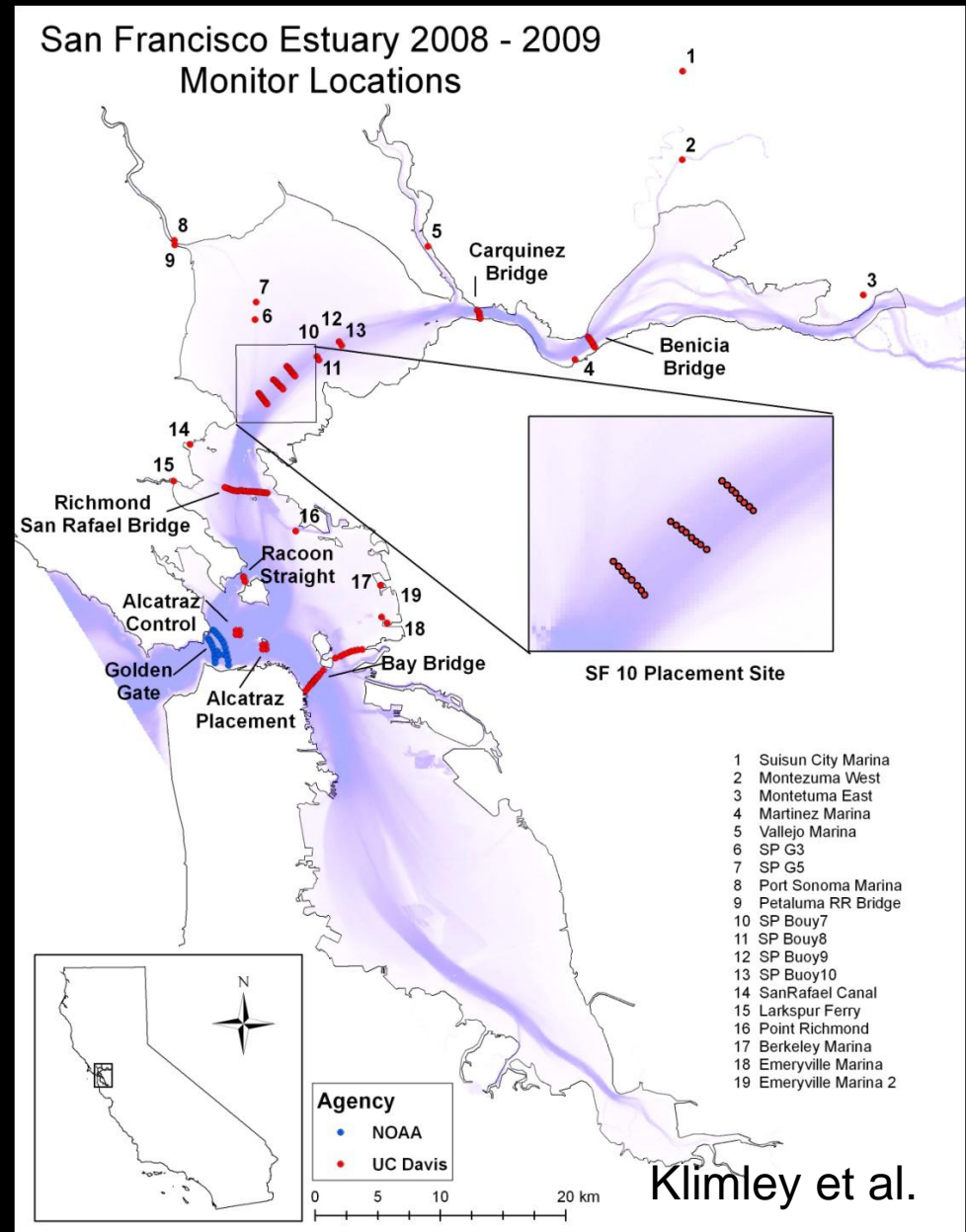
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Stakeholder Concerns

- Lack of communication re: requirements
- Impacts to work schedules
- Dredging may not be limiting factor for recovery

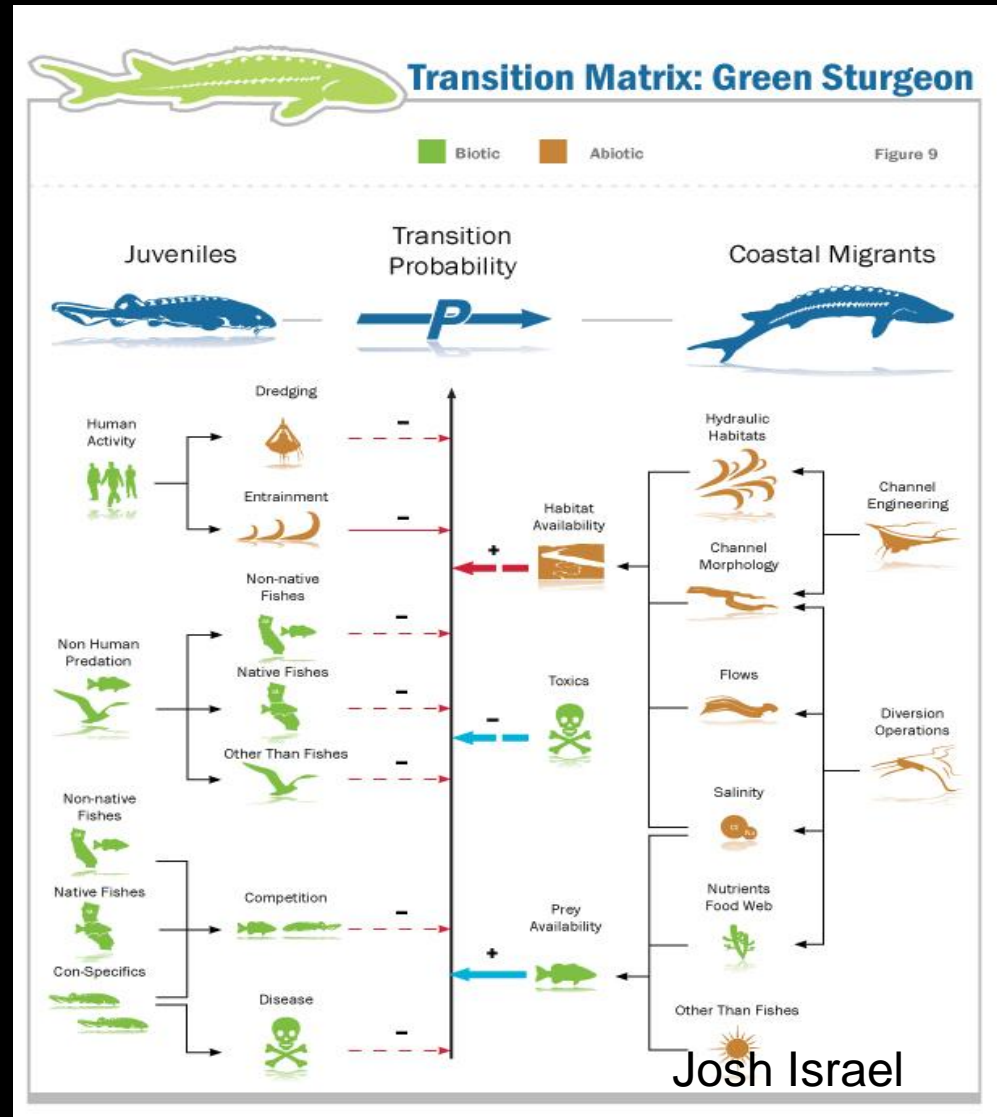
Research Recommendations from Symposium

- Improved life history and nearshore movement
 - Synthesize tracking data (GS)
- Severity of indirect impacts (limiting factors)
- Windows not ideal
- Direct entrainment studies: limited benefit (LFS)



Re-convene scientists and managers in a workshop

- Refined conceptual model
- Critical evaluation of potential management and mitigation
- Prioritized research



Recommendations for Next Steps

- Regional Research Program
 - Pooled funds
 - Ecosystem-wide, NOT project specific
 - Store data in real-time database
 - Long term benefits for all



Thanks

- Bill Brostoff and the LTMS for funding and review
- SFEI staff
- Science advisors and presenters

<http://www.sfei.org/cb/greensturgeon>

CONSERVATION ECOLOGY PROGRAM



Summary Report:

Green Sturgeon, Longfin Smelt, and Dredging Operations in the San Francisco Estuary

Prepared for U.S. Army Corps of Engineers

by Bronwen Stanford, Kat Ridolfi, and Ben Greenfield
San Francisco Estuary Institute



SAN FRANCISCO ESTUARY INSTITUTE
7770 Pardee Lane, Second floor, Oakland, CA 94621
p: 510-746-7334 (SFEI), f: 510-746-7300, www.sfei.org

- kat@sfei.org
- ben@sfei.org