

Prevention & Detection of Quagga Mussels, Zebra Mussels, and Other AIS at Aquaculture Facilities



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AIS and Aquaculture

- Interfere with operations
- Vector for spread
 - Discharge of water
 - Transfer of product



Example: NZMS at Hot Creek Hatchery (DFG)

- Spring-fed hatchery
- Found downstream before in hatchery
- Fish distribution modified



Example: Lake Mead Hatchery (NDOW)

- Lake Mead water
- Stocking suspended
- Disinfected
- Stocking truck disinfected prior to return to hatchery
- Disinfect inflow, alternate source

Example: Willow Beach NFH (USFWS)



Mark Olson, USFWS

Drivers for Action

- Hatchery infestation of NZMS in 2006
- Arrival of Dreissenid mussels in 2007
- Hatchery EIR in 2010

Hatchery EIR

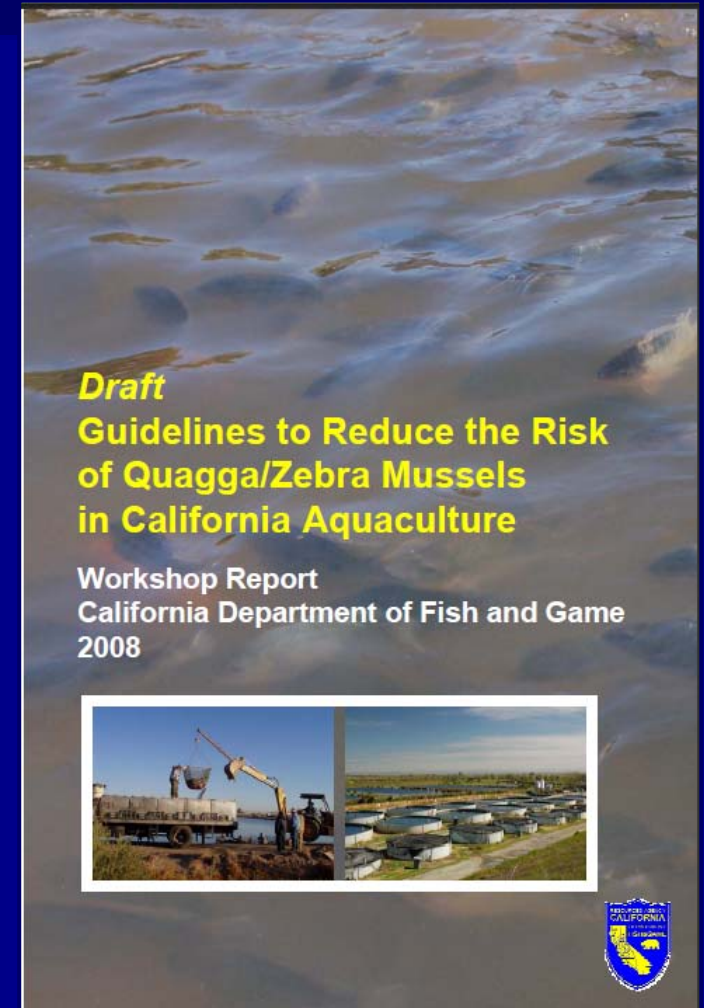
- DFG sued for non-compliance with CEQA
- EIR prepared addressing impacts on 80 "decision species"
- Effective January 11, 2010
- Potential AIS impacts mitigated to "less than significant"

CDFG Programs Affected

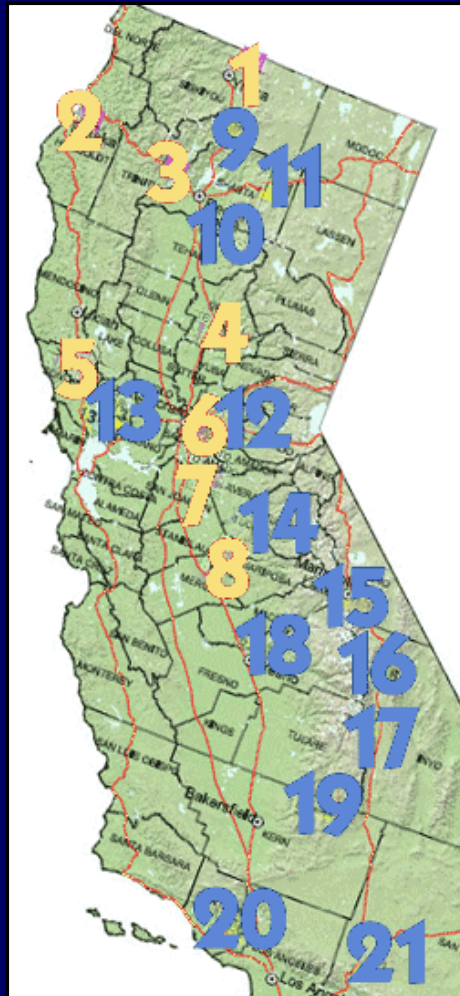
- Private Aquaculturist
- Private Stocking Permits
- Fishing in the City Program
- Classroom Aquarium Education Program
- DFG Hatcheries

Private Aquaculture in California

- Permitted by DFG
- Various warm and cold-water species
- Draft Guidelines developed in 2008
- Pending regulations, AIS monitoring may be required



DFG Hatchery Program



- 14 trout hatcheries and planting facilities
- 10 anadromous hatcheries

→ Monitor for AIS

→ Develop and implement HCCP Plans

AIS of Concern

- Dreissenid mussels
- New Zealand mudsnail
- Channeled apple snail
- *Egeria densa*
- *Myriophyllum spicatum*
- *Hydrilla verticillata*
- *Didymosphenia geminata*



Monitoring

- Goal: early detection
- Each facility is unique
 - Configuration
 - Source water
- Monitor inflow and/or outflow water
- Monitor within facility

Monitoring Method: Bioboxes



CA Department of Water Resources



Metropolitan Water District of So. CA

Monitoring Method: Surface Surveys



Mokelumne River Hatchery

Monitoring Method: Sampling "Plates"



HACCP Plans

- A management system to address product safety through analysis and control of hazards at each step of production, rather than in final product
- Originally developed for food safety, adapted to address AIS
- Systematic method to make consistent decisions on identified risks

HACCP Plans for Fish Facilities

- Specific to facility
- Identifies *who, what, where, when, how, and why*
- Addresses prevention & containment
- Effective for all potential AIS species

Thanks!

Dr. Cox, DFG Fish Production Program
Manager

CA Department of Water Resources
Metropolitan Water District of So. CA

Questions?