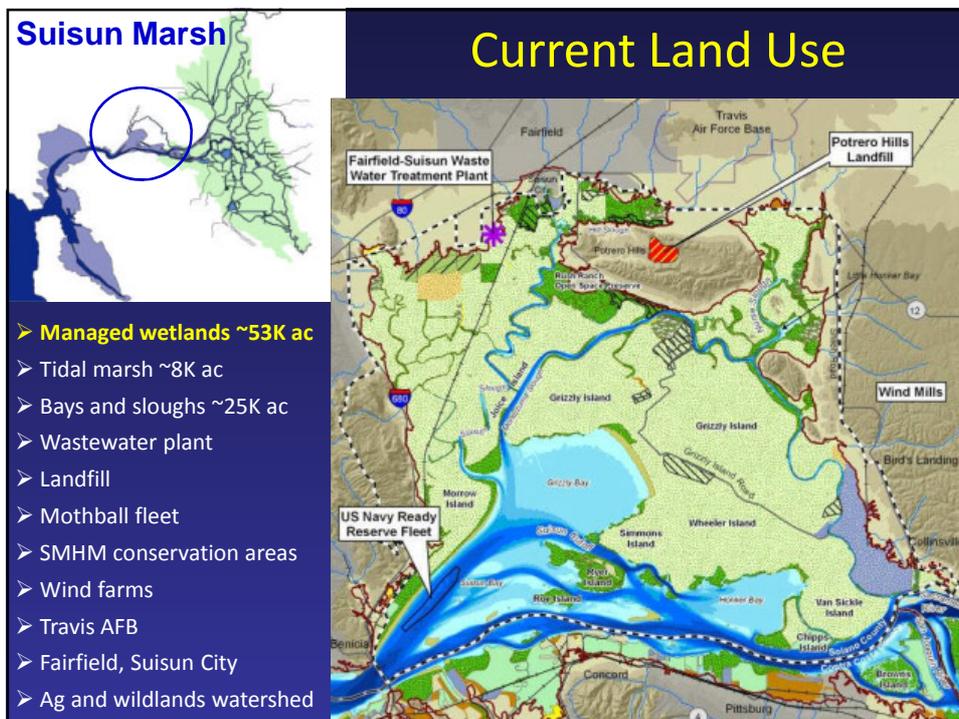


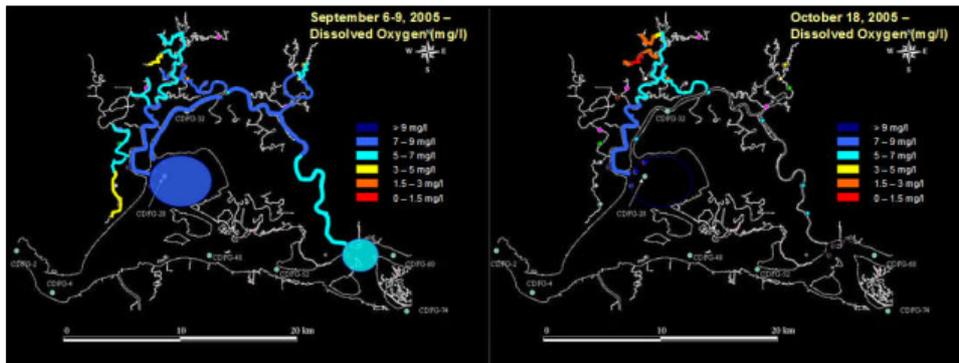
BMPs for Reducing Low Dissolved Oxygen and Methylmercury Production and Export from Diked Managed Seasonal Wetlands in Suisun Marsh

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Restoring Water Quality and Aquatic Ecosystems
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Environmental conditions in diked managed seasonal wetlands that produce low DO are well suited to produce MeHg



SWRCB Grant Project Collaborators

06-283-552-0 (Naomi Feger, Grant Manager, Region 2)

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BMP Targets

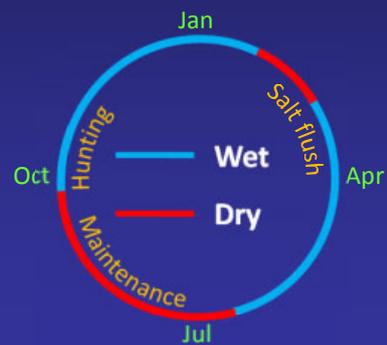
Can water, vegetation, and/or management practices be improved to reduce Low DO and MeHg production in Suisun diked managed seasonal wetlands?

Discharges can have low DO, high BOD, high MeHg

Typical Suisun Management Cycle

approximate

varies by year
and club



BMP Criteria

Water quality improvements

- A) Increased DO concentrations
- B) Decreased MeHg production and loading
- C) Decreased DOC loading (BOD in sloughs)

Slough tidal hydrology – promoting mixing

Wetland management – achieving habitat and land use objectives, regulatory compliance

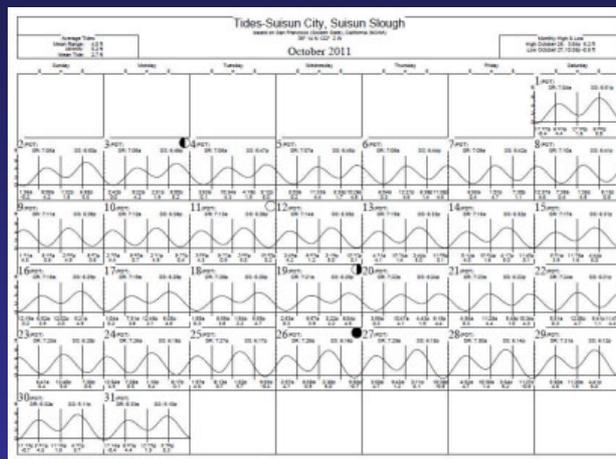
Factors Affecting Prospective BMPs

1. Environmental
2. Regulatory
3. Social
4. Economic

Environmental Factors and BMPs

Tides – higher the tide range, greater the mixing

- A. Fall equinox tides have lower range
- B. Spring vs. neap 14-day cycle very key to mixing
- C. DFG does not set hunting season to tides



Environmental Factors and BMPs

Wind – Suisun generally windy but fall has lowest winds; direct effect on slough mixing

Air temperature – fall can be hot; reduces DO saturation levels, promotes biological decomposition

Site conditions – elevations; soils; location relative to salinity regime; location relative to tidal sloughs and freshwater sources (e.g., treatment plant)

Regulatory Factors and BMPs

ESA – salmonids and delta smelt restrictions on diversion operations most of Nov to May

ESA – cessation of slough dredging for levee maintenance materials → interior soil borrow

CWA – controls on grading, water control structure modifications; maybe within RGP, maybe need specific authorization

Vector control – public health laws can force treatment or drawdown

Suisun Marsh Plan intended to help address these issues via 30-year plan

Social Factors and BMPs

Most of Suisun Marsh privately owned, ~180 clubs.
Large DFG and some DWR and SRCD ownership

1. Suspicion of government common
2. Concern over interference with managed wetlands operations
3. Concern about being penalized for cooperating
4. Concern that cooperation could help bring about the demise of duck clubs; many landowners were instrumental in bringing about Suisun conservation in the 1970s and remain vested in its preservation

Economic Factors and BMPs

Capitol costs – can be few thousand to many tens of thousands or more for complex changes

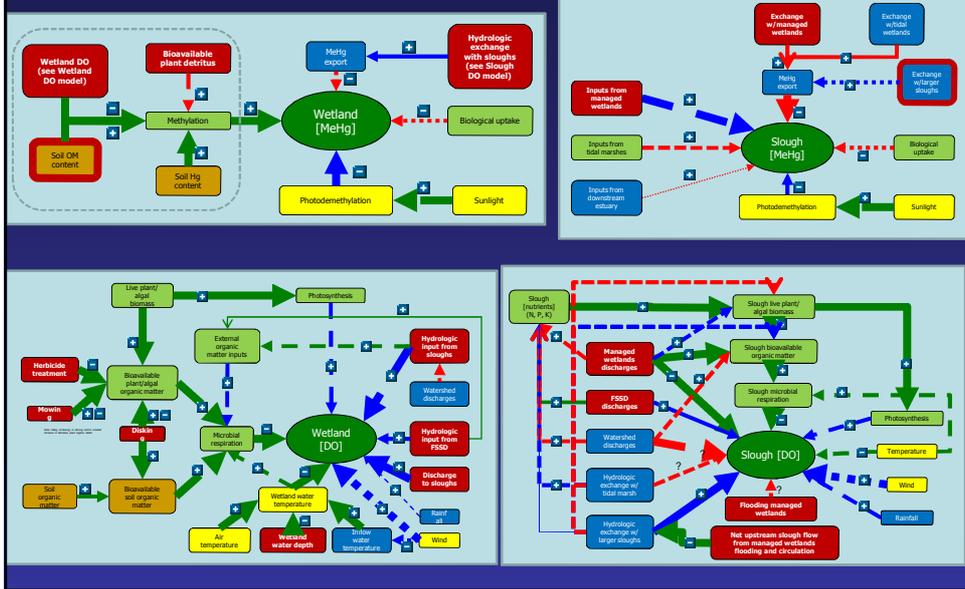
O&M costs – can be few thousand to more than \$10K annually; some clubs require costly pumps

Landowner resources – highly varied

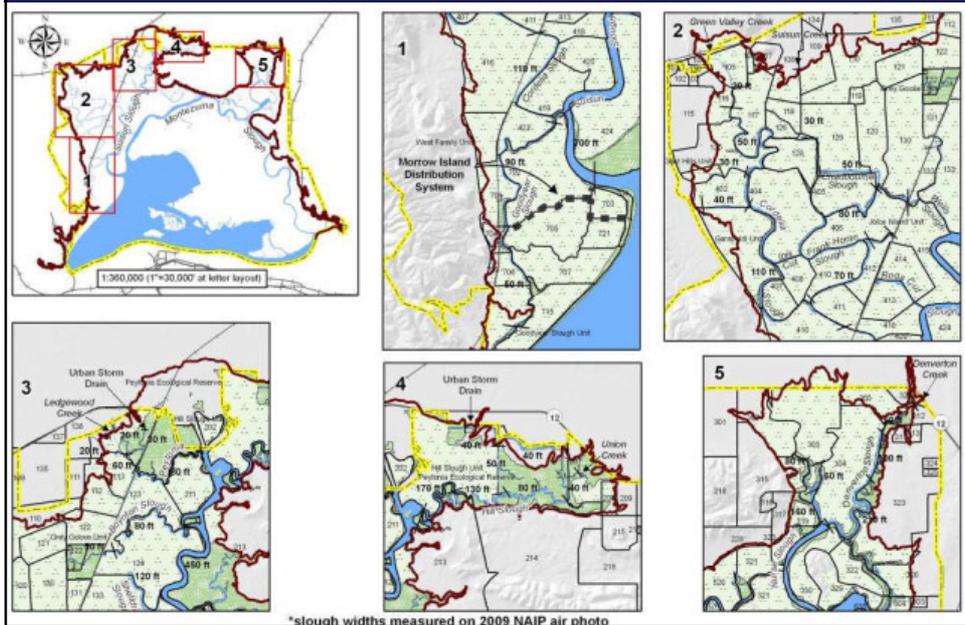
Suisun Marsh Preservation Agreement

Implementation Fund – total of \$3.7 million for specified improvements and maintenance activities, requires cost sharing 75/25 or 50/50

Conceptual Models Guide BMP Details



Selecting Sites for BMPs – Problem Areas



BMP Evaluation Costs

Cause and effect –

- A. Need to discern what works or not and why
- B. Need adequate replication to address signal-to-noise ratio of field studies
- C. Not all properties equally suited to all BMPs

Monitoring period – realistically need minimum 3 months of field monitoring to evaluate efficacy

High monitoring costs – personnel, field instrumentation, laboratory analyses

Conclusions

Priority – problems continue to occur, TMDL under preparation

Complexity from environmental factors – none may work; tailor to property; restoration likely most reliable but changes land use

Complexity from regulatory, social, economic factors – many constraints, need landowner participation, funds to implement and monitor efficacy

Questions?

