



Monitoring Design Overview

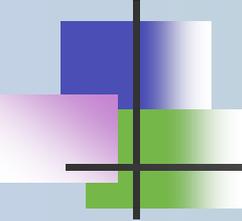
August 23, 2016

Joe Domagalski, Ph.D.



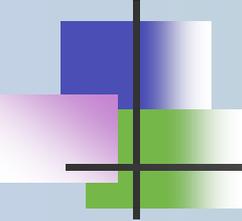
Stephen McCord, Ph.D., P.E.





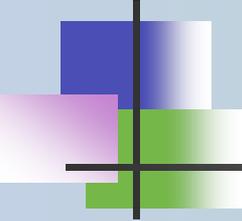
TAC Tools & Process

- Assessment **questions** (initial)
- Design **summaries** (“details”)
- Monitoring **maps** (<http://bit.ly/1vpwofH>)
- Estimated **costs** (low-med-high)
- Coordinated with **partners** (some)



Implementation Drivers

- **Pesticides & Toxicity:** Evaluate current OP TMDLs & DPR Surface Water Regulations for Pyrethroids; Pyrethroid TMDLs (2015-2025)
- **Pathogens:** April 2015-2017 per Basin Plan
- **Mercury:** 2012-2020 TMDL Phase 1
- **Nutrients:** Several ongoing plans/studies



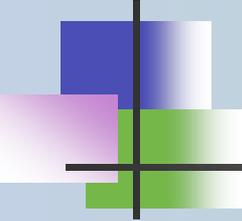
Pesticides & Toxicity

- Baseline > sources, pathways, loadings
- 5 perim. sites
- Monthly (incl. 5 targeted events)
- Pesticide scan (152+; filtered & particulate), Cu, DOC
- 3-species toxicity test each site-event
- TIEs for >50% effect, on $\leq 20\%$ of samples
- ~\$6,000 / site-event

Pesticides – Water & Sed. Sites

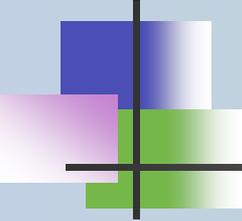


Sites		Sampling	
	Water	5	Baseline (monthly)
		4	Targeted events only
	Sediment (SPoT)		Annual



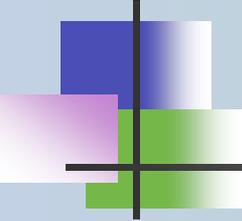
Pesticide Challenges

- ~500 pesticides used
- Dept. of Pest. Reg. prioritization issues
 - Phase-outs since 2009-2011 data
 - All uses
 - By county, not watershed
- Irrig. Lands priorities transitioning
- Lack some analytical methods



The *Hyalella* Challenge

- Sensitive to pyrethroids
- No standardized test method → inter-lab variability?
- Lab strain vs ambient → Ecological relevance and interpretation of results?

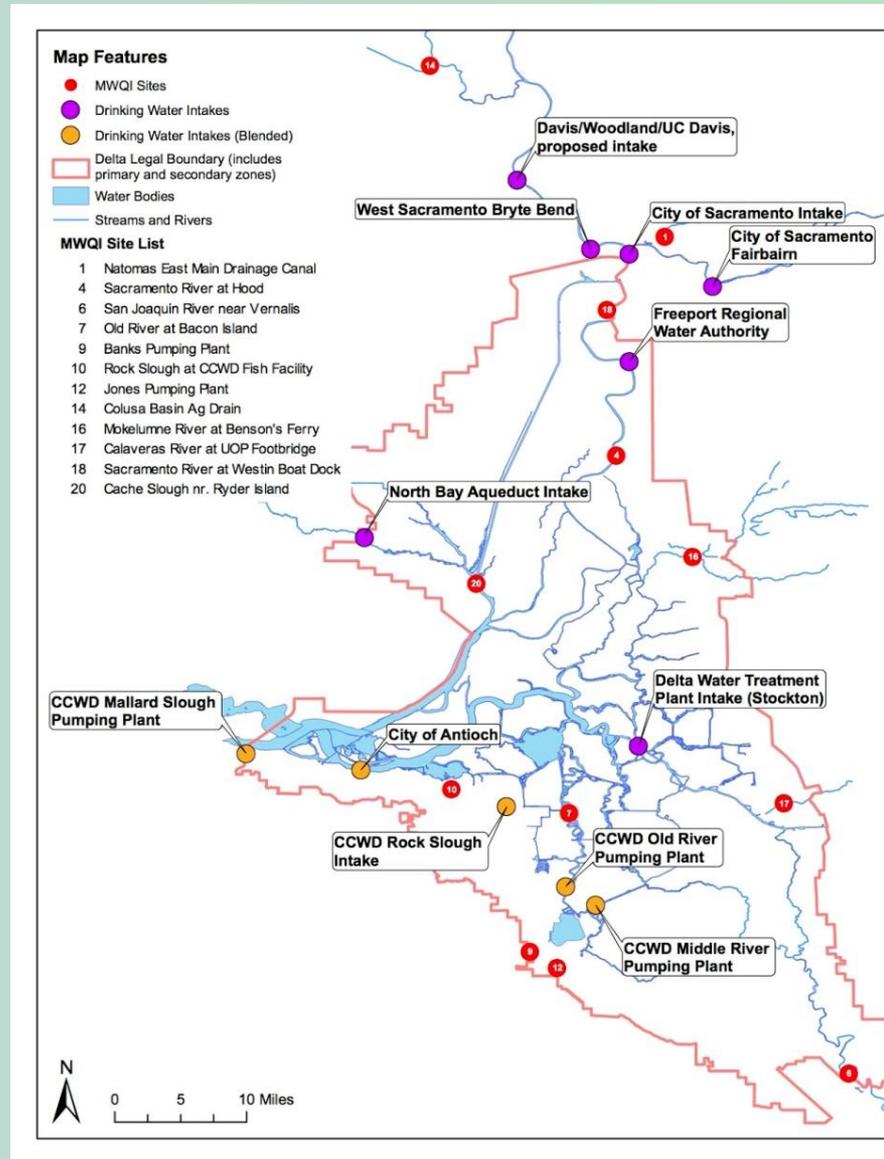


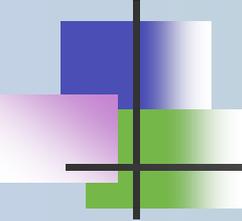
Pesticides – Next Steps

- Link monitoring design to models
- Re-assess “preferred” list of analytes & compare to current lab list
- Trends modeling

Pathogens

- Drinking Water Policy
- 2-year Special Study
- *Cryptosporidium* & *Giardia*
- 7+2 DW intakes, monthly for 2 years, by each
- 12 ambient sites monthly for 2 years, by others





Pathogens – Next Steps

- *Possible* Trigger Study
 - Infectivity monitoring
 - Microbial source tracking
 - Hydrodynamics analysis
 - Pathogen fate & transport evaluation
- Finish monitoring & reporting 2017

Mercury – Key Elements

FISH

- 6 sites
- Annually in Fall
- THg in LM bass, 11/site, 200-500 mm length
- Fish attributes (length, wt., sex, etc.)

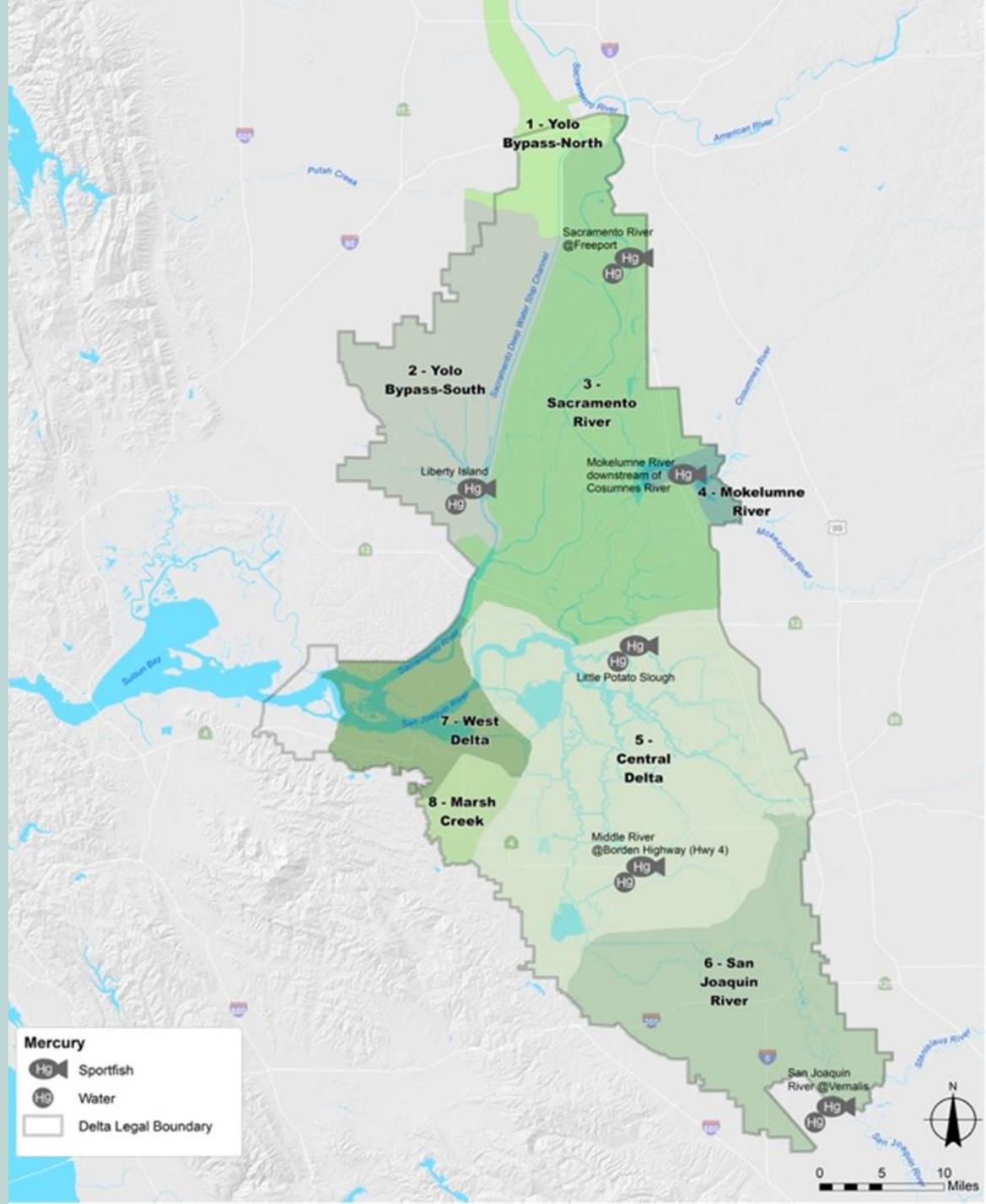


WATER

- 5 sites as vert. comp.
- Quarterly
- Unfilt.& filt. THg & MeHg
- Chl *a*, DOC, TSS, VSS, DO, pH, SC



Mercury Monitoring Sites



Delta Mercury Model Data Needs

Delta

Particles (organic and inorganic):

- Tributary inflows
- Settling & resuspension
- Grain size distribution
- Organic content
- Bed load mass and movement

Sediment bed properties:

- Porosity + density
- Long term burial
- Organic carbon and porewater chemistry

Mercury concentrations:

- THg + MeHg concentrations (dissolved and particulate) and partitioning in water and sediment

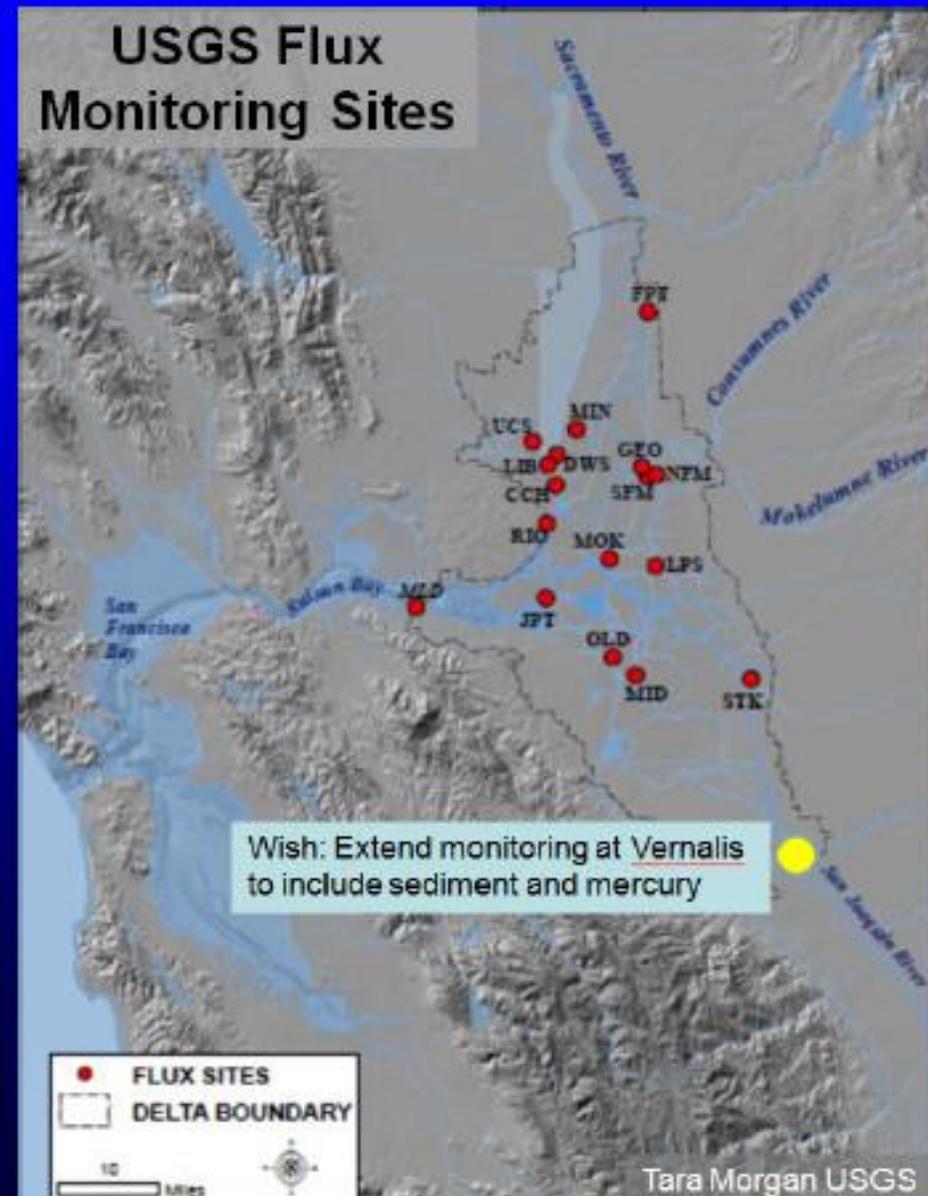
Mercury fluxes:

- Hg settling/resuspension
- Sorption and desorption Hg and particles
- THg/MeHg flux from sediment to water

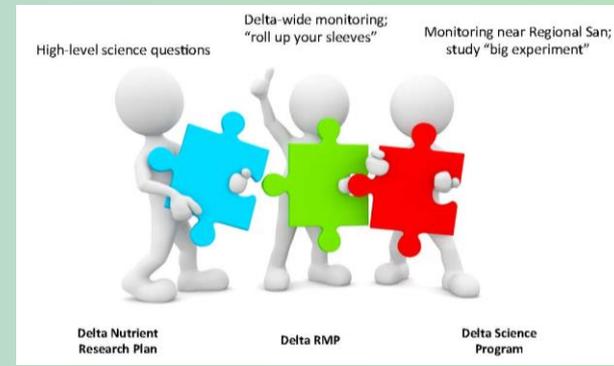
Water Quality:

- pH
- Alkalinity
- Sulfate
- DOC/type of DOC?

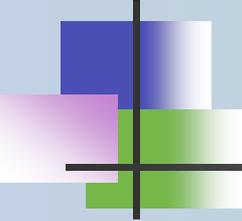
USGS Flux Monitoring Sites



Nutrients – Issues



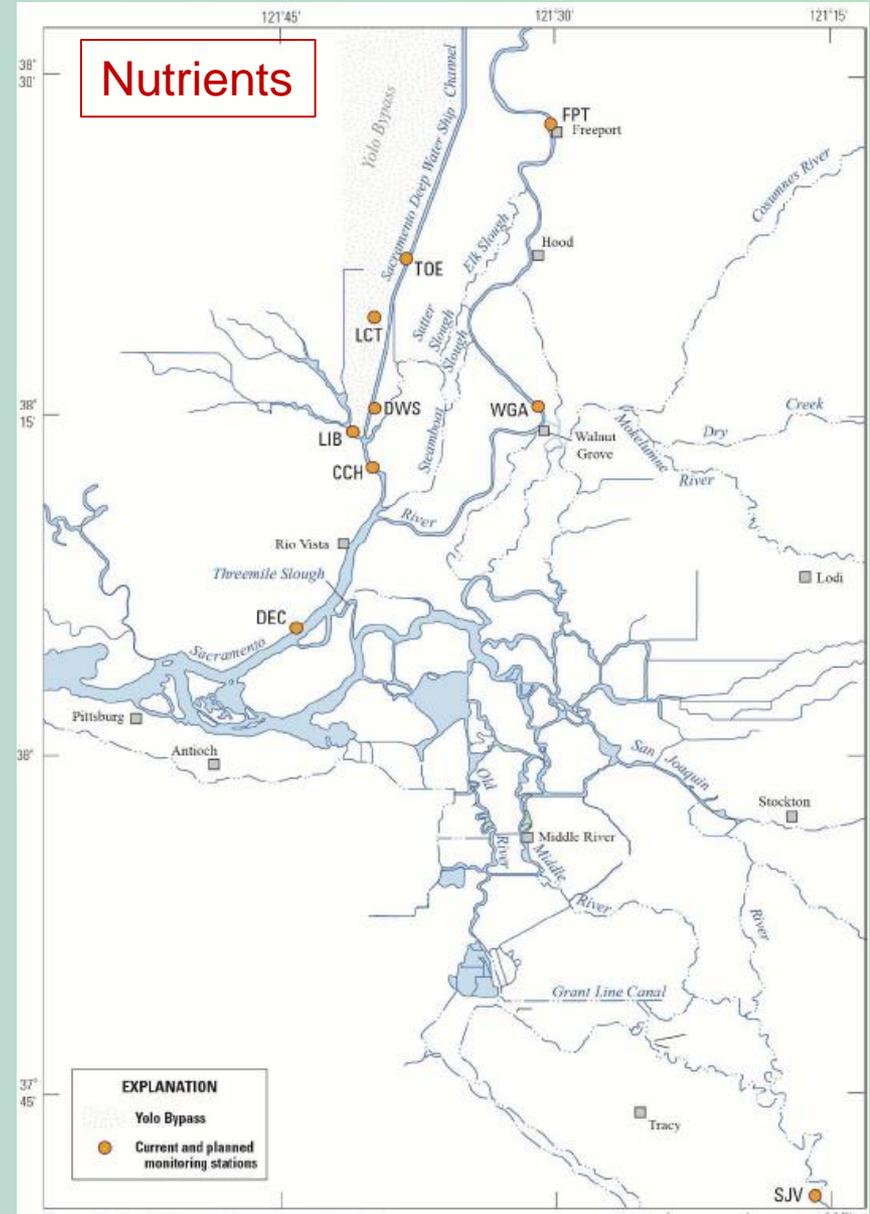
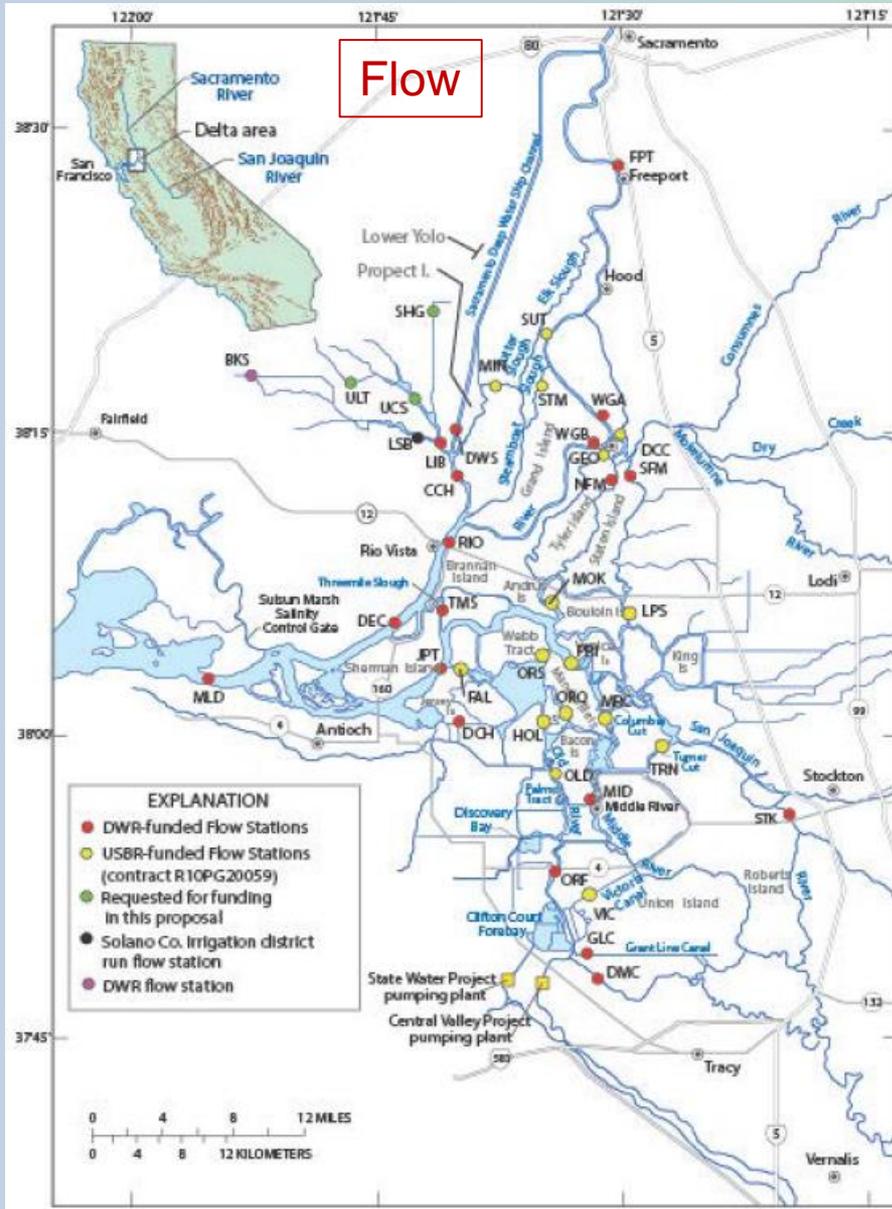
- No clear regulatory driver (yet)
- Various concerns (plants, anoxia, cyanoHABs, in-Delta vs exports)
- On-going/possible studies
- Bay-Delta nutrient management strategies

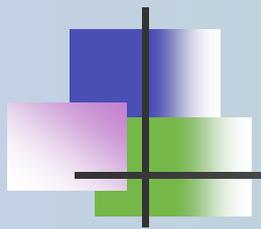


Nutrients – RMP Work in Progress

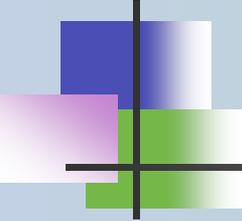
- High-frequency nutrient monitoring network synthesis report
 - Delta case studies & station maps
 - Monitoring examples & cost estimates
- IEP-EMP data synthesis by SFEI
 - Adding 2011-2015 data
 - Modeling water age & source

Continuous Monitoring Stations





OVERALL MESSAGES

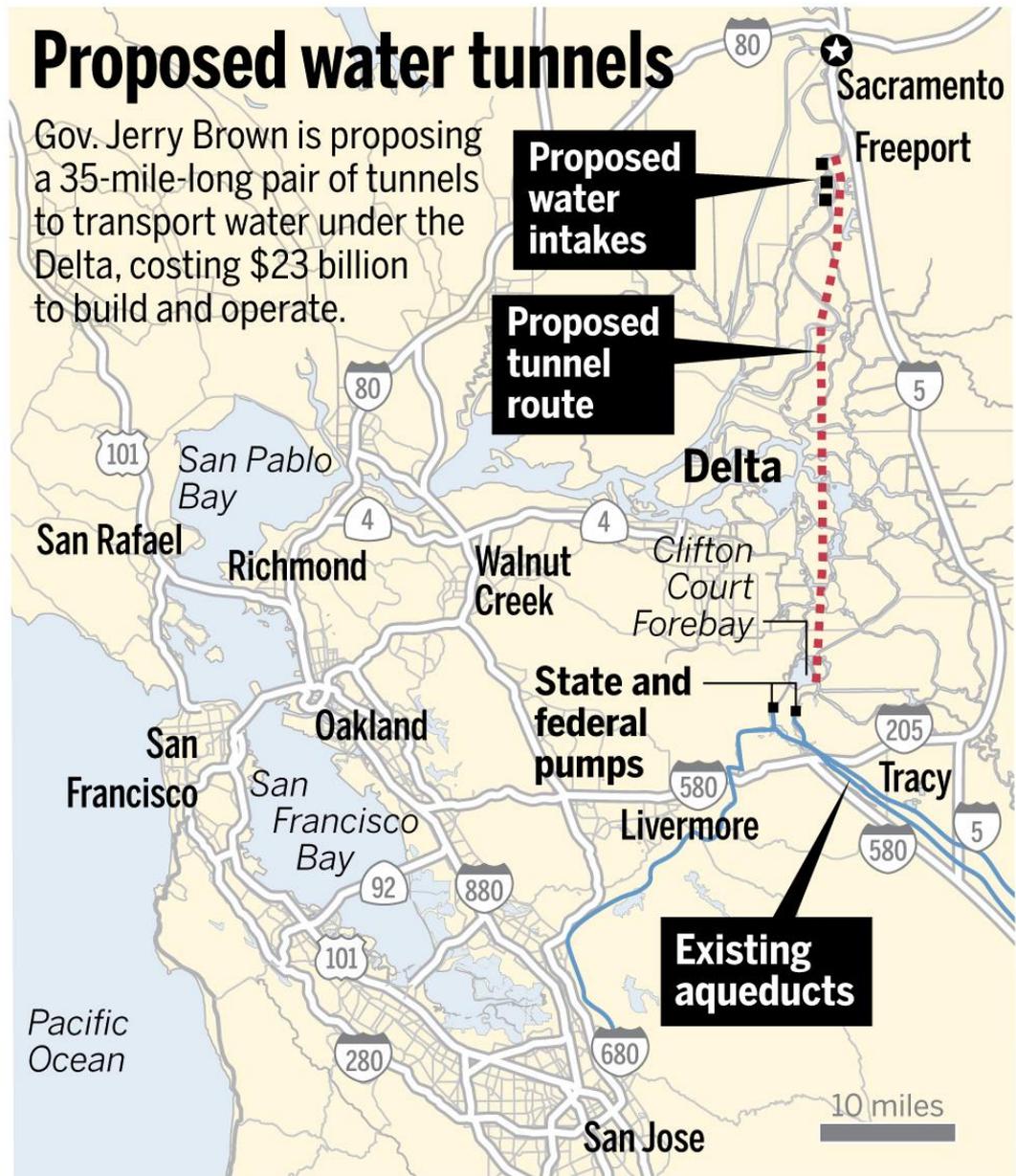


Broad Challenges

- Big changes lie ahead
- Many existing sites & programs
- Lots of existing data (centralize; synthesize)
- Yet data gaps remain (simulate)

Major Changes

- CA Water Fix
- EcoRestore
- Regional San upgrade
- Climate change



Source: California Natural Resources Agency

BAY AREA NEWS GROUP

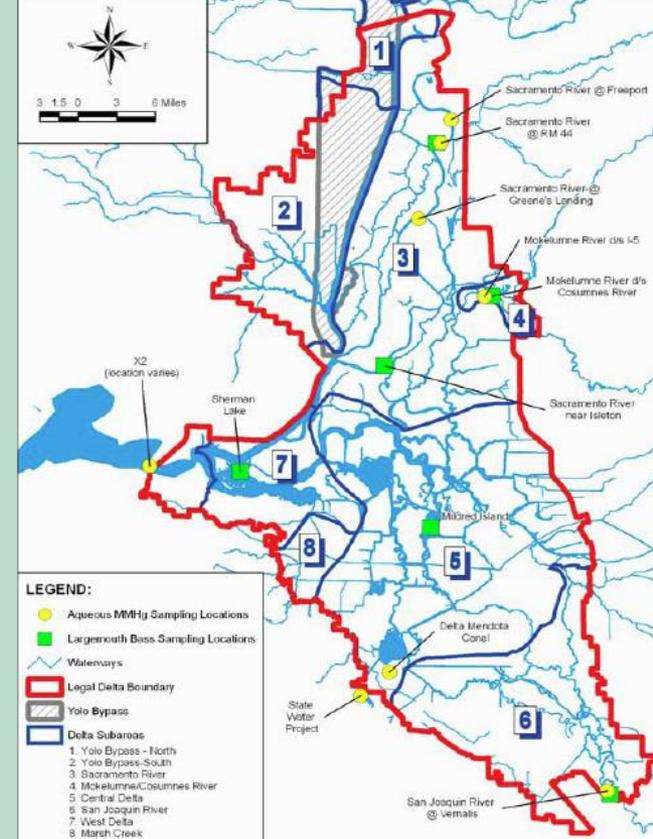
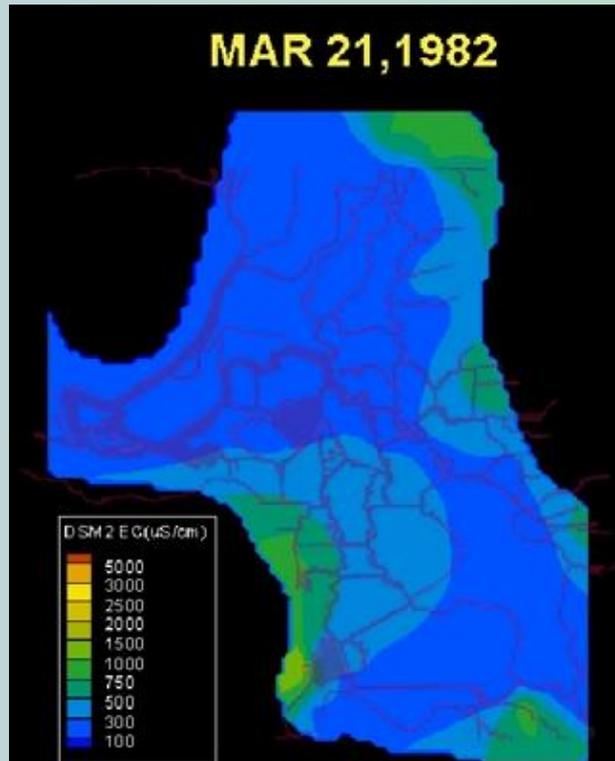
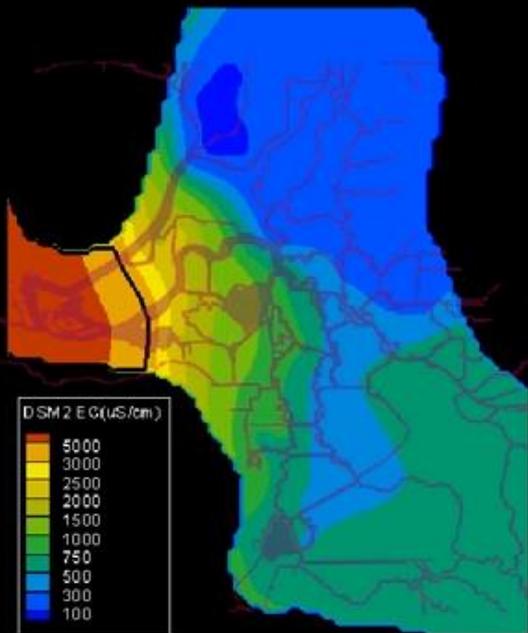
- “Subarea” ambiguity
- Temporally complex (subtidal → inter-annual)
- Major potential values from models (WARMF, DSM2)

Dry Year

Wet Year

SEP 03, 1976

MAR 21, 1982



Delta Hg TMDL