



# A Watershed Year for RMP & CEP:

Sources Pathways & Loadings 2002/03

Lester McKee & Jon Leatherbarrow  
May 2003

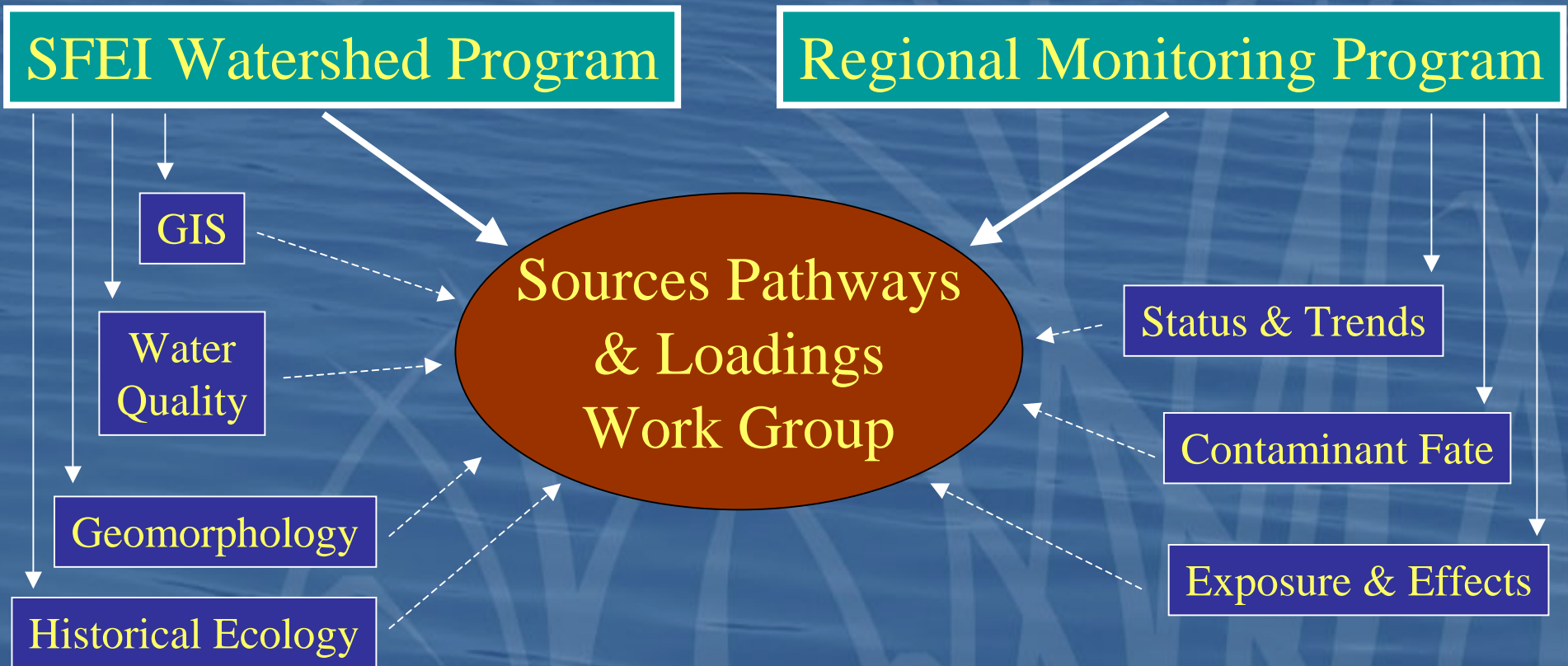


# Achievements 2002/03

- Made New Estimates of Sediment & Hg Loads from Central Valley WY 1995-2001
- Completed Urban Runoff Literature Review
- Carried Out Winter High Flow Monitoring on the Sacramento River at Mallard Island
- Carried Out Winter High Flow Monitoring on the Guadalupe River at San Jose



# Organization of Watershed Science at SFEI







# The Team

## Sources Pathways & Loadings

Peer  
Review

### SFEI Technical Staff

- Don Yee
- Sarah Pearce
- Jennifer Hunt
- Nicole David
- Lester McKee
- Chuck Striplen
- Ben Greenfield
- Jon Leatherbarrow

### Laboratories

- UC Santa Cruz
- AXYS Analytical
- Moss Landing  
Marine  
Laboratories

### Work Group

- RWQCB (R2, R5)
- Private Consulting
- Regulated Community
- USGS
- Environmental Organizations
- Universities



# Two Technical Themes

## Loadings

Processes  
Mass  
Timing



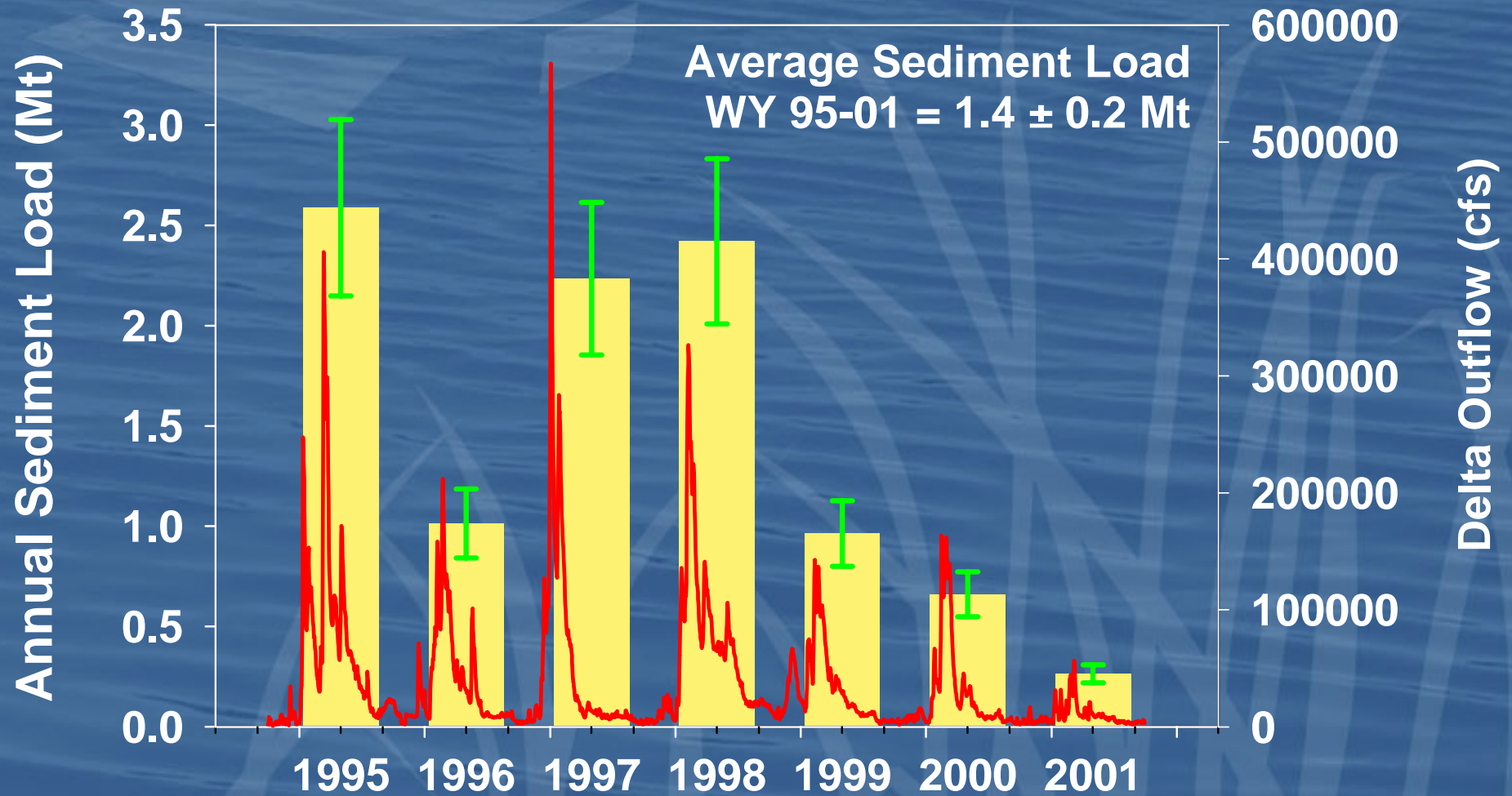
## Downstream Fate

Processes  
Mass  
Timing



# Central Valley Loads - Desktop Study

SPL & USGS  
Working Together

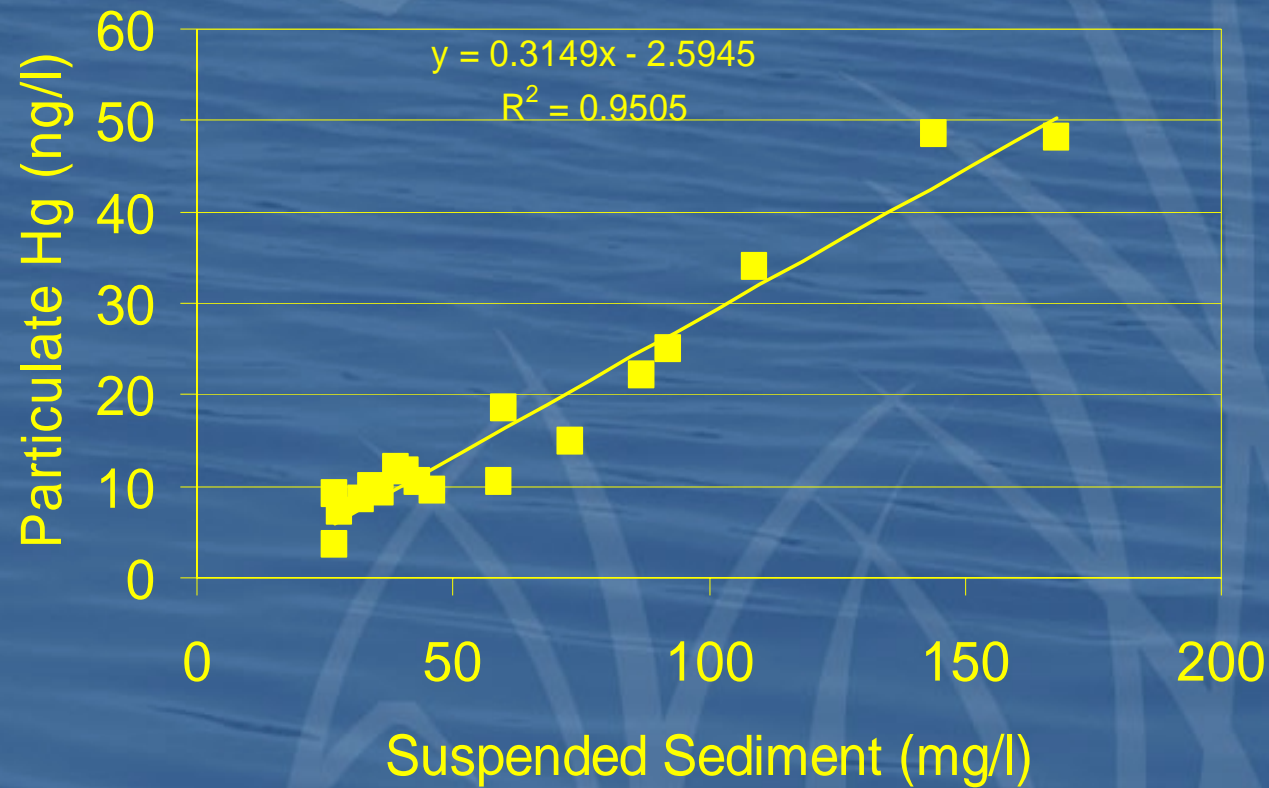






# Central Valley Loads – Desktop Study

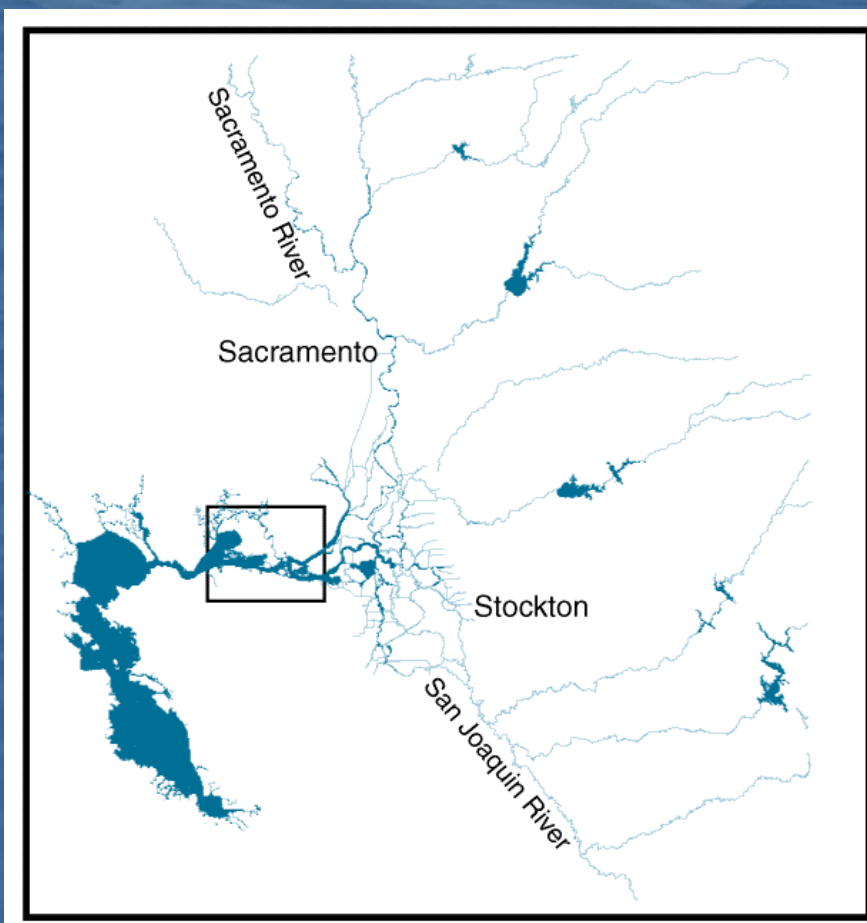
SPL & RWQCB R5  
Working Together



| Water Year  | Hg load (kg)   |
|-------------|----------------|
| 1995        | 701±154        |
| 1996        | 253±55         |
| 1997        | 612±134        |
| 1998        | 644±141        |
| 1999        | 238±52         |
| 2000        | 162 ±36        |
| 2001        | 68 ±15         |
| <b>Mean</b> | <b>383 ±84</b> |



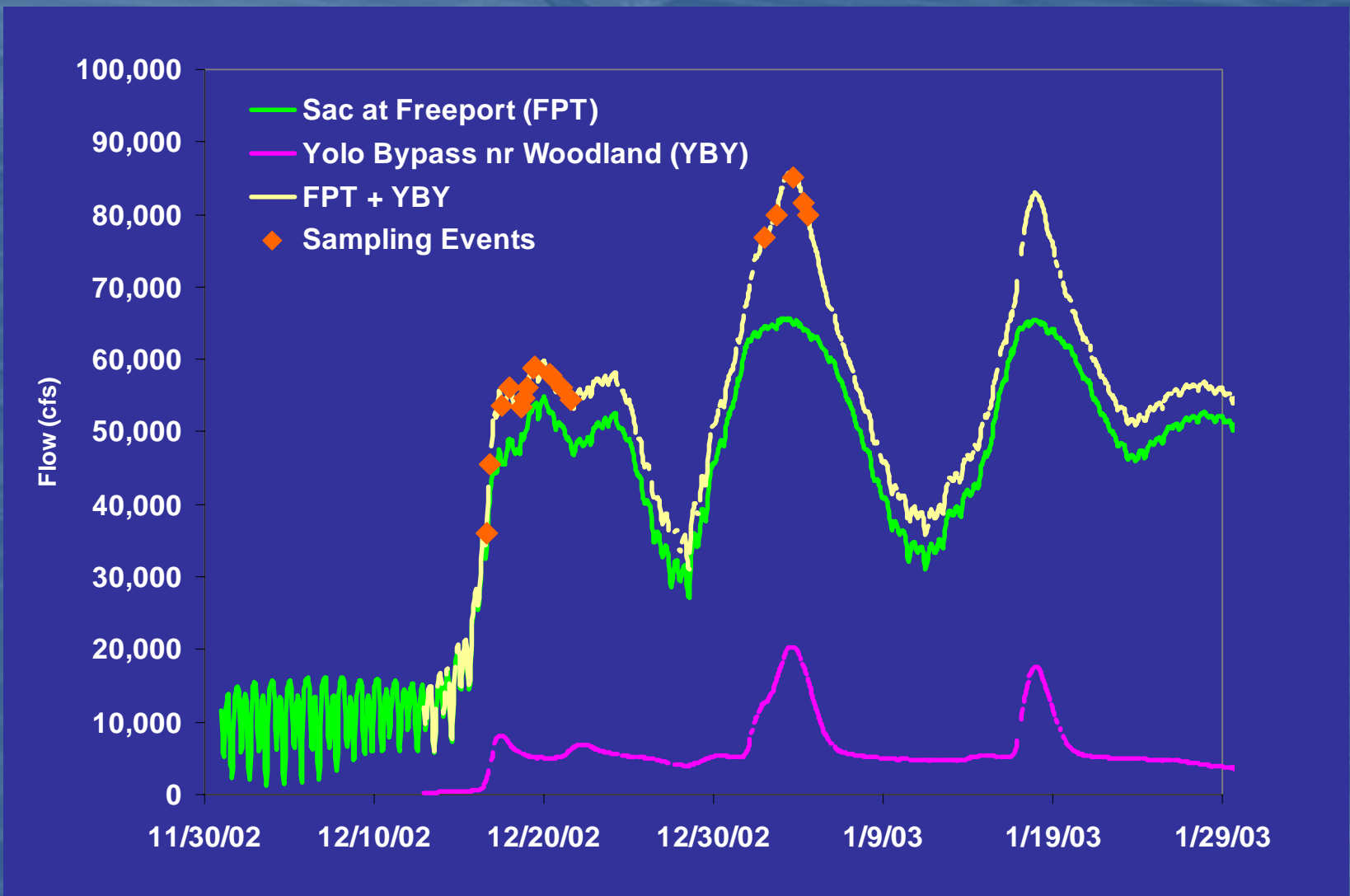
# Loadings – Central Valley







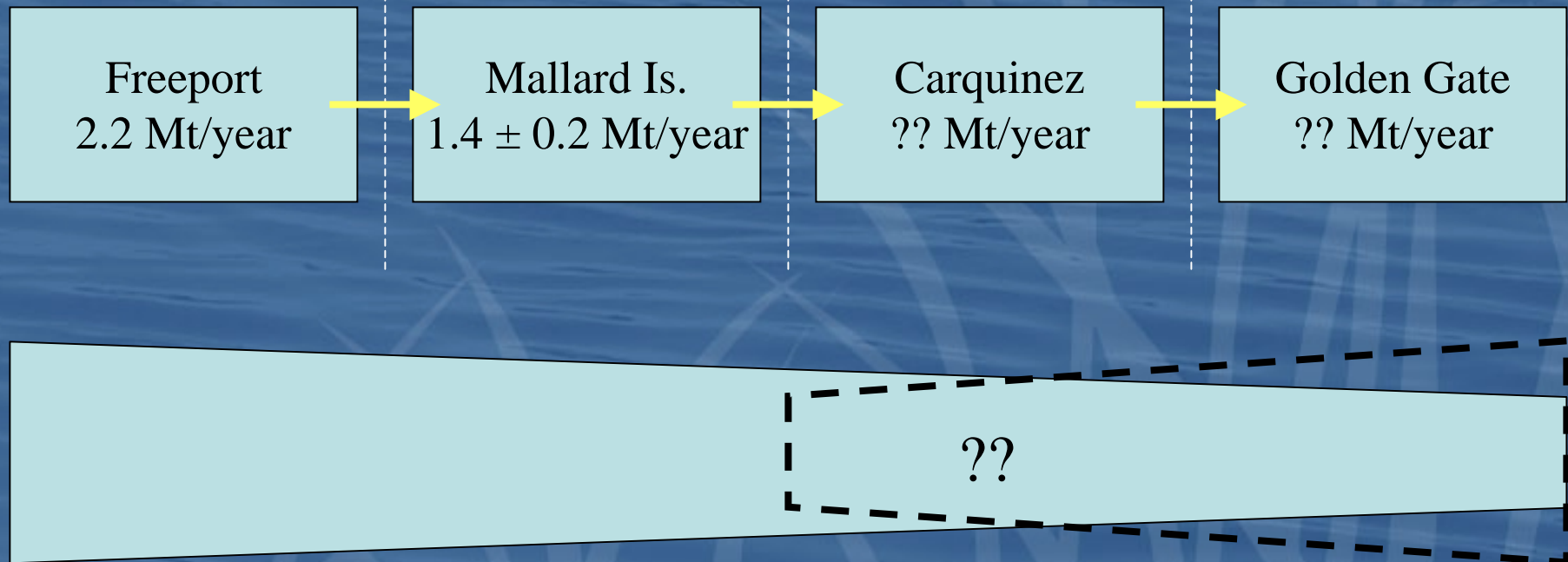
# Loadings – Central Valley





# Central Valley Sediment & Contaminant Loadings Fate

Data from USGS  
Sacramento Field  
Office



# Small Tributaries – Desktop & Special Studies



## Written reports

- Davis et al., 1999
- Davis et al. 2000
- Leatherbarrow et al., 2001
- McKee et al., 2002

## Main conclusions

- Small Tribs are a Significant Load
- Not Enough Data to Estimate Loads
- Sediment is an Important Vector
- Sediment Processes Differ Greatly Between Watersheds

## Sediment Sources differ in each watershed (e.g. Pearce et al., 2003a,b)

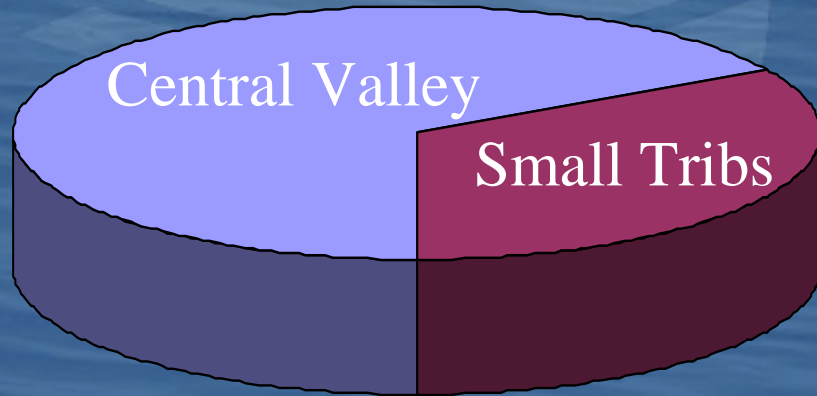
- Hillslope
- Bed & bank
- Urban runoff

## Sediment loadings

- Small Tribs 0.04 - 2.8 Mt / y
- Central Valley 0.6 - 4.0 Mt/ y

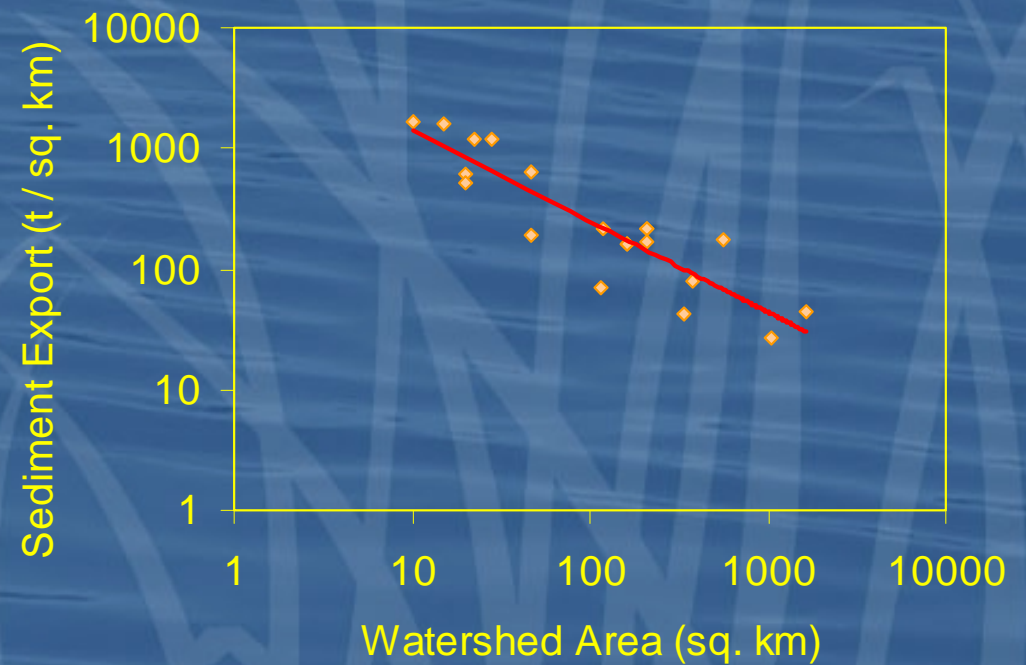


# Small Tributaries – Desktop & Special Studies



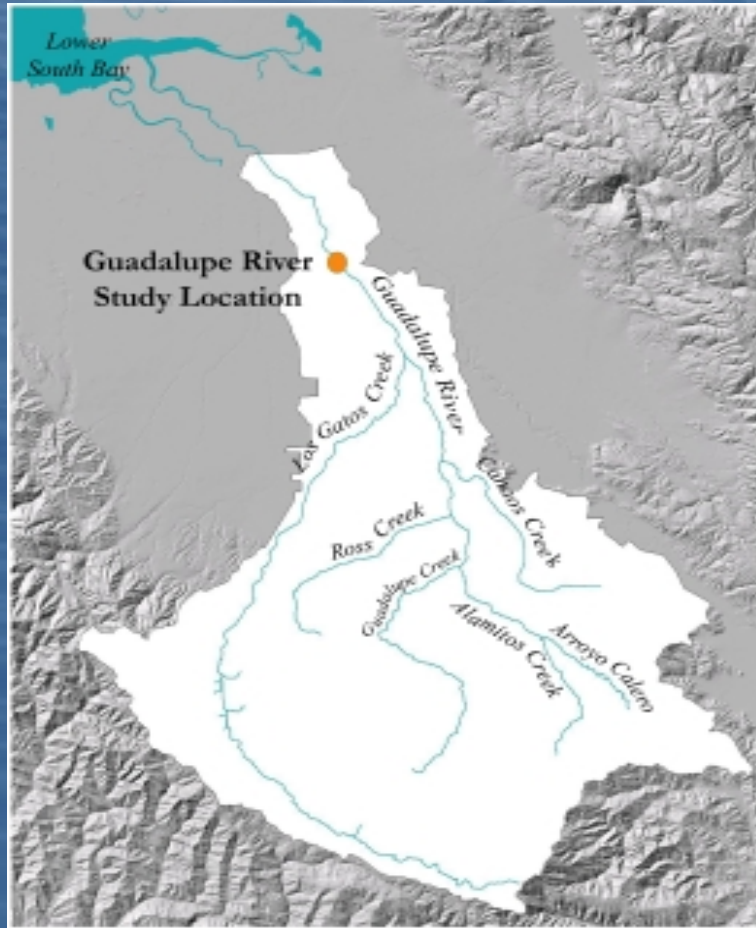
**Bay Sediment Budget**

## Sediment Export Variability





# Loadings – Small Tributaries



## Collaborators and Labs

Larry Freeman USGS

Rand Eads RSL

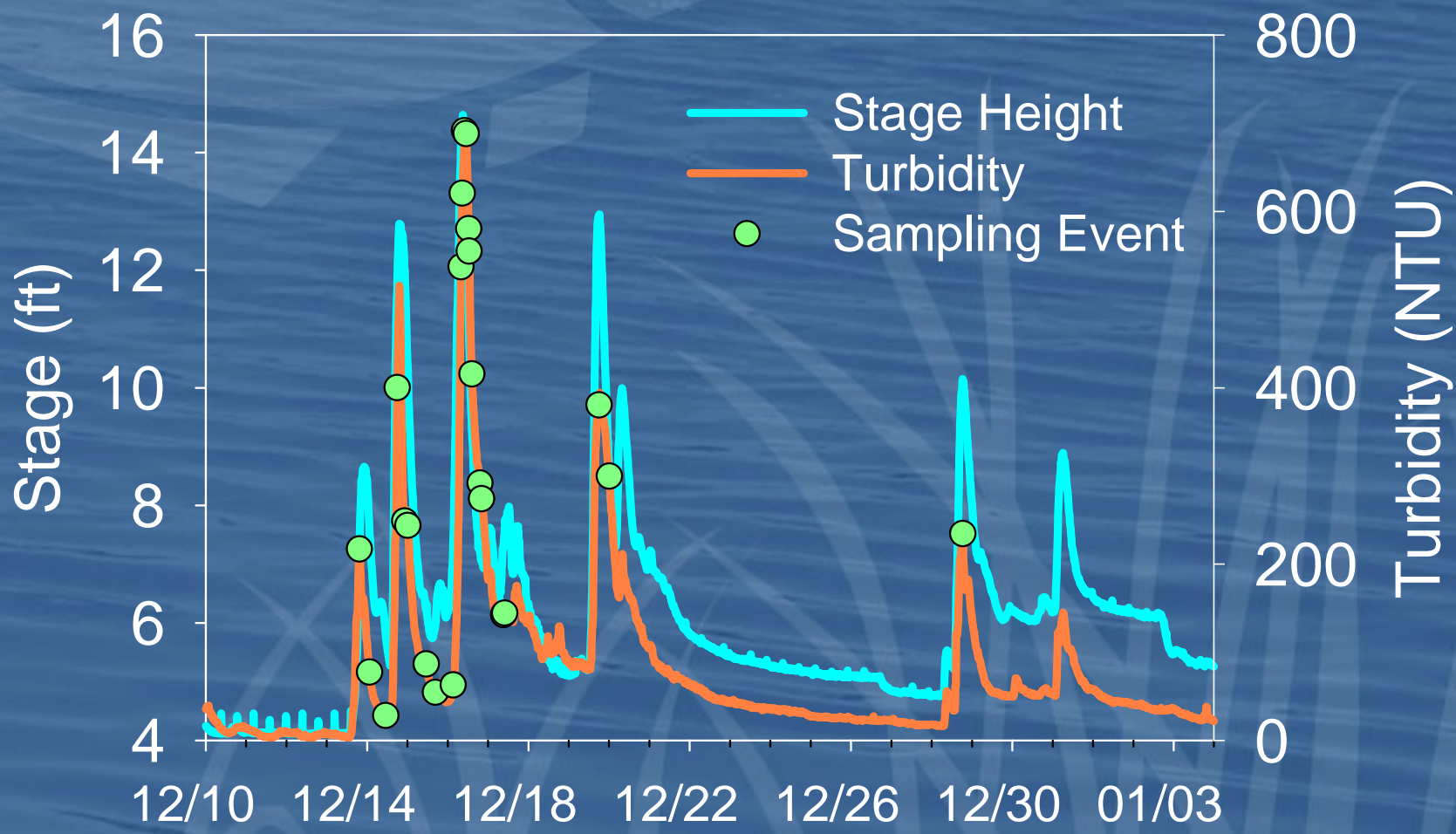
AXYS and MLML

San Francisco Estuary Institute





# Loadings – Small Tributaries







# Loadings – Small Tributaries

## Preliminary Results

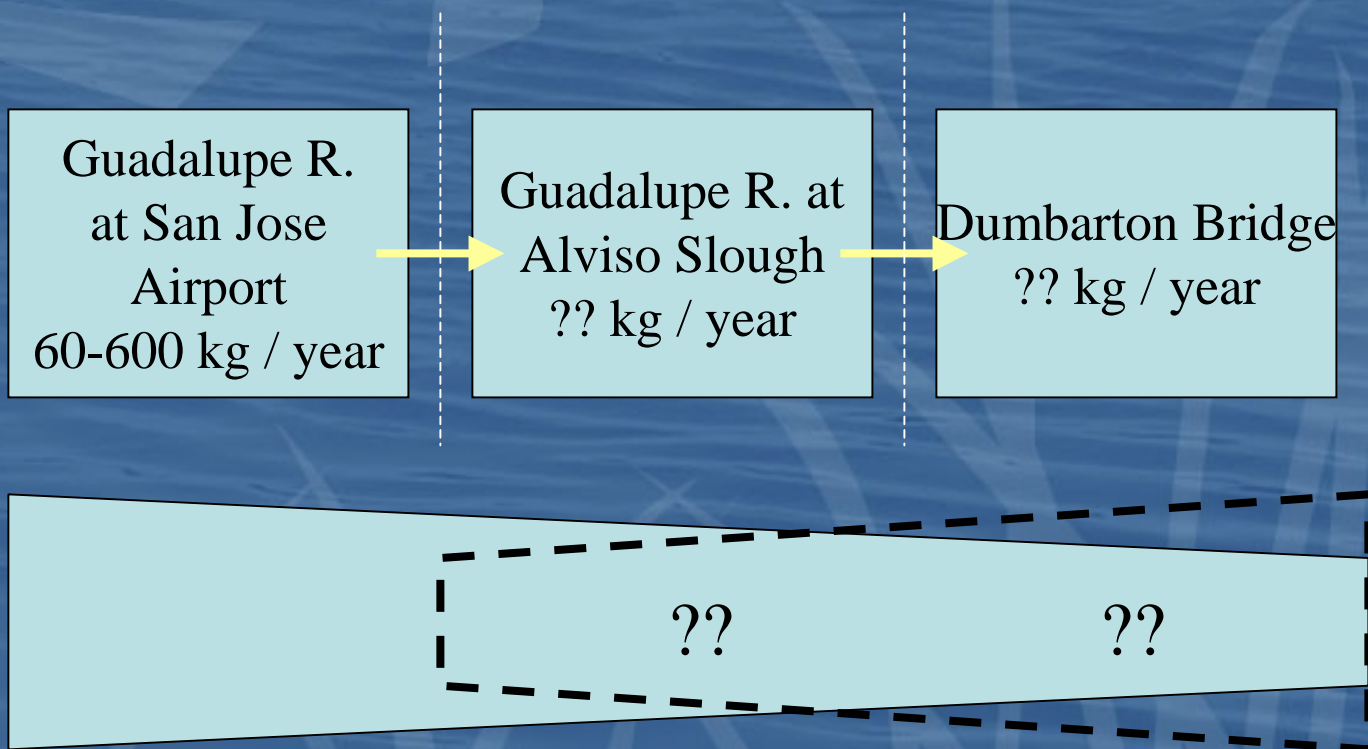
|               | Concentrations                    | Expected Loads<br>Magnitude<br>(kg)** |
|---------------|-----------------------------------|---------------------------------------|
| Mercury       | 0.2 – 18 $\mu\text{g} / \text{L}$ | 60 - 600                              |
| PCBs*         | 7.7 – 27 $\text{ng} / \text{L}$   | 0.6 - 1.2                             |
| $\Sigma$ DDT* | 5.7 – 42 $\text{ng} / \text{L}$   | 0.6 – 1.2                             |

\*Four samples only

\*\* Note that the objective is an accurate loads estimate with an accuracy of about +/- 20% – these are just illustrative of the expected magnitude



# Sediment / Contaminant Fate – Small Tributaries





# Future Directions in Sources Pathways & Loadings

## Central Valley

- Sample a “Yolo Bypass” storm
- Conduct a study to determine the contaminant budget for Suisun Bay

## Local Small Tributaries

- Conduct a desktop study to test methods of extrapolation spatially and temporally limited data
- Conduct another year of sampling on Guadalupe River
- Start a new study in another known contaminated tributary
- Determine the local fate of Hg and PCB loading from Guadalupe