

## Agenda Item #3



# Quantifying loads of sediment and contaminants entering San Francisco Bay from the Central Valley: “The Mallard Island Study”

Presentation to RMP Sources,  
Pathways, and Loadings Workgroup

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## Objective

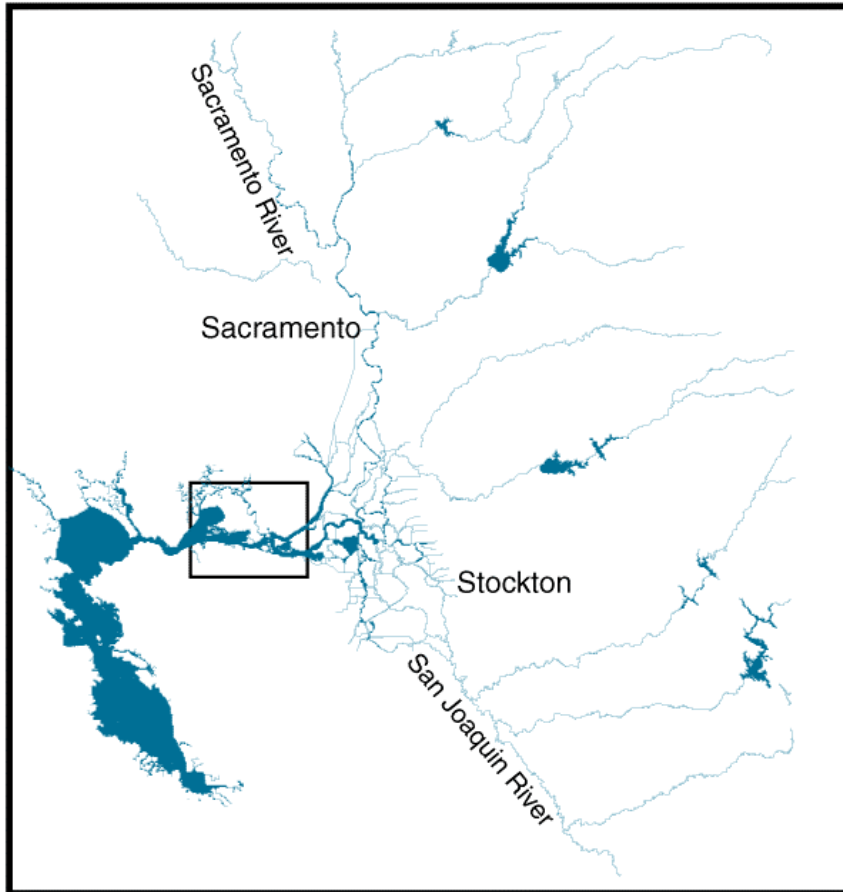
- Estimate sediment and contaminant loading from the Central Valley to San Francisco Bay
- Assist in development and refinement of mass budget models and TMDLs for Regions 2 and 5

## Background

- Funded by the RMP
- Sampling
  - Began in WY 2002
  - Continues through WY 2004



# Study Location







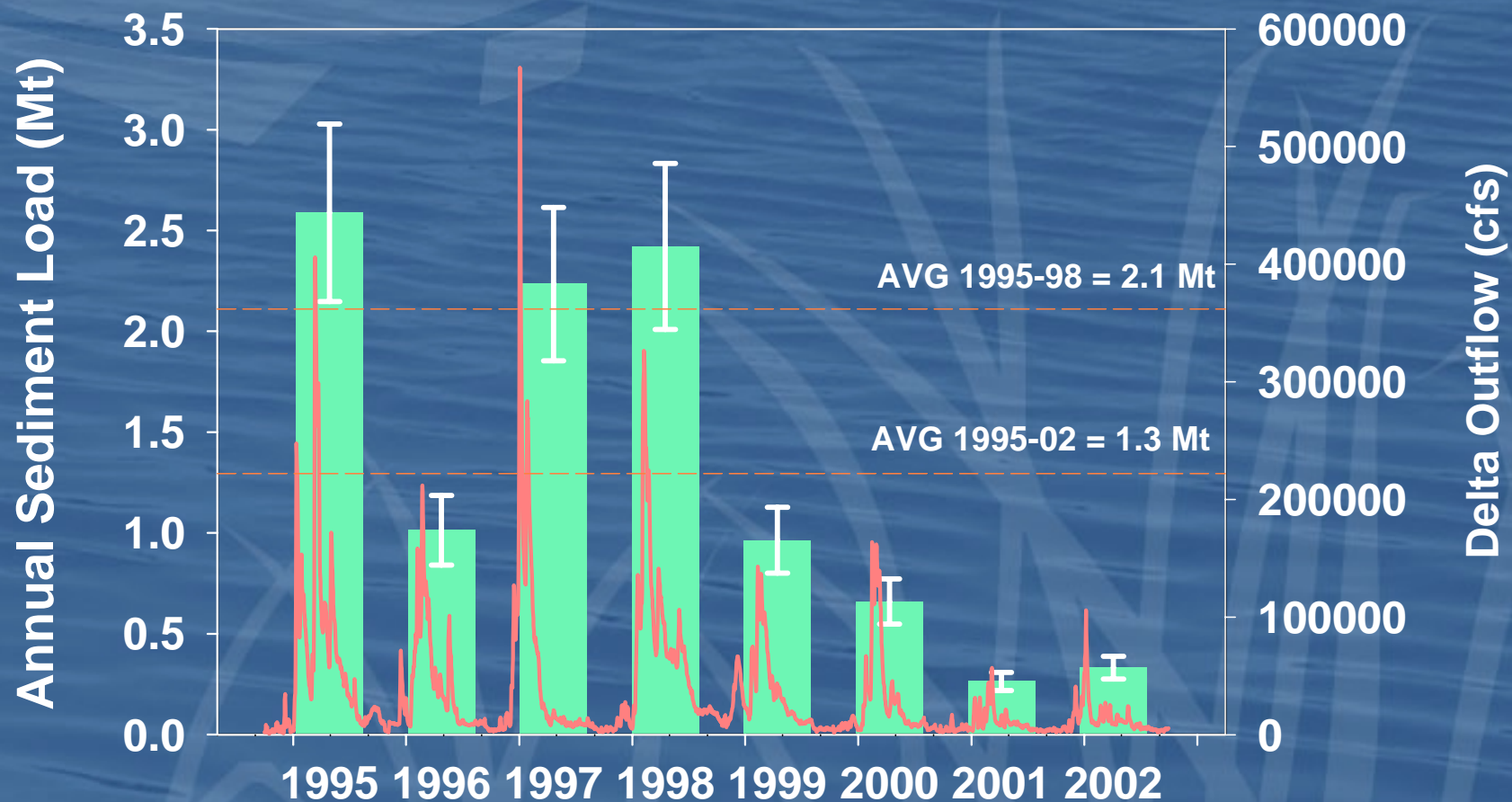
## Methodology

- Continuous monitoring:
  - turbidity by OBS-15 minute intervals (USGS: 1994-Present)
  - daily Delta Outflow (DWR; DAYFLOW)
- Discrete data for Hg, PCBs, PAHs, and OC pests during high flow events
- Regression analysis between turbidity and SSC to estimate DAILY sediment loads
- Correction factor for dispersive (tidal) flux
- Regression analysis between contaminant and SSC to estimate contaminant loads



# Suspended sediment load estimates

WY 1995 to 2002 (Methods from McKee et al., 2002)





# Mercury load estimates using data collected at X2 from March – Oct. 2000

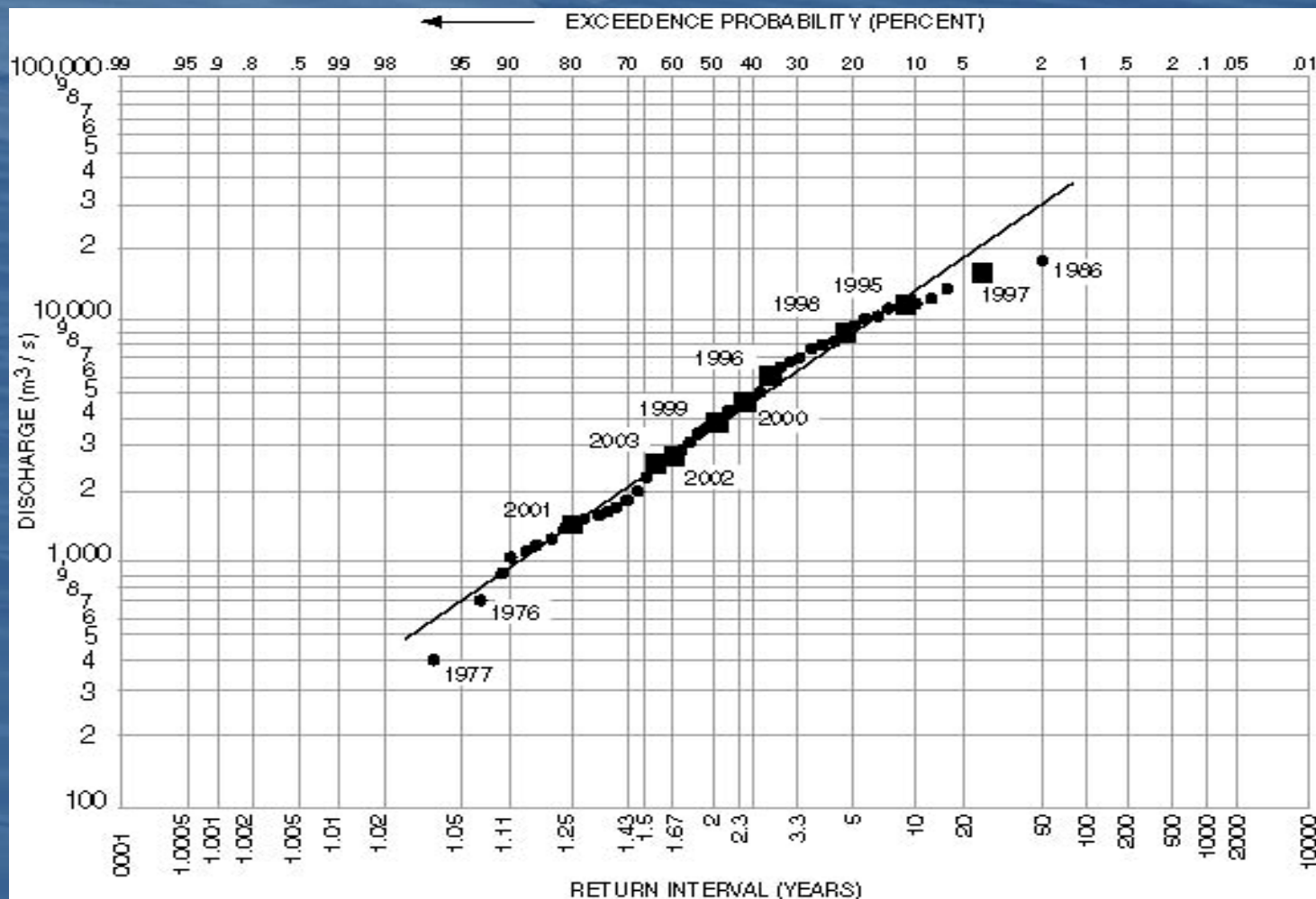
(Data reported in Foe, 2000; Load estimation methods reported in McKee and Foe, 2002; Technical Memo to RB)

<b>Water Year</b>	<b>Suspended Sediment (Mt)</b>	<b>Particulate Hg (kg)</b>
1995	2.6 ± 0.4	701 ± 154
1996	1 ± 0.2	253 ± 56
1997	2.2 ± 0.4	612 ± 135
1998	2.4 ± 0.4	644 ± 142
1999	1 ± 0.2	238 ± 52
2000	0.7 ± 0.1	162 ± 36
2001	0.3 ± 0.04	68 ± 15
2002	0.3 ± 0.1	82 ± 18
<b>8-yr AVG</b>	<b>1.3 ± 0.2</b>	<b>345 ± 76</b>





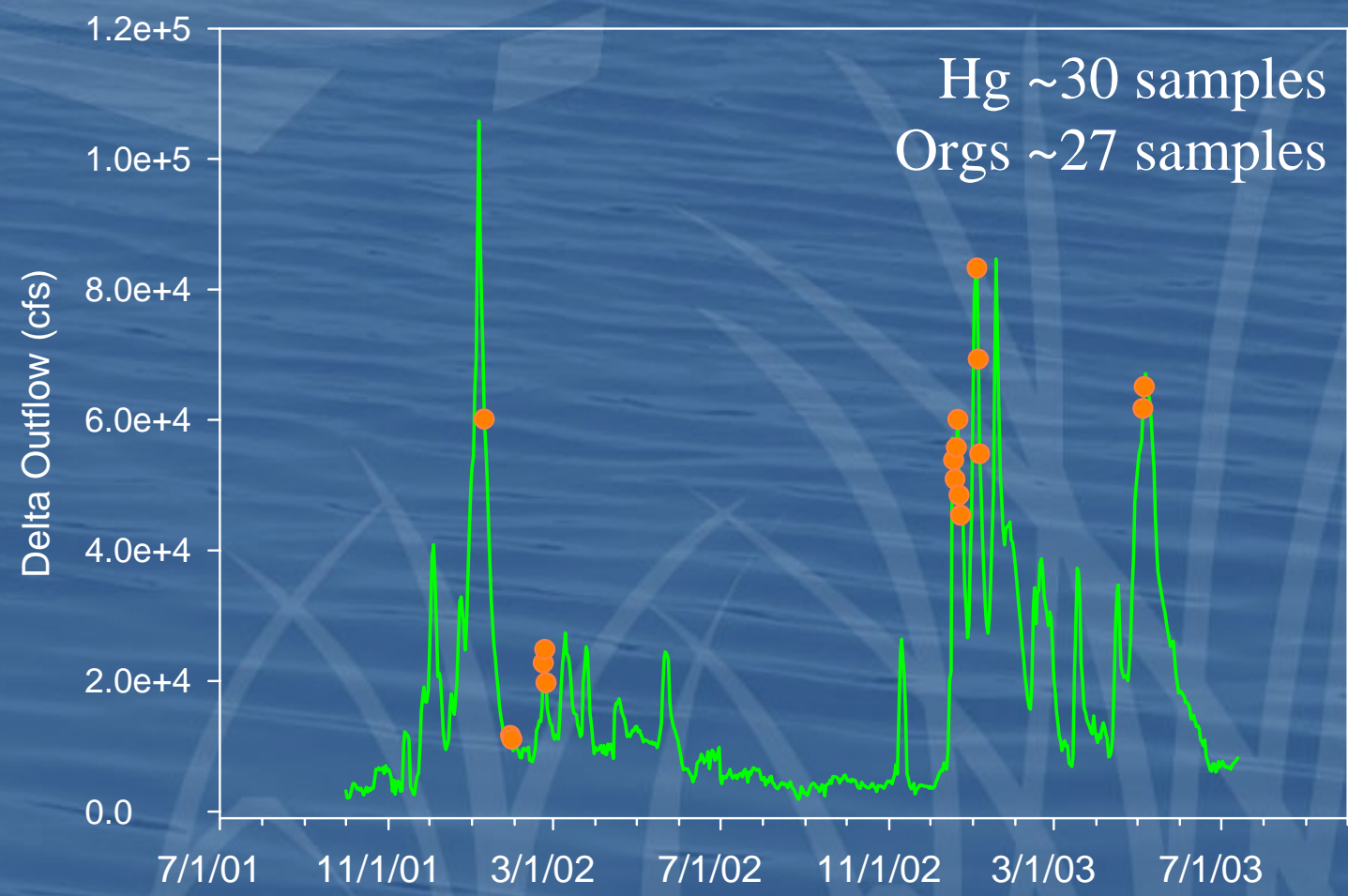
# Delta Outflow return intervals WY 1956 to 2003





# Sampling dates and hydrology

WY 2002 and 2003





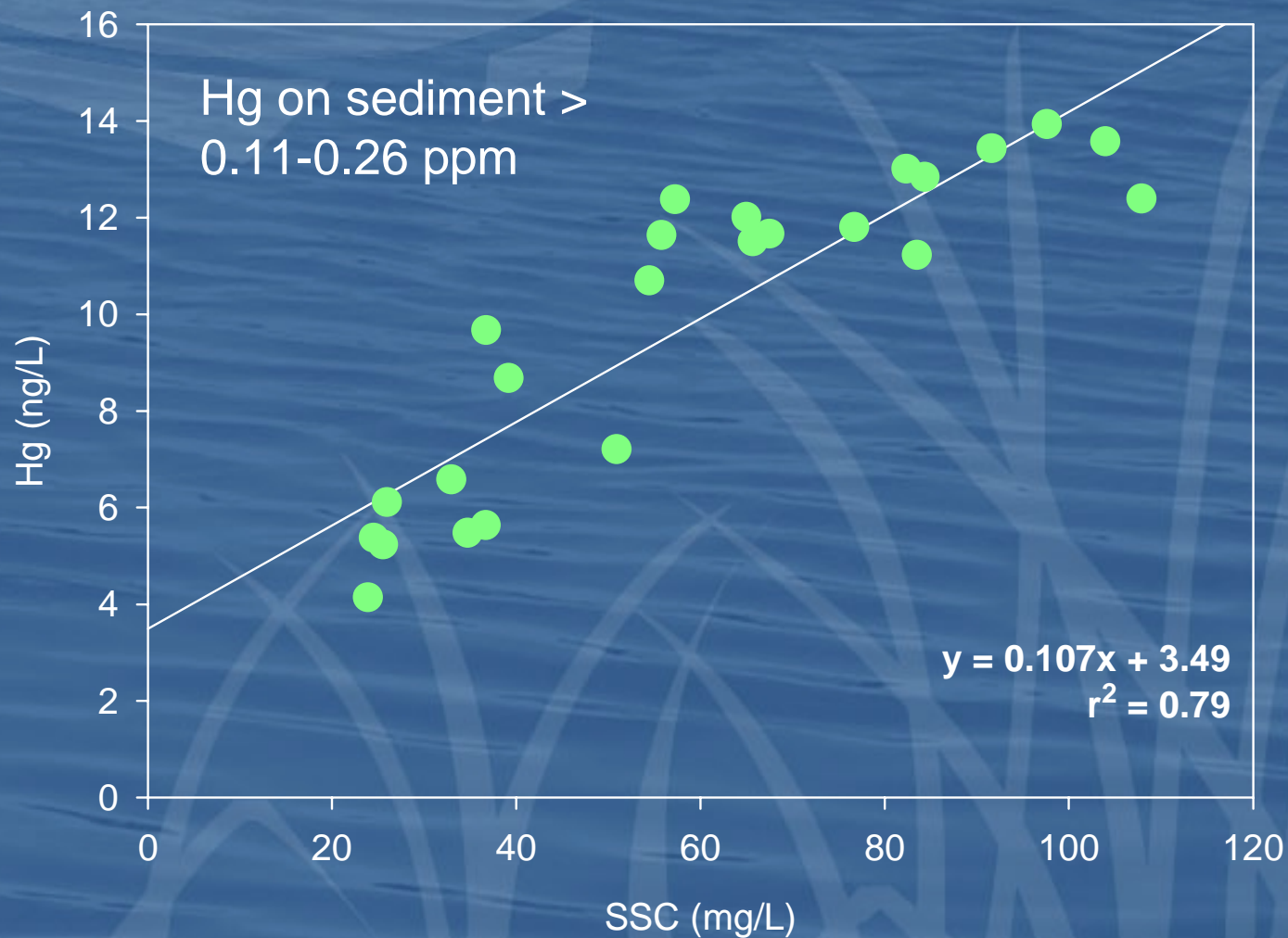


## Data disclaimer

- All contaminant data collected to date in the Mallard Island Study has not been gone through final QA review as required by the RMP and is considered preliminary.

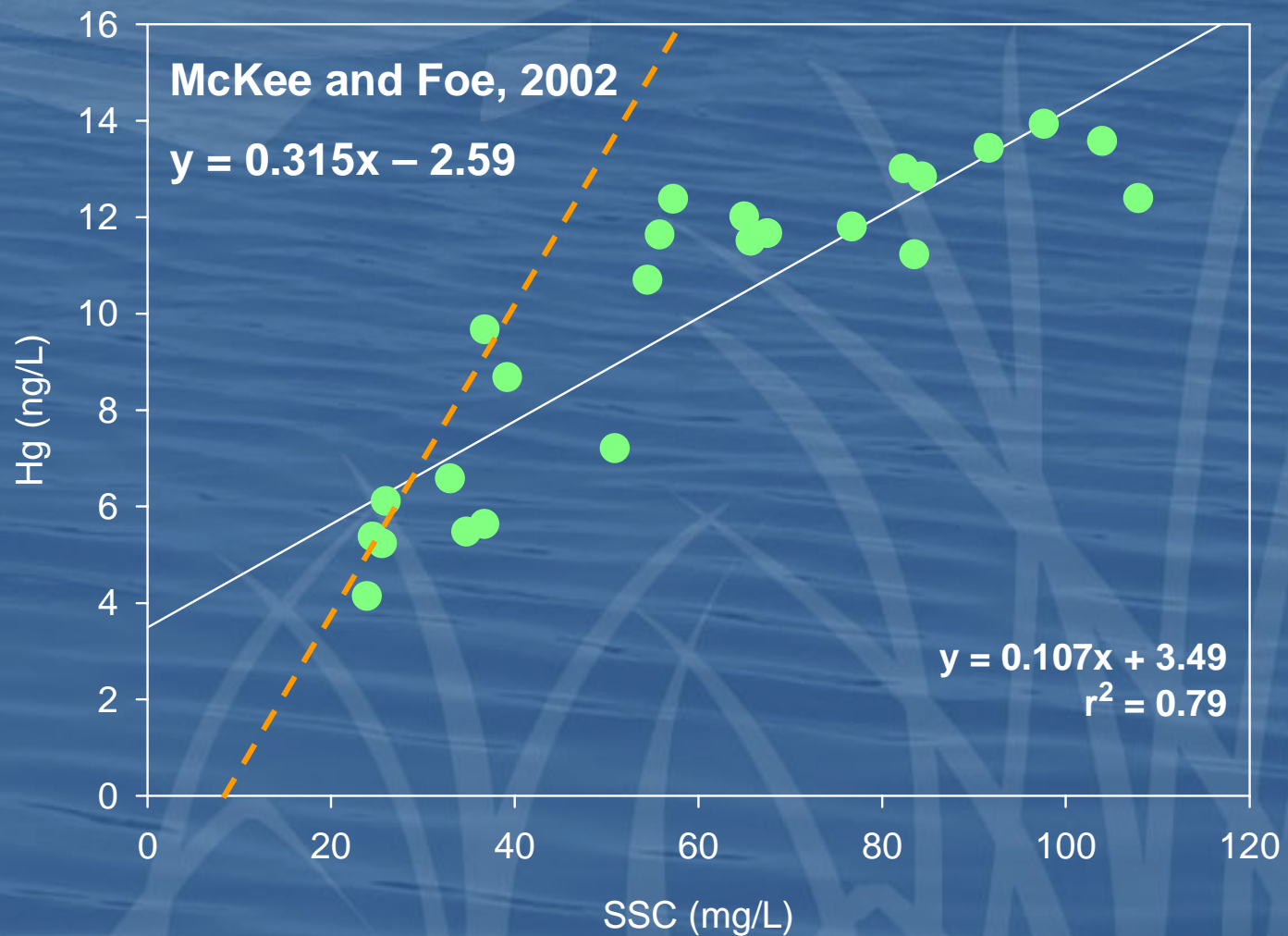


# Preliminary regression model for Hg load estimates at Mallard Island





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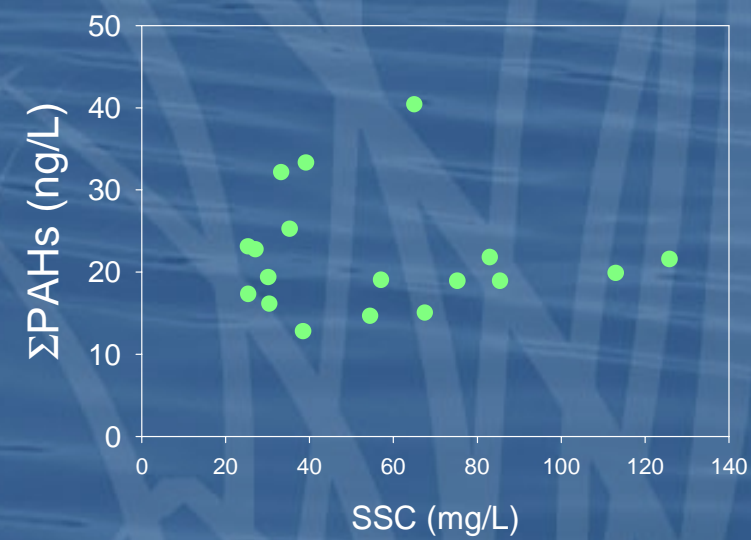
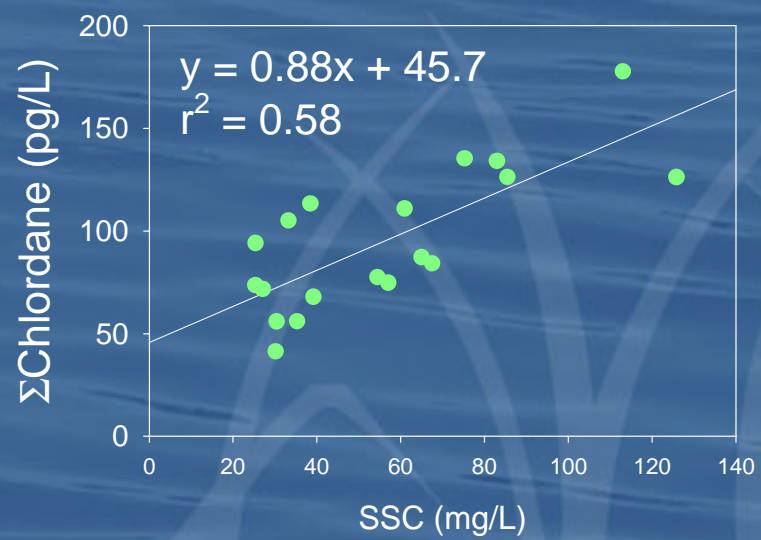
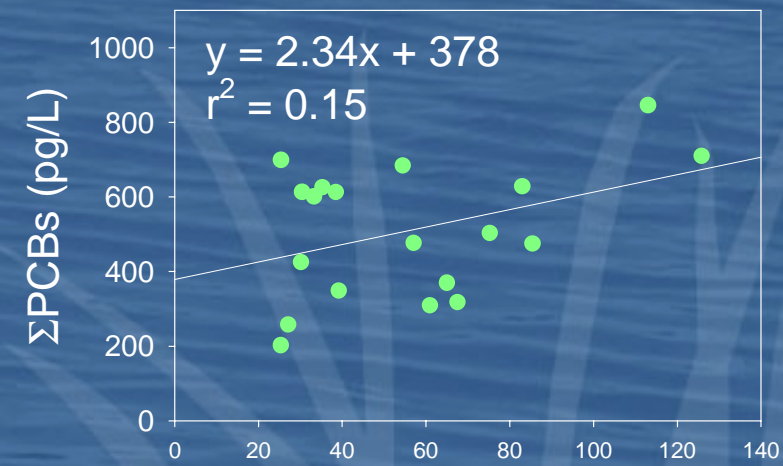
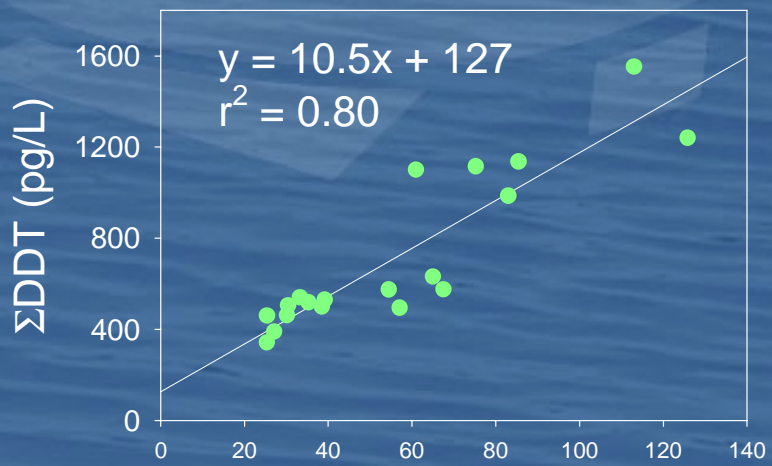
## Comparison of preliminary Mallard Hg load estimate to previous method

Water Year	Particulate	Total
	Hg Load (kg)	Hg Load (kg)
	McKee and Foe (2002)	Mallard Island
1995	701 ± 154	430 ± 95
1996	253 ± 56	198 ± 43
1997	612 ± 135	362 ± 80
1998	644 ± 142	418 ± 92
1999	238 ± 52	191 ± 42
2000	162 ± 36	133 ± 29
2001	68 ± 15	48 ± 11
2002	82 ± 18	66 ± 14
<b>8-yr AVG</b>	<b>345 ± 76</b>	<b>231 ± 51</b>



# SSC and organics at Mallard Island

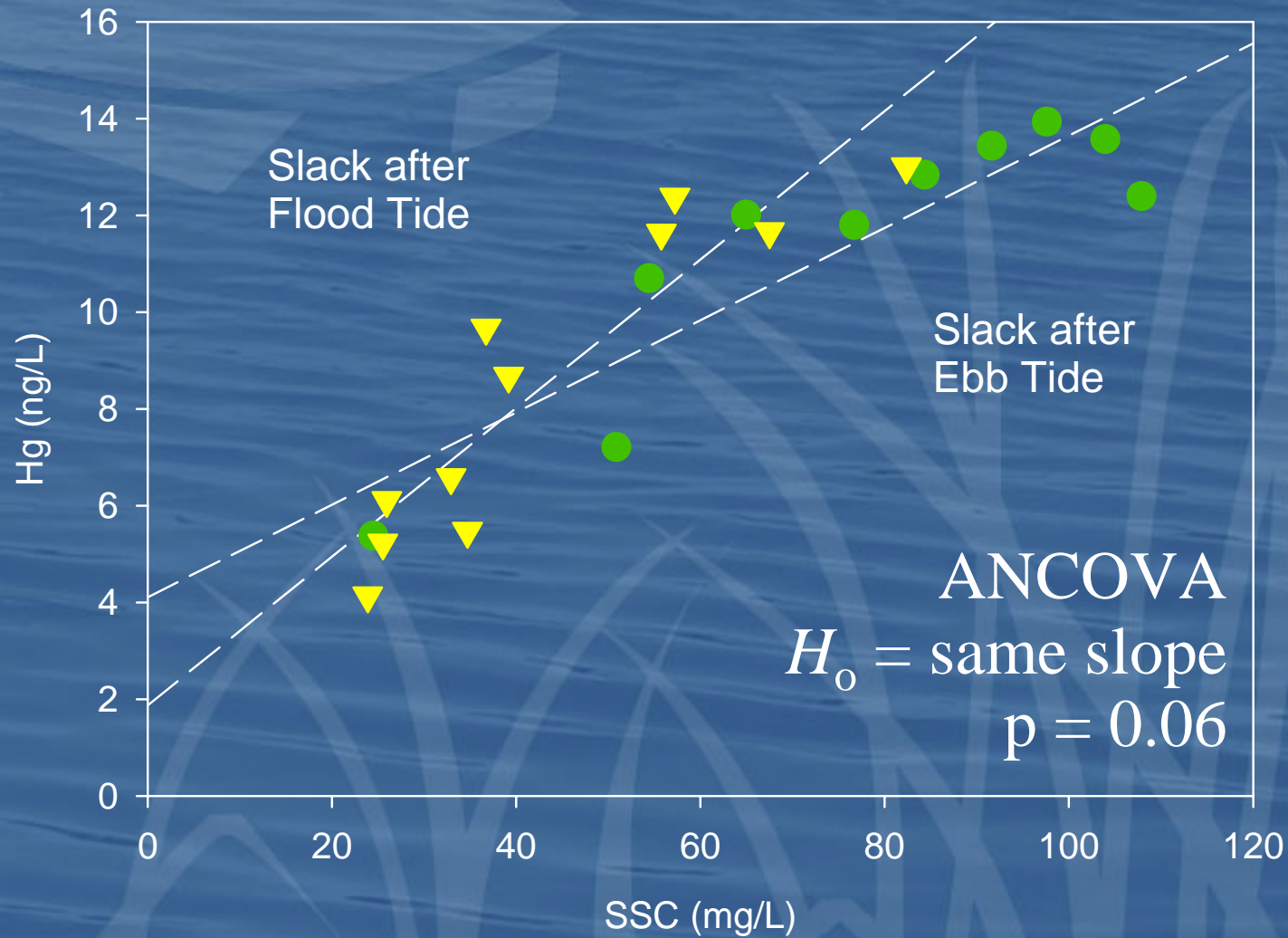
## Preliminary Data





# Effect of tide on Hg:SSC relationship

Preliminary Data

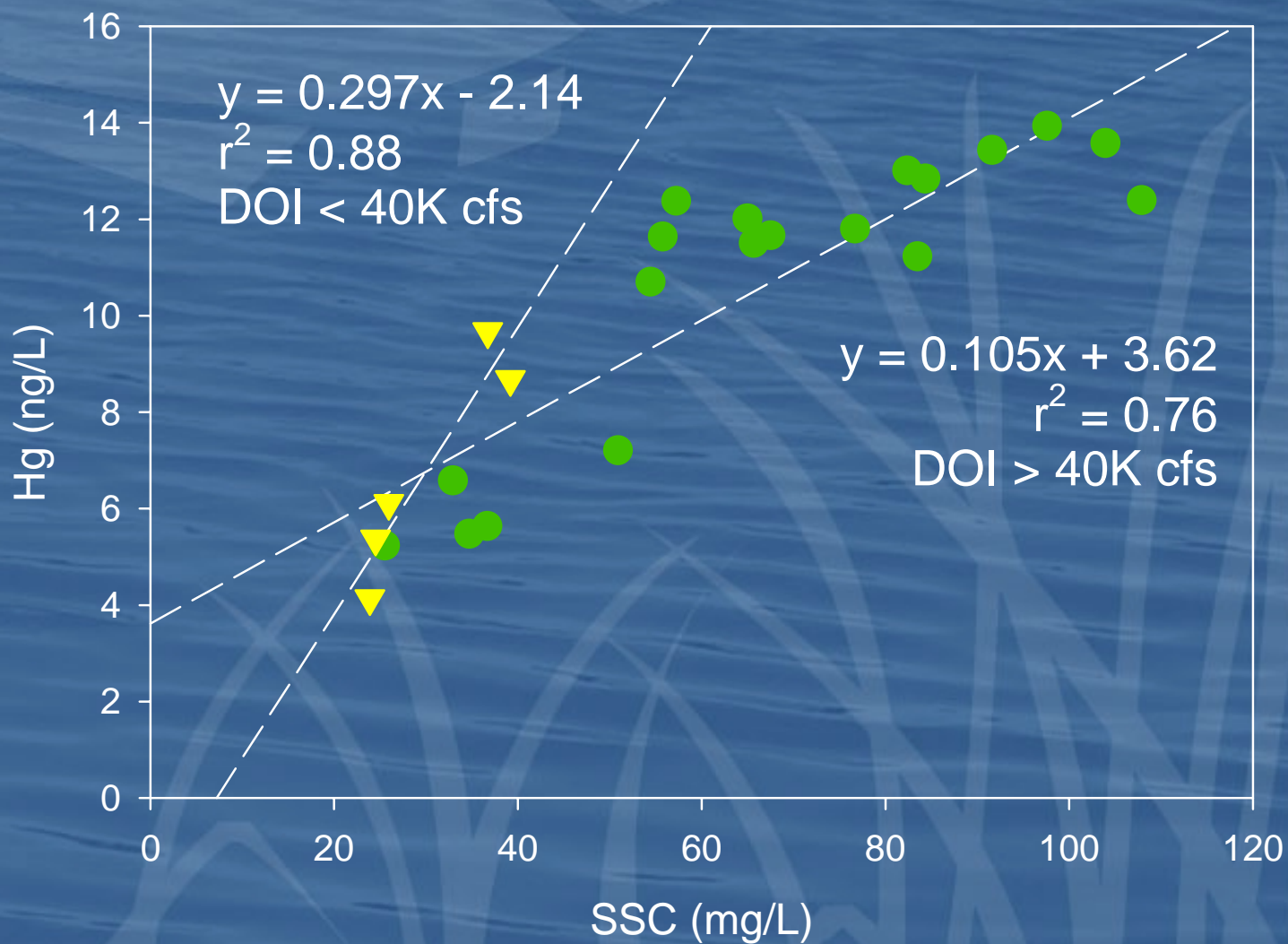






# Effect of flow on Hg:SSC relationship

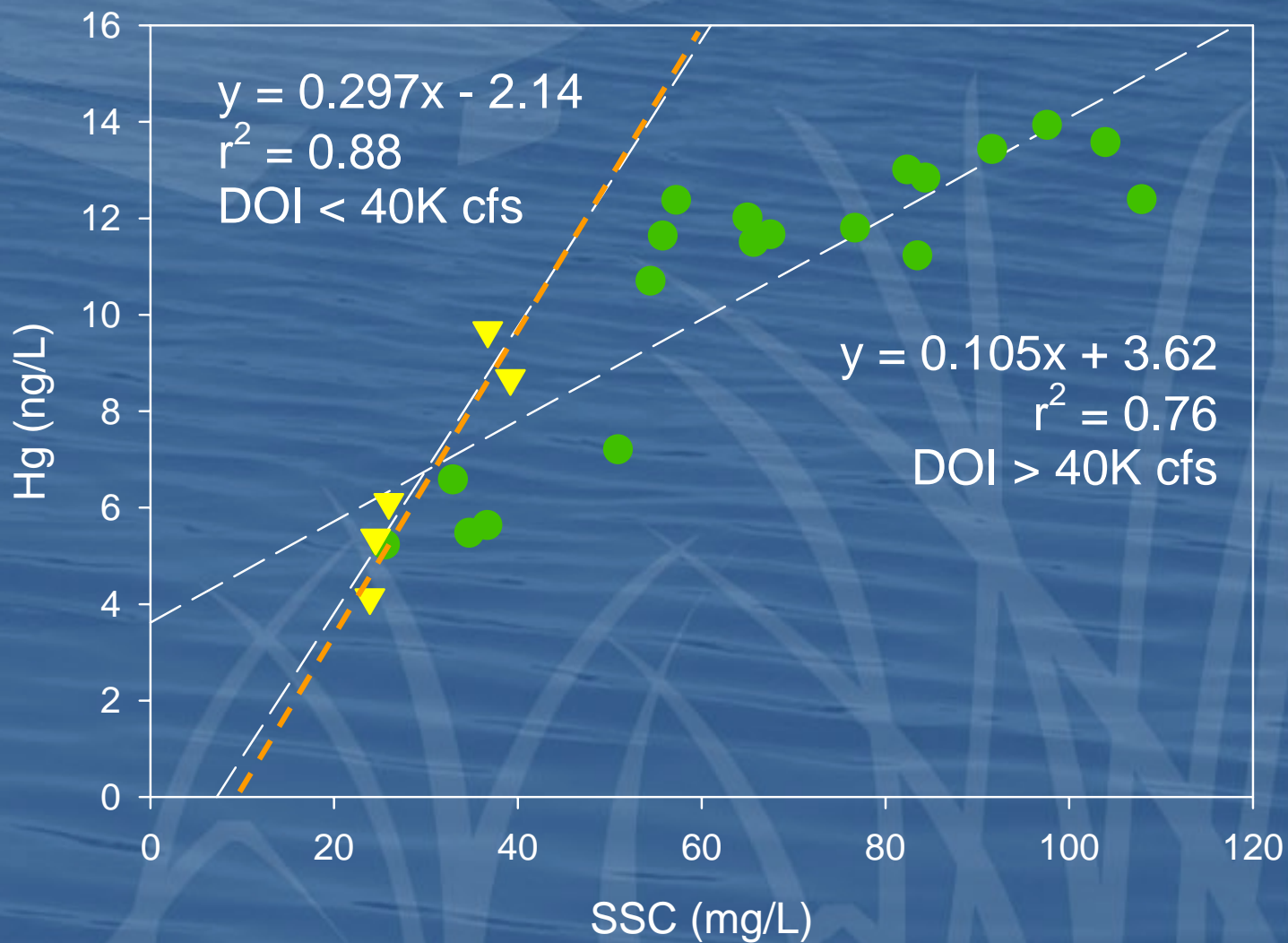
Preliminary Data





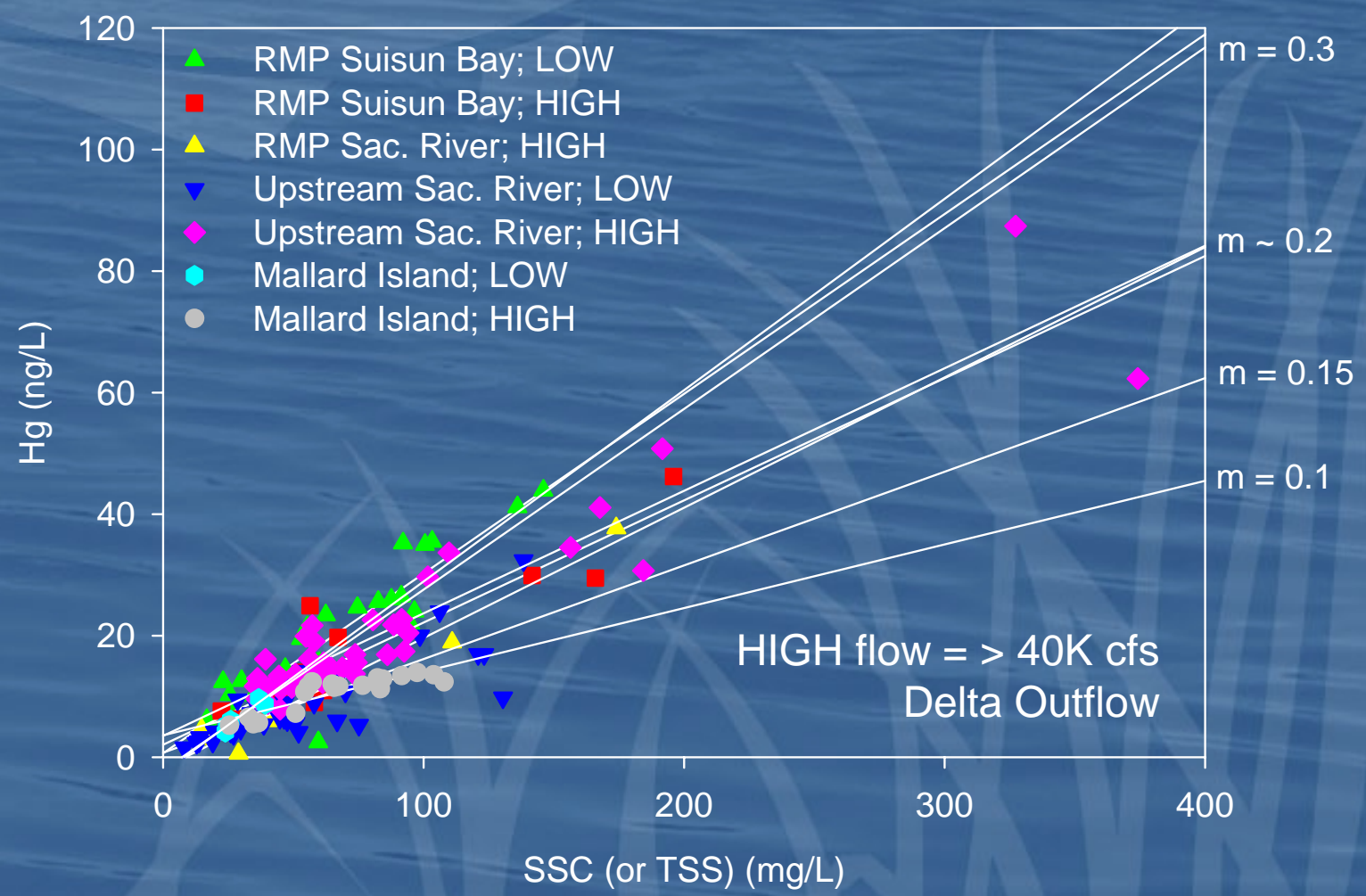
# Effect of flow on Hg:SSC relationship

Preliminary Data





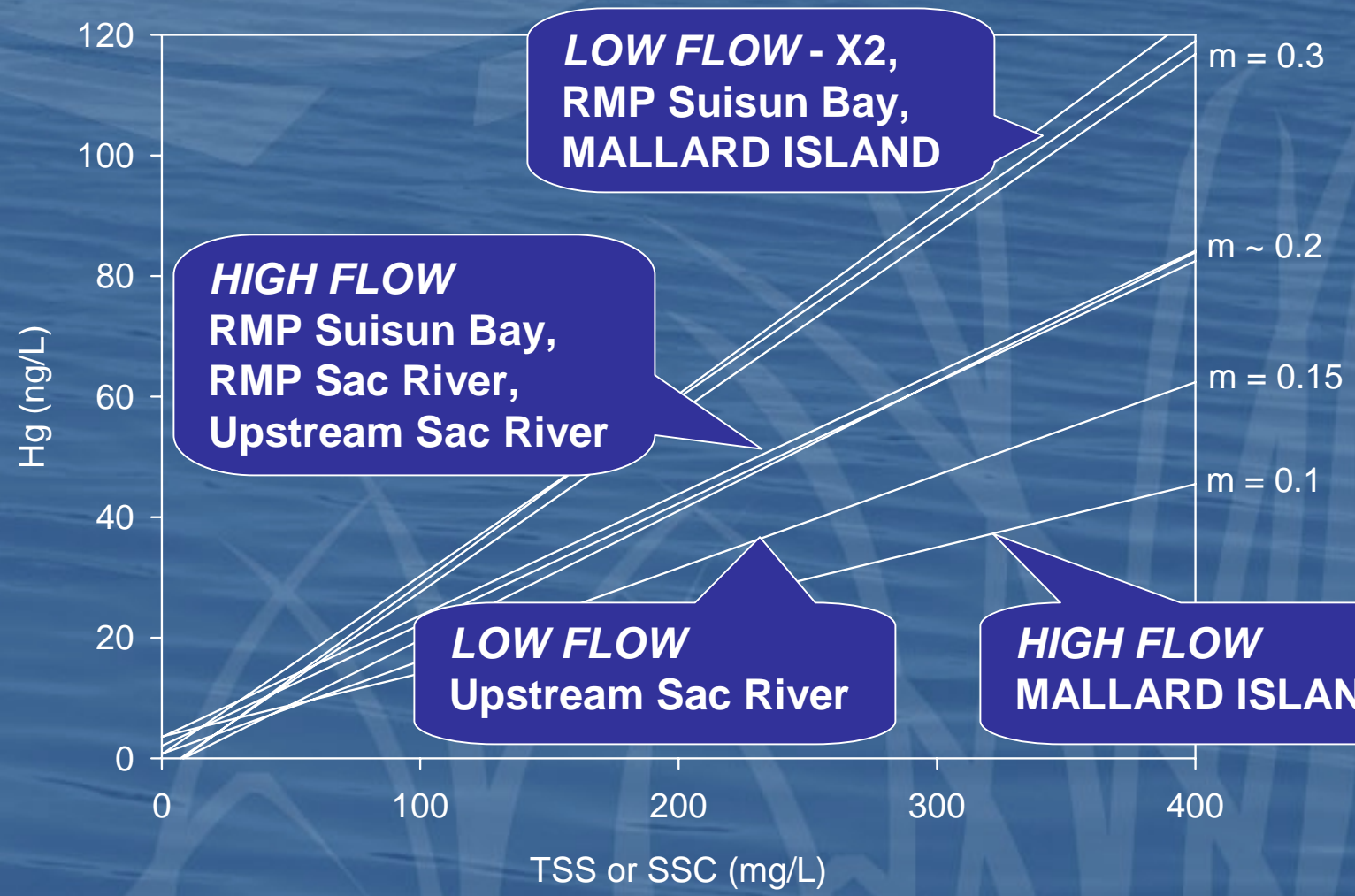
# Effects of flow on Hg:SSC (or TSS) in Bay, Delta, and Sacramento River (Data from this study; RMP 1993-2001; Foe and Croyle, 1998; Foe, 2000)





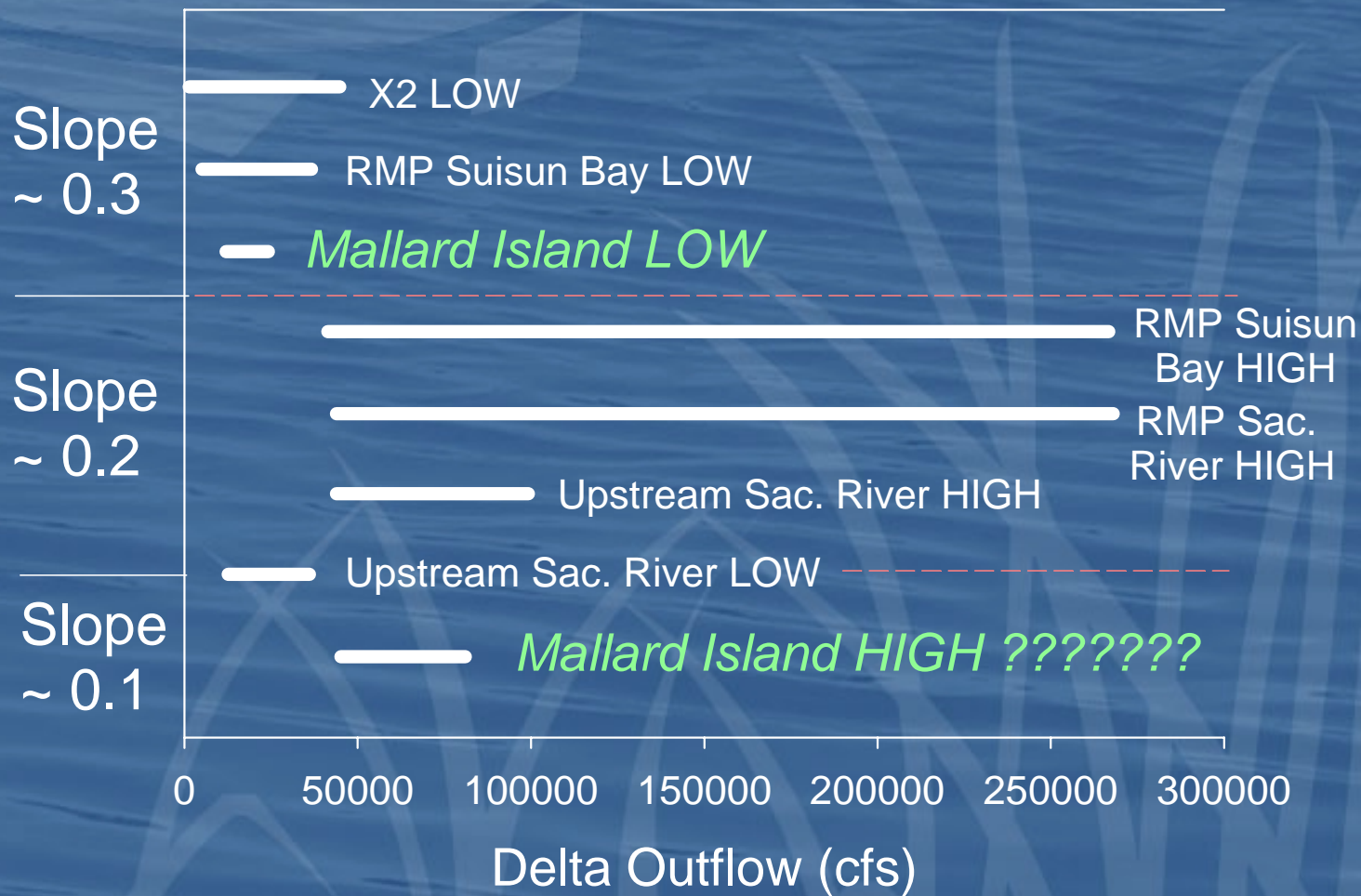


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# Conceptual model of mercury transport on suspended sediment





## Reporting and Future Data Collection

- Reporting in 2003 – Progress Report
  - Draft – Oct 2003
  - Final – Dec 2003
- Sampling WY 2004
  - 30 Hg, 18 Organics
- Reporting in 2004 – Final Report
  - Draft – Oct 2004
  - Final – Dec 2004