



# Sediment and Contaminant Loading from the Guadalupe River

## Implications for TMDLs and Mass Budget Models

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# TMDLs in San Francisco Bay

1994 – OEHHA; fish consumption advisory for bioaccumulative contaminants

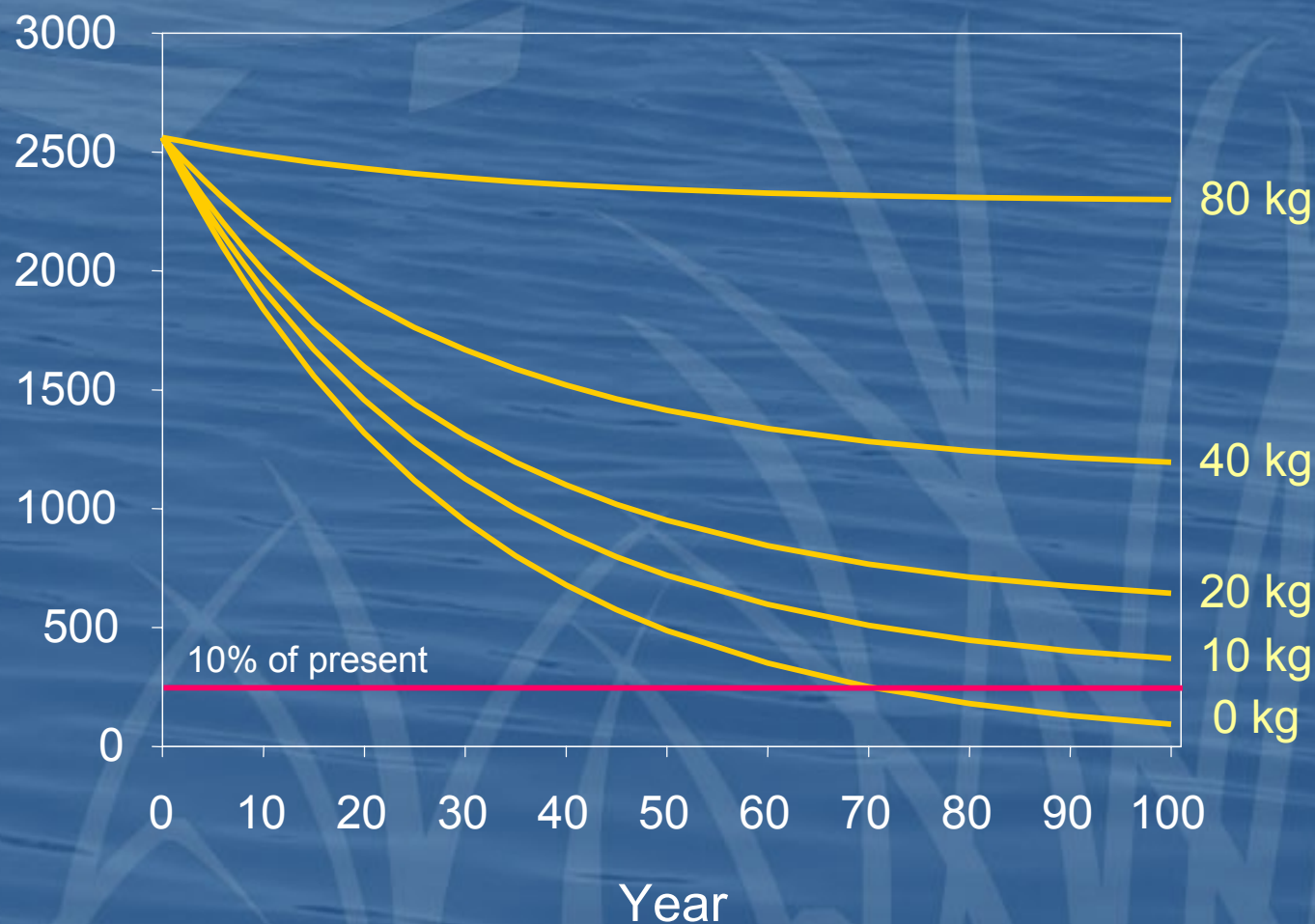
1998 – 303 (d) list of impaired water bodies for PCBs, Hg, OC pesticides (DDT, chlordane, and dieldrin)

Current Top Priority - PCB and Hg TMDL development



# Mass Budget Models – RMP

## PCBs (Davis, 2002)

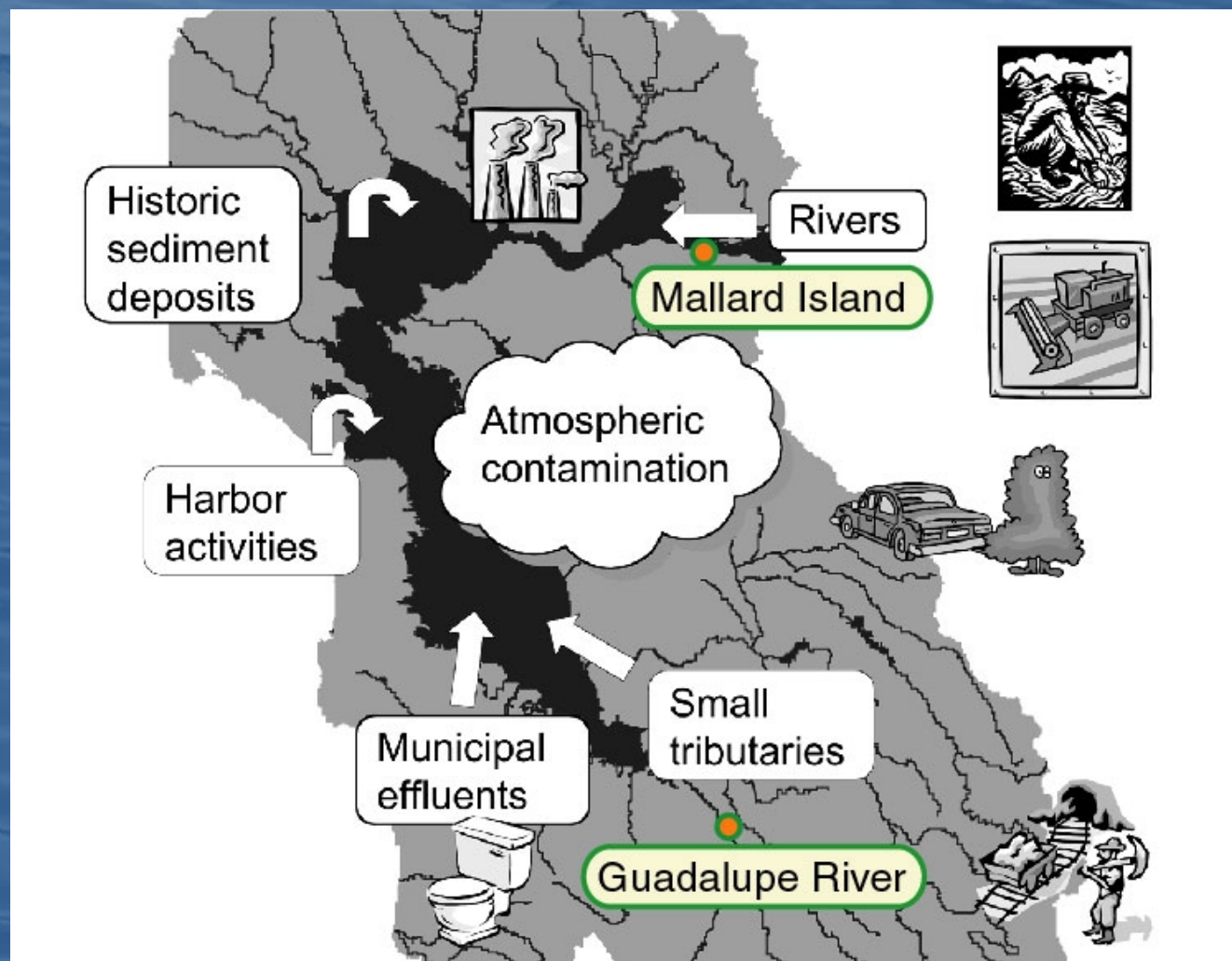






# Conceptual Model of Loading

(Davis et al., 1999)





# Why Guadalupe River?

556 km<sup>2</sup> watershed

Urban and industrial  
areas of San Jose

Historic use of OC  
pesticides

New Almaden  
Mercury Mine

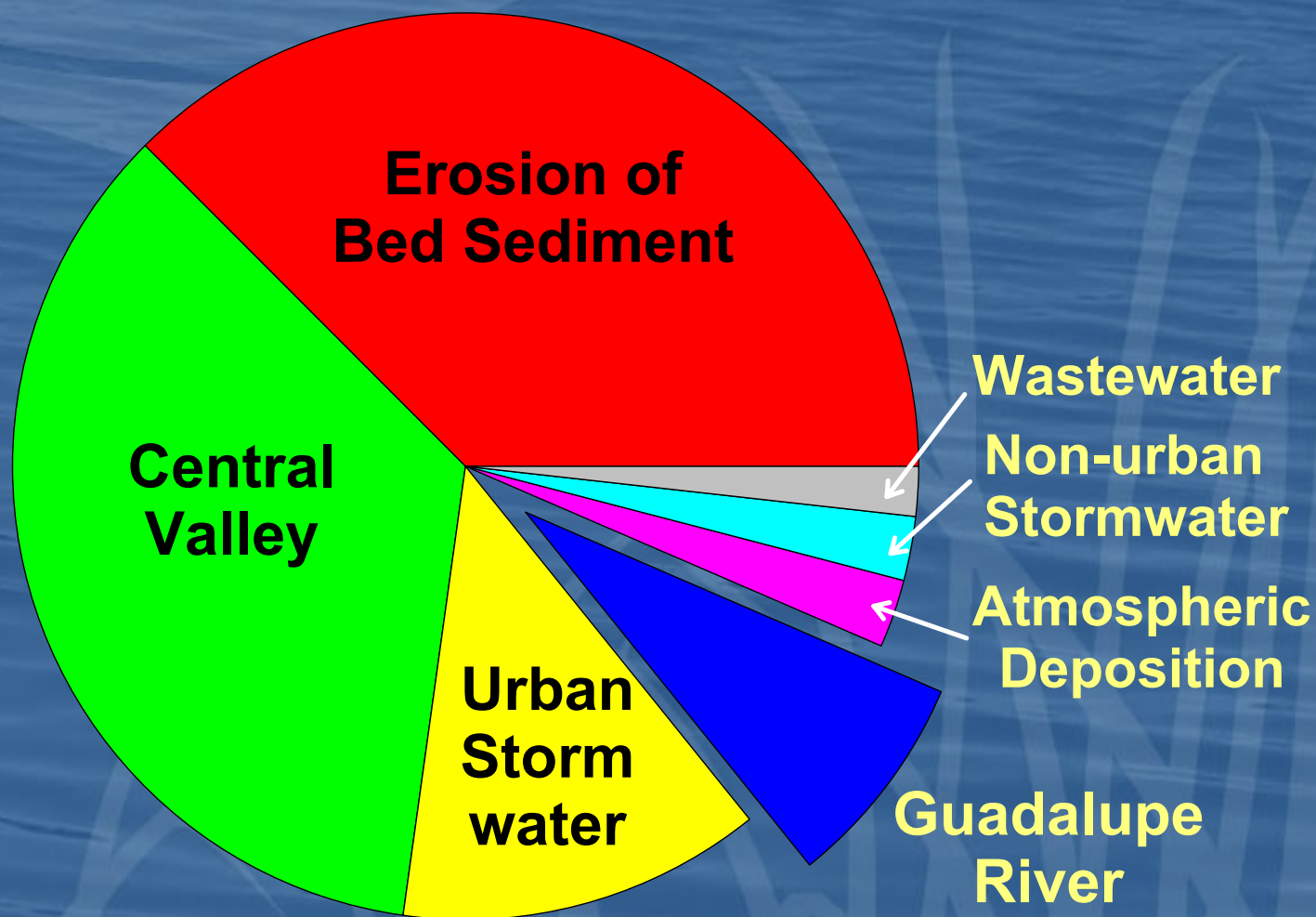
RMP – Estuary Interface Pilot Study 1997-2001  
*Leatherbarrow et al., 2002; [www.sfei.org](http://www.sfei.org)*







# Relative Proportions of Estimated Hg Loads (RWQCB, April 2003)





# Guadalupe River Study

Developed by the RMP Sources Pathways and Loadings Workgroup (SPLWG)

Funded by the Clean Estuary Partnership (CEP)

Technical oversight by SPLWG & CEP

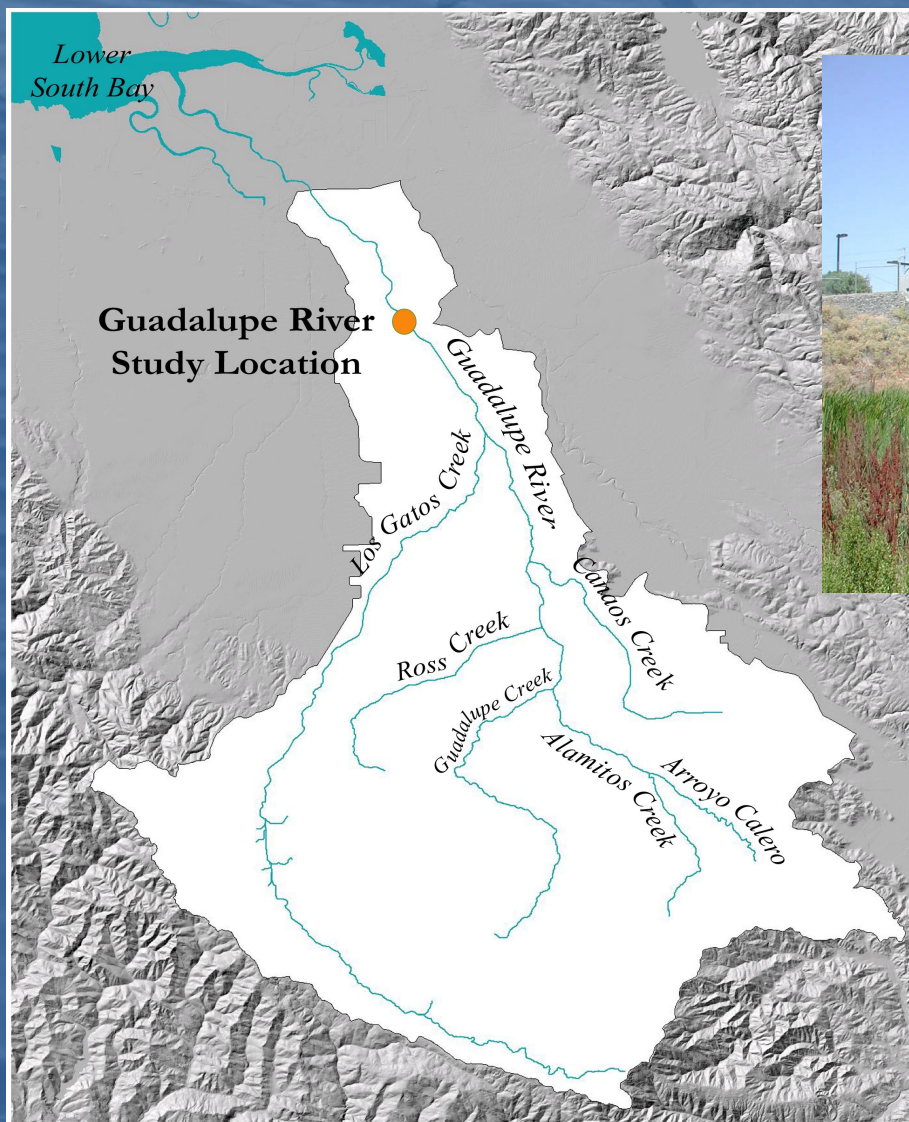
Sampling began November, 2002

Report by December, 2003





# Study Location







## Study Objectives

Estimate loading of sediment and associated contaminants

Improve understanding of transport processes and contaminant loading from local tributaries

Assist in development of TMDLs and mass budget models



# Parameters and Participants

Sample Collection – *SFEI*

Real-time Turbidity – OBS @ 15-min

*Rand Eads (Redwood Sciences Lab., USDA Forest Serv.)*

Real-time Streamflow and SSC

*Larry Freeman (USGS)*

PCBs, Hg (&TM), and OC pesticides

*AXYS Analytical Ltd – organics*

*Mark Stephensen (MLML) – Hg, TM, & cognates*





# Estimating Loads

Regression analysis of turbidity and contaminant concentrations

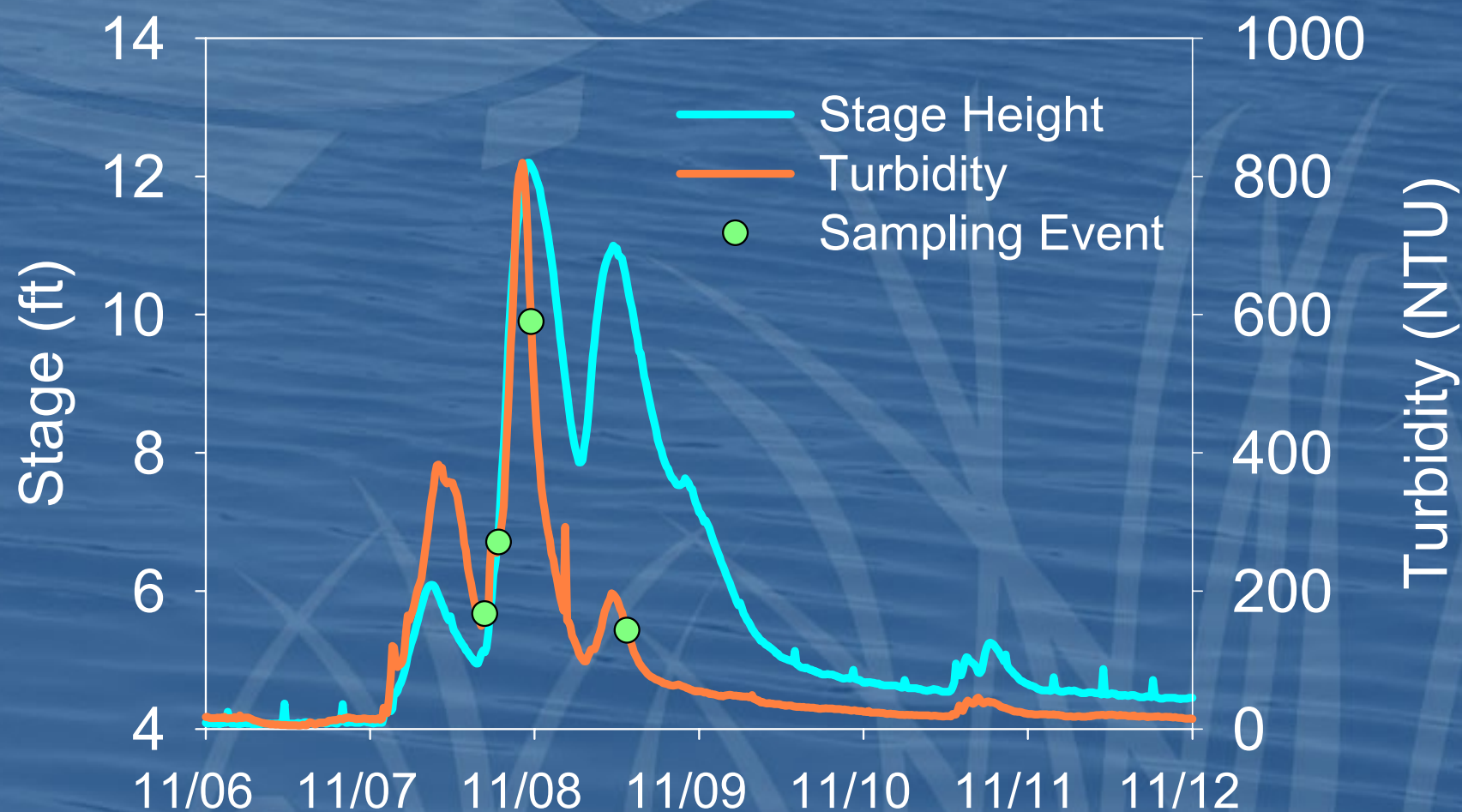
Contaminant  
Concentration

Turbidity (NTU)





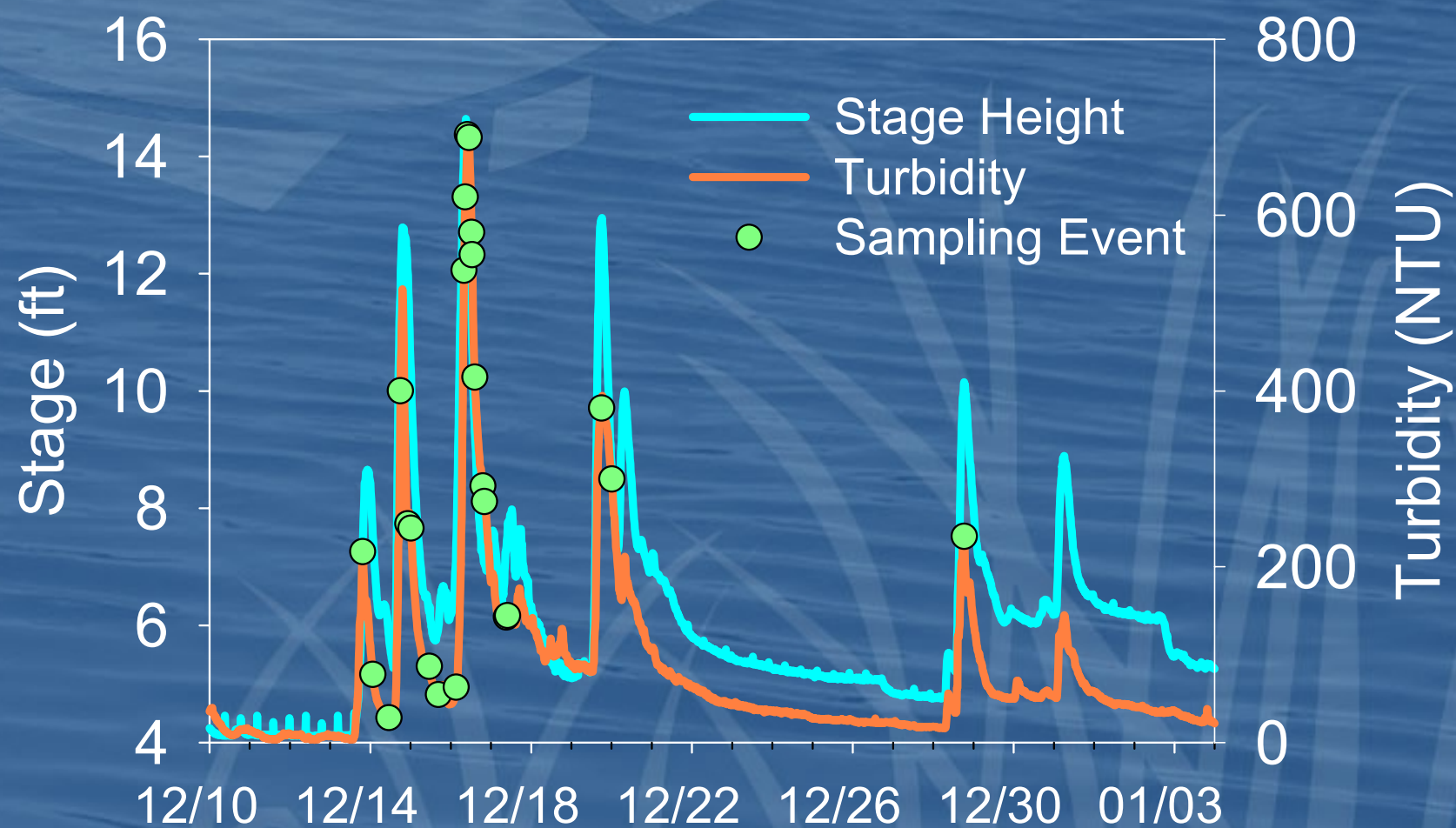
# Sample Collection – Nov, 2002





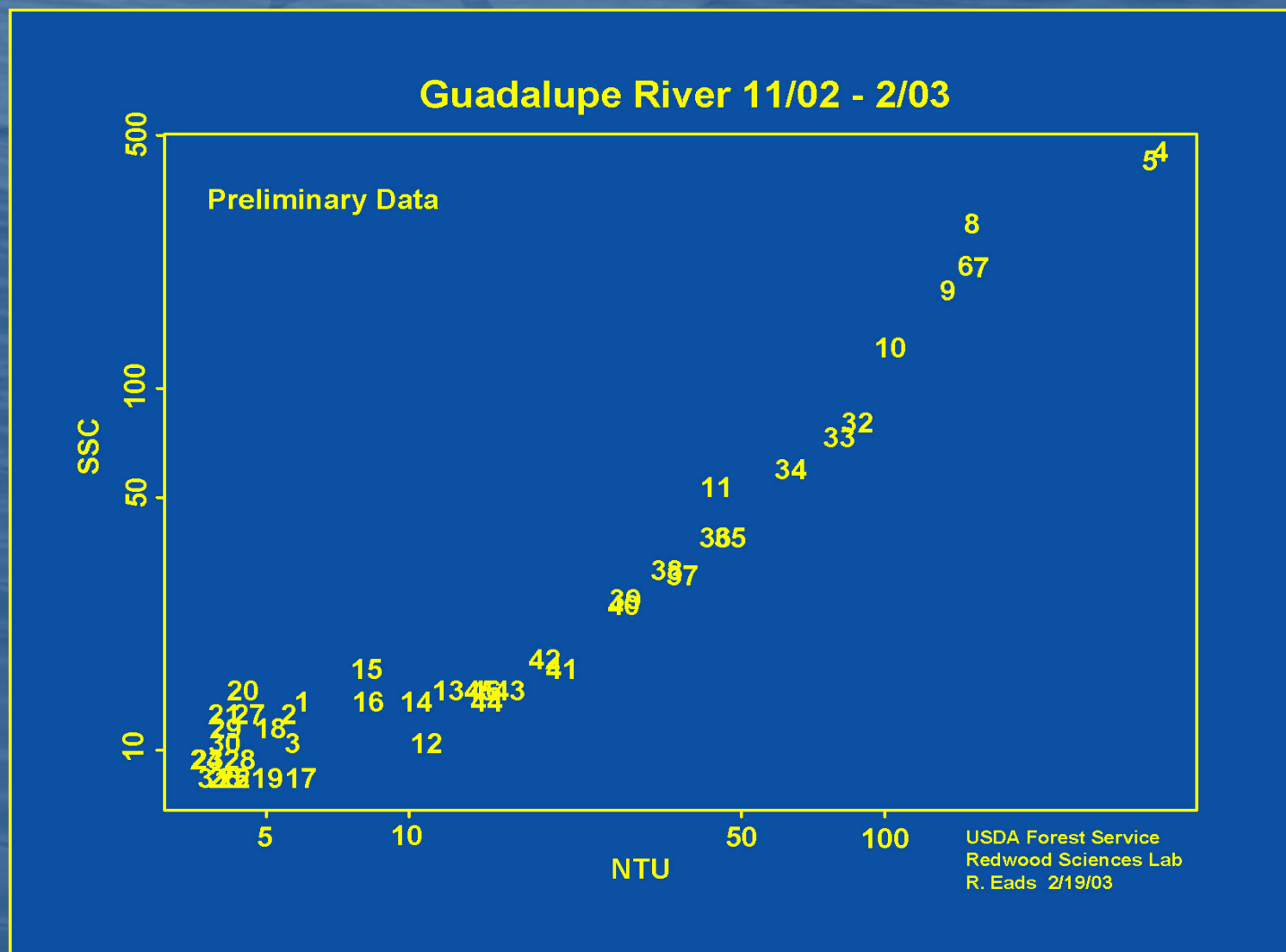


# Sample Collection – Dec, 2002





# Turbidity vs. SSC - Preliminary







# Preliminary Concentrations

	This Study	Max in Alv. Slough, 1997-2001
Hg ( $\mu\text{g/L}$ )	0.2 - 18	0.7
PCBs (ng/L)*	7.7 - 27	7.2
$\Sigma$ DDT (ng/L)*	5.7 - 42	9.2
$\Sigma$ Chlord (ng/L)*	3.5 - 33	3.0
Dieldrin (ng/L)*	0.6 - 3.1	0.5

\* only 4 samples analyzed to date from Guadalupe River  
Collection and analysis methods differed between studies



## Implications for Annual Loading

Flow weighted mean concentrations of:

Hg

$1 \mu\text{g L}^{-1} = 60 \text{ kg}$

$5 \mu\text{g L}^{-1} = 300 \text{ kg}$

$10 \mu\text{g L}^{-1} = 600 \text{ kg}$

PCBs

$10 \text{ ng L}^{-1} = 0.6 \text{ kg}$

$15 \text{ ng L}^{-1} = 0.9 \text{ kg}$

$20 \text{ ng L}^{-1} = 1.2 \text{ kg}$

Central Valley Hg Load  $\approx$  400 kg yr<sup>-1</sup>

PCB loading from small tribs  $> 10 \text{ kg}$ ?





## Future Steps

Report – December, 2003

Continued monitoring (*pending funding*)

Expand study to other watersheds

Explore characterization techniques to extrapolate information to other watersheds



Shed some...



LIGHT!!!



San Francisco Estuary Institute