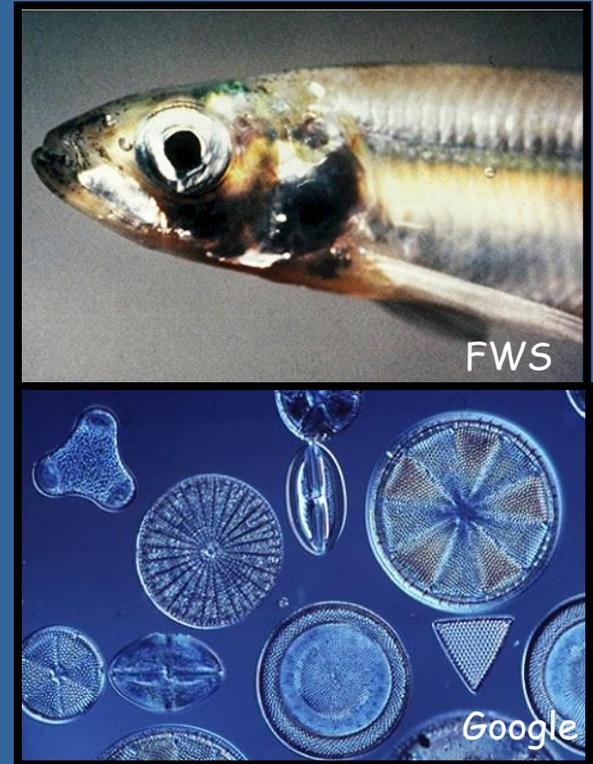


Turbidity Patterns in the San Francisco Estuary Along a Longitudinal Transect

Francine Mejia, Scott Waller, Michael Dempsey,
Eric Haydt
California Department of Water Resources

Rationale for Analysis

- Turbidity is one of main predictors of delta smelt occurrence in the fall and relative abundance in summer.
- Turbidity is also an important factor influencing upstream migration.
- Thus there is need for understanding turbidity as it relates to delta smelt habitat variability.



Hypotheses

- Turbidity varies across regions of San Francisco estuary
- Variability corresponds to delta smelt habitat

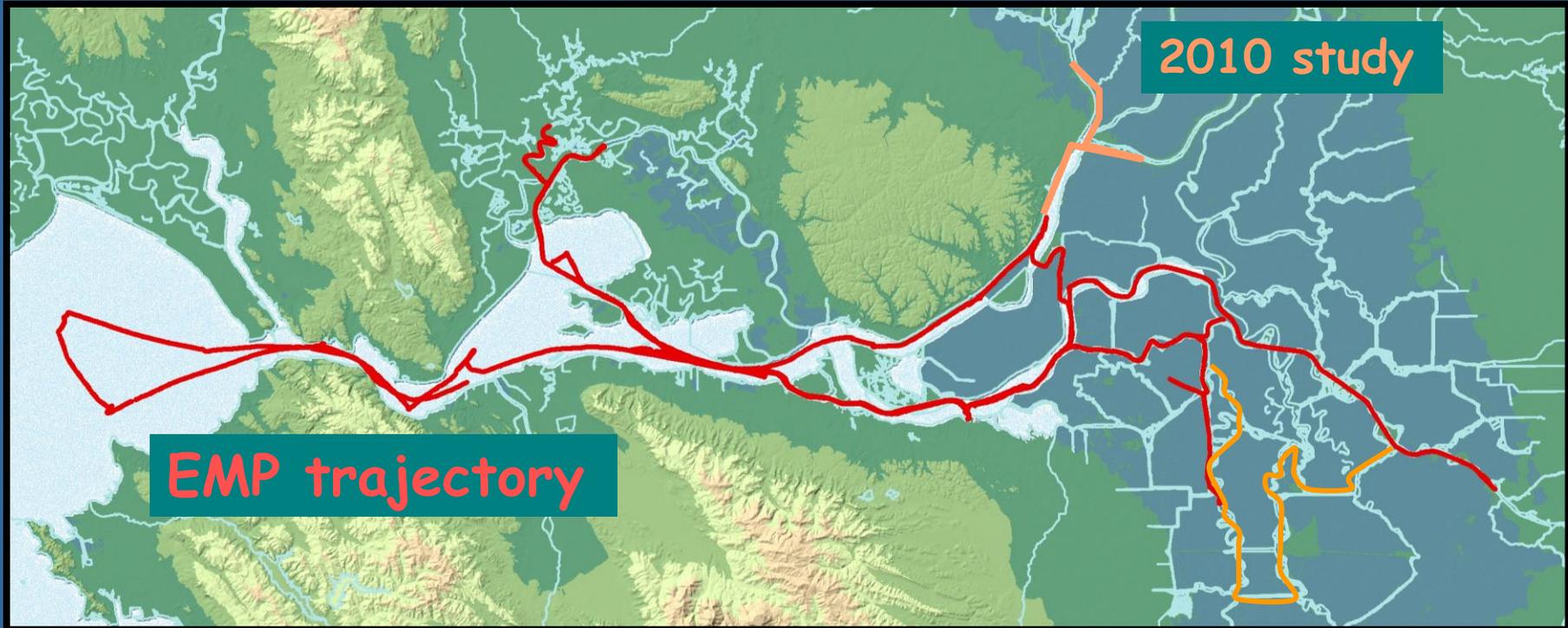


Dale Kolke, DWR



Dale Kolke, DWR

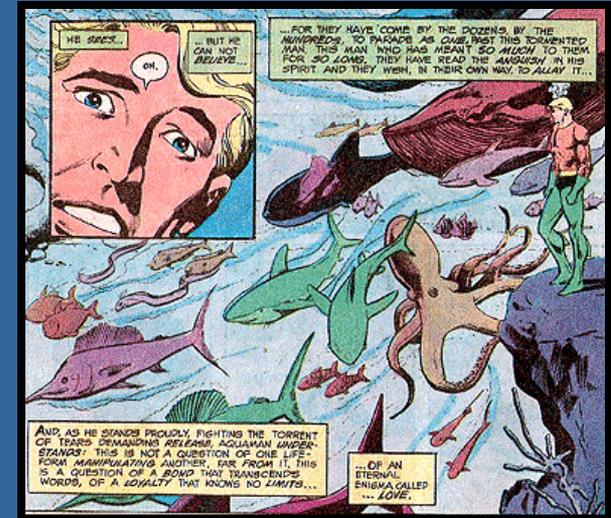
Spatial and Temporal Extent



- 1999-2010 (EMP data)
- Year-round/monthly
- San Pablo Bay to Rio Vista & Stockton
- 2010
- Year-round/monthly, separate cruise
- Suisun Bay to Liberty Island & Stockton



Real Time
Continuous Stations



Horizontal Profiles

Methodology

- Cruises near high slack tide along main channel SJ & Sac rivers
- GPS Location
- Water pumped from 1m depth to flow-through system for continuous analysis.
 - Seabird: EC & temperature
 - Turner: relative fluorescence & turbidity



Today's Presentation

- Pre-spawning (*Oct-Dec*) & spawning (*Jan-Mar*) periods
- Regional Differences for 2 water year types



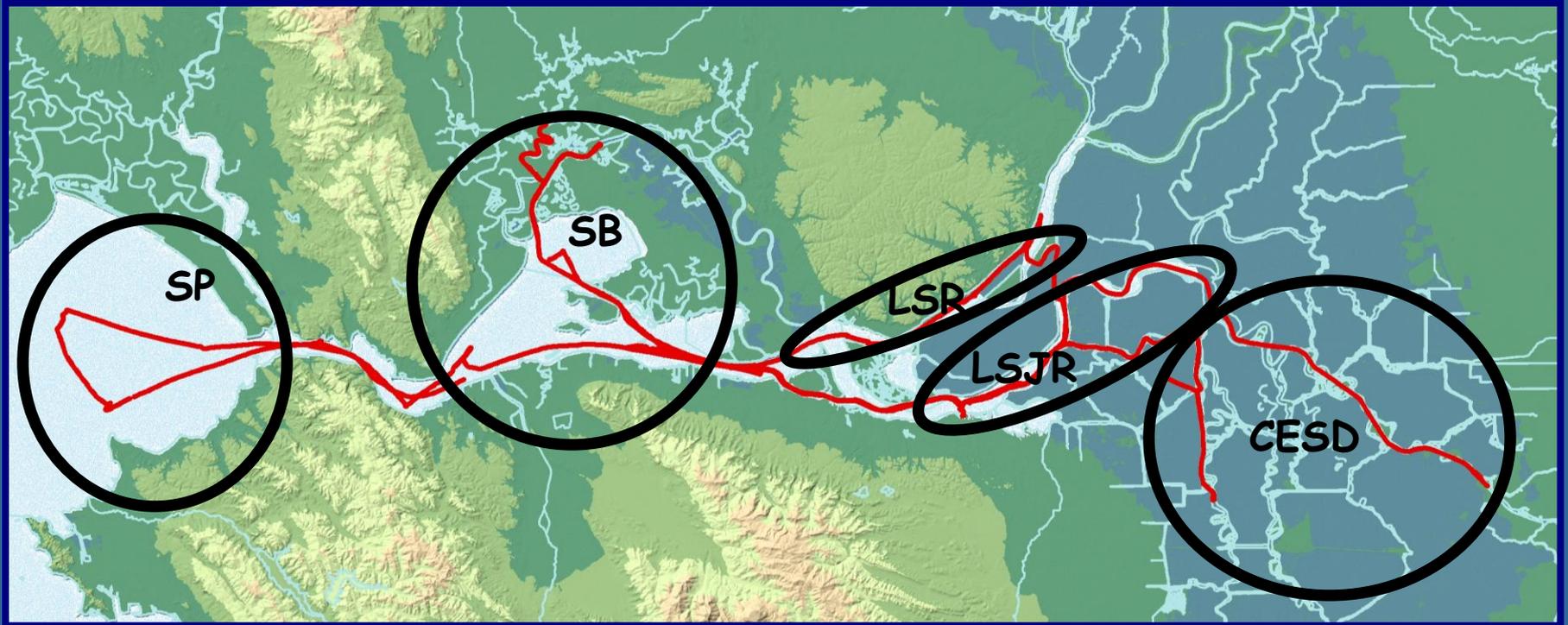
Photo: CA Dept of Water Resources

Overview of Planned Data Analysis

- Inter-annual, seasonal comparisons between regions
- Flow (DSM2 output) & wind effects
- Comparison between continuous, discrete & transect data

Ultimate Goal: Trend Analysis for complete data set

SF/Delta Regions



SP: San Pablo Bay

SB: Suisun Bay

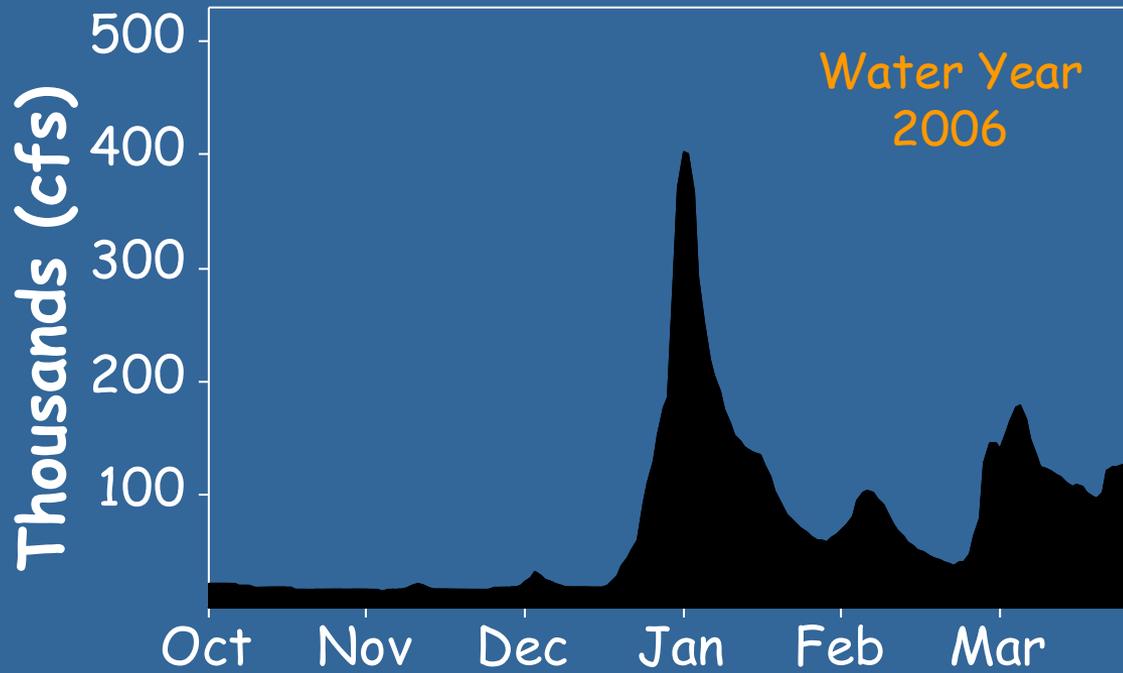
LSR: Lower Sacramento River

LSJR: Lower San Joaquin River

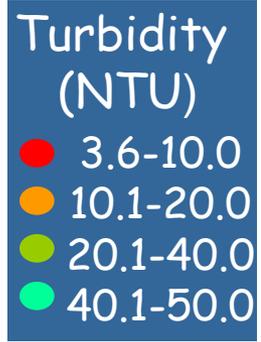
CESD: Central/East/South Delta

Lehman 1996, Jassby et al. 2005

Delta Inflow

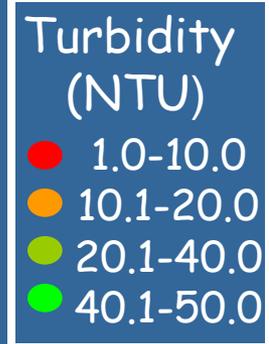
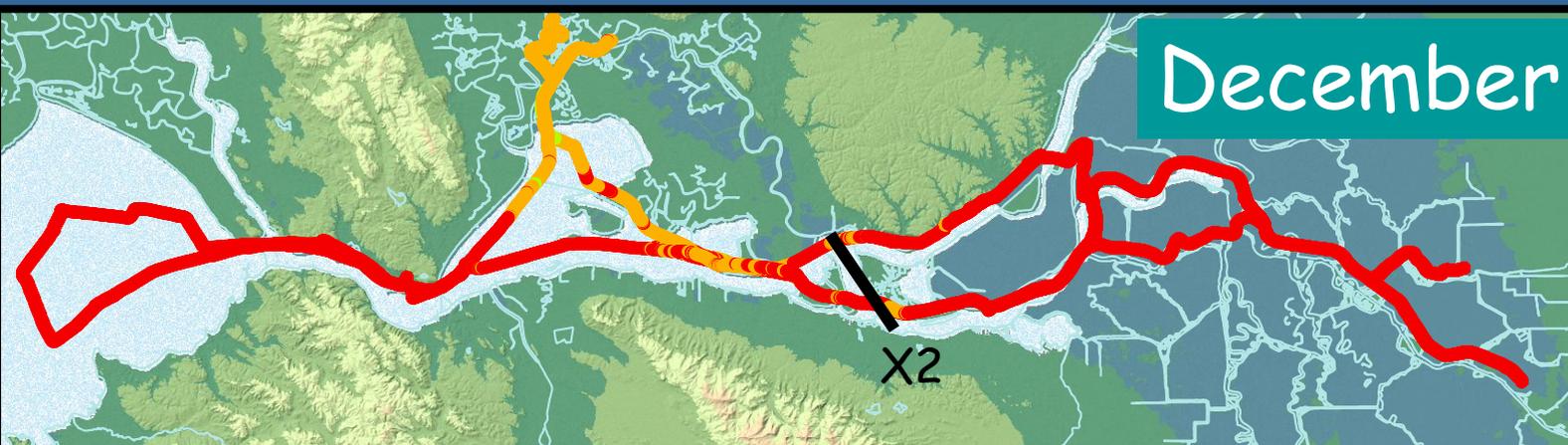


Fall 2005

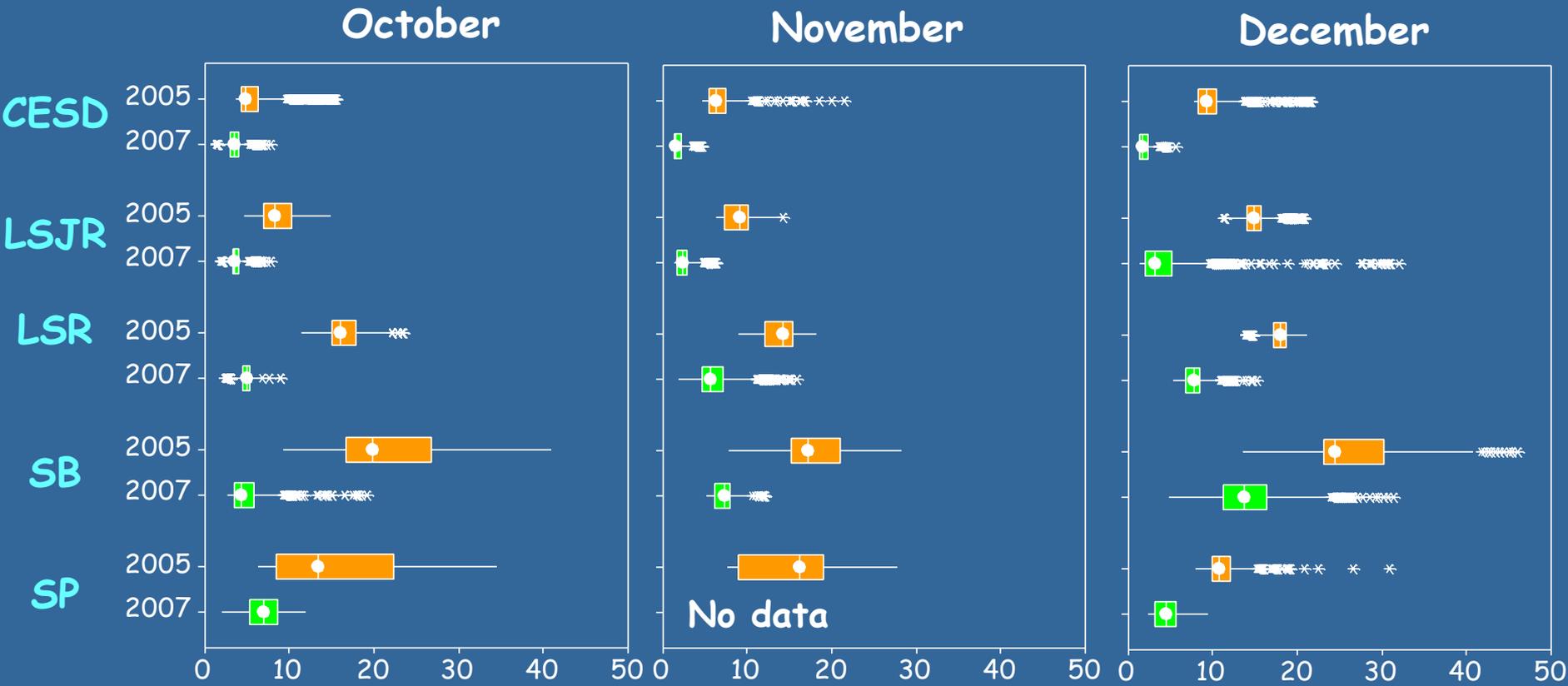
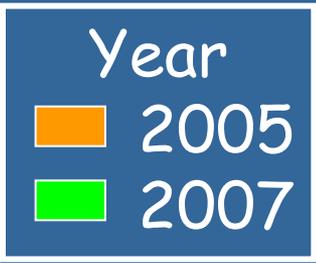


December lowest turbidity = 7.2 NTU

Fall 2007



Differences across regions

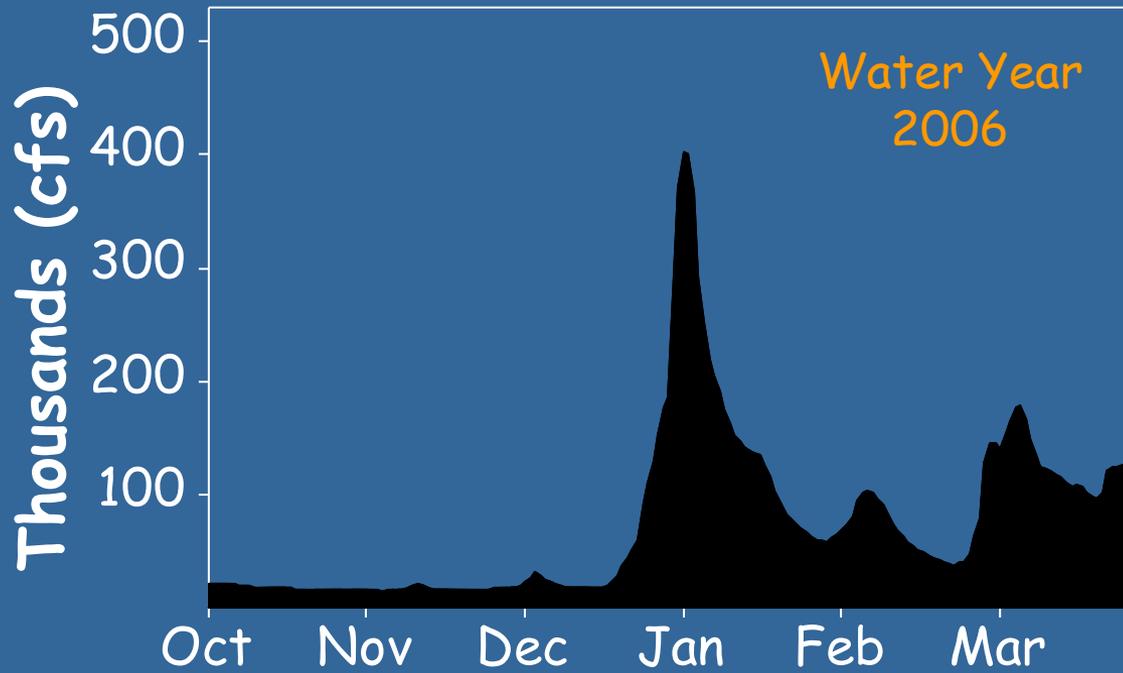


No data

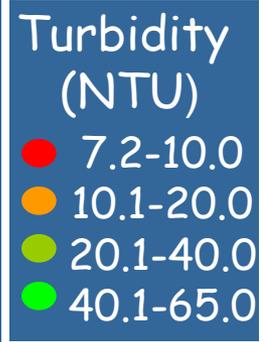
Turbidity (NTU)



Delta Inflow



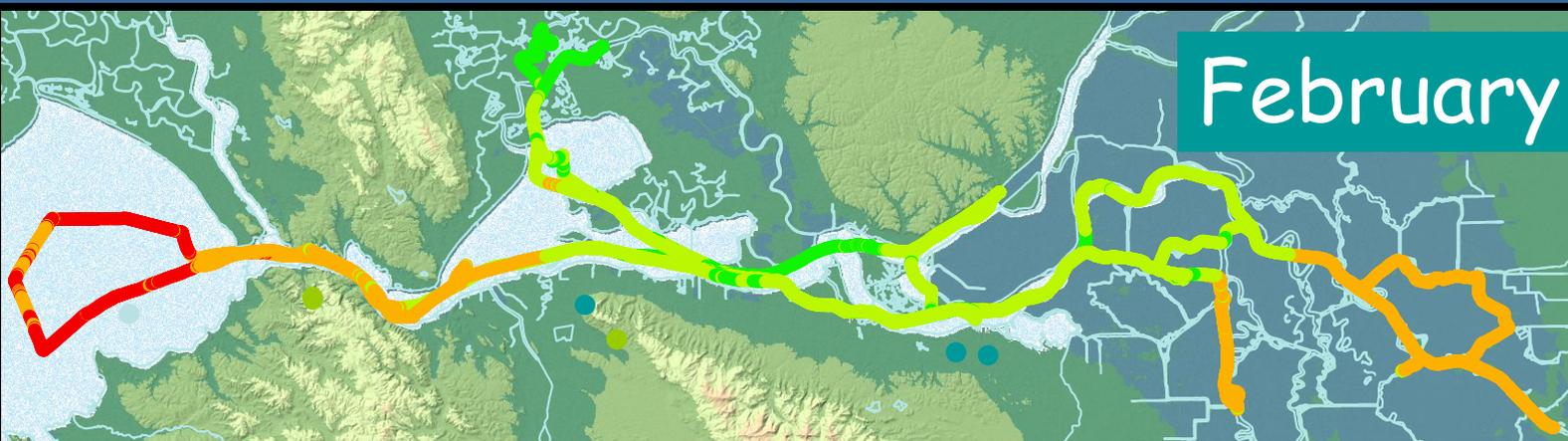
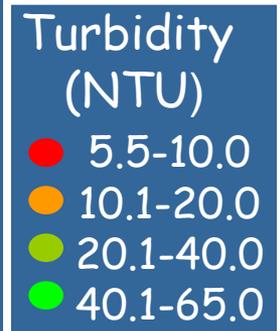
Winter 2006





Winter 2008

Critical
Water Year



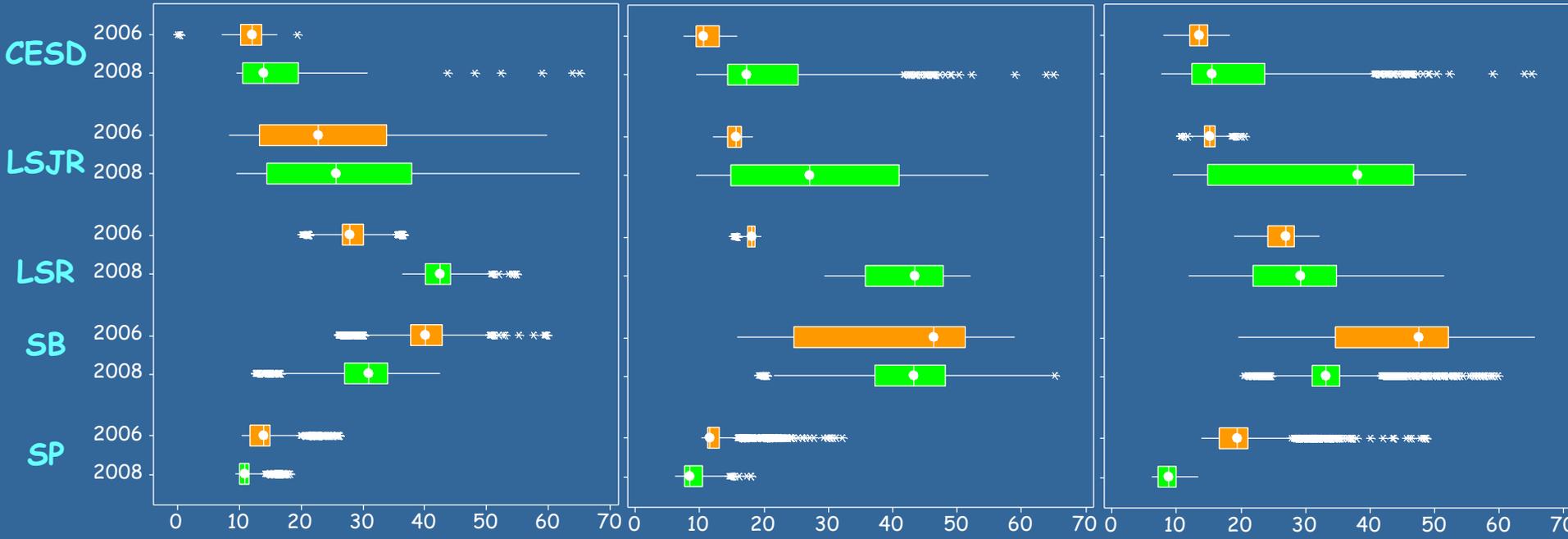
Differences across regions



January

February

March



Turbidity (NTU)



Summary

FALL

- As expected turbidity was highest in December (Suisun Bay).
- All regions are significantly different except for SP and LSR in November 2005.

Summary

WINTER:

- High variation between regions
- CESD: surprisingly high in February 2008
- SB & LSR consistently highest values (both years)
- All regions have higher values except SP during 2008?

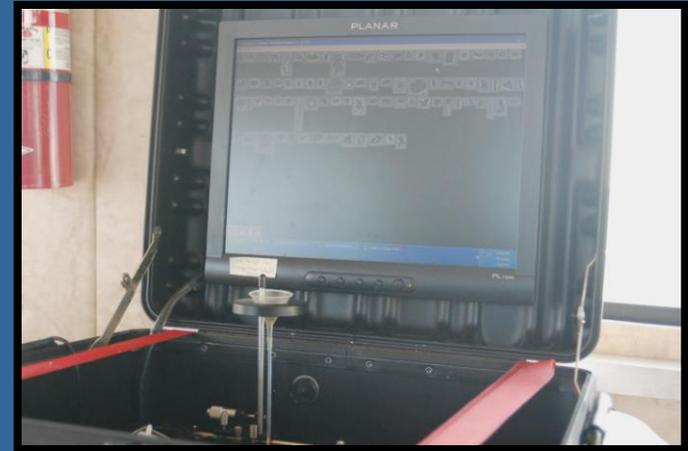
Further examination of flow and wind effect will help better elucidate regional patterns

What's Next?

- Other data collected (May-September)

- ◊ FLOWCAM phytoplankton (P. Lehman)
- ◊ Chlorophyll

- Completing long term data analysis along with the 2010 transect data to include Rio-Vista-cache slough area and mid-delta region



Acknowledgments

Nick Sakata, USBR

Kate Le, DWR

Caily Nelson, DWR



Questions?

