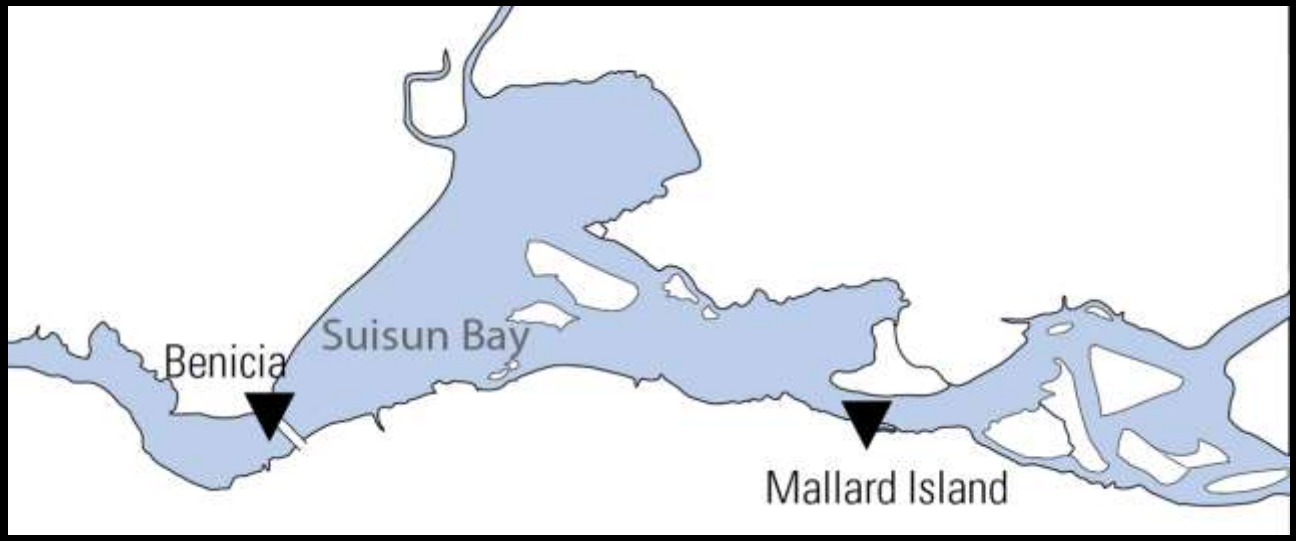
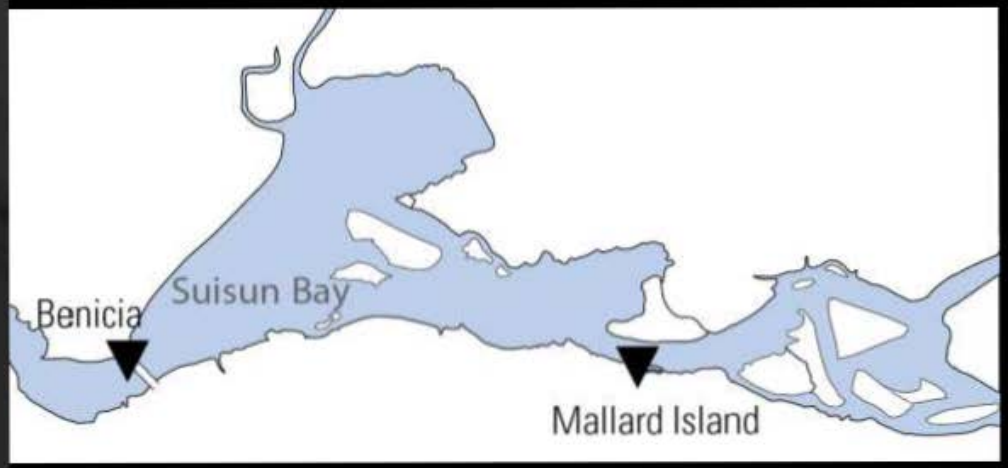
The effect, or lack thereof, of sediment supply and deposition on subsequent fall turbidity in Suisun Bay



David Schoellhamer
USGS California Water Science Center

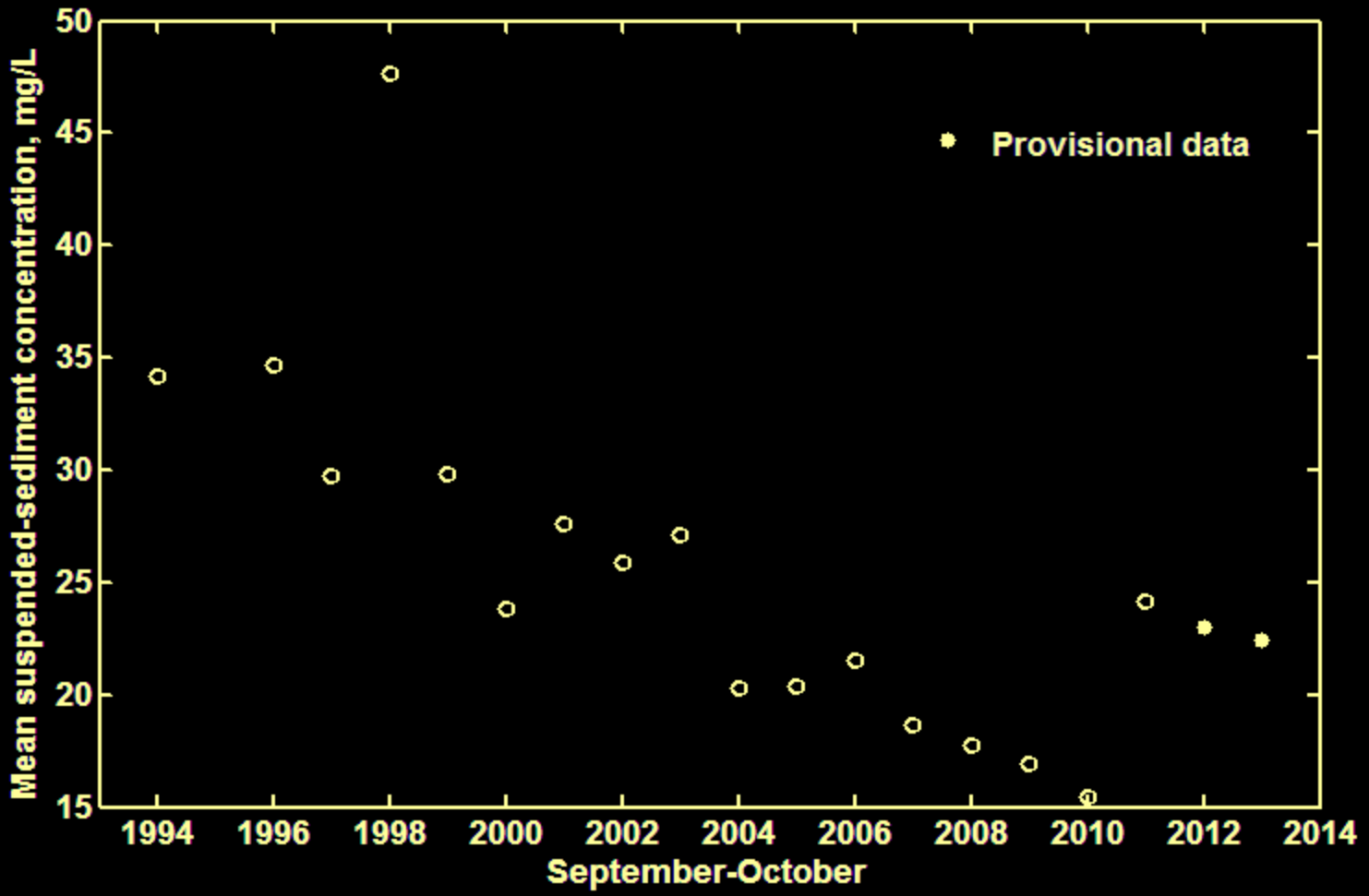
USGS

Motivation



USGS

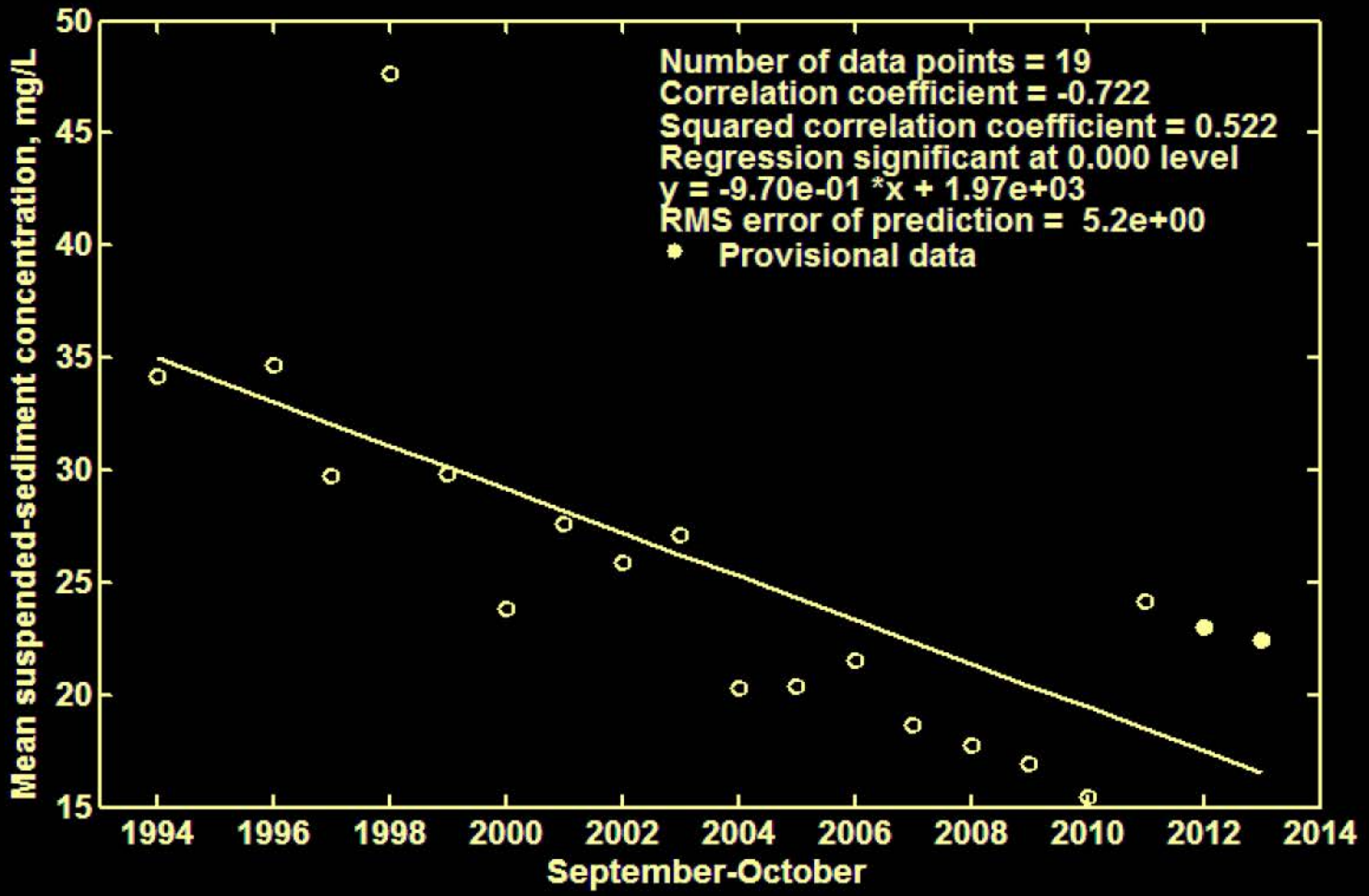
Near-surface SSC at Mallard Island, September-October mean values, 1994-2013



SSC decreased ~50% 1994-2010

USGS

Near-surface SSC at Mallard Island, September-October mean values, 1994-2013



USGS

Why is Fall SSC high in some years?

Local trapping

Greater supply in preceding wet season

Greater tidal or wind forcing

Greater erodibility

Greater supply in fall

USGS

Why is Fall SSC high in some years?

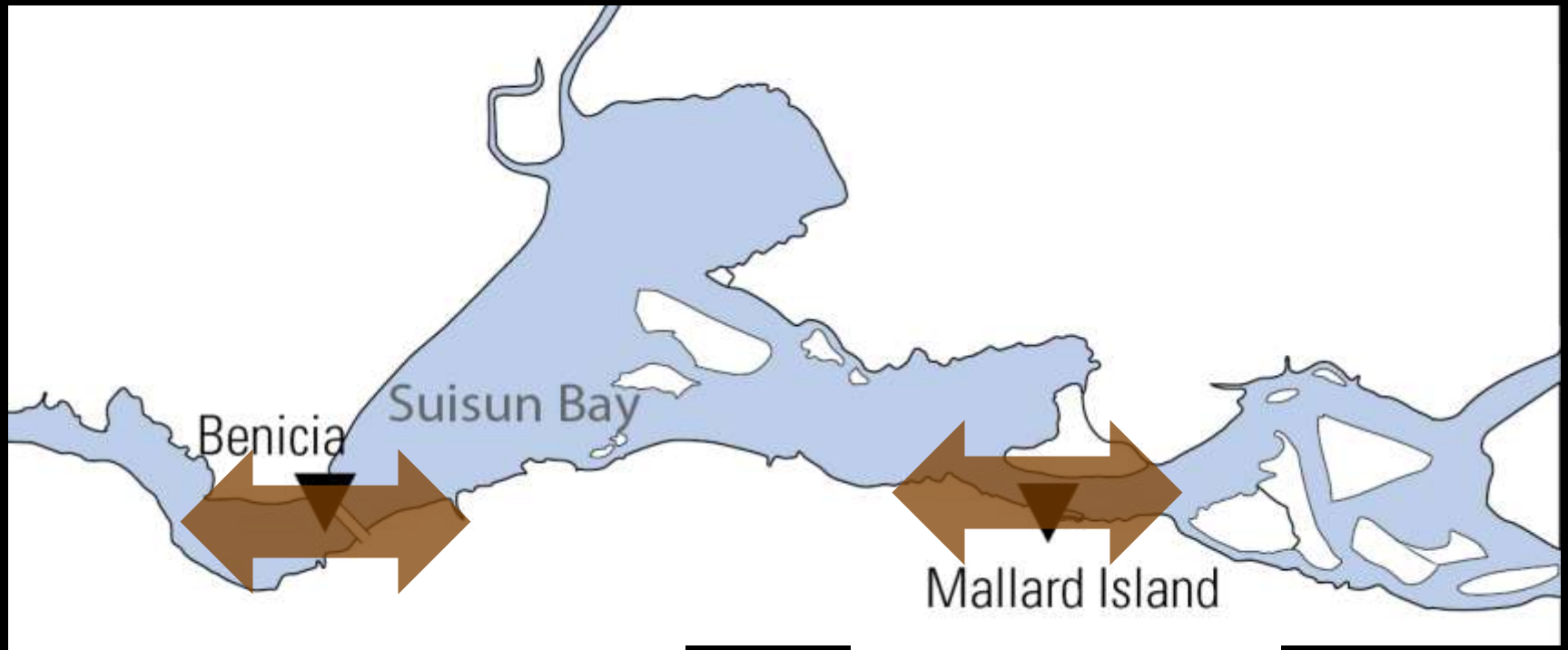
Local trapping

Greater supply in preceding wet season

USGS

Sediment budget

Tidally-averaged suspended-sediment flux (SSF)

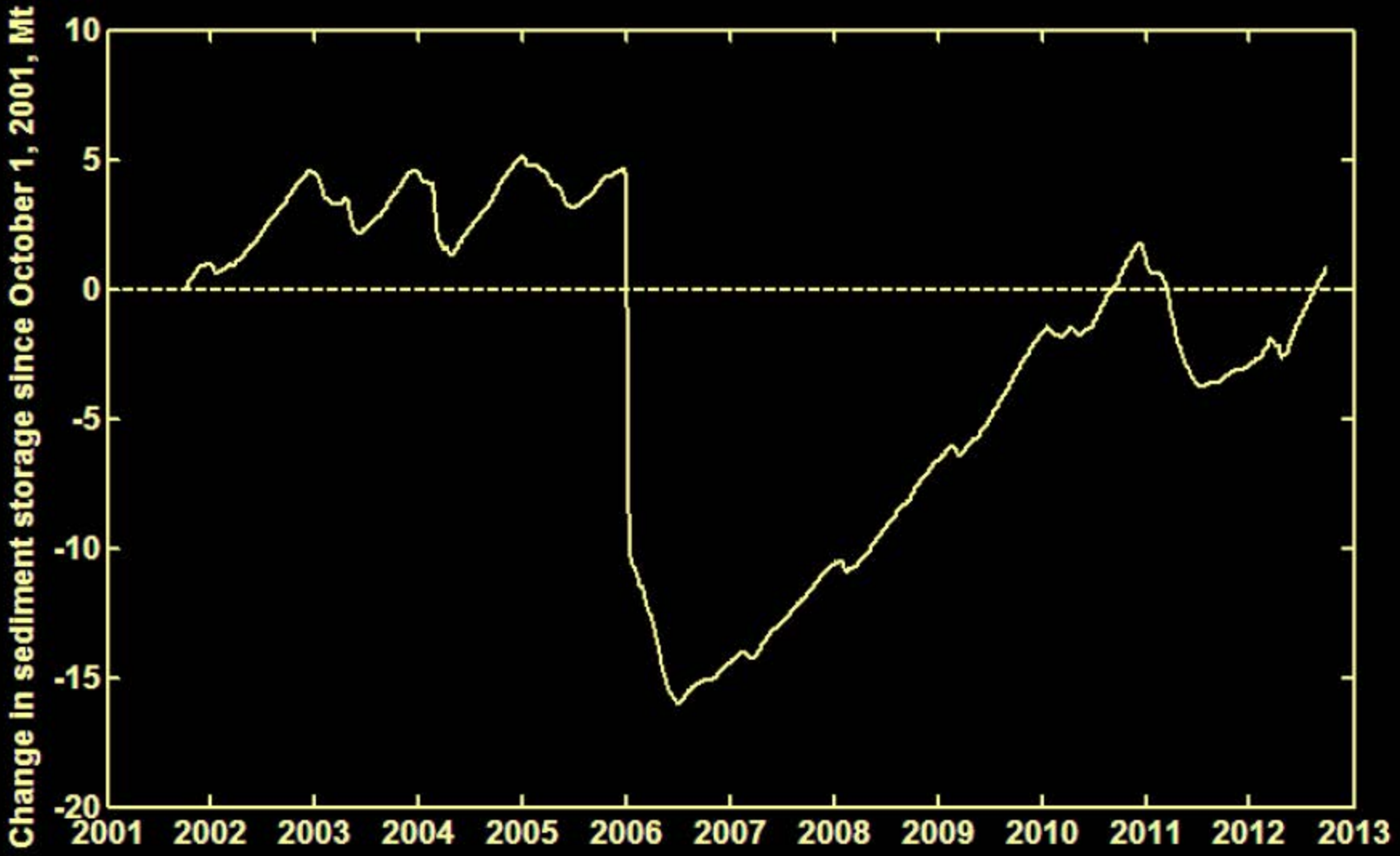


SSF(SSC,Q_{west},salinity gradient)
±~44%
Ganju and Schoellhamer 2006

SSF(SSC,$Q_{DAYFLOW}$)
±32%
McKee et al. 2006

USGS

Suisun Bay sediment budget



USGS

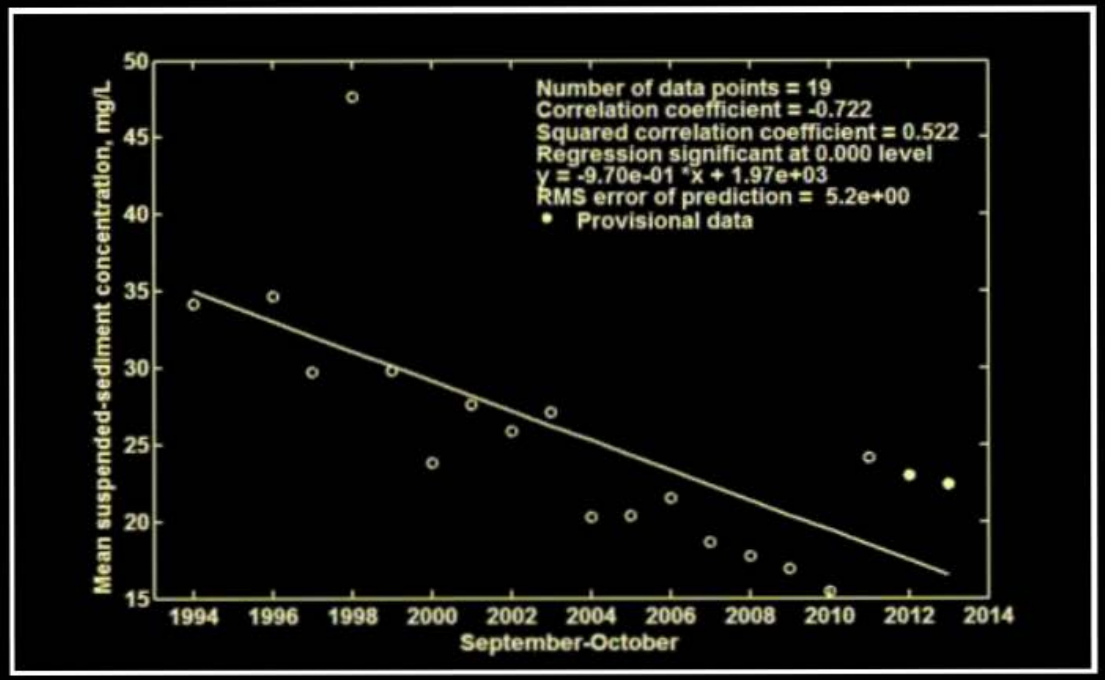
Results

Anomalies

Deposition, Mt

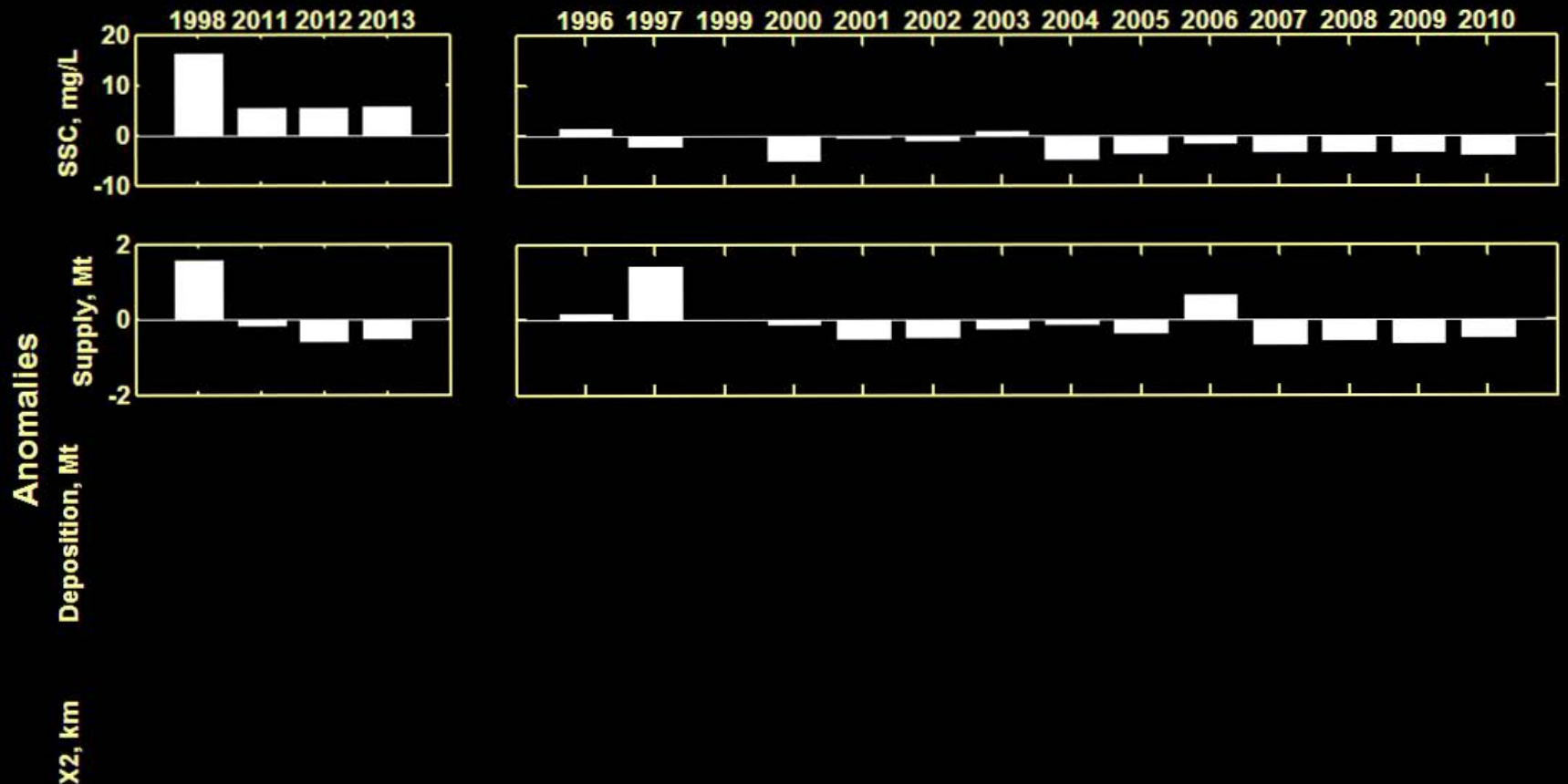
Supply, Mt

X2, km



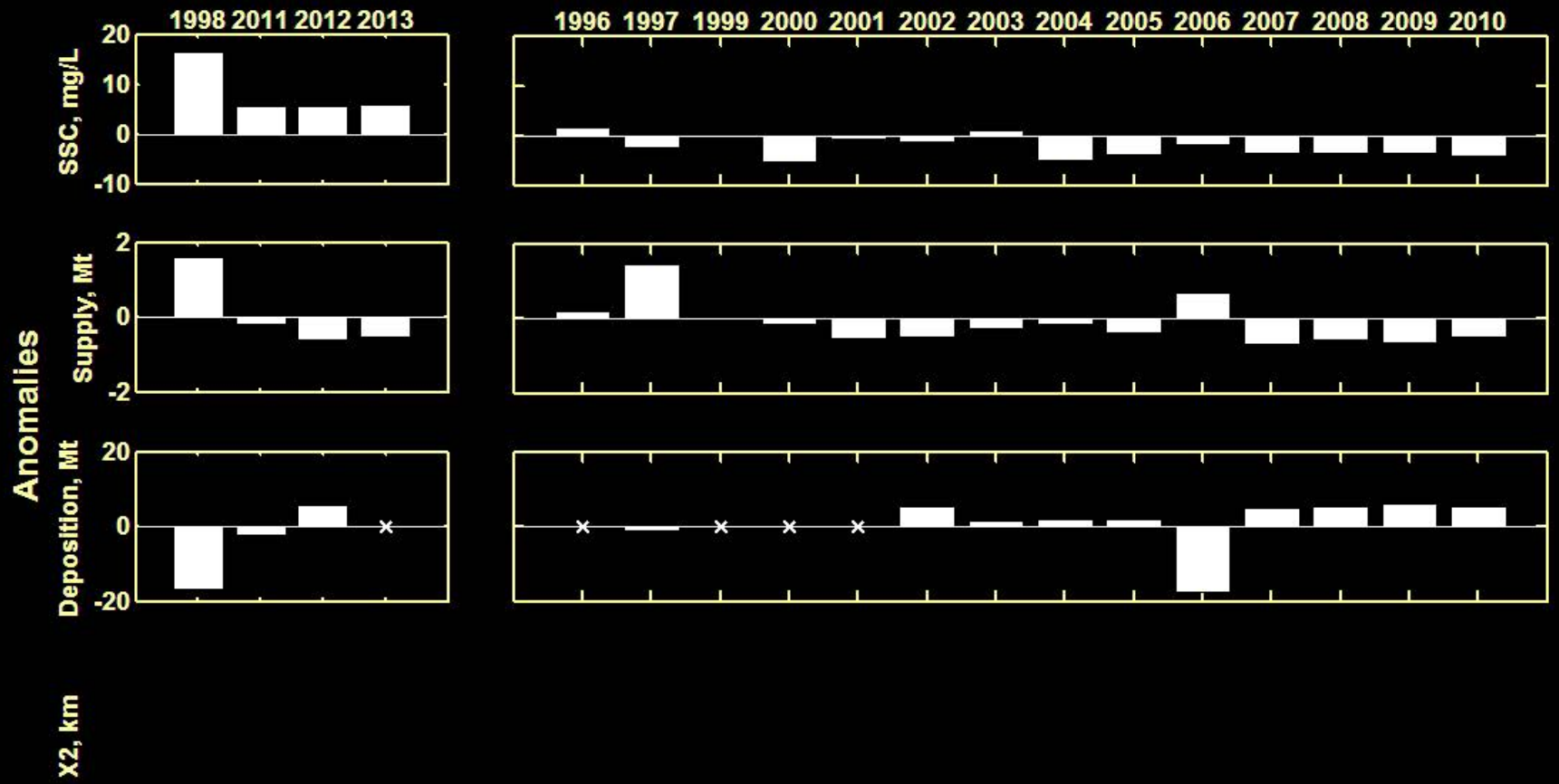
USGS

Results

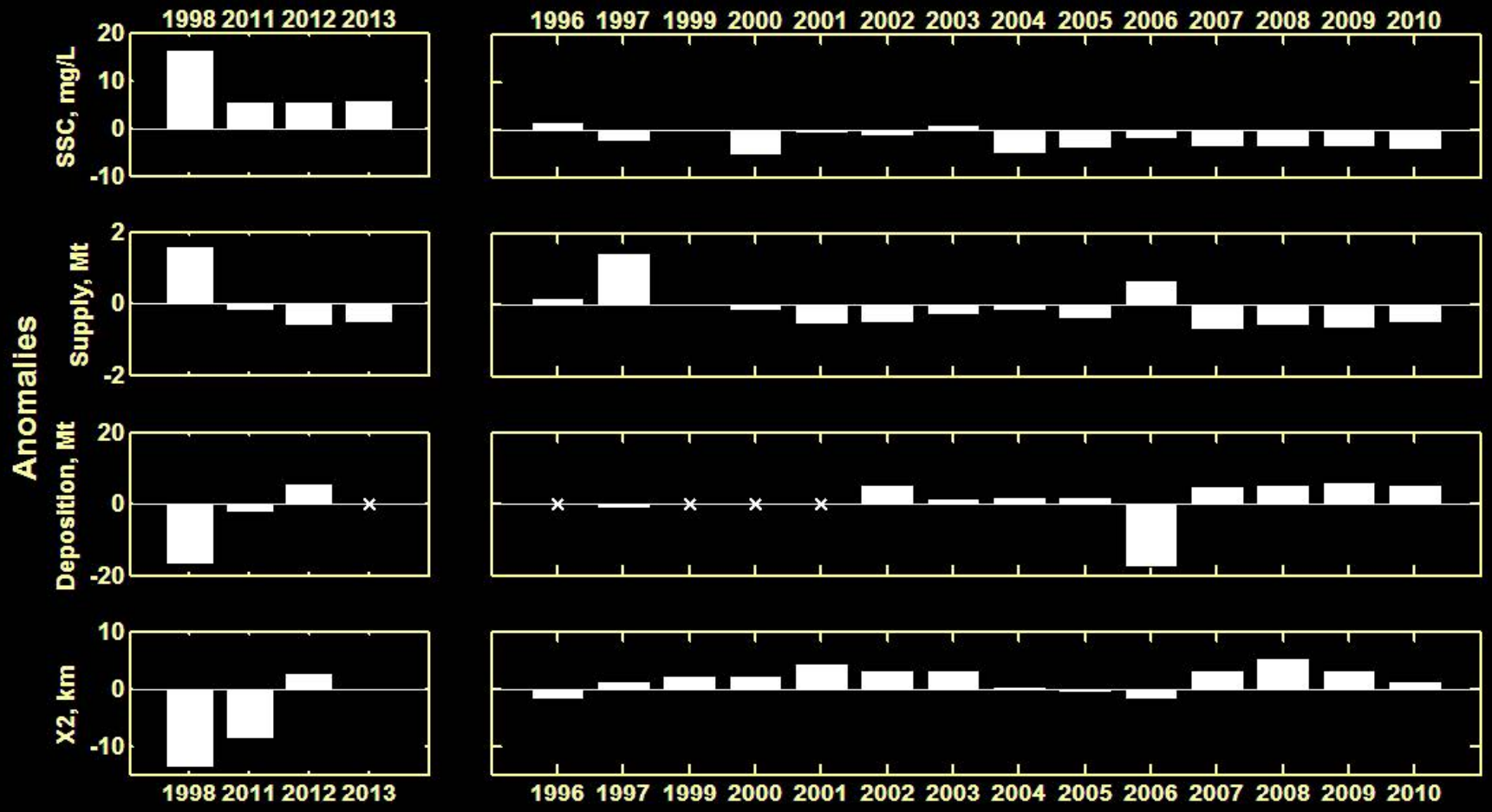


USGS

Results


1998 2011 2012 2013
1996 1997 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Anomalies
SSC, mg/L
20
10
0
-10
Supply, Mt
2
0
-2
Deposition, Mt
20
0
-20
X2, km

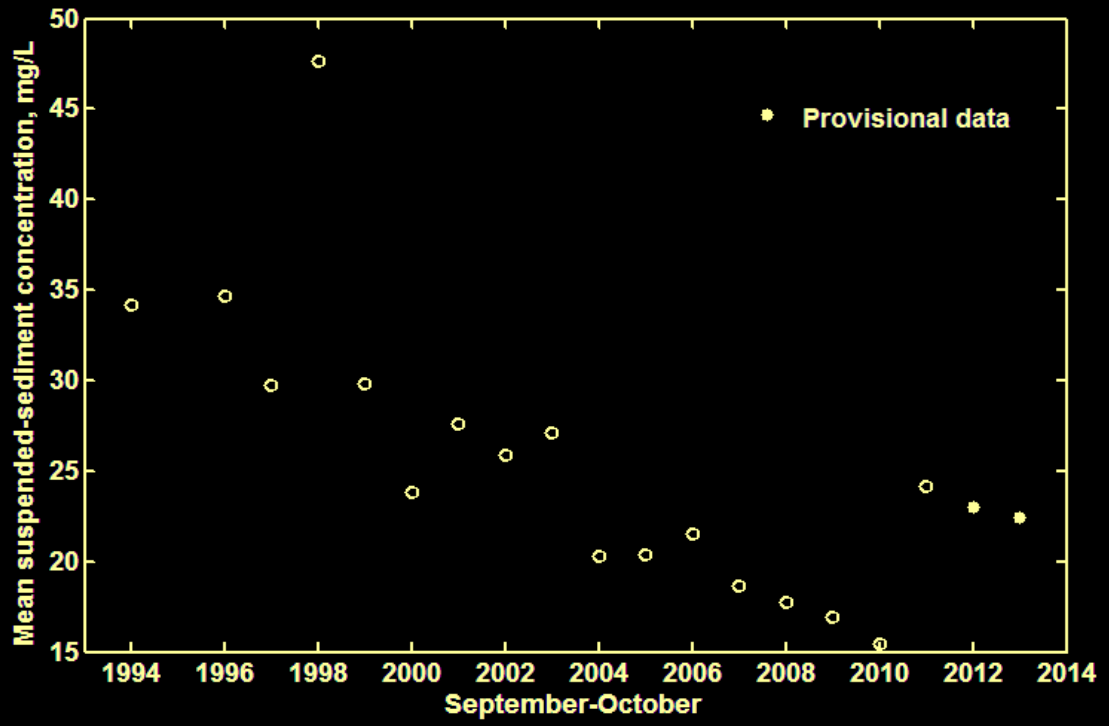
Results


Anomalies
SSC, mg/L
Supply, Mt
Deposition, Mt
X2, km
1998 2011 2012 2013
1996 1997 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
20
10
0
-10
2
0
-2
20
0
-20
10
0
-10

Caveats

Only 2 years with Fall X2 in Suisun Bay

SSC grouping depends on trend assumption



USGS

Conclusions

When Fall X2 is in Suisun Bay, SSC is large

Fall SSC can be large when X2 is landward

Sediment supply and deposition in preceding wet season do not affect fall SSC

Acknowledgements

- US Army Corps of Engineers
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- US Geological Survey Federal/State Cooperative Program
- CalFed Bay-Delta Program
- San Francisco Bay and Delta Sediment Transport Project members
- Mike Dempsey, DWR
- Nicole David, SFEI

USGS

Conclusions

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