Organic carbon and bromide concentrations trend analysis.

Water Years

1990 - 2008

- Sacramento River at Hood
- San Joaquin River at Vernalis
- Banks Pumping Plant

Two prior reports documenting trends in organic carbon

- DWR 2005.

  WY's **1990-2003**

  SWP and CVP Headworks

- USGS 2003.

  WY's **1980-2000**

  Sacramento and San Joaquin River Basins

The Seasonal Kendall Test –

what it does

- Detects consistency in the direction of change of the central tendency of the data over time. *Does the concentration tend to increase or decrease?*
- Blocks out the seasonal variation. *Season = Month.*

what it doesn't do

- Give information on the behavior of a trend.
  Is it exponential? linear?

Considerations

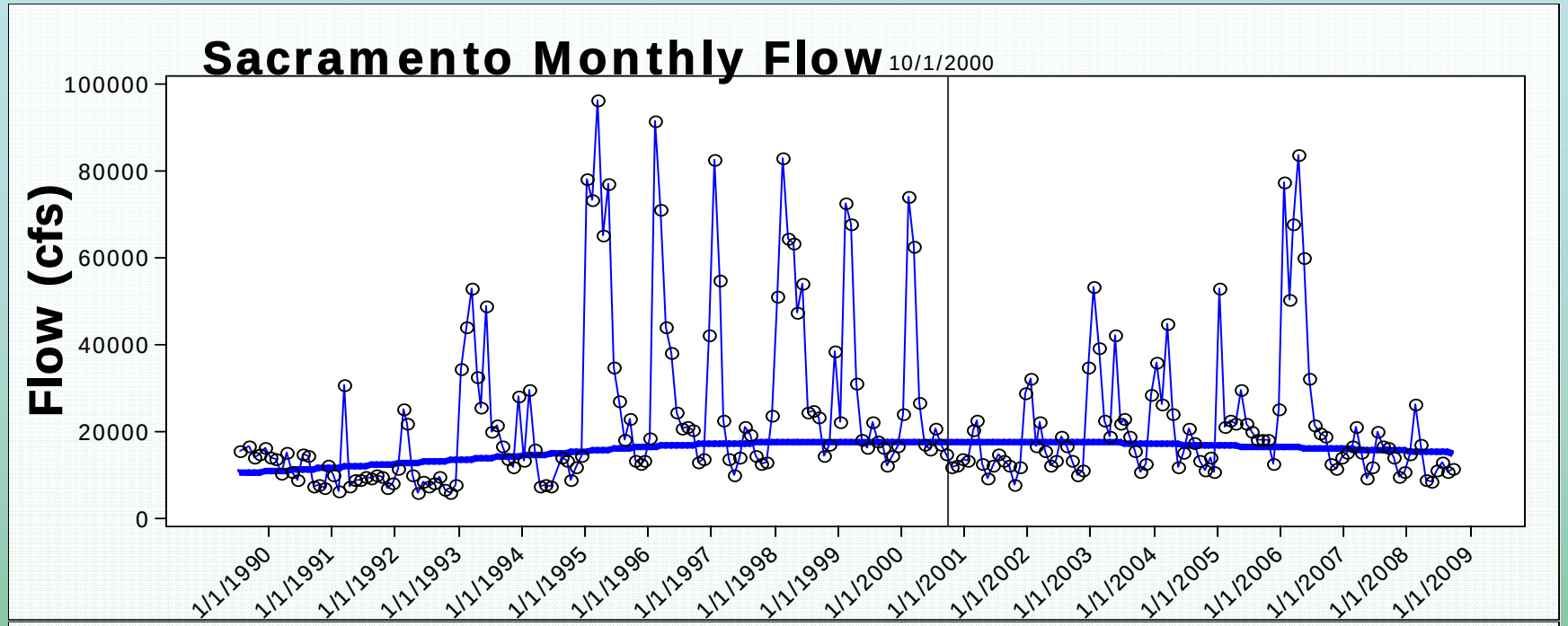
- Flow Compensation – *most appropriate method?*

- Serial Dependence – *skews test of significance. To adjust or not to adjust p-values?*

Results from Seasonal Kendall Test
Sacramento River at Hood

1990-2008 Dissolved Organic Carbon			
	Trend	P-value	Magnitude
DOC	(-)	0.0006	- 0.21 mg/L
Flow comp DOC	(-)	0.022	- 0.17 mg/L
Load (Mg/day)	NS		

No significant trend in FLOW


Sacramento Monthly Flow
10/1/2000
Flow (cfs)
100000
80000
60000
40000
20000
0
1/1/1990
1/1/1991
1/1/1992
1/1/1993
1/1/1994
1/1/1995
1/1/1996
1/1/1997
1/1/1998
1/1/1999
1/1/2000
1/1/2001
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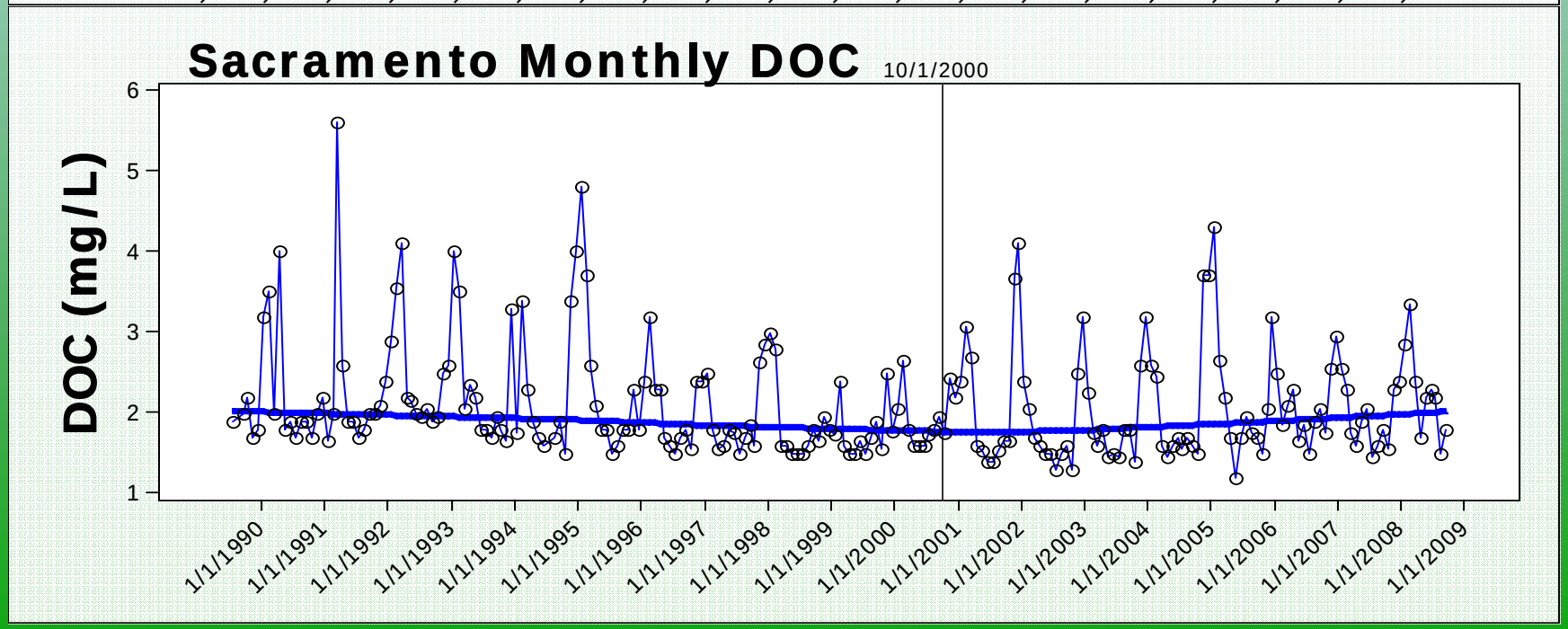
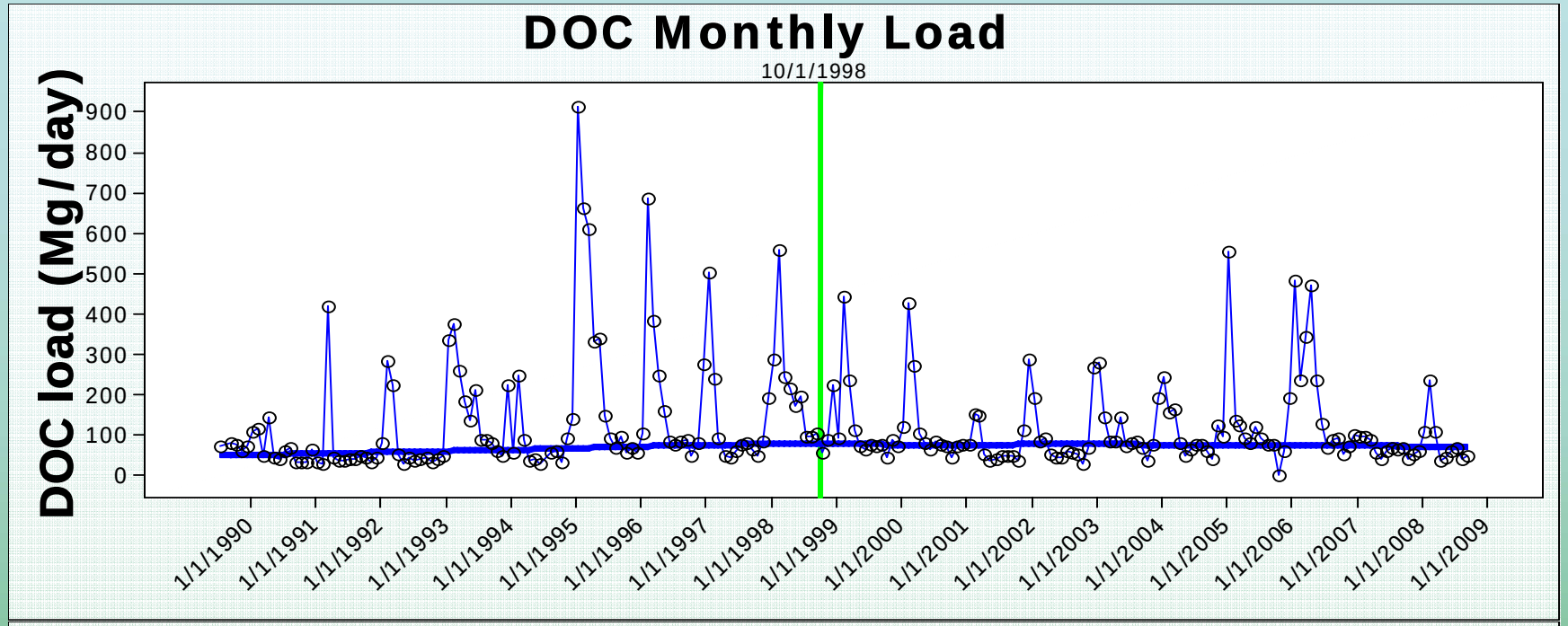
1/1/2006
1/1/2007
1/1/2008
1/1/2009


Sacramento Monthly DOC
10/1/2000
DOC (mg/L)
6
5
4
3
2
1
1/1/1990
1/1/1991
1/1/1992
1/1/1993
1/1/1994
1/1/1995
1/1/1996
1/1/1997
1/1/1998
1/1/1999
1/1/2000
1/1/2001
1/1/2002
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009

Results from Seasonal Kendall Test
Sacramento River at Hood

1998-2008 Dissolved Organic Carbon			
	Trend	P-value	Magnitude
DOC	(+)	0.005	0.22 mg/L
Flow comp DOC	(+)	0.001	0.28 mg/L
Load (Mg/day)	(-)	0.0012	-28 Mg/day
Flow	(-)	0.00007	- 5,858 cfs


DOC Monthly Load
10/1/1998
DOC load (Mg/day)
0
100
200
300
400
500
600
700
800
900
1/1/1990
1/1/1991
1/1/1992
1/1/1993
1/1/1994
1/1/1995
1/1/1996
1/1/1997
1/1/1998
1/1/1999
1/1/2000
1/1/2001
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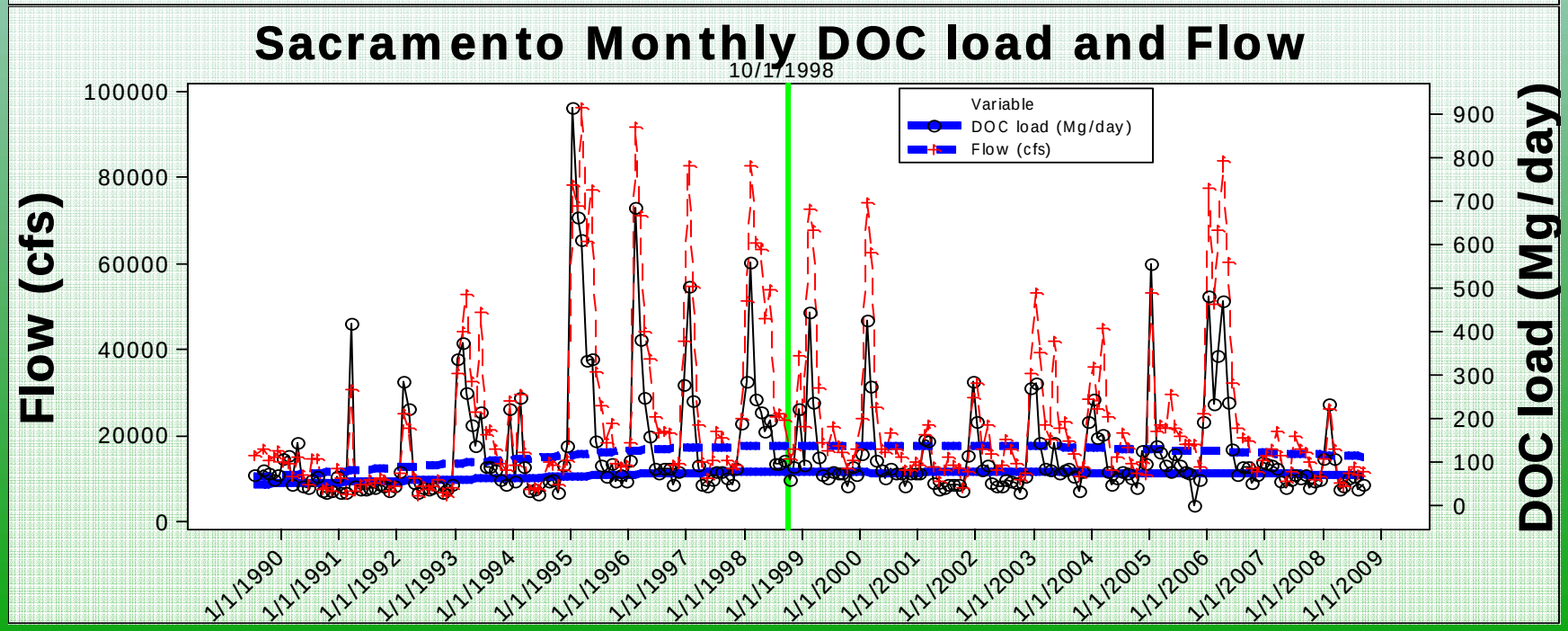
1/1/2007
1/1/2008
1/1/2009


Sacramento Monthly DOC load and Flow
10/1/1998
Variable
DOC load (Mg/day)
Flow (cfs)
Flow (cfs)
0
20000
40000
60000
80000
100000
DOC load (Mg/day)
0
100
200
300
400
500
600
700
800
900
1/1/1990
1/1/1991
1/1/1992
1/1/1993
1/1/1994
1/1/1995
1/1/1996
1/1/1997
1/1/1998
1/1/1999
1/1/2000
1/1/2001
1/1/2002
1/1/2003
1/1/2004
1/1/2005
1/1/2006
1/1/2007
1/1/2008
1/1/2009

References

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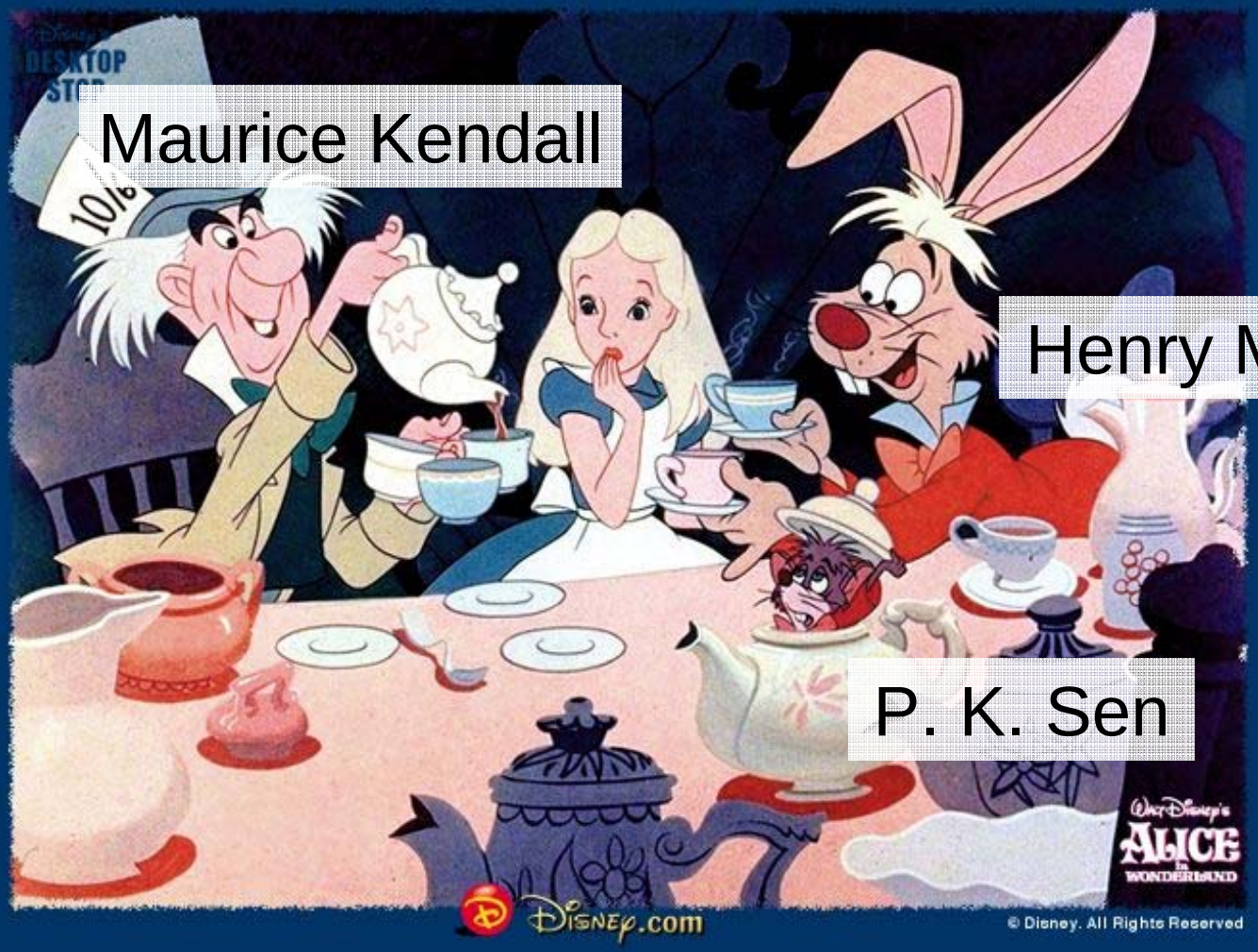
- USGS 2007. *Organic Carbon Trends, Loads, and Yields to the Sacramento-San Joaquin Delta, California, Water Years 1980 to 2000, Second Edition.* Water Resources Investigation Report 03-4070, Second Edition Sacramento, California 2007

Upon the Shoulders of

- MWQI Field Unit Staff
- Bryte Laboratory Staff
- Murage Ngatia
- Carol DiGiorgio
- Otome Lindsey
- Ted Swift
- Francine Meija

Thank You.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