



Ventura River Continuous Monitoring Program

2013 - 2014 Summary

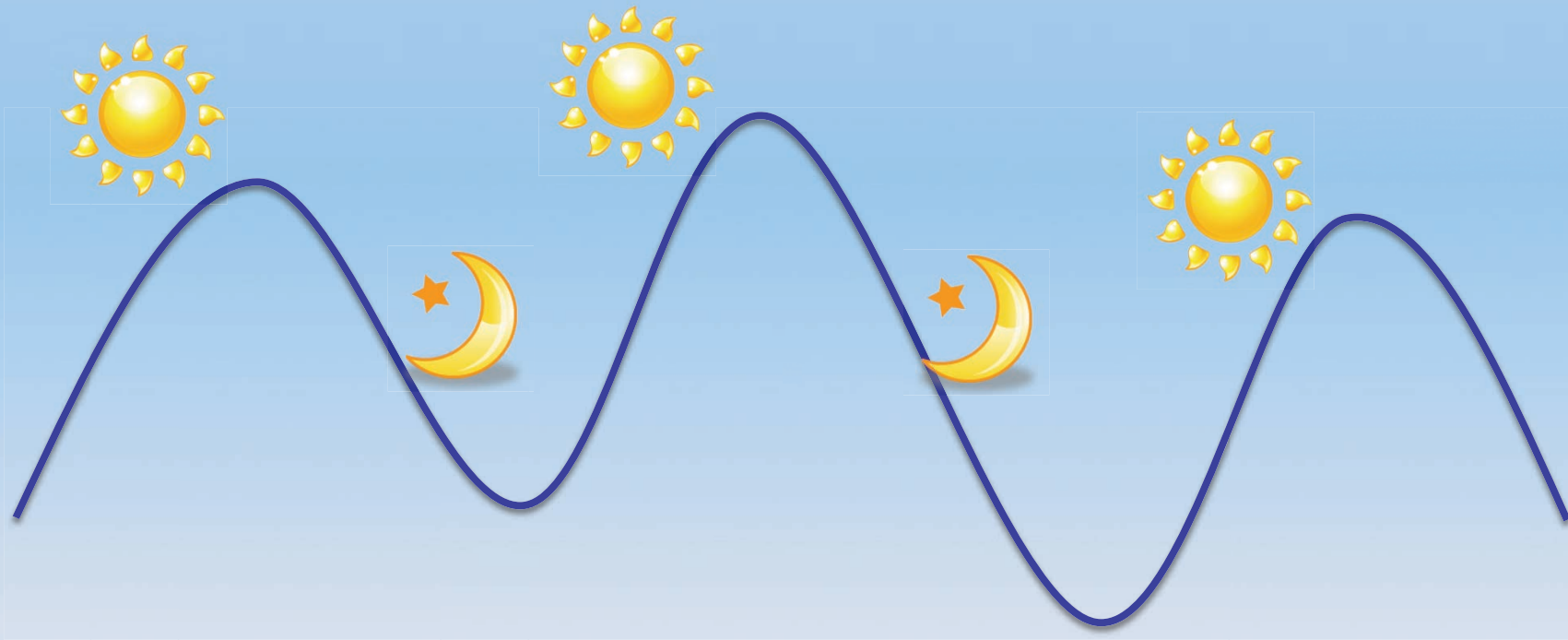
Ben Pitterle and Jenna Driscoll

From 2001 – 2008 Ventura Stream Team volunteers collected dissolved oxygen data between the hours of 9 am – 12 pm.

During this period no oxygen deficiencies (< 5 mg/l) were detected.

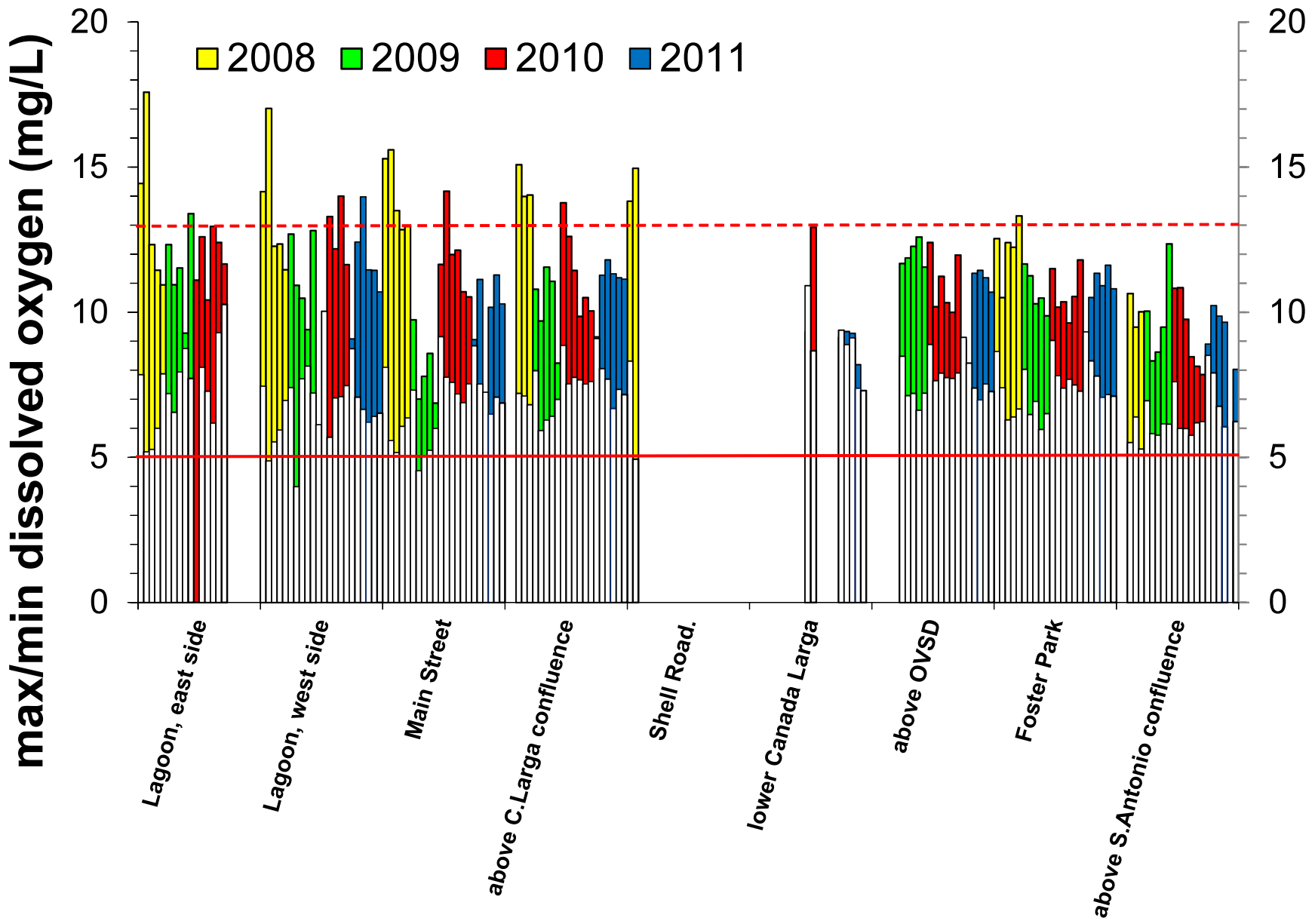


Diurnal Dissolved Oxygen Fluctuations



Volunteer Predawn Monitoring 2008 - 2012







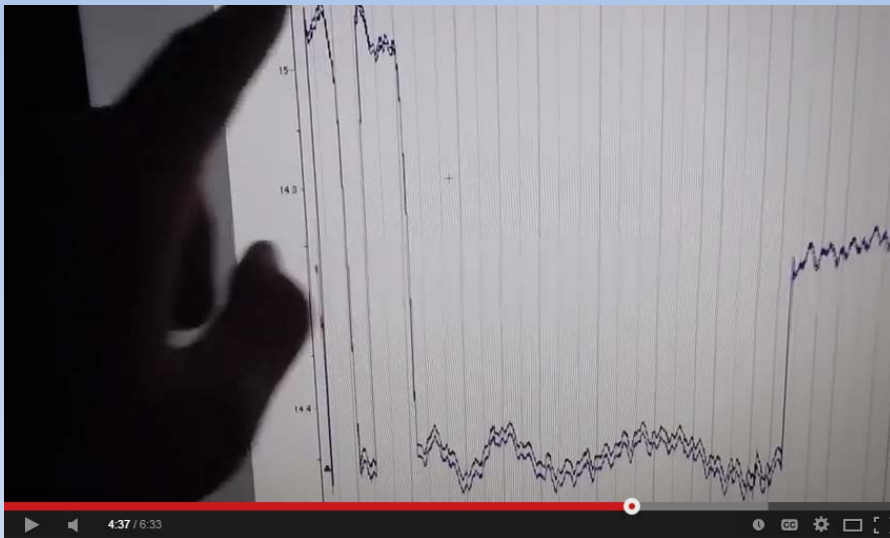
Data Collection Procedure

- Dissolved oxygen sensors replaced prior to each season
- Dissolved oxygen logger pre-deployment calibrations performed
- Copper tape applied to minimize fouling
- Loggers housed in perforated PVC
- Mounted to 10 – 15 pound river rocks. Rocks placed with sensors positioned in flowing portion of river at each site. Pools and stagnant side-channels avoided. Co-located with pressure transducer and camera where possible.
- Sensors launched with 30 minute logging interval
- Data uploaded using portable shuttle device every 2 – 3 weeks
- Sensors cleaned of fouling and relaunched
- Disturbance minimized
- Calibration dissolved oxygen measurements collected on precise 30 minute interval each upload event

Data Processing Procedure

- Data imported from shuttle using Onset Hoboware Software
- DO data processed to adjust for fouling using field calibration measurements and Hoboware Dissolved Oxygen Assistant
- Barometric compensation software applied to transducer data
- Corresponding depth data normalized for movement of rock (if any)





Questions

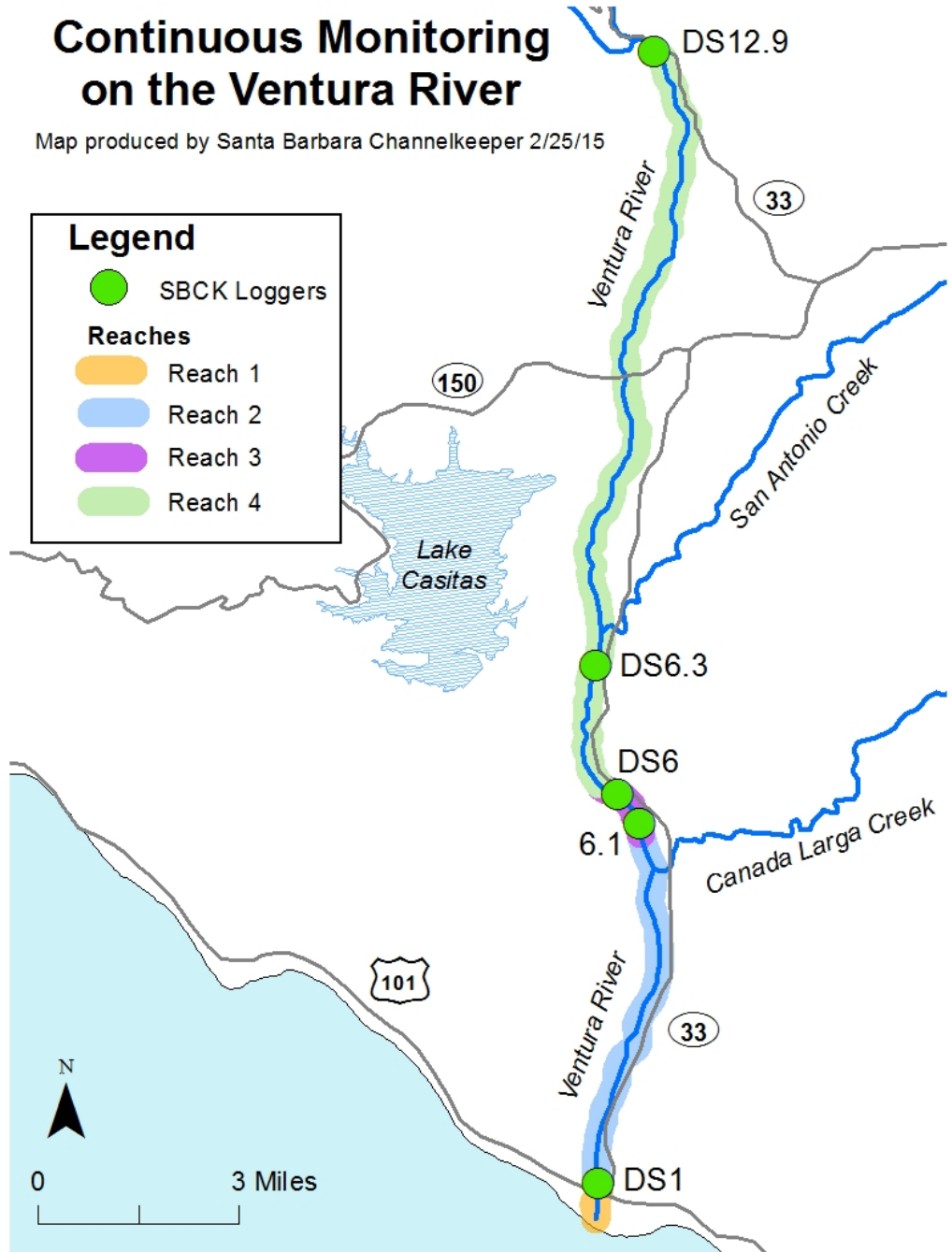
1. Are minimum dissolved oxygen concentrations falling below the 7 mg/l and 5 mg/l Water Quality Objectives
2. What are dissolved oxygen conditions of Reach 3 in 2013 and 2014.
3. Are irregular fluctuations in water depth occurring.

Continuous Monitoring on the Ventura River

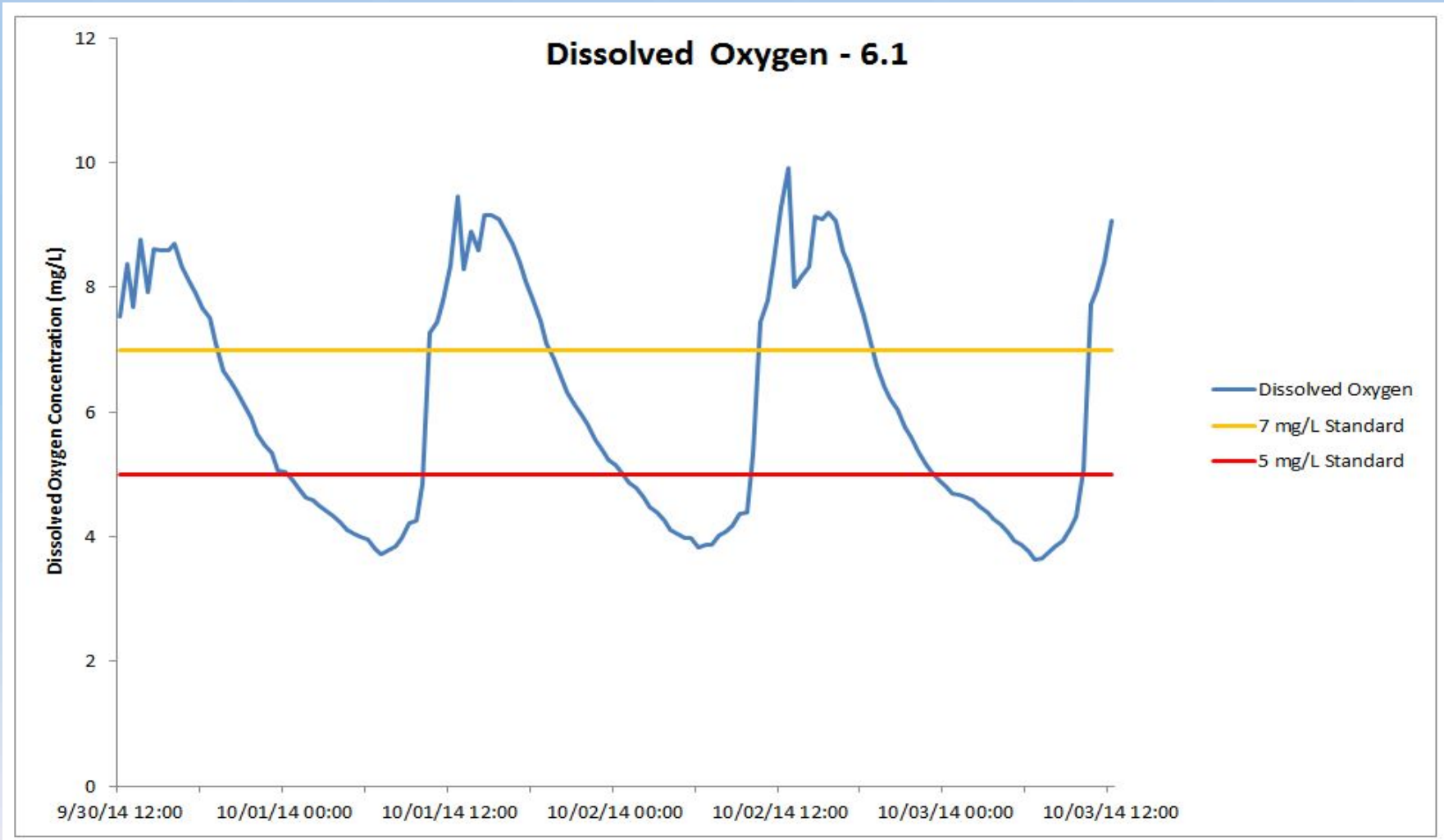
Map produced by Santa Barbara Channelkeeper 2/25/15

Legend

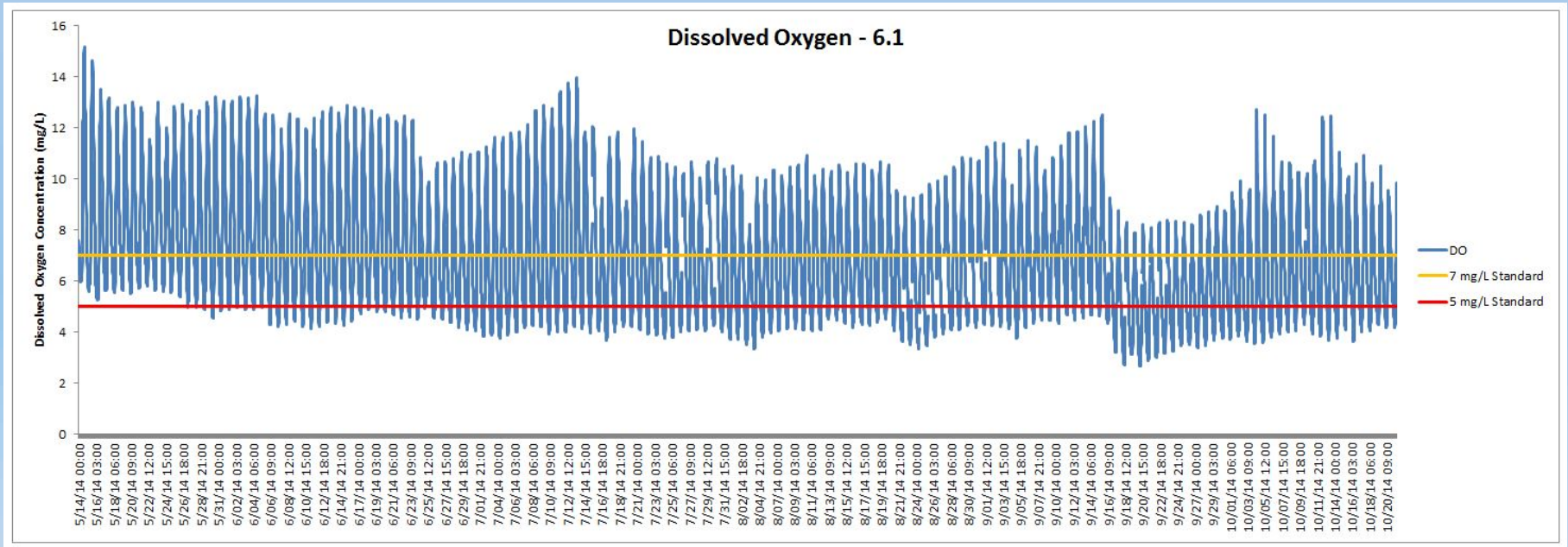
- SBCK Loggers
- Reaches**
 - Reach 1
 - Reach 2
 - Reach 3
 - Reach 4



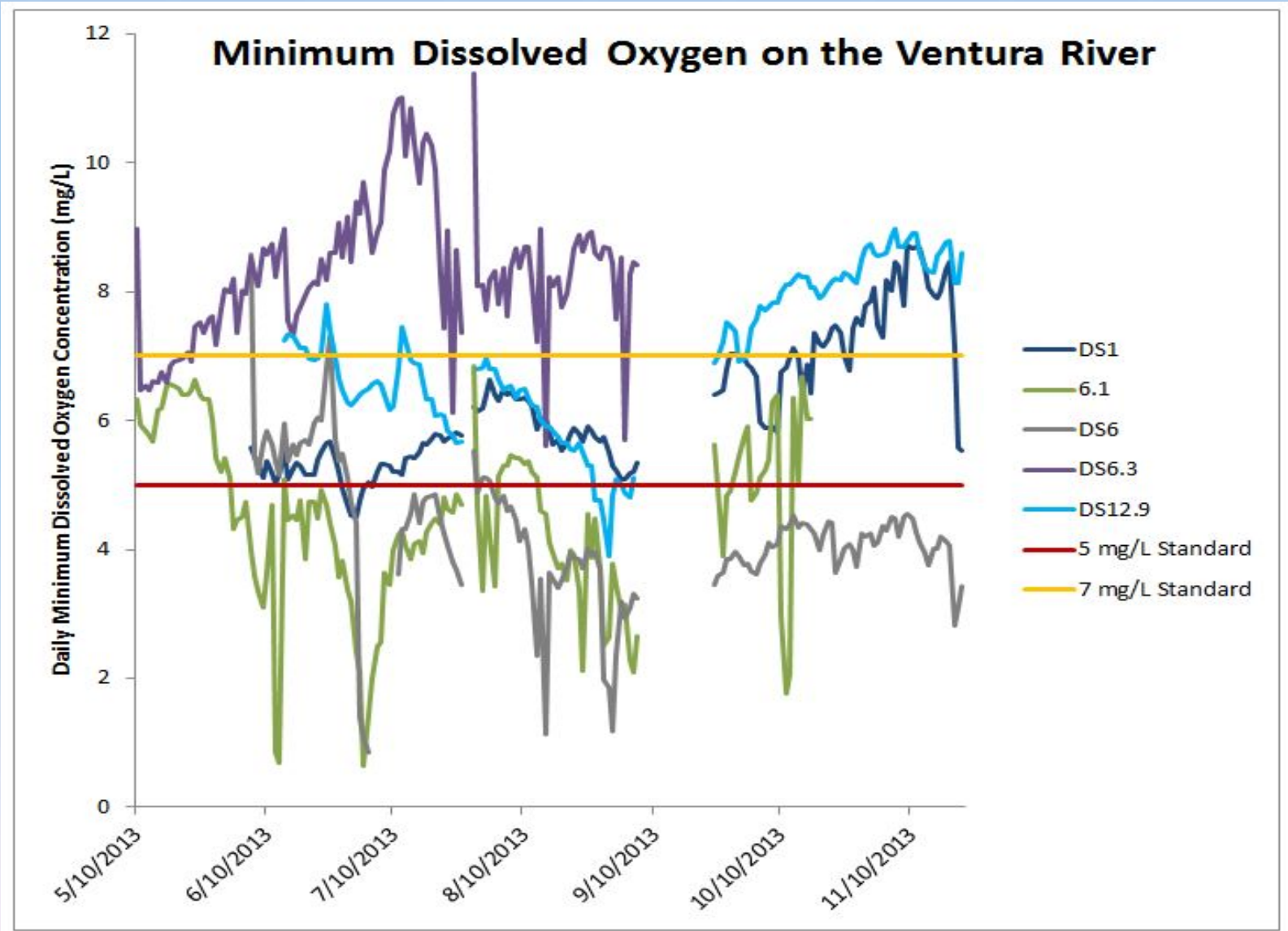
72 – Hour Period



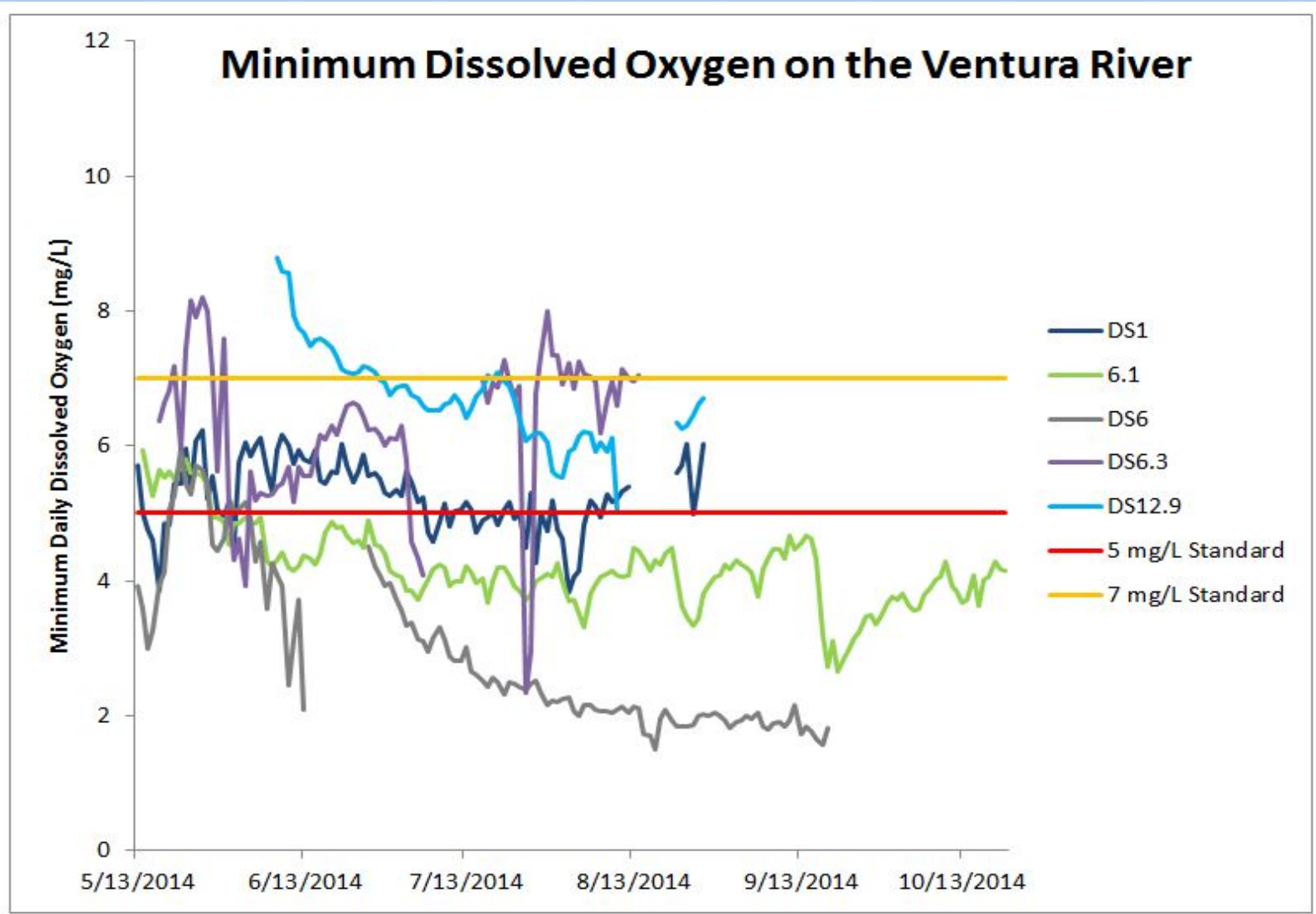
5 – Month Period



2013



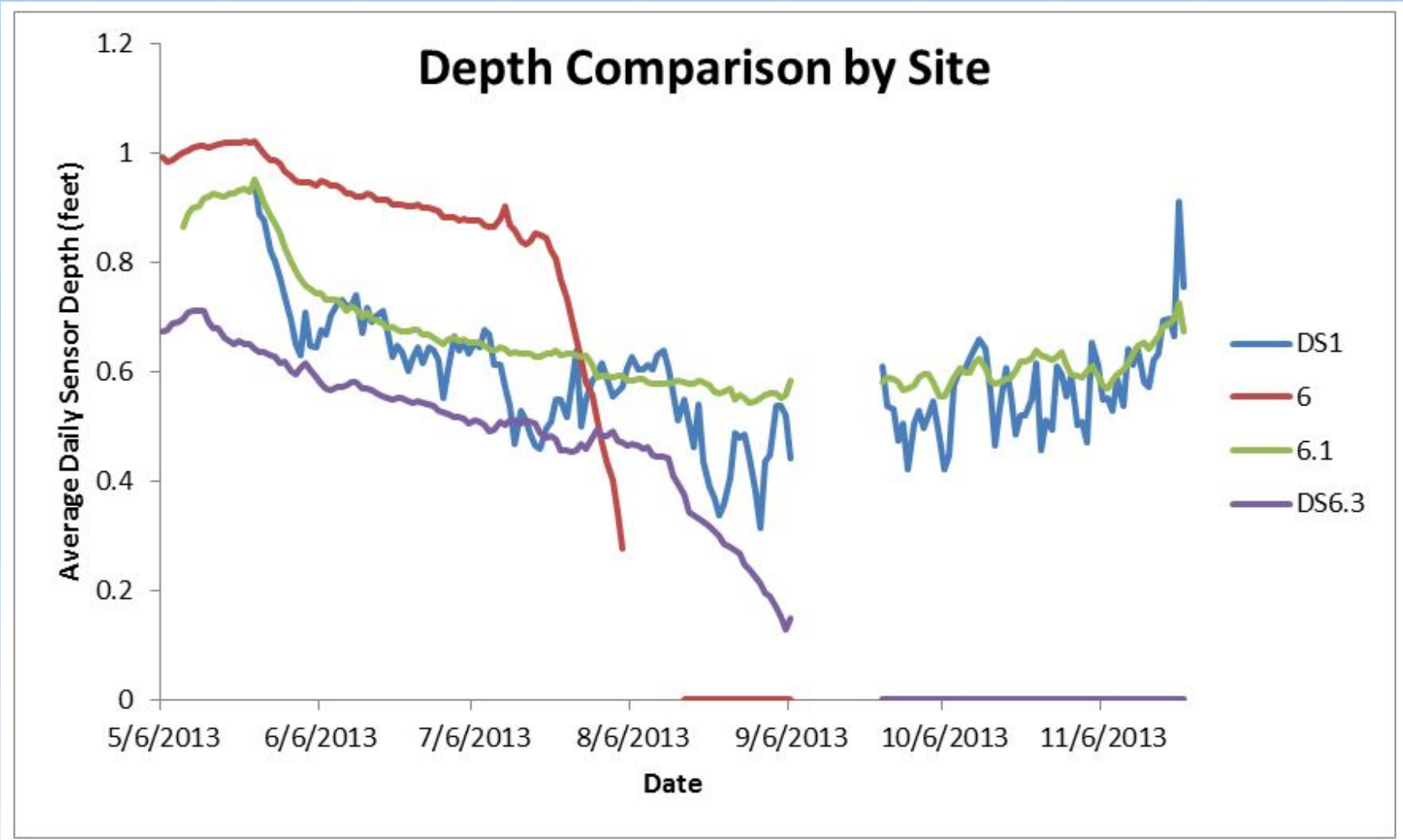
2014



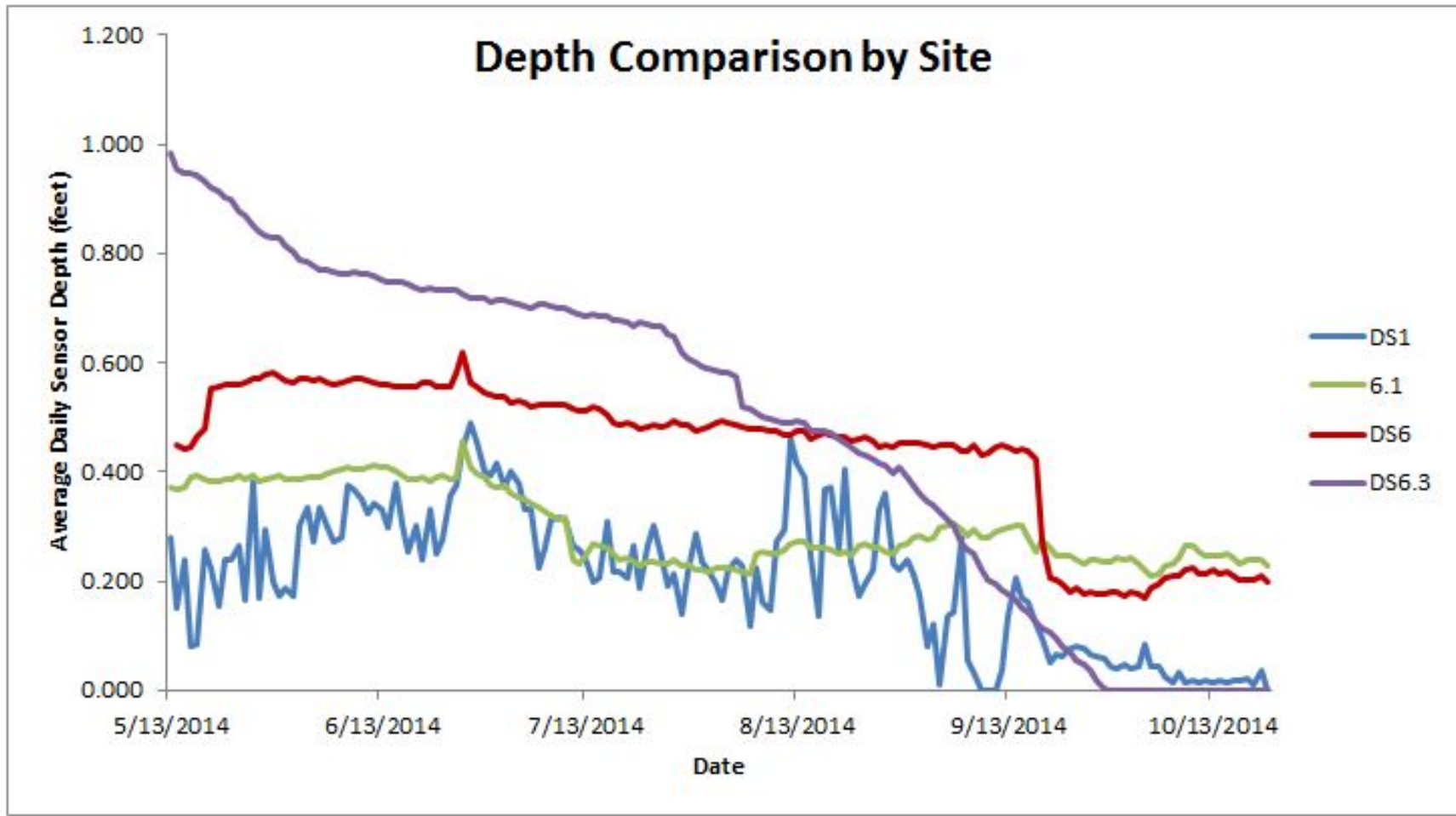
DO Logger Accuracy and Calibration (mg/l)

Site	Date	Hach Meter	Logger	Variation	Standard Deviation
DS1	5/13/2014	5.86	5.86	0	0.19
	6/5/2014	8.29	8.51	-0.22	
	6/24/2014	6.59	6.74	-0.15	
	7/15/2014	4.71	4.5	0.21	
	7/31/2014	4.85	4.54	0.31	
	8/21/2014	5.59	0.51	**Fouling	
	8/26/2014	7.31	7.28	0.03	
6.1	5/13/2014	9.61	8.51	1.1	1.12
	6/5/2014	6.41	6.47	-0.06	
	6/24/2014	5.44	5.46	-0.02	
	7/15/2014	5.58	5.28	0.3	
	7/31/2014	6.74	8.85	-2.11	
	8/21/2014	7.21	8.53	-1.32	
	9/16/2014	4.46	4.35	0.11	
	10/21/2014	9.85	12.04	-2.19	
DS6	5/13/2014	11.57	11.91	-0.34	0.29
	6/5/2014	6.82	6.53	0.29	
	6/24/2014	7.39	3.4	**Fouling	
	7/15/2014	6.23	5.88	0.35	
	7/31/2014	4.78	5.13	-0.35	
	8/21/2014	8.39	8.33	0.06	
	9/16/2014	2.46	2.22	0.24	
DS6.3	5/13/2014	13.62	12.95	0.67	1.52
	6/5/2014	7.99	5.34	2.65	
	6/24/2014	12.03	12	0.03	
	7/15/2014	14.6	0.95	**Fouling	
	7/31/2014	15.03	16.61	-1.58	
	8/21/2014	14.62	2.23	**Fouling	
	8/26/2014	12.17	1.35	**Fouling	
DS12.9	6/24/2014	9.67	10.22	-0.55	0.11
	7/15/2014	11.35	11.76	-0.41	
	7/31/2014	11.76	12.01	-0.25	
	8/21/2014	11.2	2.35	**Fouling	
	8/26/2014	11.34	11.8	-0.46	

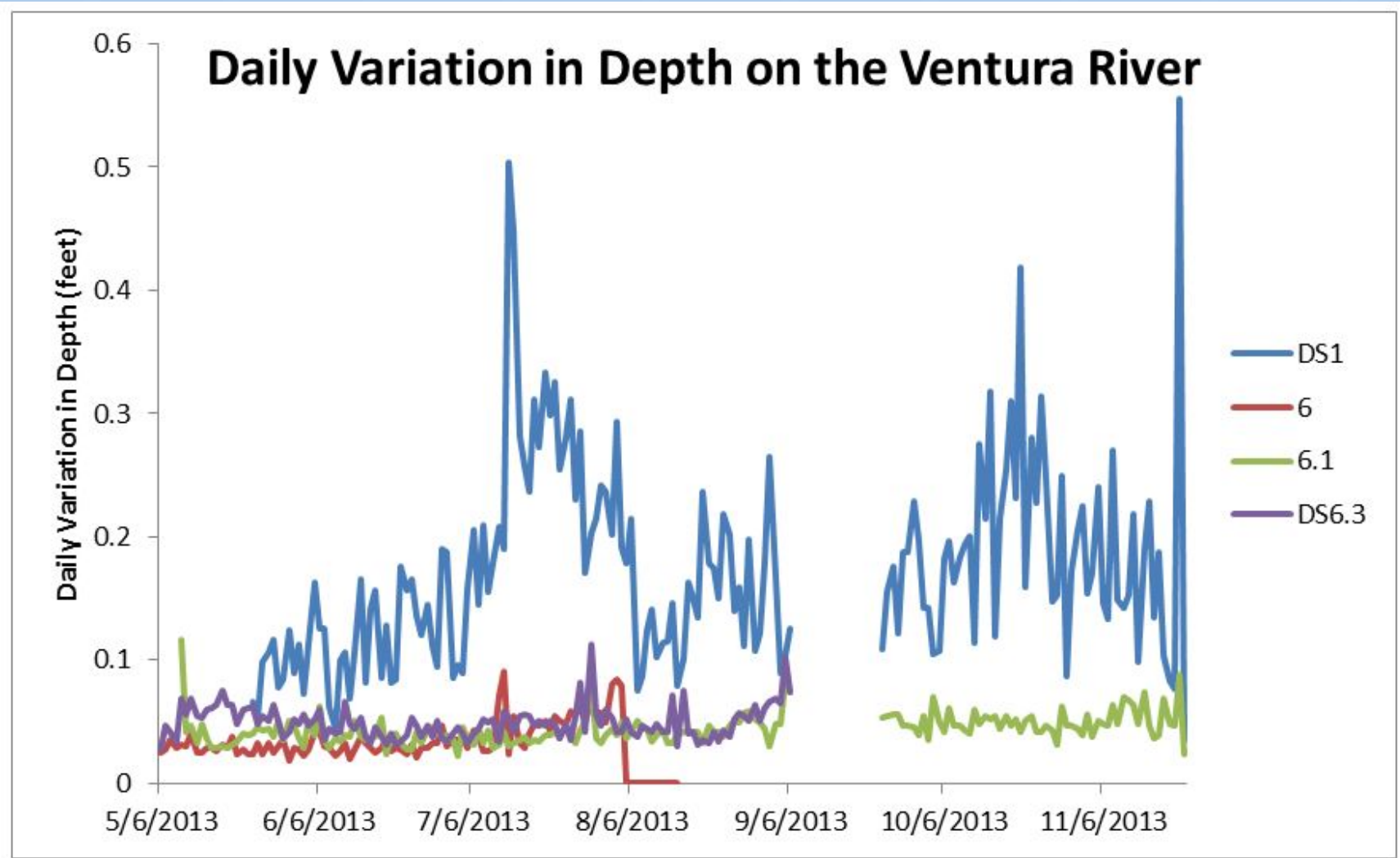
2013



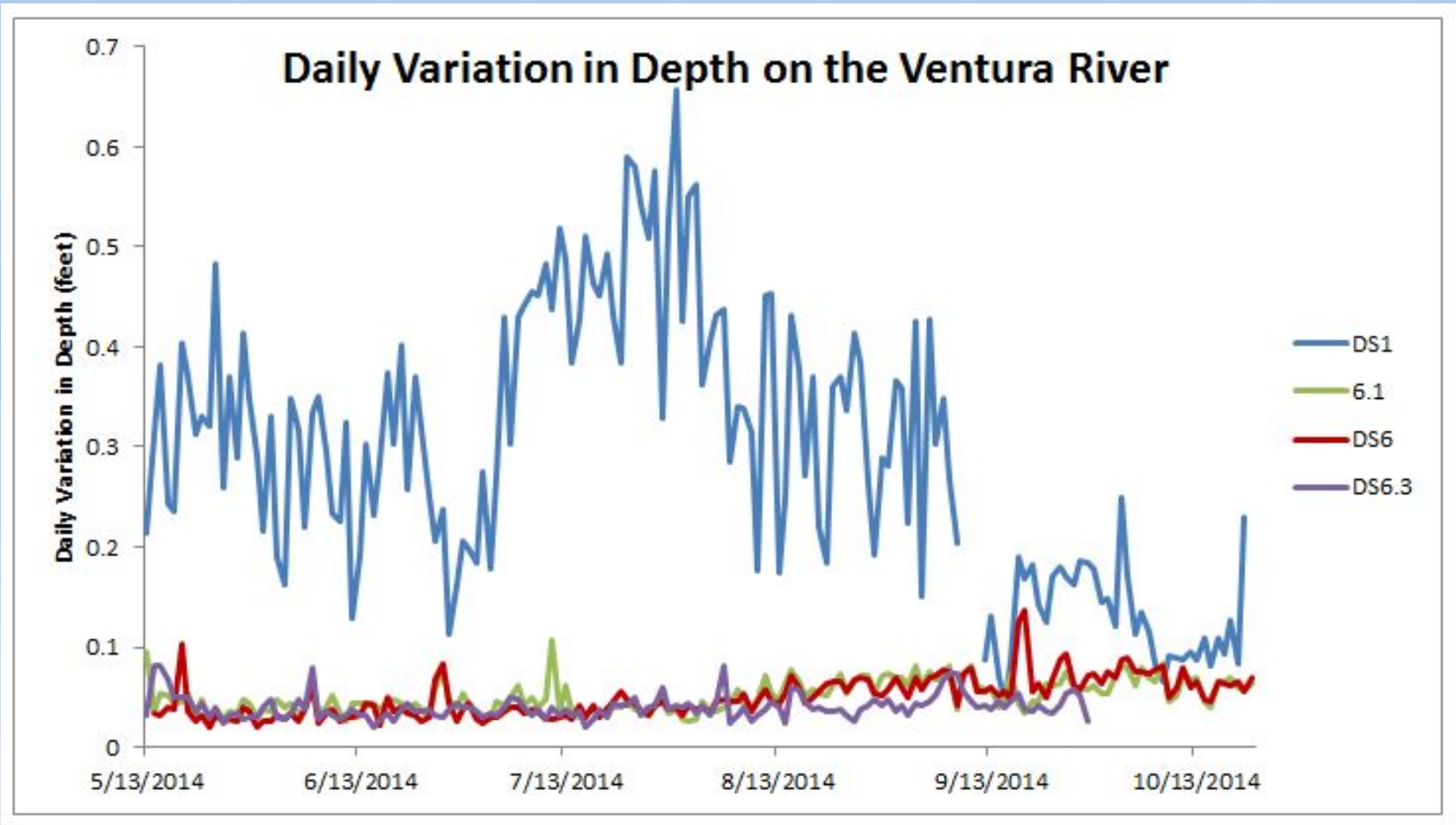
2014



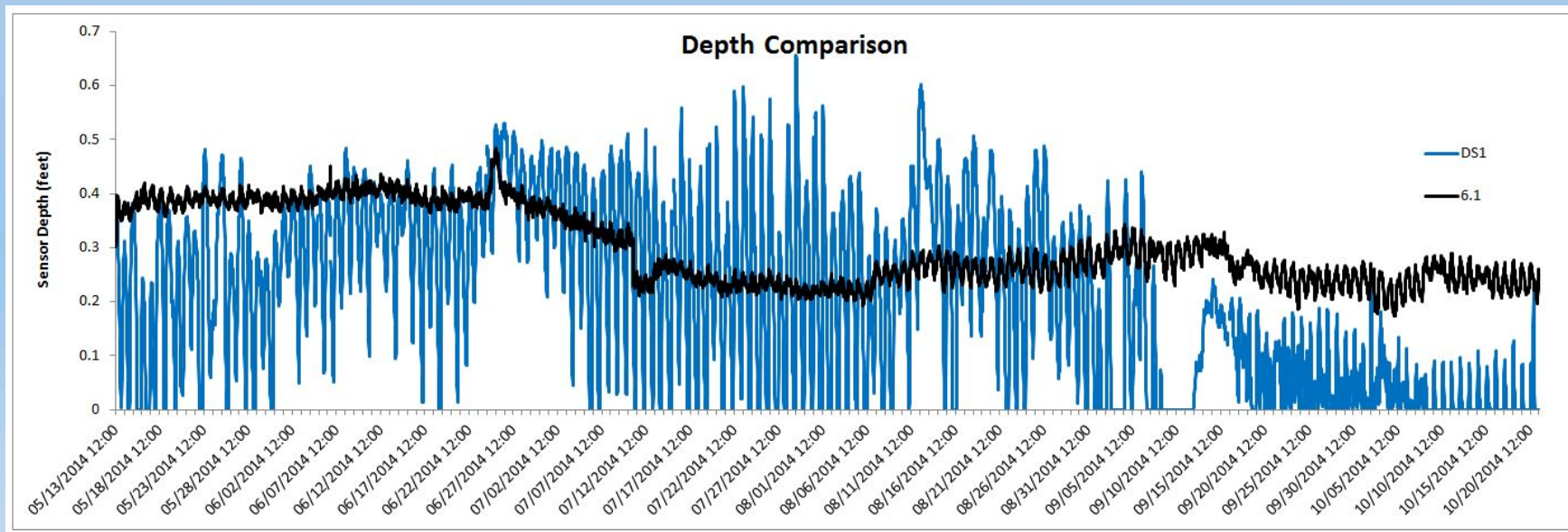
2013



2014



Depth at Main St. vs above OVSD



Conclusions

1. Are minimum dissolved oxygen concentrations falling below the 7 mg/l and 5 mg/l Water Quality Objectives

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Answer: Yes. DO consistently < 7 mg/l at all sites. DO consistently < 5 mg/l at all sites except 12.9 (Upper Reach 4).

Conclusions

2. What are dissolved oxygen conditions of Reach 3 in 2013 and 2014.

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Answer:

DO concentrations at Reach 3 sites consistently lower than other sites.

Both 7 mg/l and 5 mg/l WQOs consistently exceeded.

DO less than 2 mg/l measured at both sites

Conclusions

3. Are irregular fluctuations in water depth occurring.

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Answer:

Yes. River at Main Street consistently dewatered during early AM hours each day for extended periods.