



**2010 Spill Season
Year-end Review
November 3, 2010**

TOTAL DISSOLVED GAS Monitoring

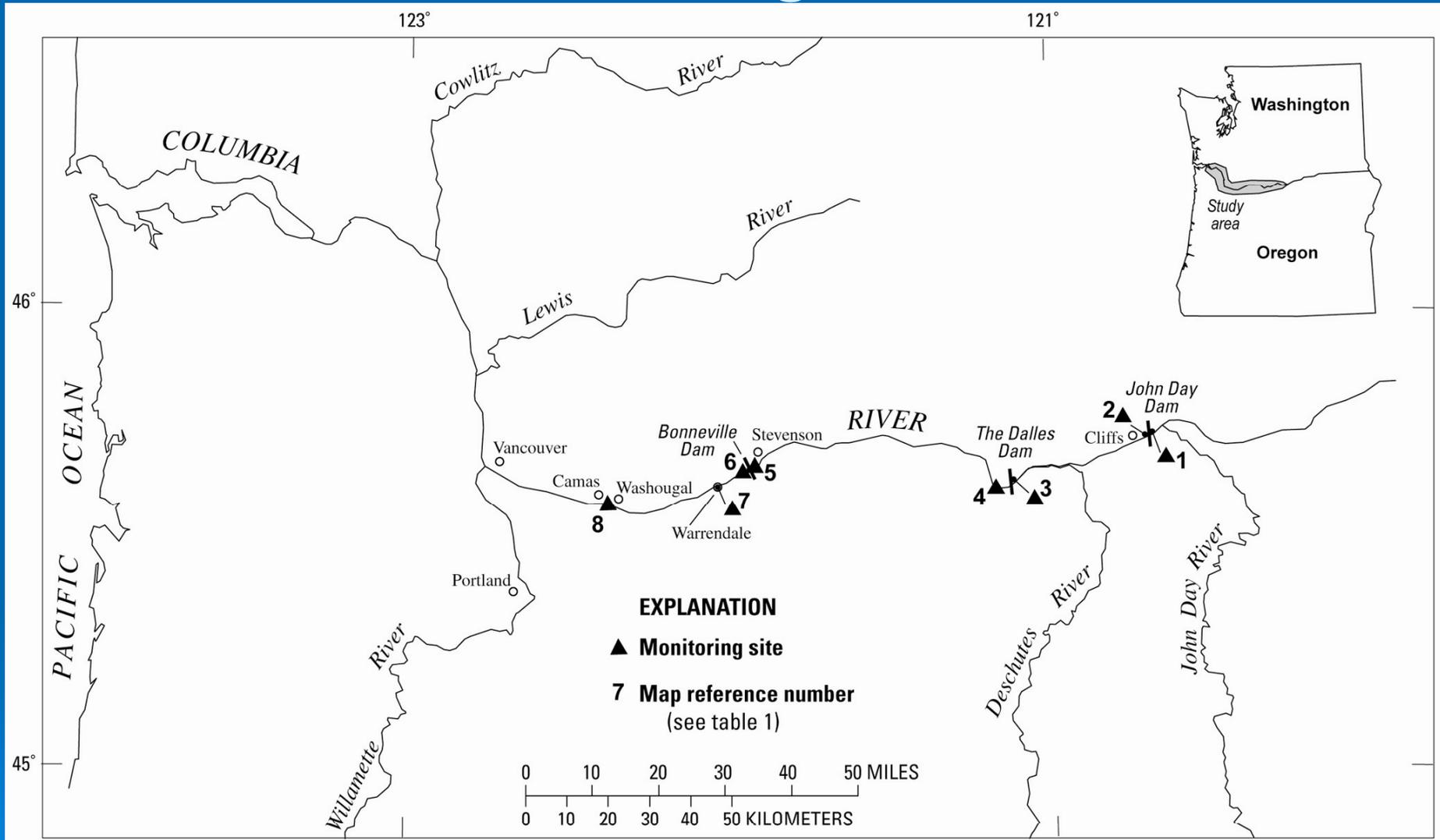
Lower Columbia River

U.S. Department of the Interior
U.S. Geological Survey

Overview

- 8 monitoring sites; 4 year-round and 4 only during spill season
 - 4 forebay sites (including Camas) and 4 tailwater sites (two below Bonneville Dam)
 - Calibration interval:
 - 3 weeks during spill
 - 4 weeks otherwise
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Monitoring Sites



Field and lab equipment

- Hydrolab Minisondes
- Surveyor 4 display units for Hydrolabs
- Vaisala analog barometers
- Sutron Satlink 2 high-data-rate DCPs (data collection platforms) give new data every hour
- NovaLynx hand-held digital barometer
- For lab, Digimano pressure gage

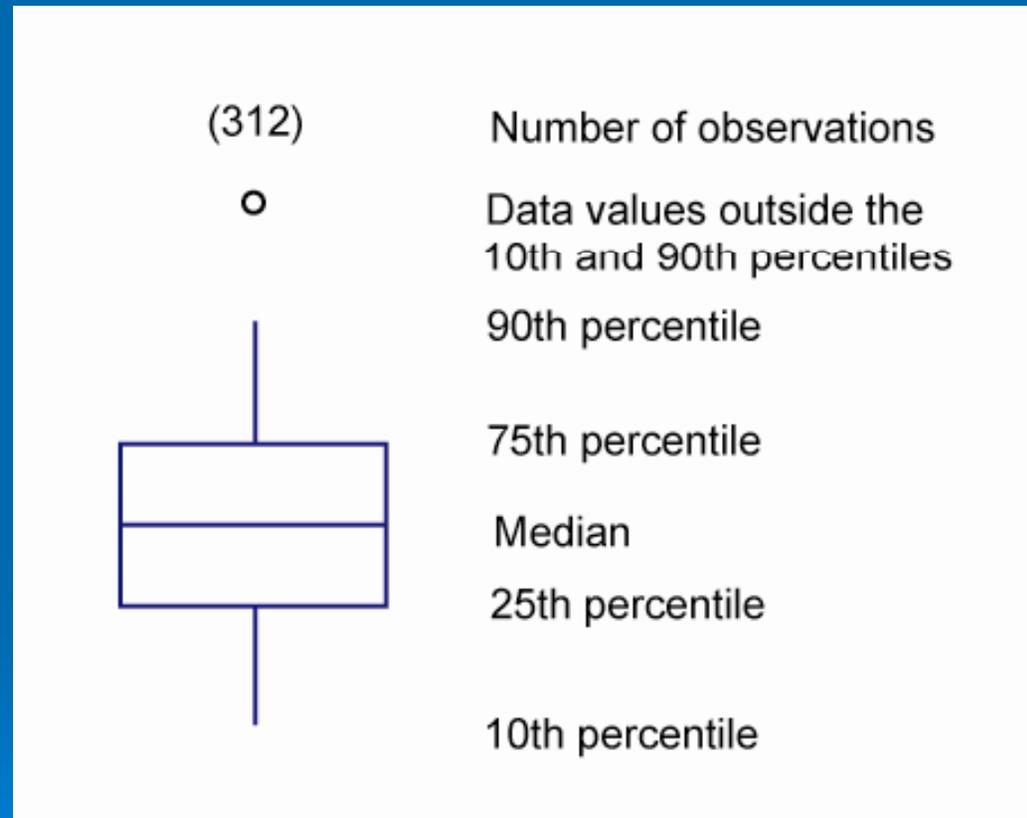
Season summary

- During the spill season, hourly values of TDG were occasionally larger than 115% saturation for the forebay sites and larger than 120% for the tailwater sites.
- All except one of the field checks of TDG sensors were within $\pm 2\%$ saturation after 3 to 4 weeks of deployment in the river. Most field checks were within $\pm 1\%$.
- Field checks of barometric pressure were within ± 1.0 mm Hg, and water-temperature field checks were within $\pm 0.2^\circ\text{C}$.
- For the eight monitoring sites, an average of 99.7% of the TDG data were received in real time and passed QA checks.

Data Completeness for WY 10

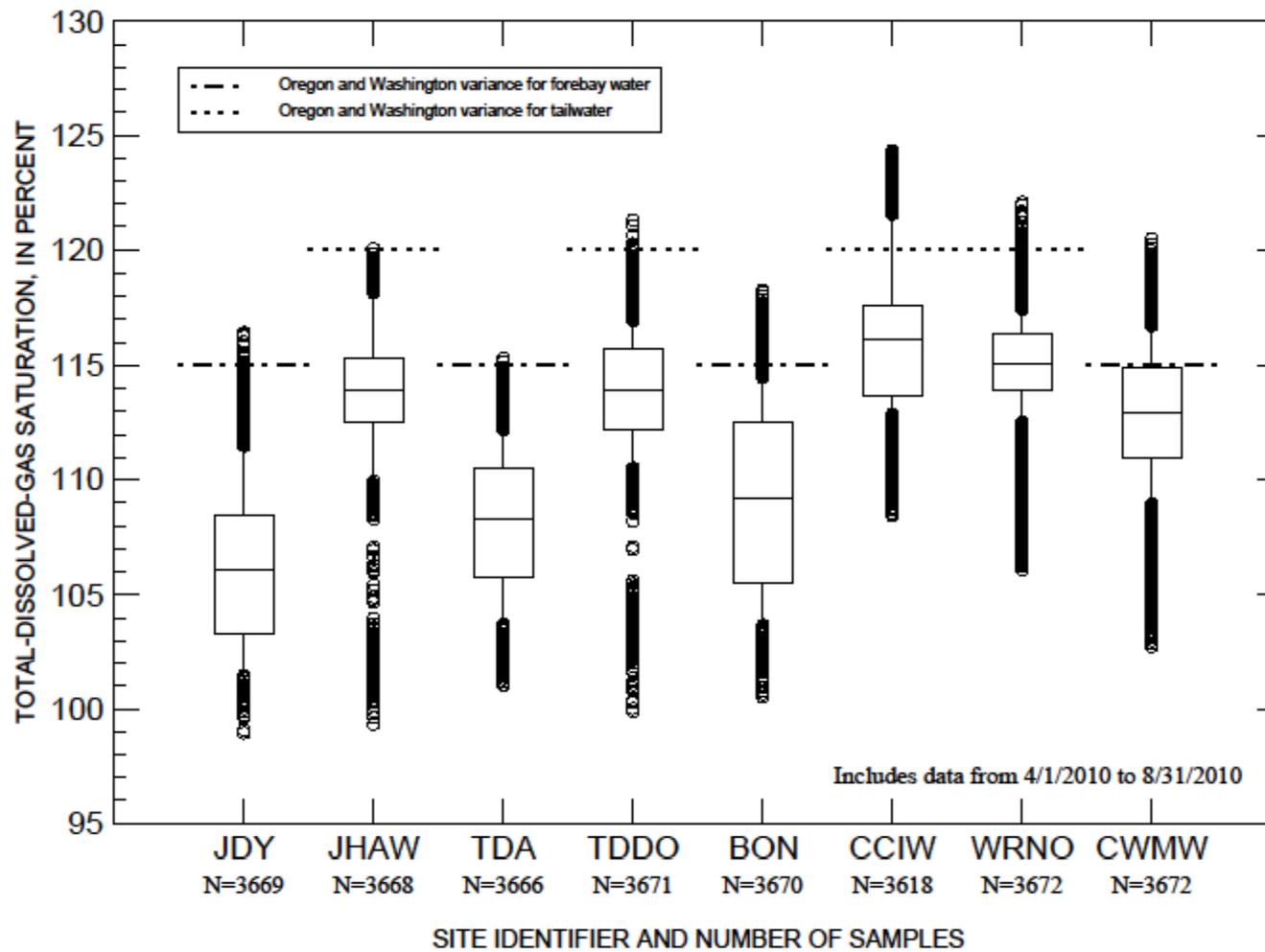
Station name	Number of missing or deleted hourly values	Percentage of real-time data passing quality assurance
John Day navigation lock	2	100.0%
John Day tailwater	38	99.6
The Dalles forebay	22	99.5
The Dalles tailwater	4	100.0
Bonneville forebay	4	99.9
Cascade Island	80	98.4
Warrendale	4	100.0
Camas	2	100.0
Average		99.7 %

Explanation of a Boxplot



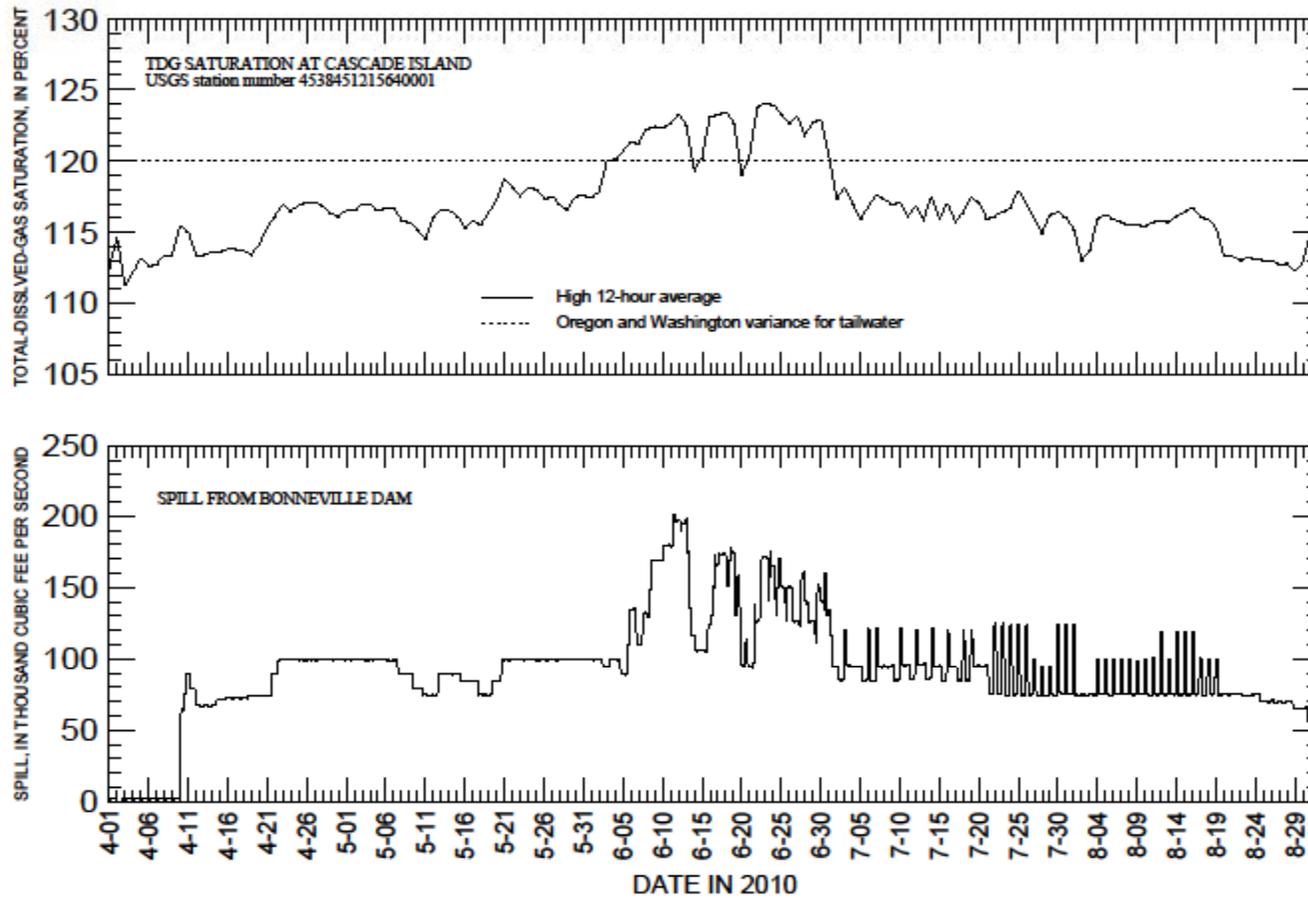
TDG distribution at 8 sites-spill season

Figure 10



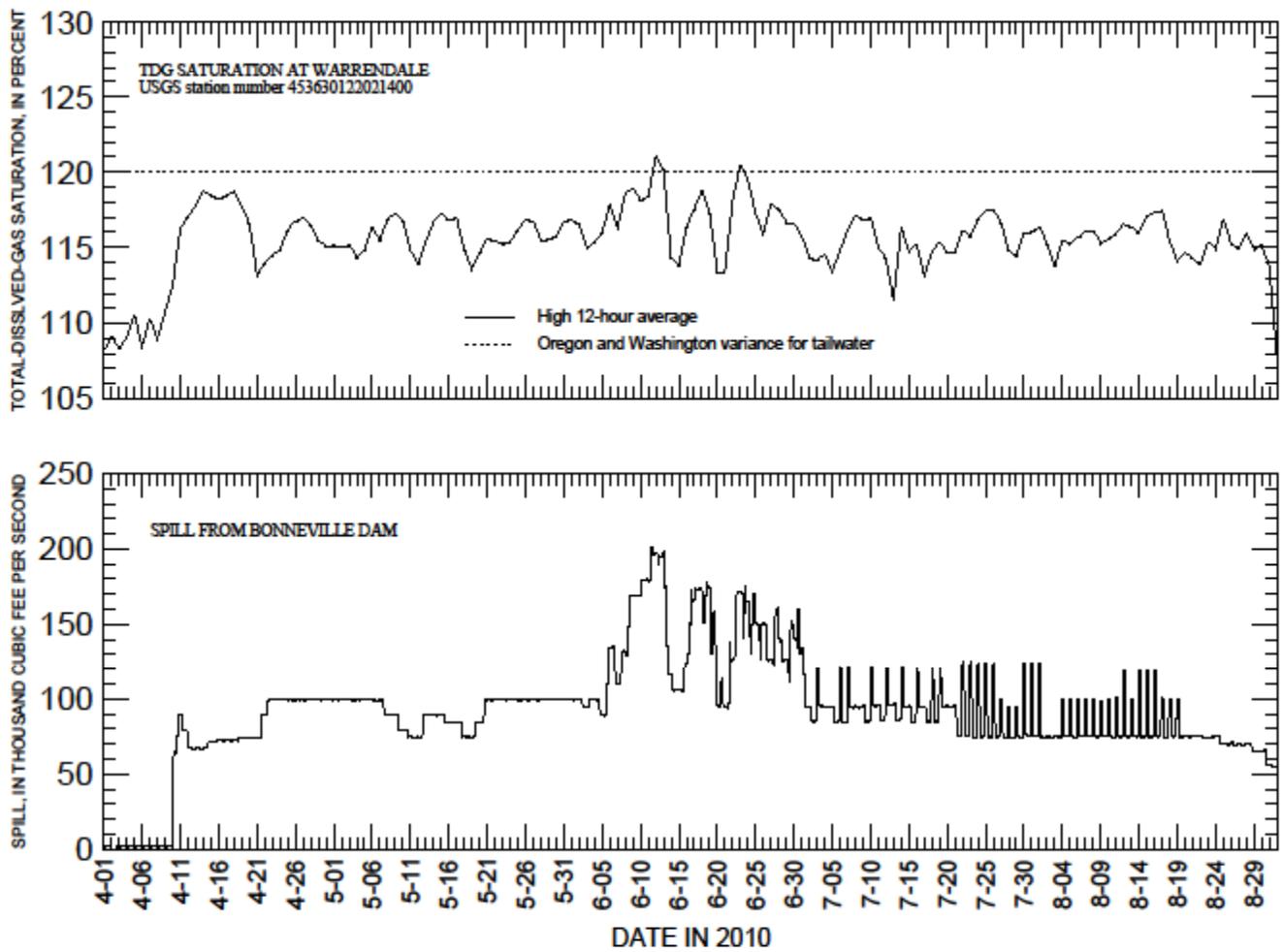
TDG and spill below Bonneville Dam

Figure_16



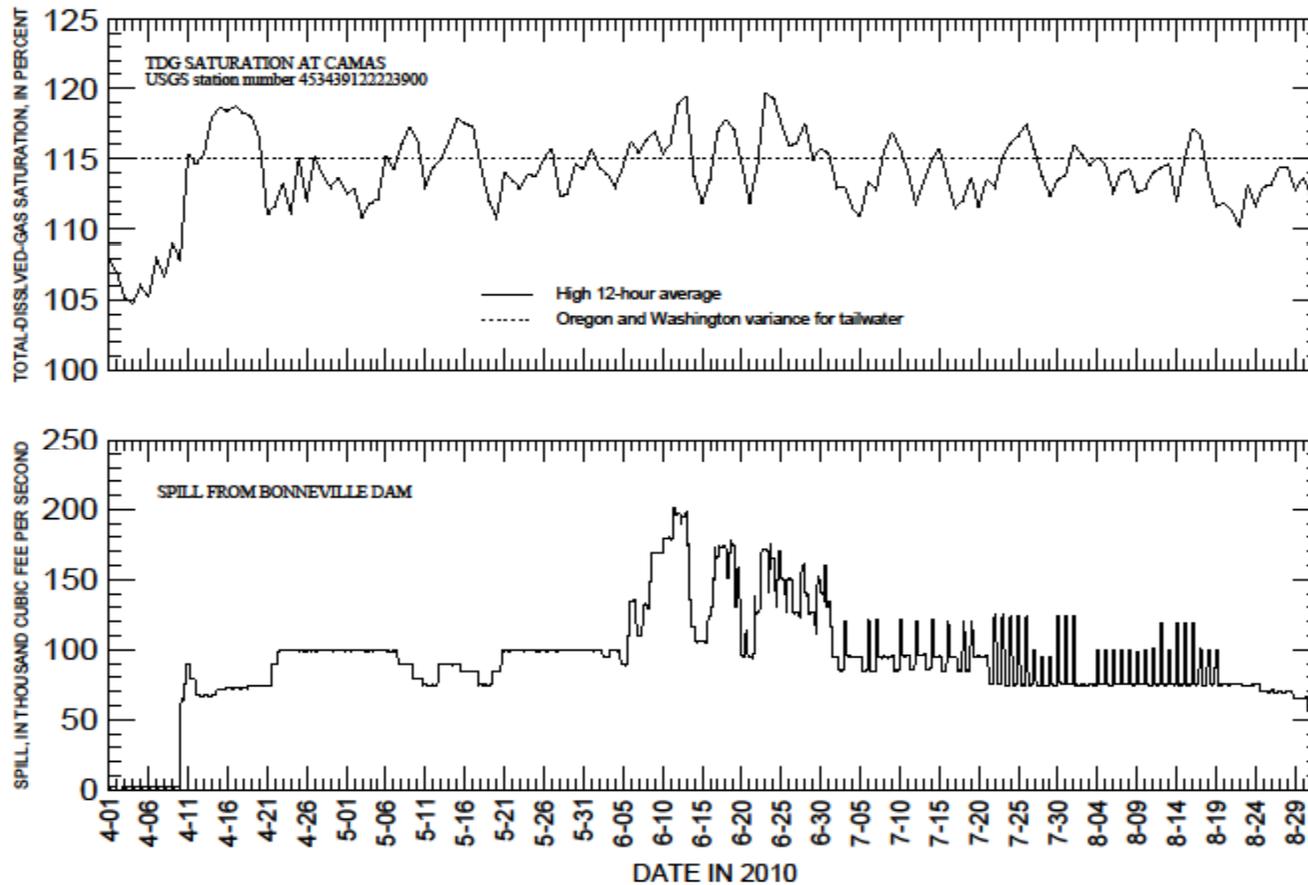
TDG and spill below Bonneville Dam, continued

Figure_17



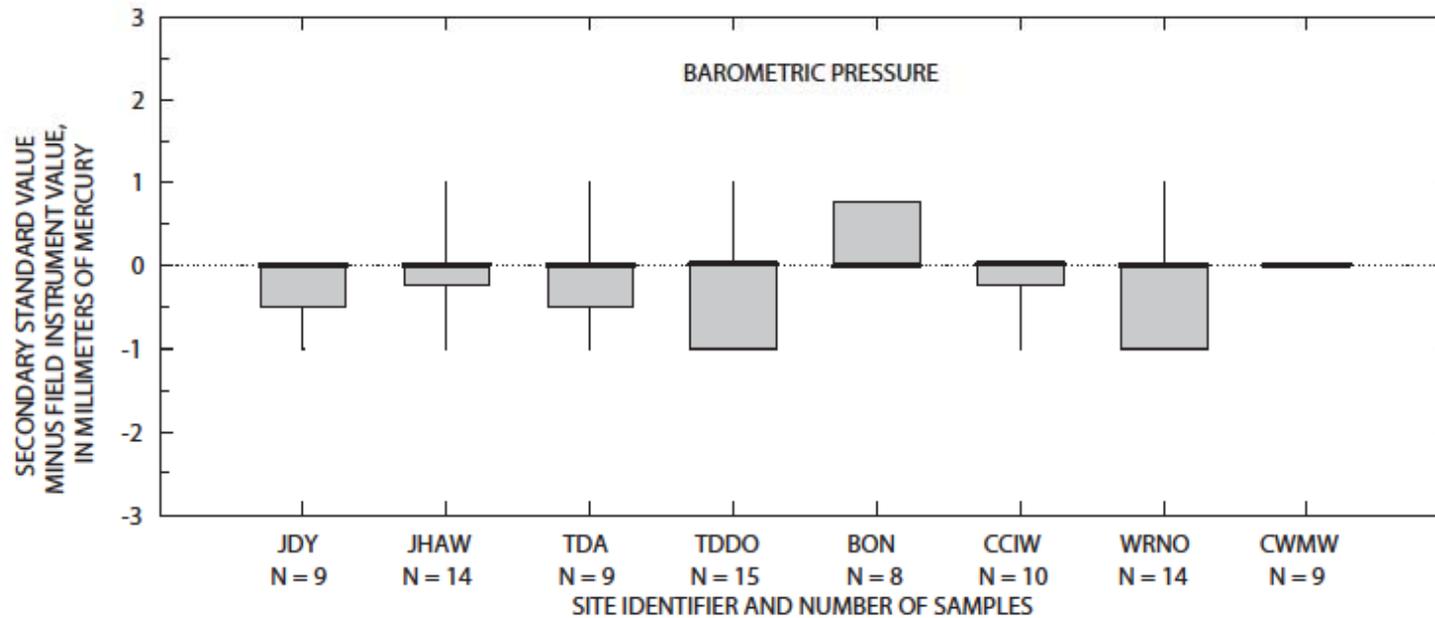
TDG and spill below Bonneville Dam, continued

Figure_18

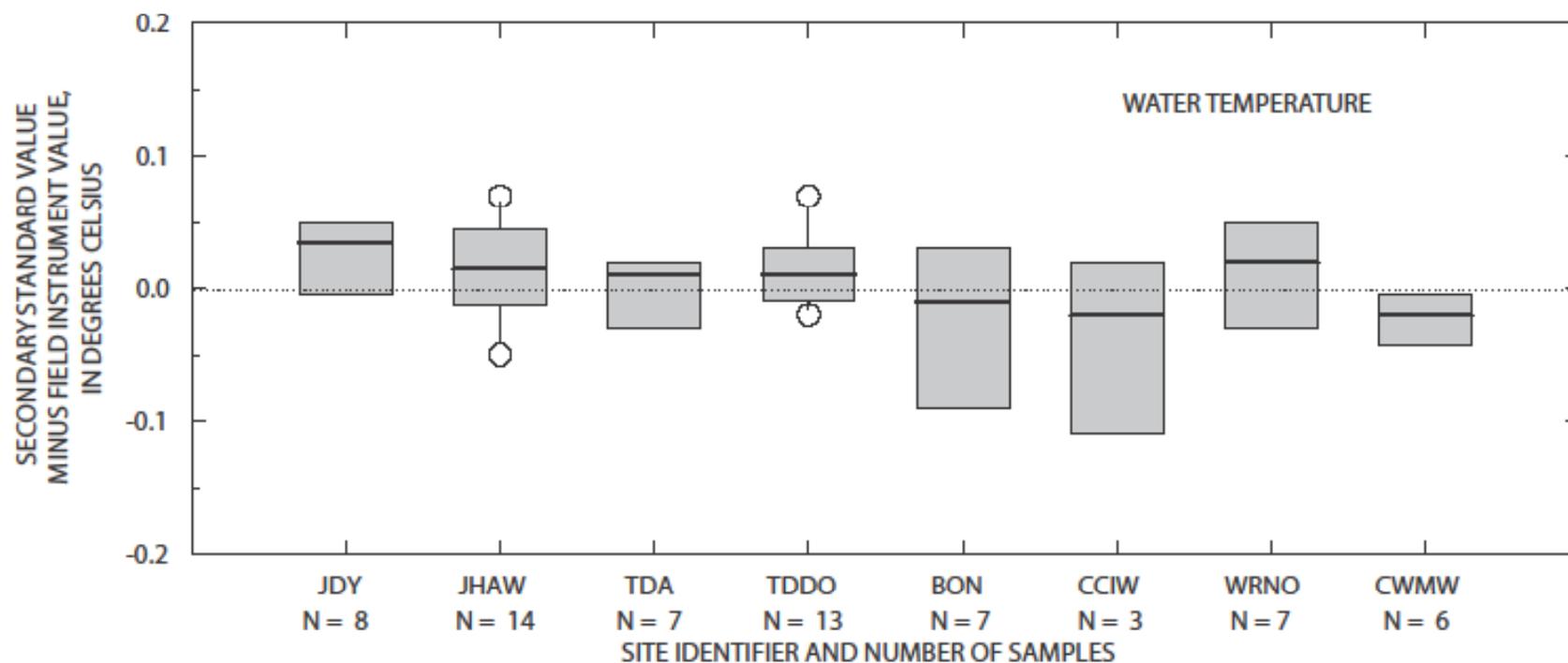


Field Check Results- Barometric Pressure

Figure 3.

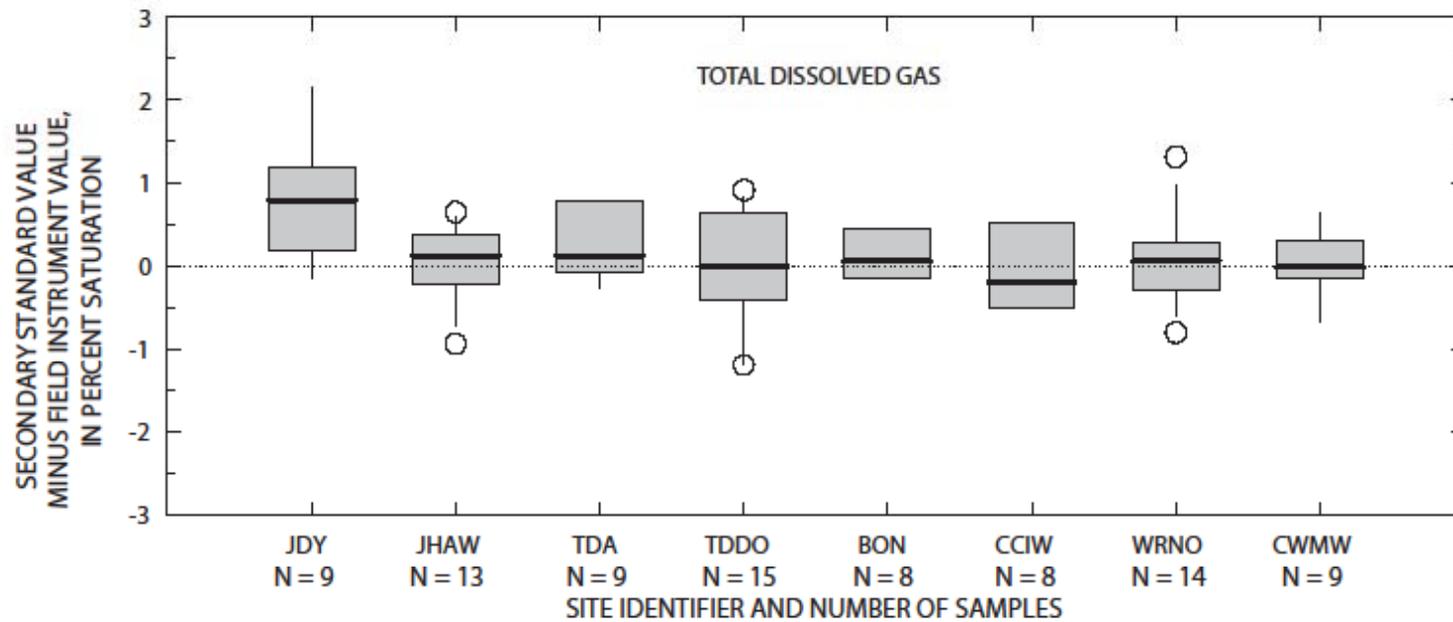


Field Check Results- Temperature



Field Check Results- TDG

Figure 5.



Hydrolabs have been rebuilt

- Up until the end of this summer, the newer TDG sensors were taking up to one hour to completely equilibrate to the river conditions.

(The older ones worked better, but were wearing out and being phased out of service).

- Hydrolab has redesigned the TDG sensors now and the newest one takes about half the time to respond.
- The result is that we can achieve better results for the same amount of time spent in the field.



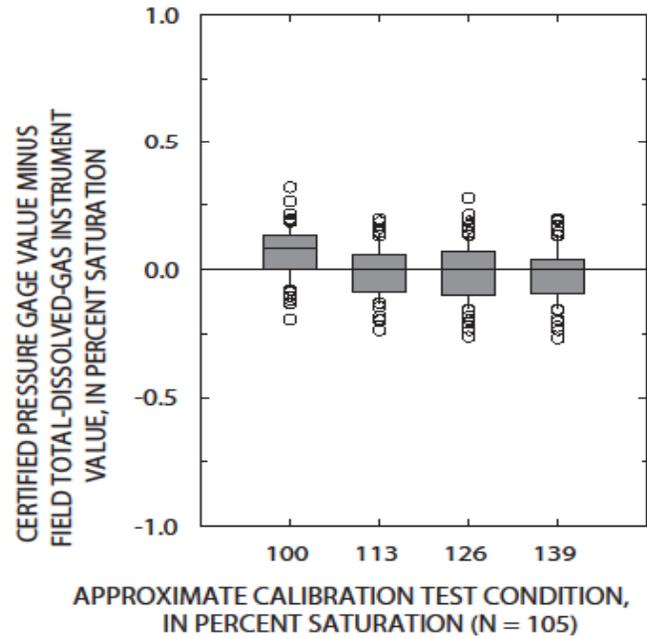
Lab Calibration



- ➔ Hydrolabs calibrated in the lab with a certified pressure gage
- ➔ Sensors tested at 4 different pressures

Lab calibration results

Figure 2.



Future Plans

- Winter monitoring continues below John Day, The Dalles, and Bonneville Dams (Warrendale site); calibration at 4 week intervals.
- USGS will publish an on-line report covering the material in this talk.

