



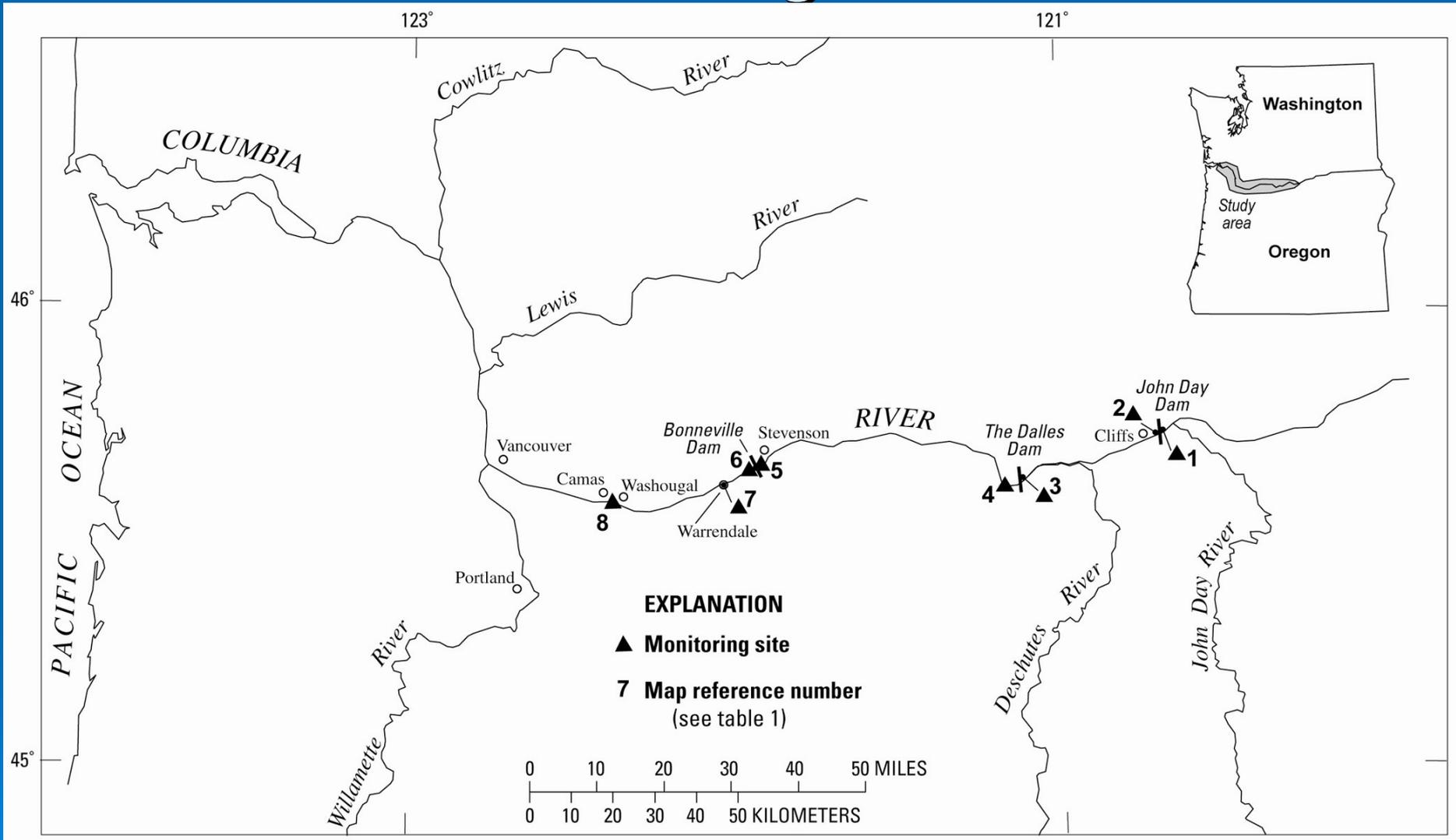
**2009 Spill Season
Year-end Review
November 17, 2009**

TOTAL DISSOLVED GAS Monitoring

Lower Columbia River

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

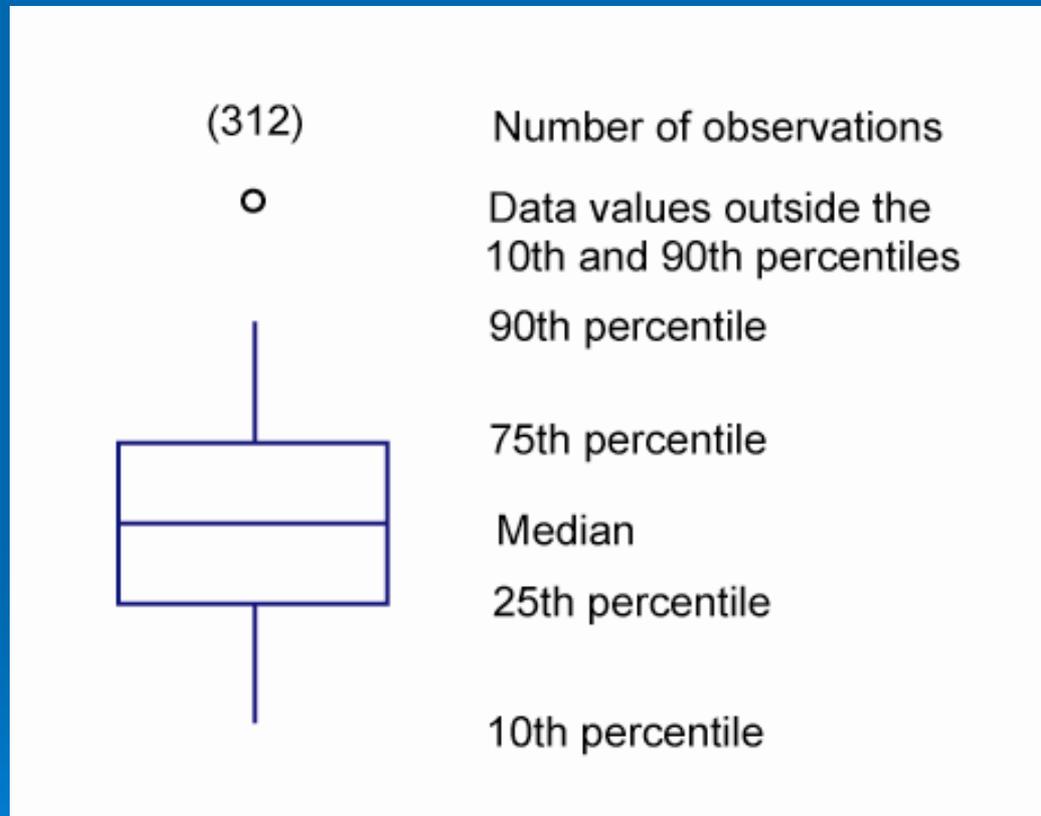
Monitoring Sites



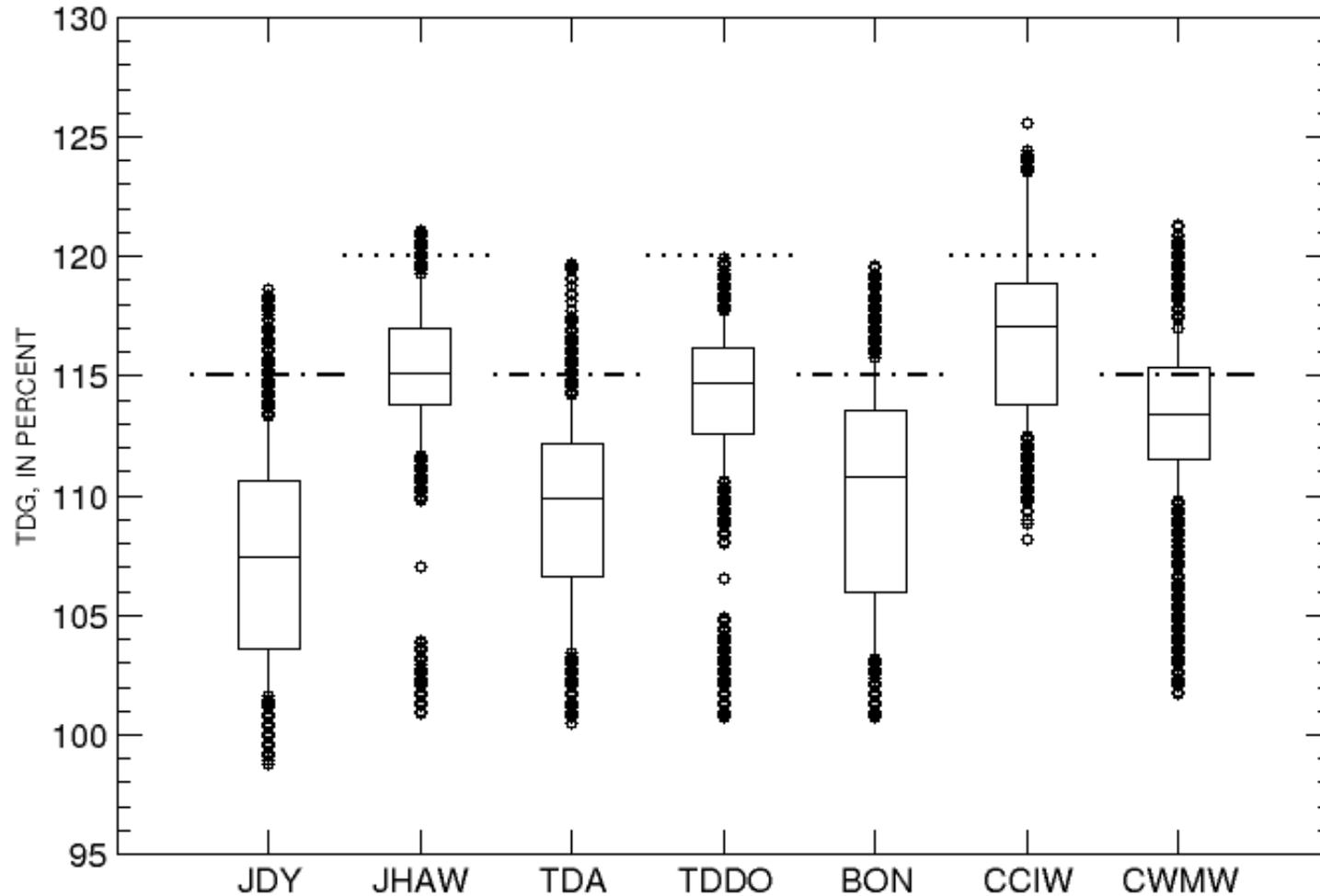
Summary

- During the spill season, hourly values of TDG were occasionally larger than 115% saturation for the forebay sites and larger than 120% for all tailwater sites except The Dalles.
- Field checks of TDG sensors were within $\pm 1\%$ saturation after 3 to 4 weeks of deployment in the river. (With the exception of two cases of slow sensor response).
- Field checks of barometric pressure were within ± 2.0 mm Hg, and water-temperature field checks were within $\pm 0.2^\circ\text{C}$.
- For the eight monitoring sites, an average of 99.4% of the TDG data were received in real time and passed QA checks.

Explanation of a Boxplot



TDG distribution at 7 sites-spill season (N=3,670)



TDG and spill below John Day Dam – June in purple

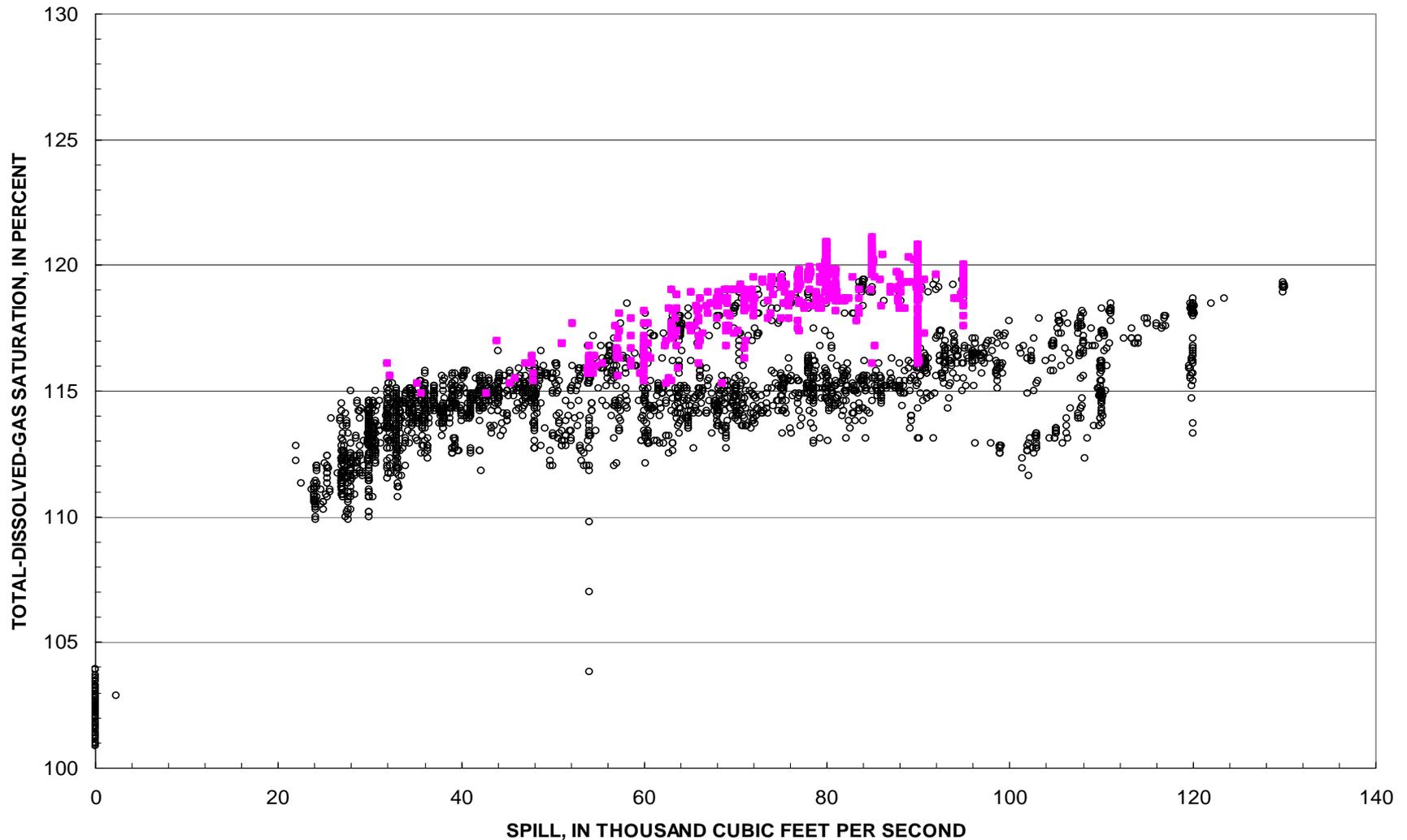
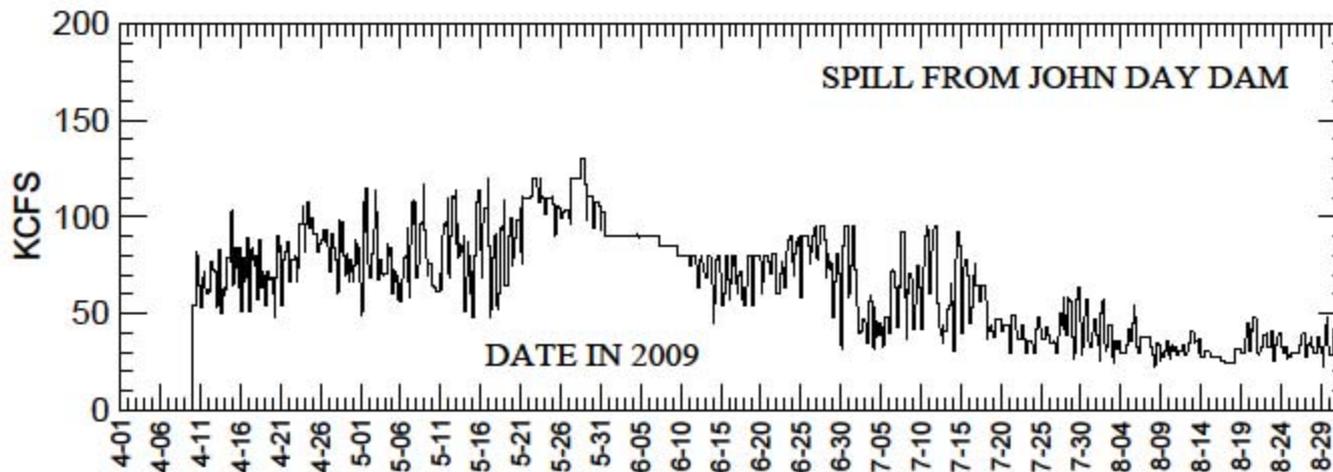
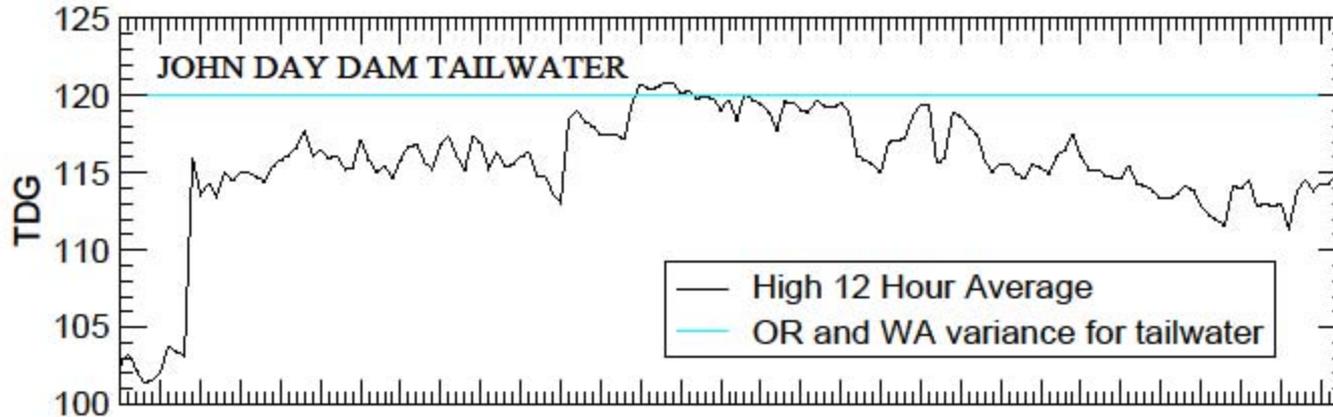
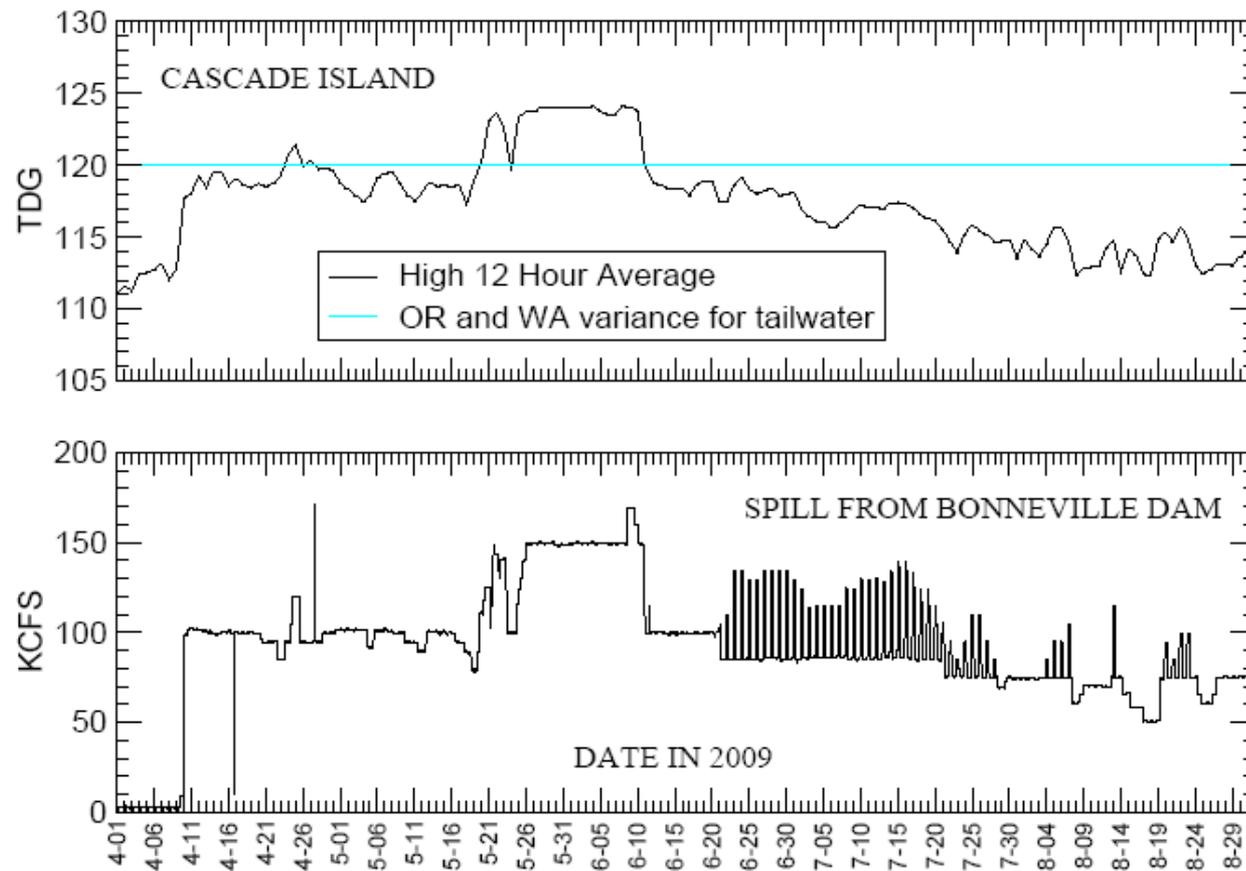


Figure 6. Relation of total-dissolved-gas saturation downstream from John Day Dam and spill from John Day Dam, lower Columbia River, Oregon and Washington. April 1 through August 31, 2009.

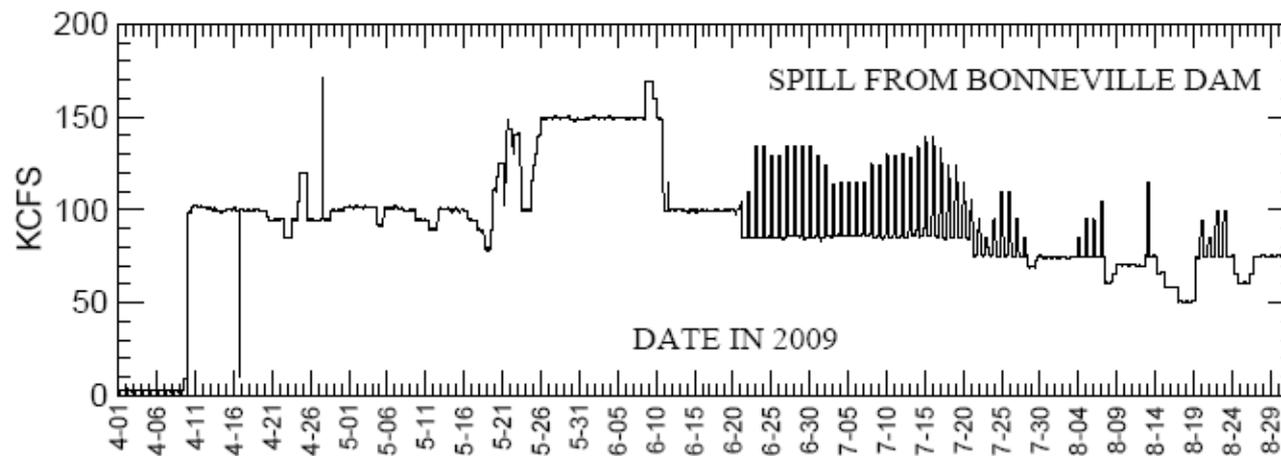
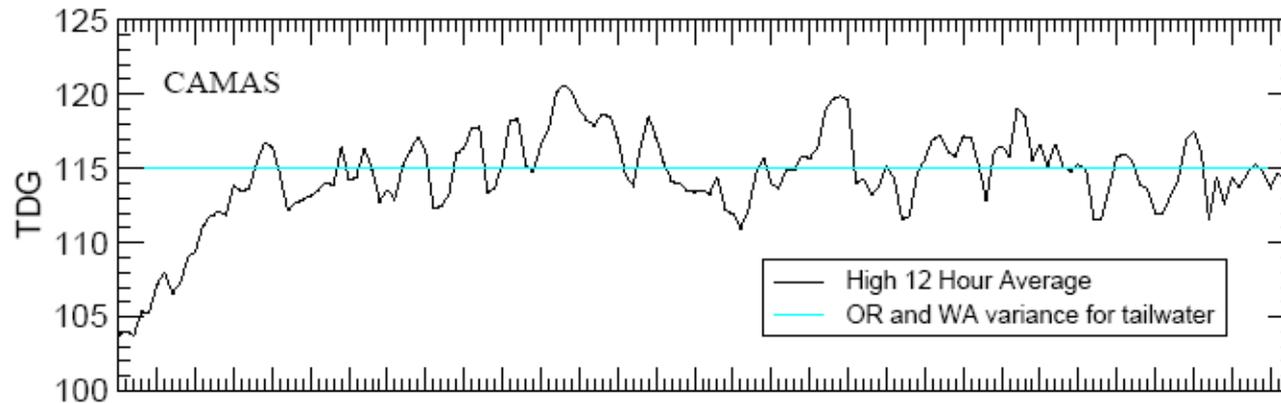
TDG exceedances and spill below John Day Dam



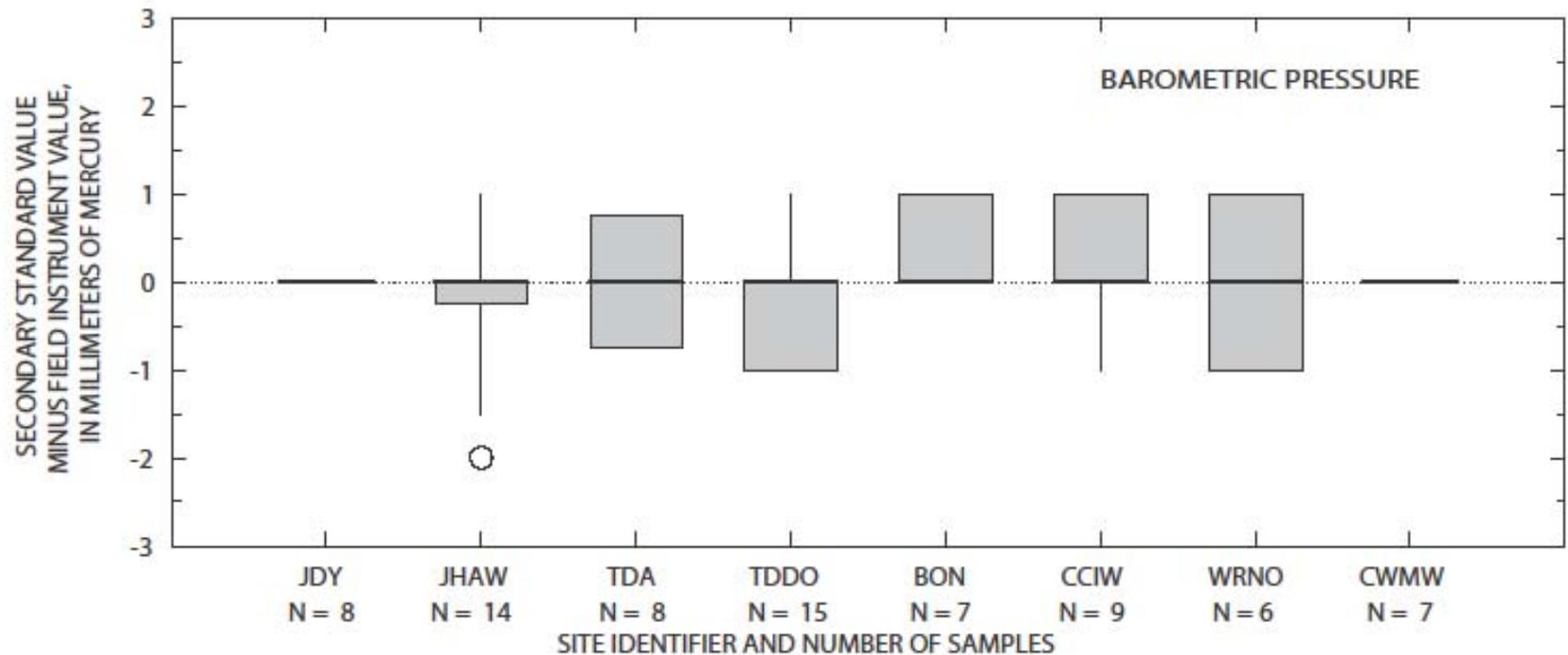
TDG exceedances and spill below Bonneville Dam



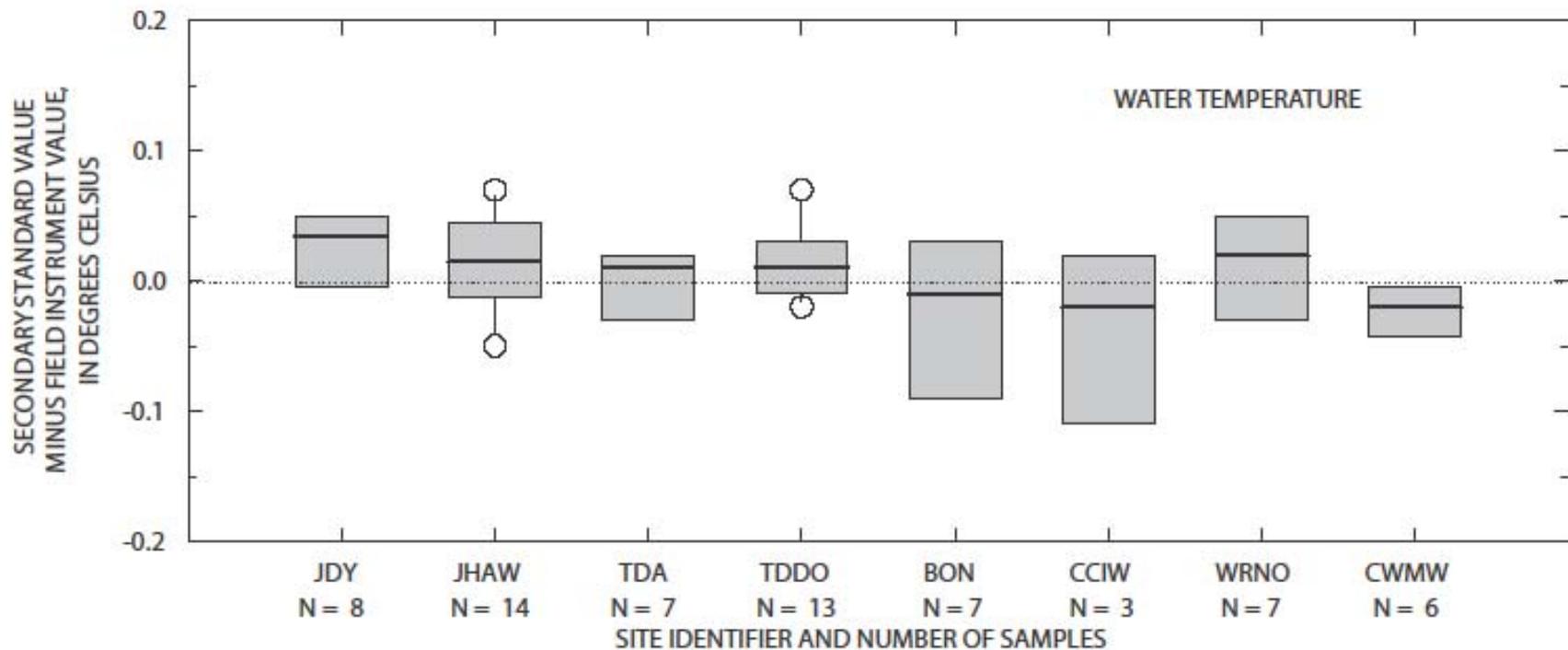
TDG exceedances at Camas



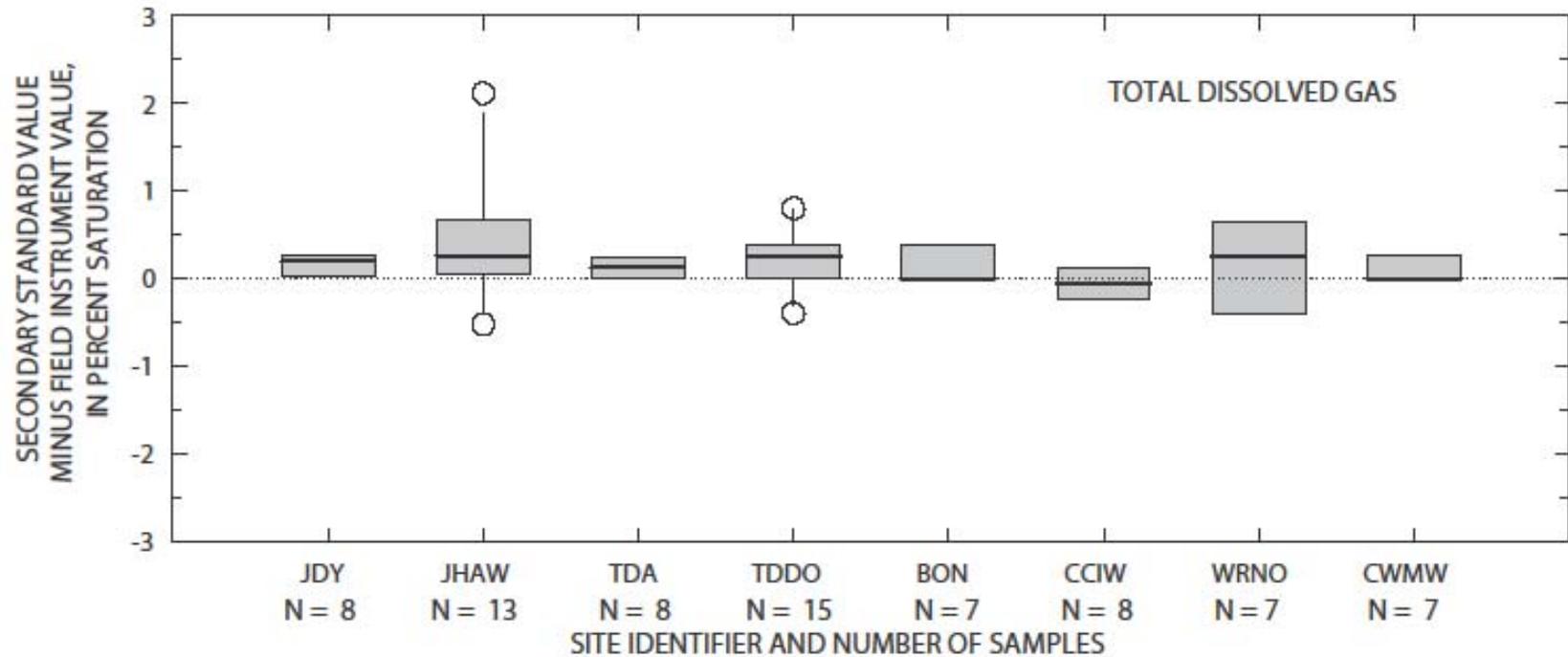
Field Check Results- Barometric Pressure



Field Check Results- Temperature



Field Check Results- TDG

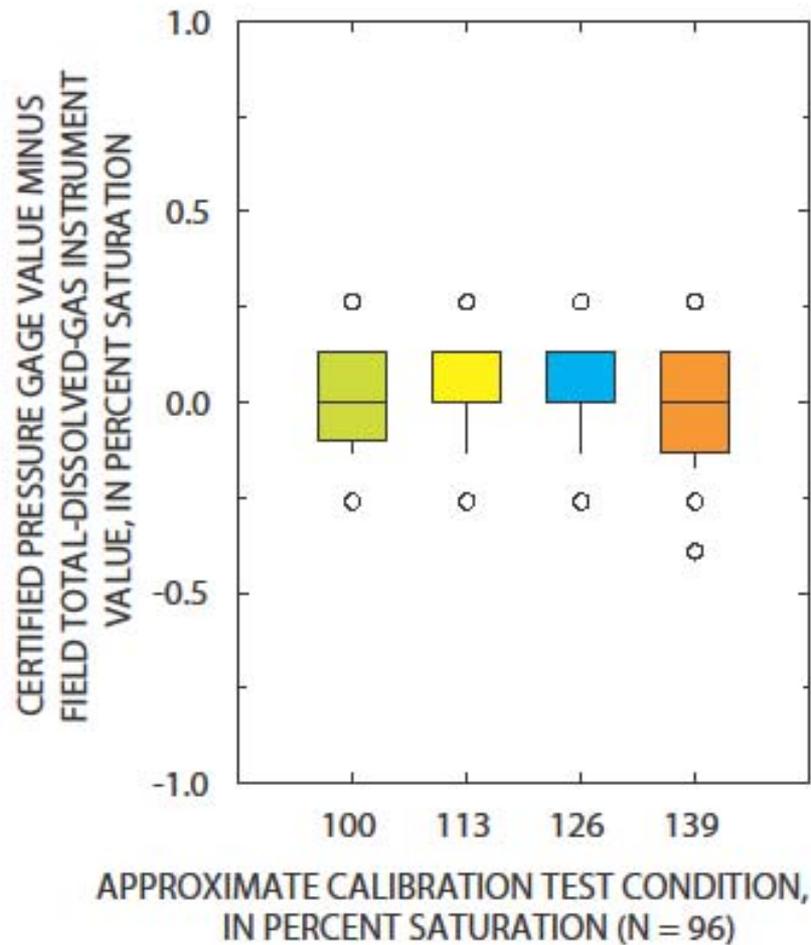


Lab Calibration



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

Lab calibration results



Data Completeness for WY 09

Station name	Number of missing or deleted hourly values	Percentage of real-time data passing quality assurance
John Day navigation lock	4	99.9
John Day tailwater	265	97.0
The Dalles forebay	0	100.0
The Dalles tailwater	0	100.0
Bonneville forebay	83	98.1
Cascade Island	0	100.0
Warrendale	2	100.0
Camas	1	100.0
Average		99.4 %

Amphipods on probe at Camas



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.