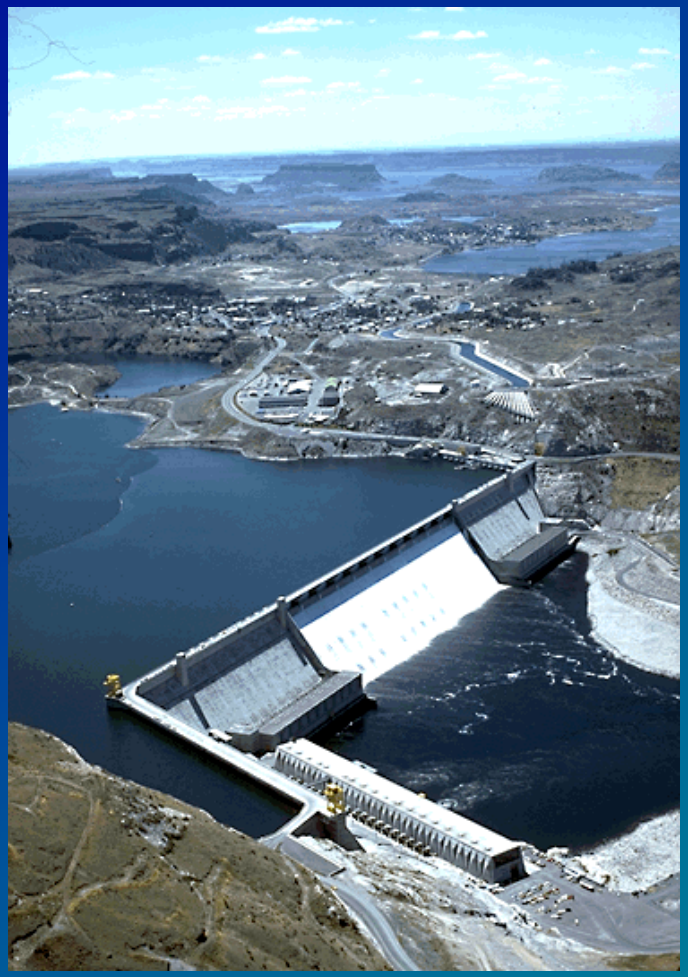
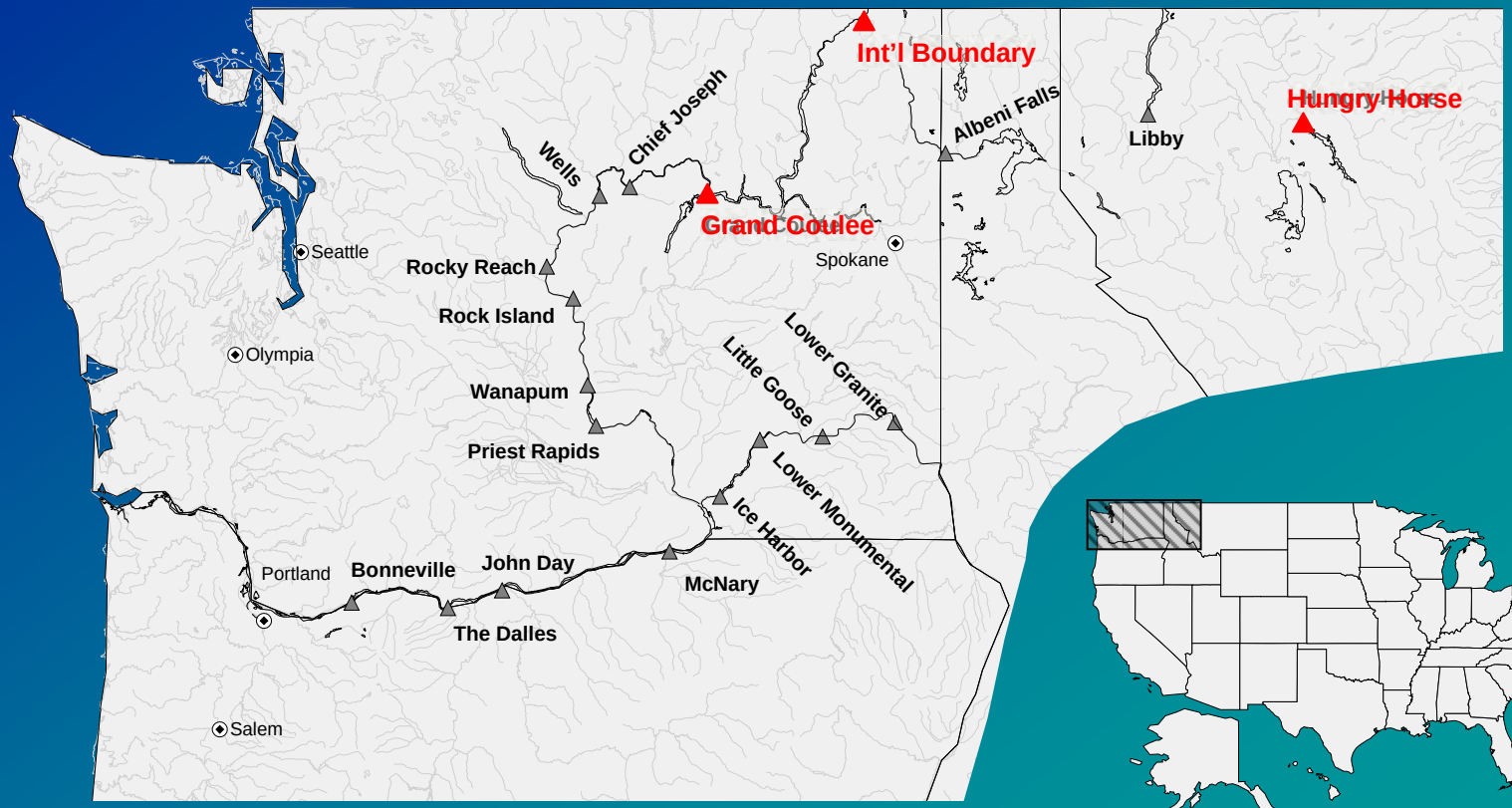
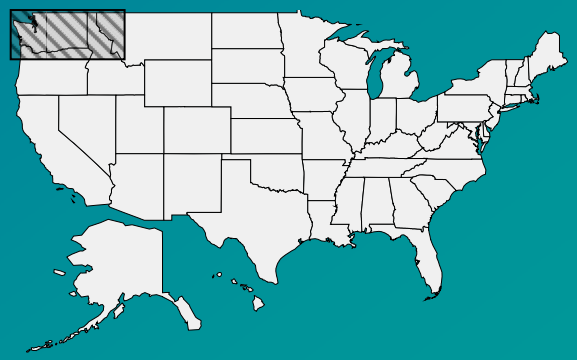


US Bureau of Reclamation Total Dissolved Gas Fixed Monitoring System 2009

Upper Columbia Basin TDG Monitoring Locations

	Grand Coulee	Hungry Horse
Drainage Area:	74,700 sq mi	1654 sq mi
Normal Full Pool:	1290.0 ft MSL	3560.0 ft MSL
No. Main Units:	24	4
Hydraulic Capacity:	280,000 cfs	8,900 cfs

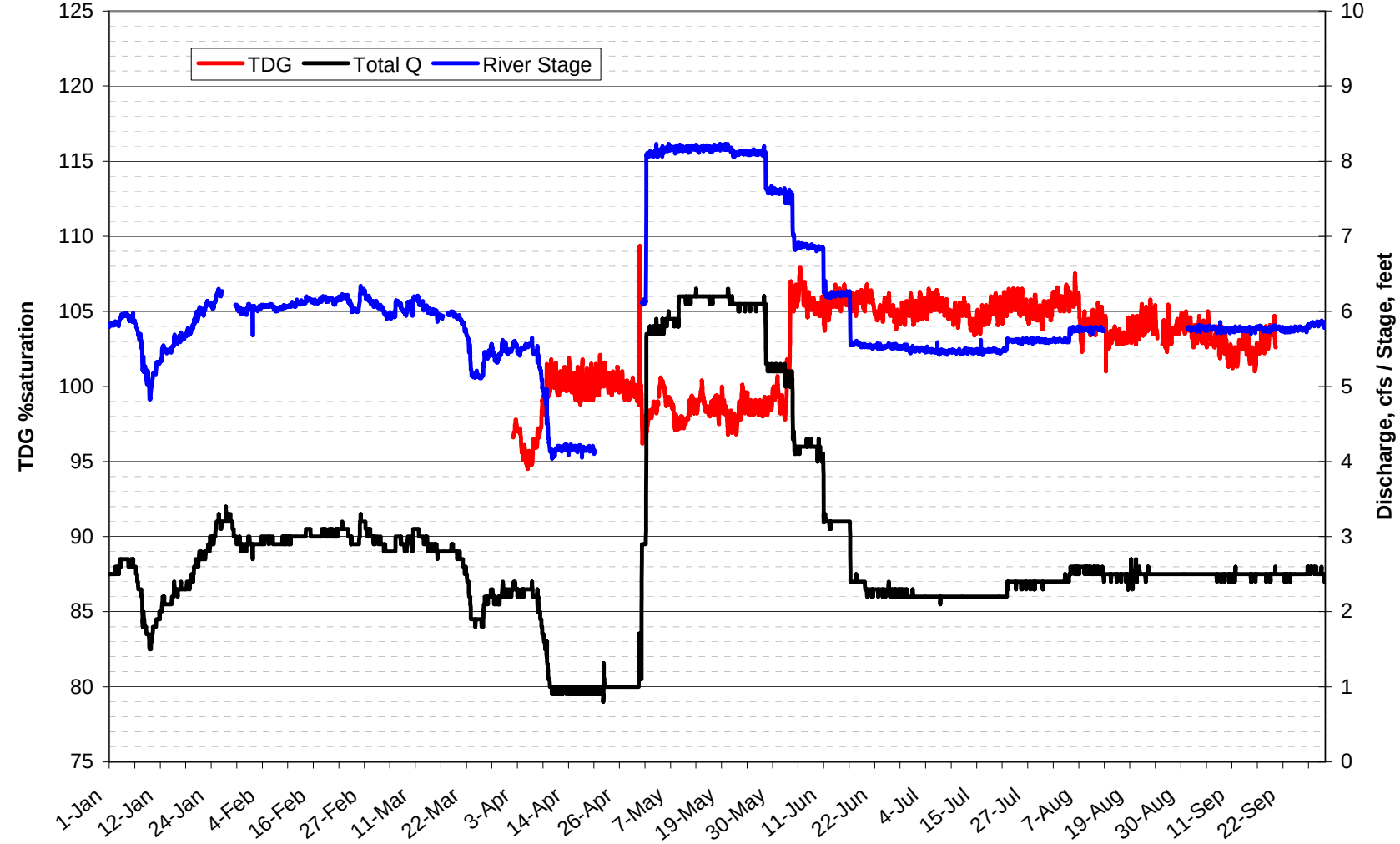




Hungry Horse Dam TDG Monitor

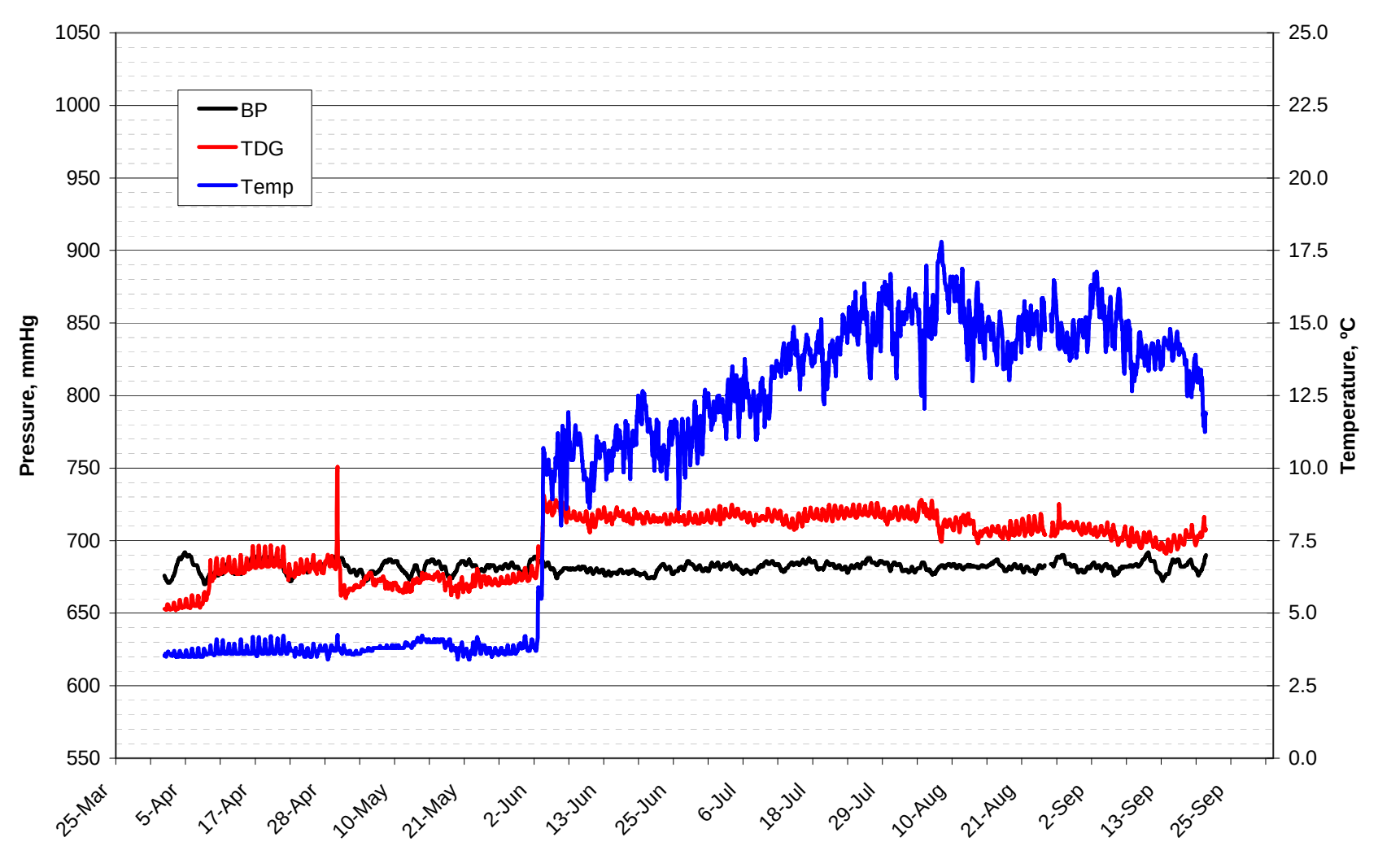
Hungry Horse Dam TDG and Project Discharge Data

January – October, 2009



HGHM Monitor Data

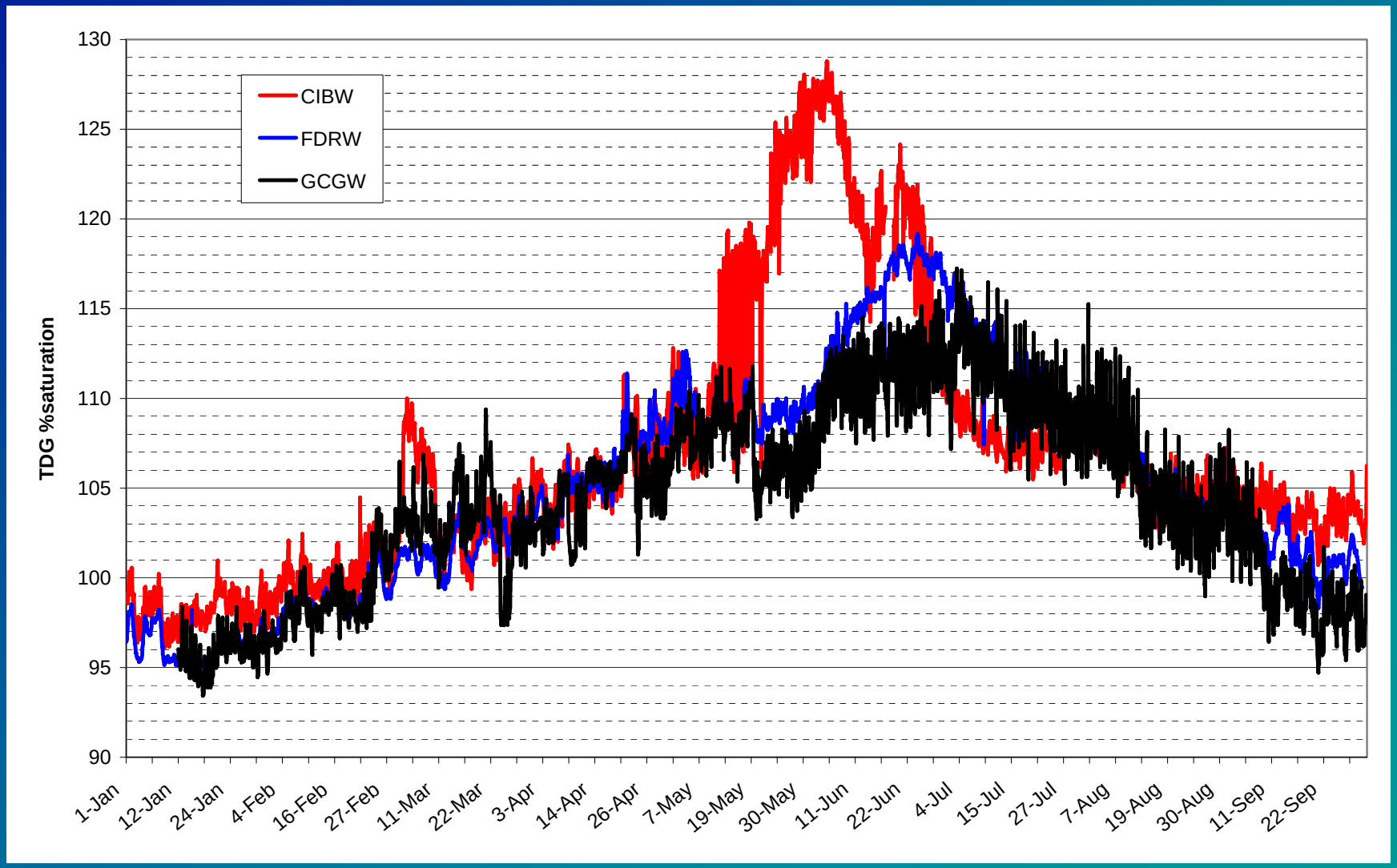
April – September, 2009



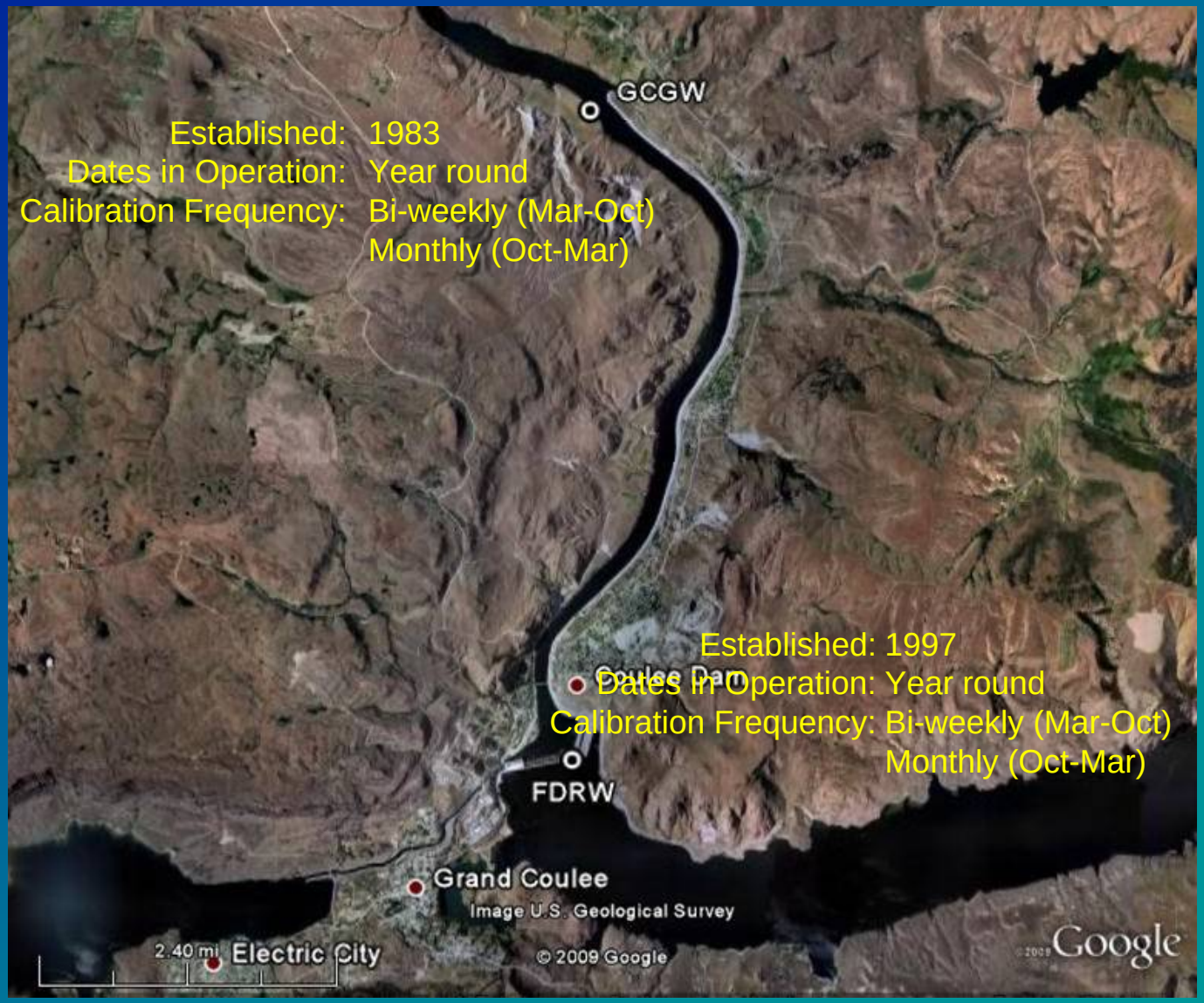
Lake Roosevelt TDG Monitoring Locations

Lake Roosevelt TDG Saturations

January – October, 2009

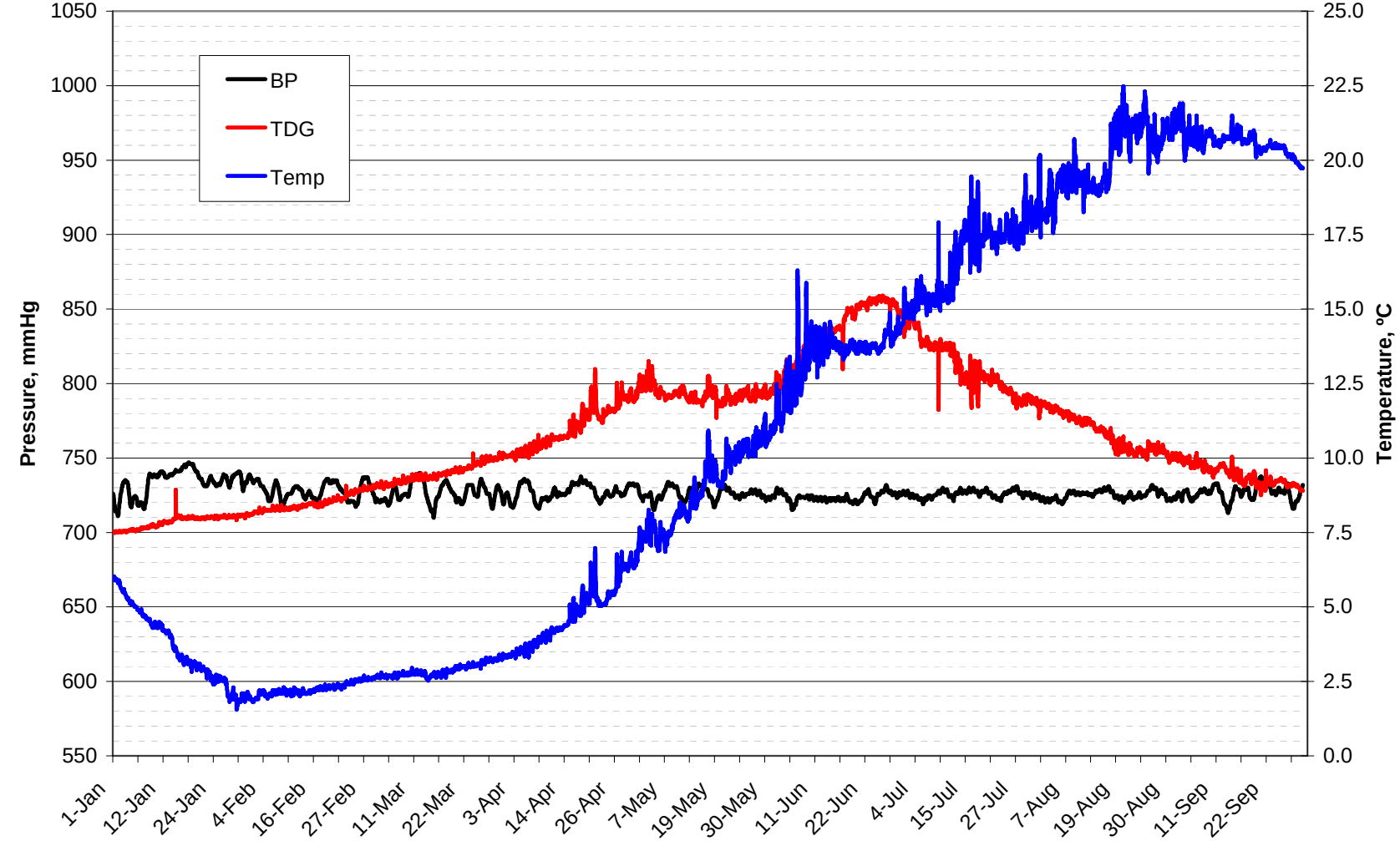


Grand Coulee Dam TDG Monitoring Locations



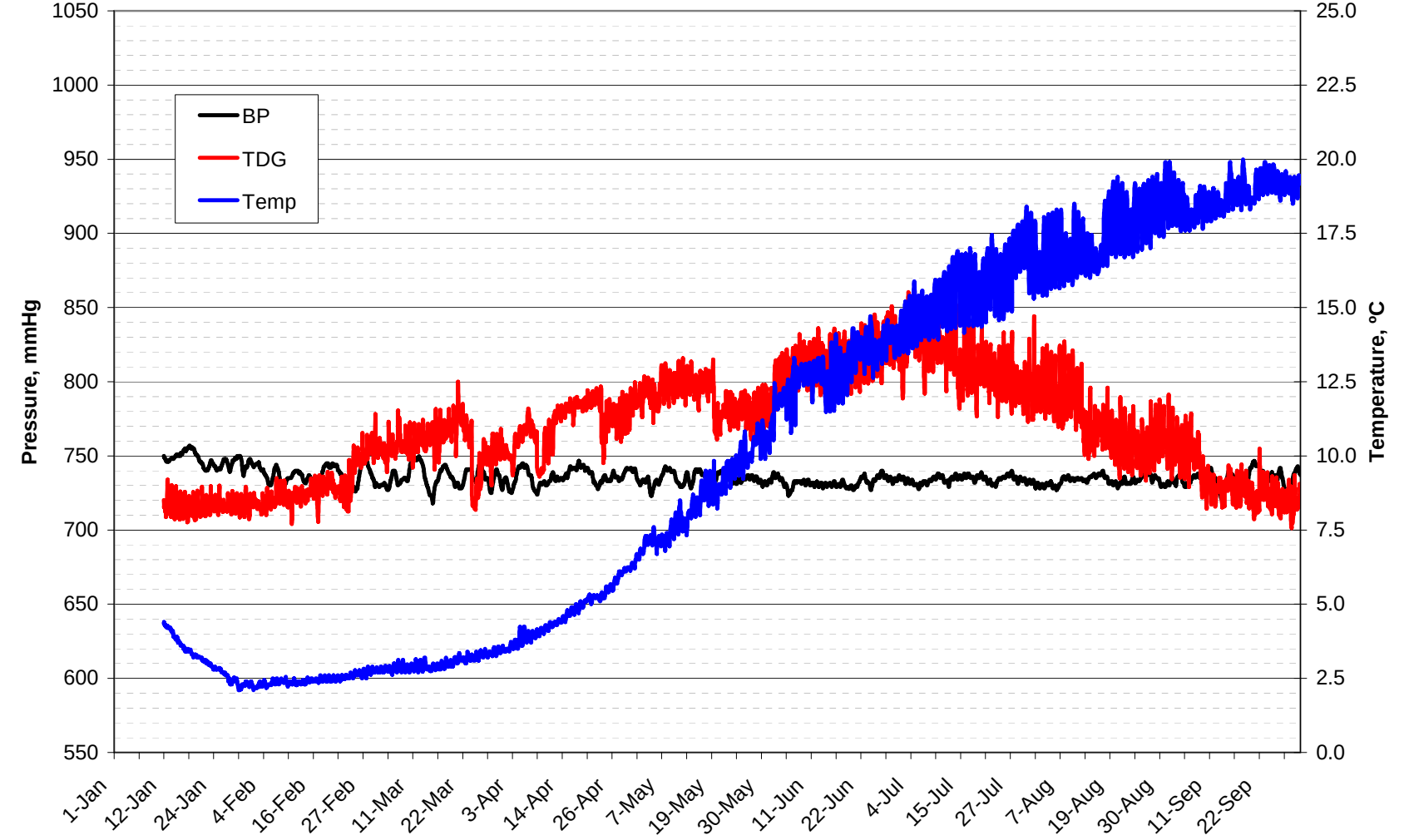
FDRW Monitor Data

January – October, 2009



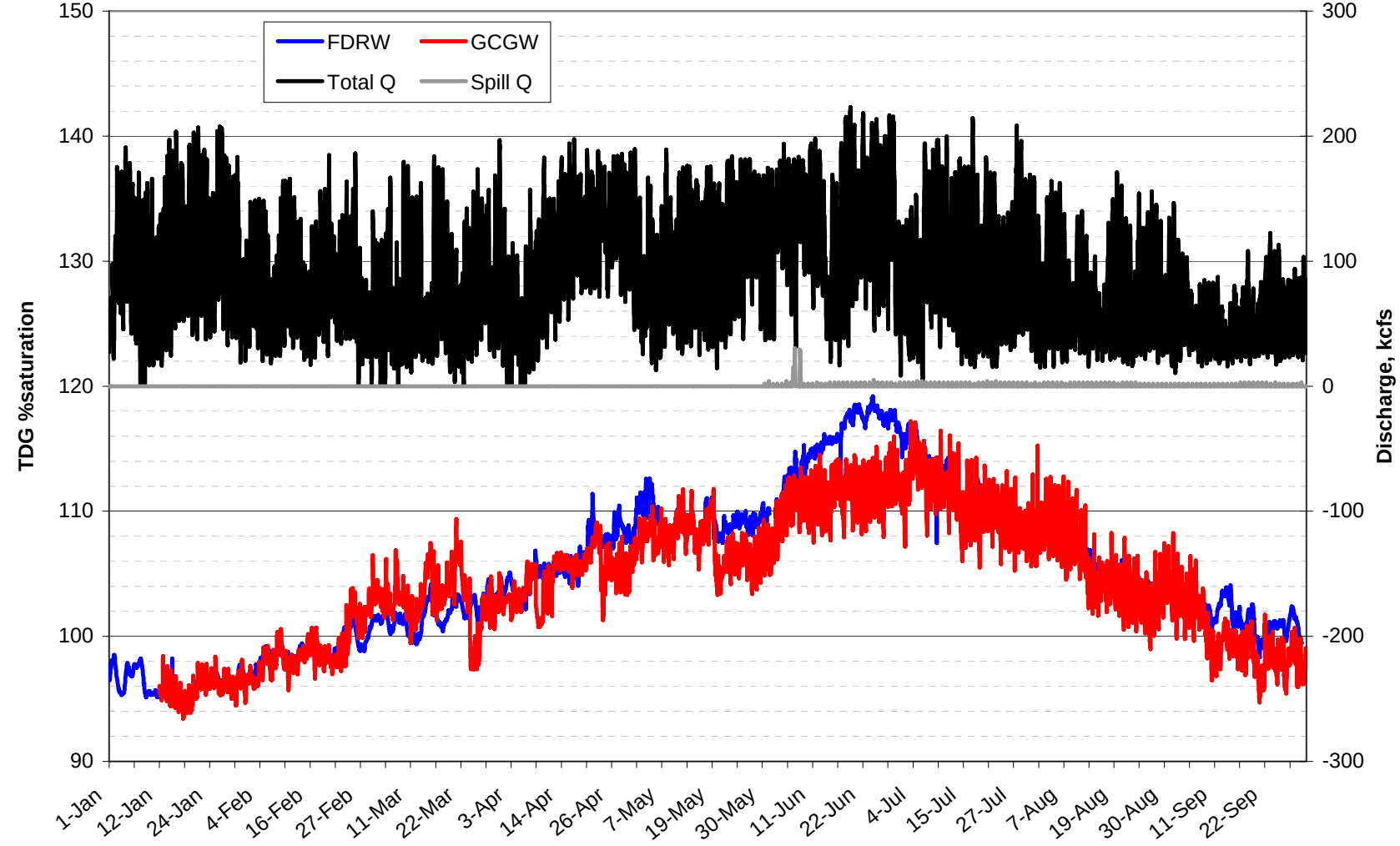
GCGW Monitor Data

January – October, 2009



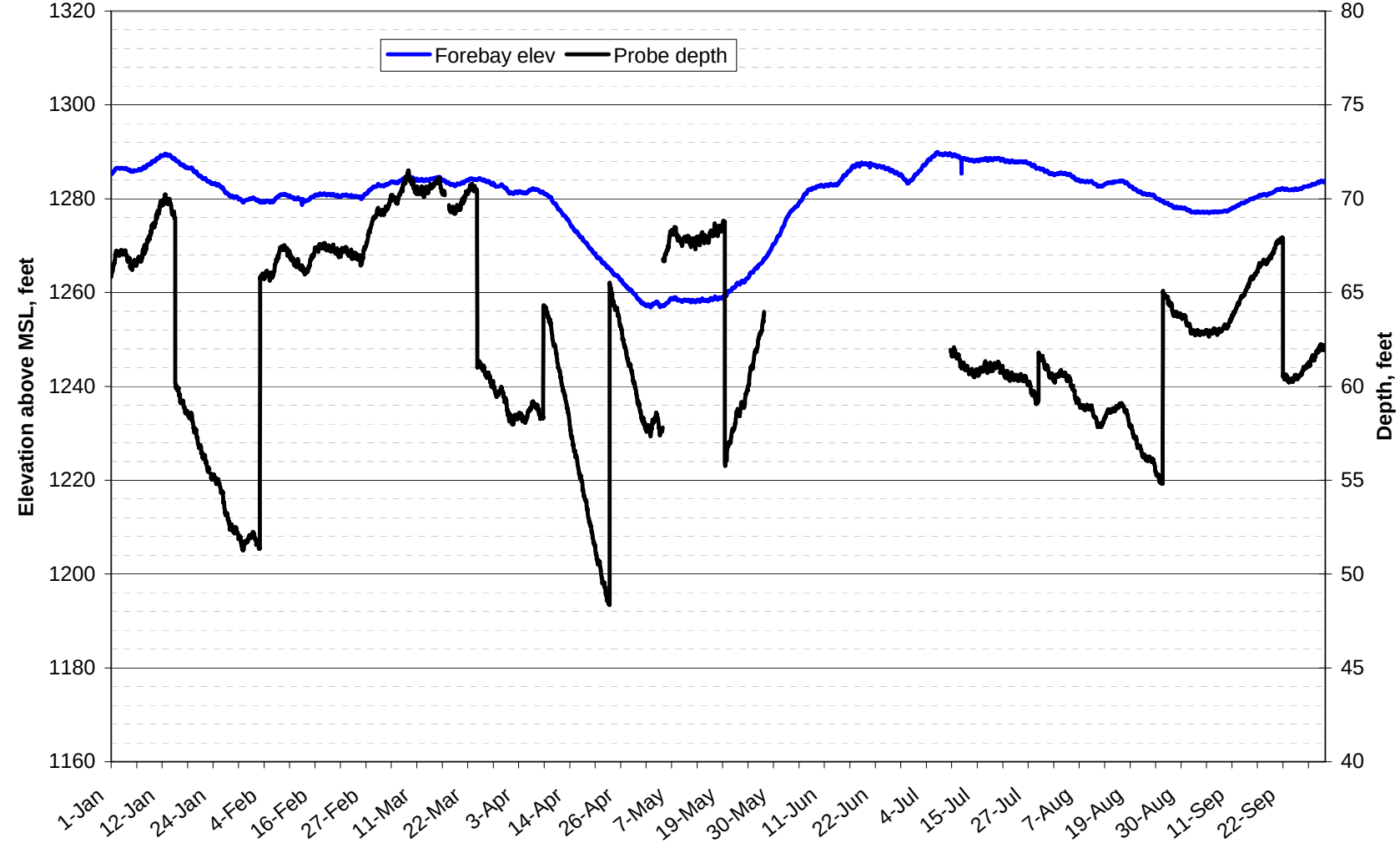
Grand Coulee Dam TDG and Project Discharge Data

January – October, 2009

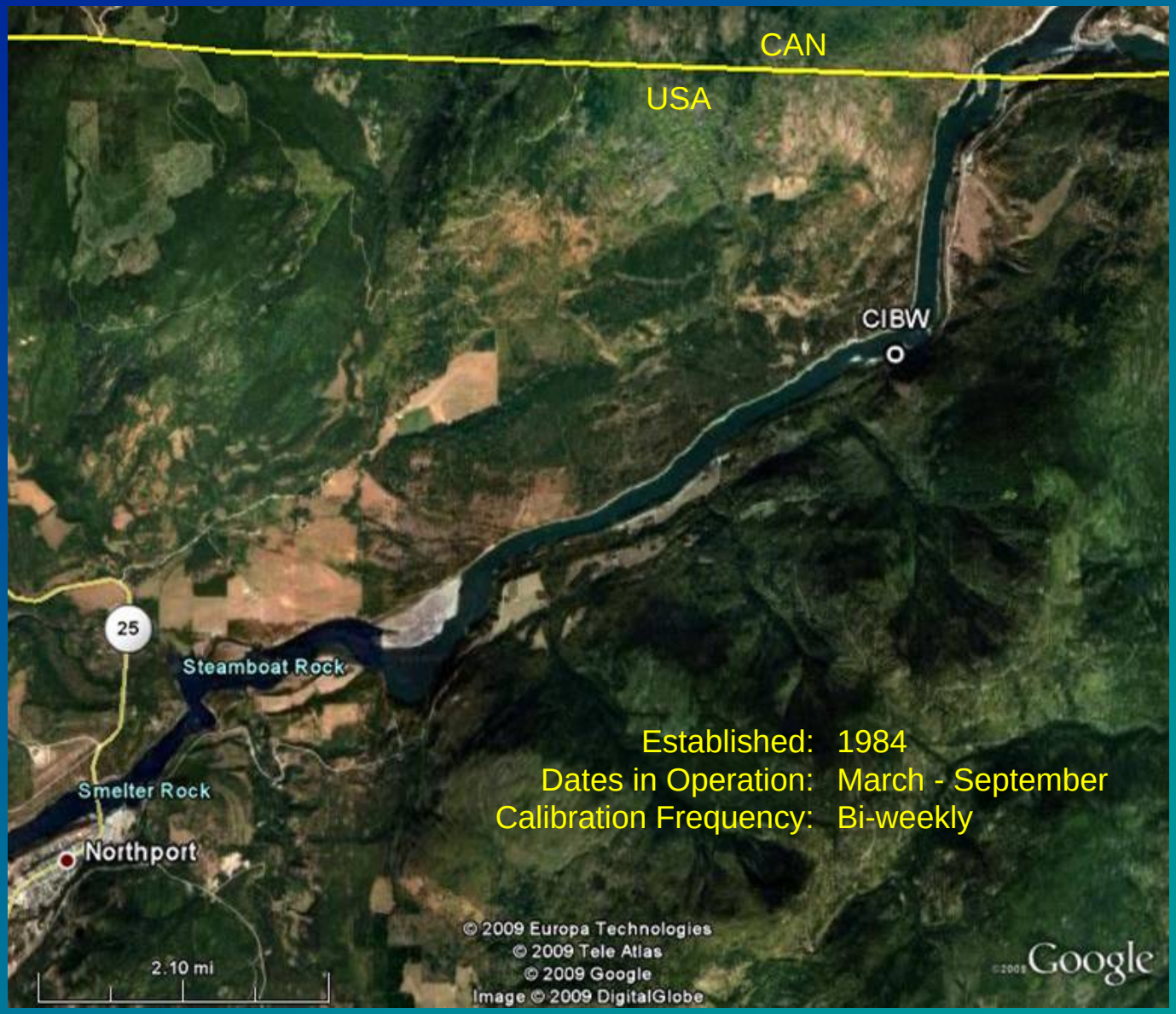


Grand Coulee Forebay Elevation and Probe Depth

January – October, 2009



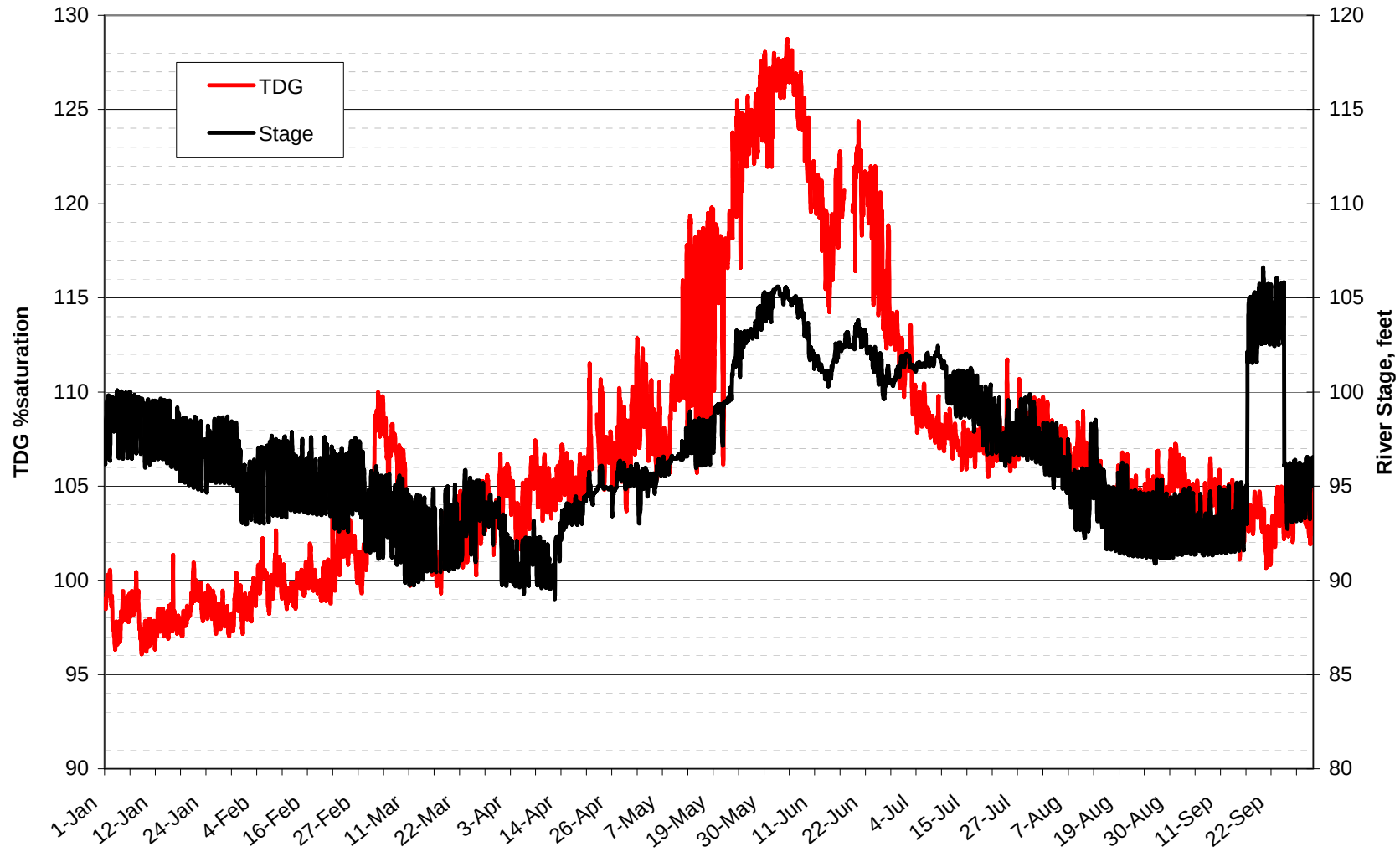
International Boundary (CIBW) TDG Monitor



Established: 1984
Dates in Operation: March - September
Calibration Frequency: Bi-weekly

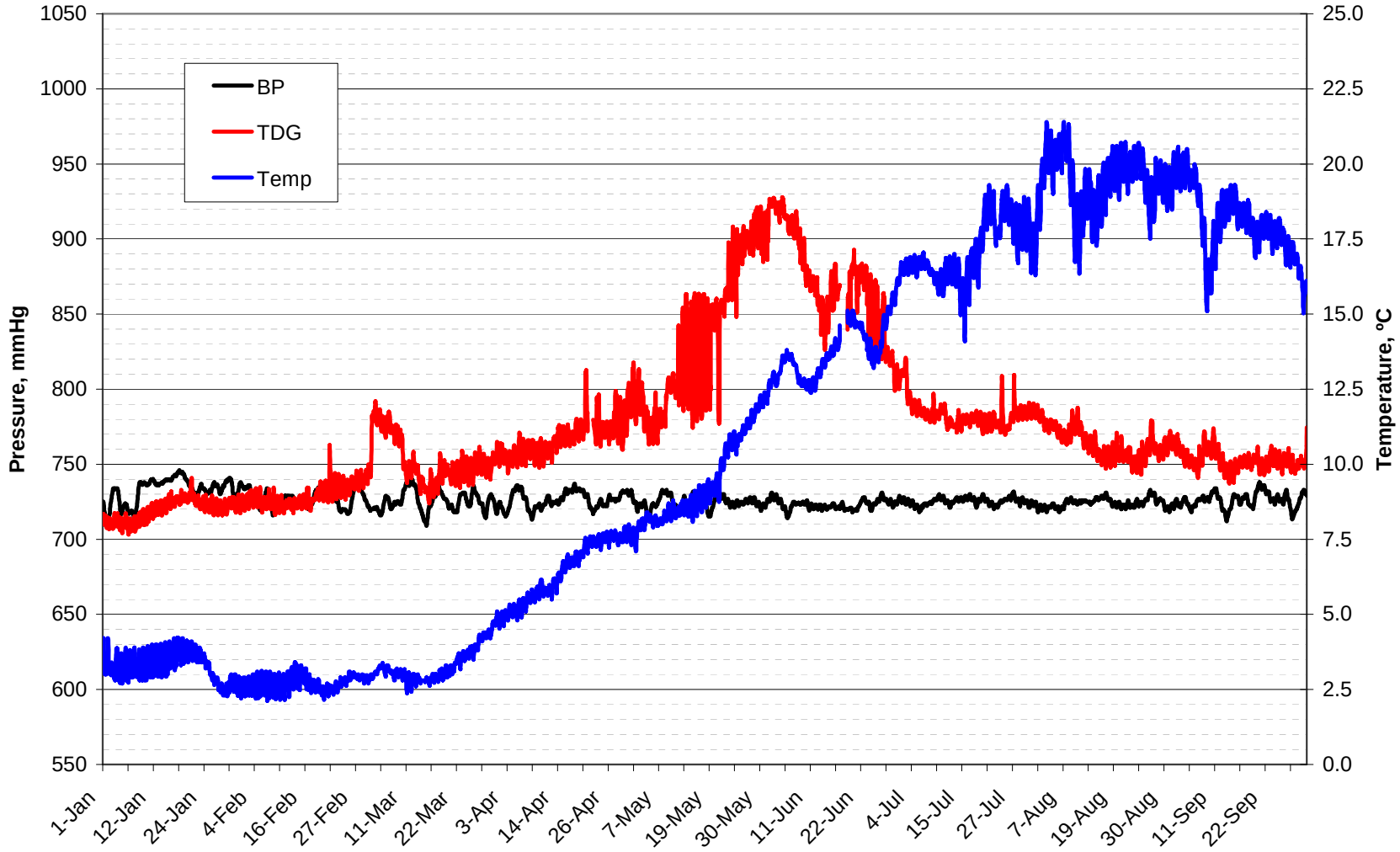
International Boundary TDG and River Stage

January – October, 2009

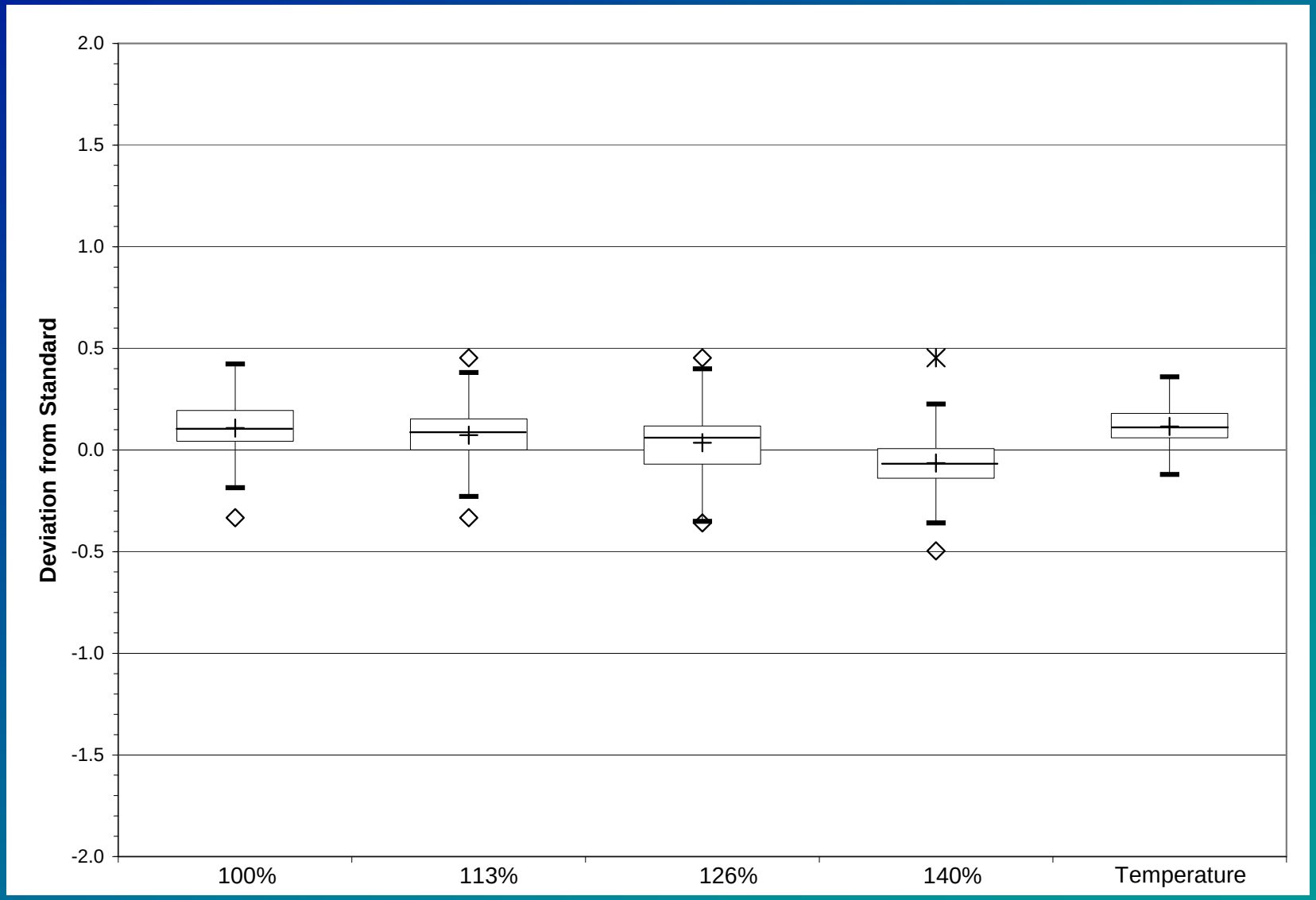


CIBW Monitor Data

January – October, 2009



USBR Calibration Summary Box Plots



US Bureau of Reclamation 2009 Calibration Summaries

	Temperature (ºC)	TDG Pressure (mmHg)			
		100%	113%	126%	140%
Mean	0.12	0.11	0.07	0.04	-0.06
Median	0.11	0.10	0.08	0.05	-0.07
Standard Deviation	0.09	0.13	0.14	0.14	0.16
Variance	0.01	0.02	0.02	0.02	0.03
Minimum	-0.04	-0.33	-0.33	-0.36	-0.50
Maximum	0.31	0.35	0.45	0.45	0.45
n	63	63	63	63	63

US Bureau of Reclamation
Data Return for 2009

Site	Time Period	Total Hours	Barometric Pressure	Water Temperature	TDG Pressure	TDG %saturation
HGHM	4/2 to 9/20	4126	99.3	99.4	99.4	99.3
CIBW	1/1 to 10/1	6576	100.0	99.4	98.9	98.9
FDRW	1/1 to 9/30	6552	99.5	100.0	100.0	100.0
GCGW	1/12 to 10/1	6300	100.0	100.0	100.0	100.0

Site	Period	Hours	Parameter(s)	Problem
GCGW	1/1 to 1/12	275	All	Power outage to site
CIBW	4/21 to 4/22	28	TDG	Torn TDG membrane
CIBW	6/17 to 6/19	42	Temp, TDG	Lightening damage to probe
HGHM	8/25 to 8/26	21	All	Problem with data transmission
FDRW	6/1 to 6/2	30	BP	Damaged depth sensor interfered with barometer