A Department of Ecology Report

Total Dissolved Gas Monitoring Results
Columbia and Snake Rivers
May-July 2002

Abstract

Total dissolved gas (TDG) was monitored in the Columbia River at Wells Dam and in the Snake River at Lower Granite Dam during four surveys (two at each site) in May through July 2002. Data will support the development of a total maximum daily load for TDG in the Mid Columbia and Lower Snake rivers. A data logging meter was deployed at a tailwater mooring, while readings were collected with a second meter from a boat while motoring or drifting. Data showed TDG changes over time and laterally across the channel. However, the method did not allow for accurate measurements close to the spillways of the dams, which limited its ability to show longitudinal variation. Field data did not correlate well with fixed monitoring station data. Recommendations are provided on improvements to field TDG measurements for future work.

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Acronyms and Abbreviations

BP	barometric pressure
dd	decimal degrees
degC	degrees Celsius
DO	dissolved oxygen
DQO	data quality objective
DS15 (DS16)	datasonde number 15 (or number 16)
FMS	fixed monitoring station
ft	feet
GPS	global positioning system
kcfs	thousand cubic feet per second
m	meters
MQO	measurement quality objective
mg/L	milligrams per liter
mm Hg	millimeters of mercury
mS/cm	milliSiemens per centimeter
NWS	National Weather Service
sec	seconds
SpCond	specific conductance
TDG	total dissolved gas
Temp	temperature
TMDL	Total Maximum Daily Load
303(d)	section 303(d) of the federal Clean Water Act
%Sat	percent saturation

Introduction

The Washington State Department of Ecology (Ecology) is determining the Total Maximum Daily Load (TMDL) of total dissolved gas (TDG) in the mainstem Mid Columbia River from Grand Coulee Dam to the confluence of the Snake River and on the Lower Snake River from the Idaho border to its confluence with the Columbia River. The state of Washington has listed multiple reaches of the Columbia and Snake rivers on its 303(d) list where TDG levels exceeded state water quality standards. All reaches of the TMDL area are considered impaired for TDG. Washington will be issuing this TMDL and submitting it to the U.S. Environmental Protection Agency for approval.

Elevated TDG levels are caused by spill events at the hydroelectric projects on the two rivers. Water pouring over the spillway of a dam and plunging into tailrace waters entrains air bubbles. When these bubbles are carried to depth in the dam's stilling basin, the higher hydrostatic pressure forces air from the bubbles into solution. The result is water supersaturated with dissolved nitrogen, oxygen, and the other constituents of air. As the bubbles rise in the aerated zone of the tailrace, some of the gas leaves solution at a relatively rapid rate. However, as the bubbles dissipate and the water enters the downstream reach, the remaining TDG will equilibrate with air pressure at the air-water interface at a relatively slow rate, unless the process is enhanced by wind or channel-induced turbulence. At the Lower Columbia River dams, water that passes through the powerhouse generally has the same TDG as upstream.

Spills can occur at any time for several reasons:

- Fish passage spills (voluntary spills), conducted under the National Marine Fisheries Service 2000 Federal Columbia River Power System Biological Opinion in compliance with the Endangered Species Act.
- Spills required when flow exceeds powerhouse capacity (involuntary spills).

There are three main reasons for involuntary spills:

- The powerhouse cannot pass flood flows.
- The powerhouse is off-line due to lack of power demand.
- The powerhouse is off-line for maintenance or repair.

With the exception of Grand Coulee Dam, dams on the Mid Columbia and Lower Snake rivers are run-of-the-river dams with very little storage capacity. Therefore, spills are often forced due to operational decisions at upstream storage reservoirs, such as Grand Coulee or Dworshak dams.

TDG TMDLs for the Columbia and Snake rivers will be set by evaluating the effects of dam spills on TDG in the river. Due to extensive research into TDG in the Columbia and Snake rivers, the TMDLs will be developed almost entirely from existing and on-going data and analysis, mostly by the U.S. Army Corps of Engineers. Long-term monitoring of TDG has occurred in the forebay and tailrace of each dam at the fixed monitoring station (FMS) sites.

Detailed monitoring studies of TDG downstream of the dams' spillways has been conducted for most dams.

However, with respect to the development of the TMDL, a few data gaps exist. Although the FMS sites provide a long-term record of TDG levels, they do not provide information on the spatial variability of TDG or on the boundaries of the aerated zone below the spillway. Detailed monitoring from an intensive synoptic survey is required to obtain this information.

Lower Granite Dam on the Snake River and Wells Dam on the Mid Columbia have had only limited detailed TDG data collection. Therefore, Ecology conducted four monitoring surveys to collect TDG data from these two dams to support the TMDL. The objectives of the data collection were to assess the variability of TDG laterally and longitudinally upstream from the FMS site and to determine the end of the aerated zone based on TDG measurements.

Methods

The methods used for the TDG surveys followed the Quality Assurance Project Plan (Ecology, 2002), with the changes and exceptions noted below. The locations of sampling are described under *Results* and are shown in Figures 5 through 8. Data were collected from tailwater moorings by suspending the meter several meters below the surface from an anchored buoy. Transects were collected by motoring as close to the dam as allowed or safe, and then cutting the engine, lowering the meter, and collecting data while the boat drifted (with occasional use of the motor).

Survey dates and river and spill flows (FPC, 2002) are shown in Table 1. The first survey at each dam represented spring freshet flows with fish passage ("involuntary") spills being provided in accordance with the Biological Opinion for salmon recovery in the Columbia River basin. The second survey at each dam represented peak spring freshet flows with large involuntary spills due to flow volumes exceeding powerhouse capacity.

Table 1. Survey dates and flows

Date	Location	Total river flow (kcfs[1])	Spill flow (kcfs[1])	Percent spilled
May 14, 2002	Lower Granite	64.2	17.0	26.5
May 29, 2002	Wells	159.8	14.9	9.3
June 10, 2002	Lower Granite	79.0	55.7	70.5
July 2, 2002	Wells	250.7	139.5	55.6

[1] thousand cubic feet per second

During the first two surveys, conditions were relatively calm. Access to the tailwater areas of the two dams was only limited by the defined exclusion zone (boat restricted zone) below the spillways. Both surveys at Lower Granite Dam and the second Wells Dam survey were conducted with an Ecology boat, while the first Wells survey was conducted from a boat owned and operated by Columbia Basin Environmental, the consultant who manages the FMS stations at Wells Dam. The tailwater mooring at Lower Granite Dam was set across the channel from the FMS site, and at Wells Dam the tailwater mooring was just downstream of the boat exclusion zone towards the east bank. During the first two surveys, time allowed for a second measurement near the forebay FMS at the end of the day. However, there was insufficient time during any of the surveys to launch the boat above the dam for forebay profiling, as had been suggested in the project plan.

The second survey at Lower Granite Dam coincided with a line change at the powerhouse, which resulted in most of the river being spilled that day. Snake River flows that day were well below the spring peak (136.7 kcfs), and spills were slightly below the highest seasonal spill (68.9 kcfs), but the proportion of spill was the highest for the year (55.7 of 79 kcfs, or over 70% of flow spilled). This resulted in rough water conditions that limited the ability to begin drift surveys or

locate the moored meter near the dam. The beginning of each drifting transect was determined by safety considerations due to the height of the waves, and access to the boundary of the boat restricted zone was not possible. The tailwater mooring was located near the same spot as the May survey, which was as far upstream as possible given the speed of the current and logistics of dropping the anchor.

At Wells Dam, the second survey coincided with the highest daily flow on the Columbia River in 2002 and a lack of load demand, which resulted in the highest spill of the season and the highest proportion of the river spilled (55%). Conditions were extremely rough below the dam, and therefore the boat was launched at Chelan Falls instead of at the dam, which reduced the time available for monitoring. The beginning of each drifting transect was also determined by safety considerations due to the height of the waves. Also, placement of a moored tailwater meter was not feasible. Two meters were used for drift transects, but only one meter produced usable data due to meter malfunction.

Seven drifting transects were taken during both surveys at Lower Granite Dam. At Wells Dam, three drifting transects were taken during the first survey, and four drifting transects were taken during the second. During the first survey at Wells, an additional lateral transect was taken across the channel by dragging the meter behind the boat under power.

Global Positioning System (GPS) measurement checks were made at Lower Granite Dam at surveyed benchmarks as planned. Surveyed benchmarks were not available at Wells Dam, so checks were at an elevation marker during the first survey (which was near the FMS site but proved to be unsurveyed), and at the FMS station during the second survey.

After the first two surveys, the datasondes were programmed to read at one-minute intervals, which proved to provide more dependable readings than five-minute intervals or manual readings. Barometric pressure readings were taken irregularly from an analog aneroid barometer.

Results

Data Quality

The analyses of data quality for the four surveys are shown in Tables 2 through 5. All meters met measurement quality objectives (MQOs) for TDG during calibration and postcalibration (±1% or 5 mm Hg). The majority of measurements of paired Ecology meters ("DS15-DS16" in Tables 2 through 5) met the MQOs. Deviations outside the MQO could generally be attributed to field variability or to not allowing sufficient time for equilibration. The TDG data meets data quality objectives (DQOs) and is considered acceptable for use in the TMDL.

GPS readings overall met their MQO. Individual readings sometimes showed greater variability, which may be partly due to differences between the reading and surveyed locations. Also, readings from the surveyed benchmark at Ecology headquarters showed greater accuracy than from the dam benchmarks. This could possibly be due to poorer reception of GPS signals from the satellites in the Columbia and Snake River gorges near the dams. However, in general, the GPS readings are acceptable for use for the TMDL.

Barometric pressure (BP) readings did not meet their MQOs in the field, despite calibrating and postcalibrating very well in the laboratory. Plots of the BP readings are shown in Figures 1 through 4 in comparison to the FMS barometric pressure readings and nearby National Weather Service (NWS) readings. (The NWS readings are corrected to sea level, and are shown to compare the trend in readings during the day.) Readings tended to show a bias compared to FMS measurements, and varied widely during the day. Sometimes the meter would drop suddenly and then later return to a higher level. This may have been due, in part, to temperature changes in the field due to movement from sun to shade, and from the vehicle to the dam deck to the boat.

To minimize the error from the BP readings, a single value was chosen for calculation of percent saturation for groups of forebay and tailwater readings. Evaluation of BP data suggested more consistent readings at higher levels with occasional plunges to low readings. Therefore the higher readings were chosen to select a value for calculations, which reduced the overall error. (The BP data for the adjacent FMS stations could have been used, but in this analysis were not used in order to preserve the independence of measurements.)

Both TDG and BP readings conducted under this study typically showed significant sampling error, with a slight bias compared to FMS readings ("DS15- FMS" and "DS16-FMS" in Tables 2 through 5). The difference between the FMS and field readings varied from -18 to +28 mm Hg. The BP values used in the calculation of paired TDG percent saturation values differed by -6 to +10 mm Hg. A difference of 10 mm Hg in either a BP or TDG reading results in roughly a 1-1/2 percent difference in TDG % saturation. Therefore, errors in both BP and TDG readings could either cancel out (if the bias in TDG and barometric pressure readings were similar) or result in almost an error of 5% TDG saturation (if the biases are opposite). TDG percent saturation differences between pairs varied from -2.2% to 2.8% and averaged less than 2%, suggesting that to some extent the errors tended to offset each other.

It is not clear why the FMS readings and field readings for both TDG and BP showed such relatively large differences. For BP, it could be explained by the differences in equipment used and the problems with the field use of the aneroid barometer. For TDG pressure, it could reflect the higher variability in field readings due to the time required to equilibrate, differences in lab calibration versus field calibration, or differences in time and location (the pairs were not exactly matched). However, sampling error due to variation in the water and/or membrane diffusion differences could be adequate to explain the variability. Data quality information for the FMS sites has not been reviewed, so no assessment has been made as to the quality of that data.

Temperature and pH readings met MQOs for all surveys. Specific conductance readings met the MQO for the first three surveys and slightly exceeded the MQO for the final survey. Temperature, pH, and specific conductance data are considered acceptable if the relatively generous MQOs are taken into account. DO met MQOs for the two Lower Granite surveys. For the May Wells survey, the DO sensor for datasonde (DS) 15 appeared to be malfunctioning and the data were deleted. DO data for the July Wells survey also failed to meet MQOs and were deleted.

Field Data

Figures 5 through 8 show the routes followed for each drift during each survey based on GPS readings. The figures also show the sites of spot readings with the GPS units and the FMS sites. These figures show that the attempt to take readings from different sides of the channels was generally successful. The GPS readings used for these figures are presented in Tables 6 through 9 for the four surveys.

The datasonde data collected during the surveys are shown in Tables 10 through 16. Each table is for one meter in one survey. Typically both meters collected data at the Forebay FMS, and then one meter was placed as a tailwater mooring. Figures 9 through 11 show the TDG collected at each tailwater mooring, while Figures 12 through 15 show the TDG data collected from the drift transects. The FMS data from each survey are presented in Tables 17 through 20 and are also shown in Figures 9 through 15 for comparison.

One pattern that is easily seen from the figures is that the meters typically took 10 to 15 minutes to equilibrate before readings accurately reported river conditions. On Tables 10 through 16, data has been qualified with an “N” (for “not in equilibrium”) if the meter changing by less than 0.5 mm Hg per minute during the initial deployment (the measure of stability specified in the Quality Assurance Project Plan). Data qualified with “N” are not usable, but are retained in the database to illustrate the performance of the meters. Once a reading was collected that changed by less than 0.5, all further readings are reported without qualification, since they have reached equilibrium and data quality objectives have been met. A long equilibration period is expected and actually indicates the proper behavior of the membrane. Rapid equilibration suggests a leak in the membrane.

One consequence of the need for equilibration is that little data from near the dam are usable. During drifts, the boat drifted a long distance downstream before the meter equilibrated. It was

difficult to place a moored meter close to the dam under survey conditions. Therefore the objective of determining the end of the aerated zone (the location where bubble rise ceases) was not met with TDG measurements.

Field observations do provide some insights to the aerated zone. At Lower Granite, during the May survey no sign of surfacing bubbles were seen below the exclusion zone (west end of the navigation locks). However, during the June survey, during high flow and spill conditions, surfacing bubbles extended slightly below the exclusion area to roughly the location of the fish transport dock (Figure 16), approximately 1500 feet (450 meters) below the spillway.

Conditions were similar at Wells Dam: at the May survey, no bubbles were seen below the exclusion zone (the downstream bird wire). However in July surfacing bubbles were seen below the boat launch area, approximately 2000 feet (600 meters) below the spillway. The drift transects on the west side of the channel began in the aerated zone.

During drift transects, the pattern of TDG longitudinal variability that would be expected would be higher values near the dam that decrease downstream. The ability to detect such a pattern was hampered by the tendency for the meters to begin at low values when placed in the water and to increase towards equilibrium. Almost all drift transects showed the latter pattern. One transect (Figure 14, Transect 1) shows slightly higher values upstream, but the difference is small and well below the variability of the meter. Therefore no conclusions can be drawn regarding upstream to downstream trends, other than to note that in the locations where the meter had reached equilibrium, well below the aerated zone, readings appear to be fairly stable.

Lateral variation can be evaluated from the drift transects, and at Lower Granite from the tailwater mooring. The Lower Granite drifts suggest a small amount of variability across the channel (Figure 13). Most drifts vary only slightly from the FMS measurements. During the high flows in June, values in the center channel appear to be higher by 1 to 3% saturation (Figure 13, Transects 2, 4, and 7). The tailwater mooring values suggest that TDG can vary by about 1% saturation during moderate flows, to 2% saturation during high flows, across the channel from the FMS. Table 21 shows the gate settings during the surveys. Settings at Lower Granite in June were slightly higher at the center gates, which is consistent with the patterns of TDG downstream.

At Wells Dam, drifts during moderate flows show values about 0.5% saturation higher across the channel from the FMS station (Figure 14, Transects 2 and 4). The lateral transect (about 300-350 feet below the spillways) showed a range of 0.9% saturation across the channel, although some equilibration may have contributed to the observed change. During high flows in July the pattern is reversed (Figure 15), with saturation values lower than the FMS station by a difference of 2%. These patterns could perhaps be explained by the spill patterns during the two events (Table 21). In May, spill was occurring symmetrically across the dam. However in July, spillways on the west end of the dam were closed as part of spillway maintenance work. This could have produced some lateral variability in TDG across the channel, especially during high flows and high TDG. More detailed studies proposed for Wells Dam may verify this variability and provide more evidence for causes.

The tailwater mooring at Lower Granite was across the river channel from the FMS, suspended below the compensation depth (the depth where the hydrostatic pressure equals the excess TDG pressure above ambient). Data generally vary above and below the FMS values, with higher variability at high flows.

The tailwater mooring at Wells Dam in May, which floated near the surface below the spillway in the left channel, showed steadily declining values. This may partially be due to the shallow depth of the meter, but may also reflect lower TDG values on the left side of the channel, as were observed with the drift transects. A large eddy at the surface near the dam moved water upstream at the right bank and across the channel. This suggests the possibility that the lateral variation at Wells Dam could be due to different velocity patterns near the surface and at deeper depths, moving the flows from the spill and turbines into different parts of the channel. Further measurements would be necessary to determine if this is the case.

Conclusions and Recommendations

The data collected in this study support the following conclusions:

- The end of the aerated zone at the two dams could not be determined from the monitoring approach employed. However, the aeration zone could be estimated from visual observations during high spill events (the second survey at each dam): 1500 feet below the spillway at Lower Granite Dam, and 2000 feet below the spillway at Wells Dam.

- The methods used did not allow for an accurate assessment of longitudinal variability close to the spillways. By the time meter readings equilibrated, at least 500 feet below the spillway and sometimes over 1000 feet downstream, readings for the rest of the drift were relatively stable.

- Lateral variability was detected during multiple drifts along different trajectories. TDG up to 3% saturation higher than the FMS readings were measured mid-channel during high flows at Lower Granite Dam. TDG up to 0.7% saturation higher than the FMS readings were measured in the right channel during moderate flows near Wells Dam. Differences might be attributable to spill gate settings, velocity patterns caused by channel configuration, or heterogeneities of TDG exchange.

Several recommendations are suggested for future Ecology TDG monitoring surveys:

- Drift transects are best used only as a low-effort screening tool to assess lateral variability below the dam. To improve the effectiveness of drift or motorized transects, a planer could be rigged with the meter to pull the meter below compensation depth while the boat holds position or moves. This would allow equilibration of the meter before the drift or motorized transect begins.

- Detailed TDG measurements are best taken with meters moored below the compensation depth. Lateral and longitudinal variability can be assessed with an array of meters laid out in a grid.

- A more accurate and dependable field barometer is needed for surveys. The TDG sensor could be used as a field barometer by calibrating to a National Weather Service reading and then taking a reading from the air with the TDG membrane removed.

- TDG field procedures should include a calibration check in the field at the beginning of each survey.

References

Ecology, 2002. Quality Assurance Project Plan, Mid Columbia and Snake Rivers Total Dissolved Gas Total Maximum Daily Load Field Monitoring. Pub. No. 02-03-067, Washington State Department of Ecology, Environmental Assessment Program, Olympia, WA.

FPC, 2002. Fish Passage Center Weekly Reports, #02-10 through 02-20. Fish Passage Center, Portland, OR.

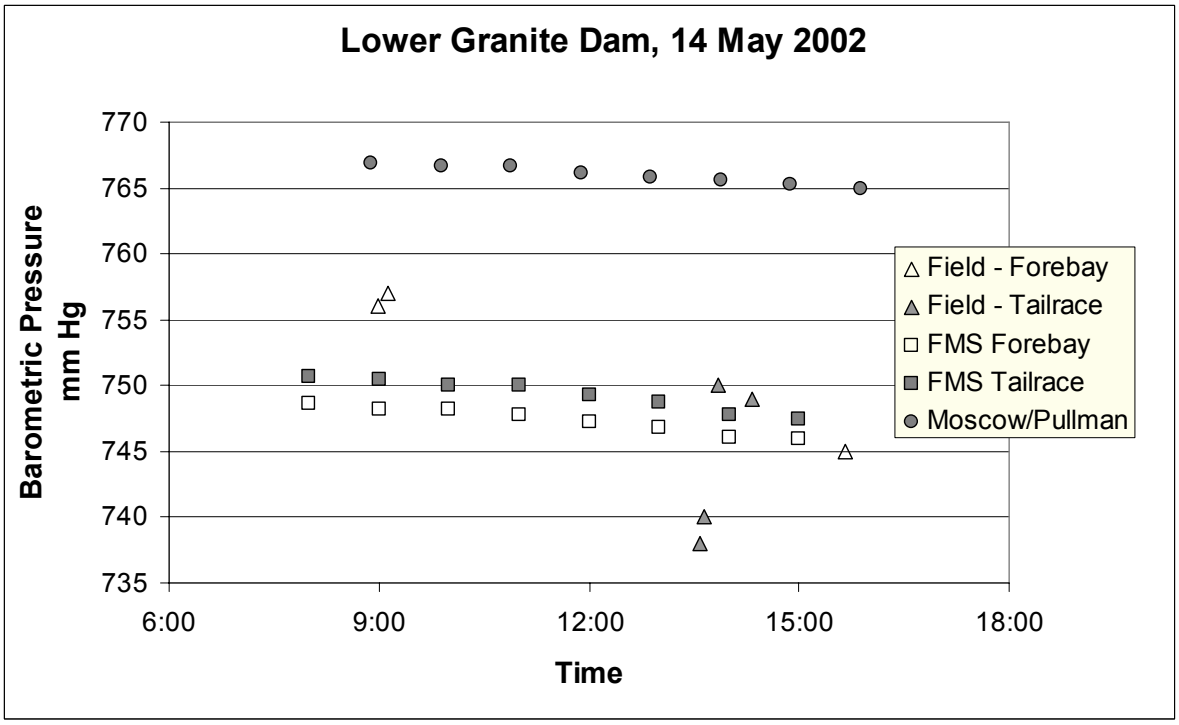

Figure 1. Barometric Pressure at Lower Granite Dam (Paired FMS and Ecology Field Stations) and at Nearby Weather Stations, May 14, 2002

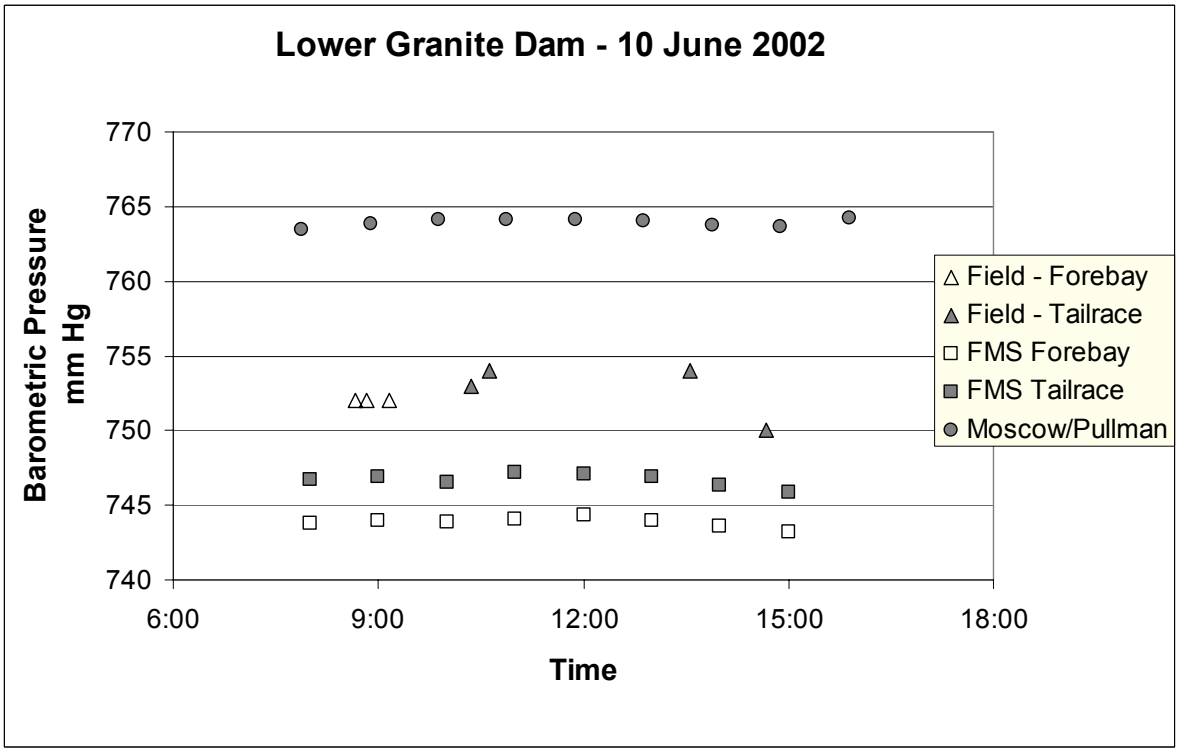

Figure 2. Barometric Pressure at Lower Granite Dam (Paired FMS and Ecology Field Stations) and at Nearby Weather Stations, June 10, 2002

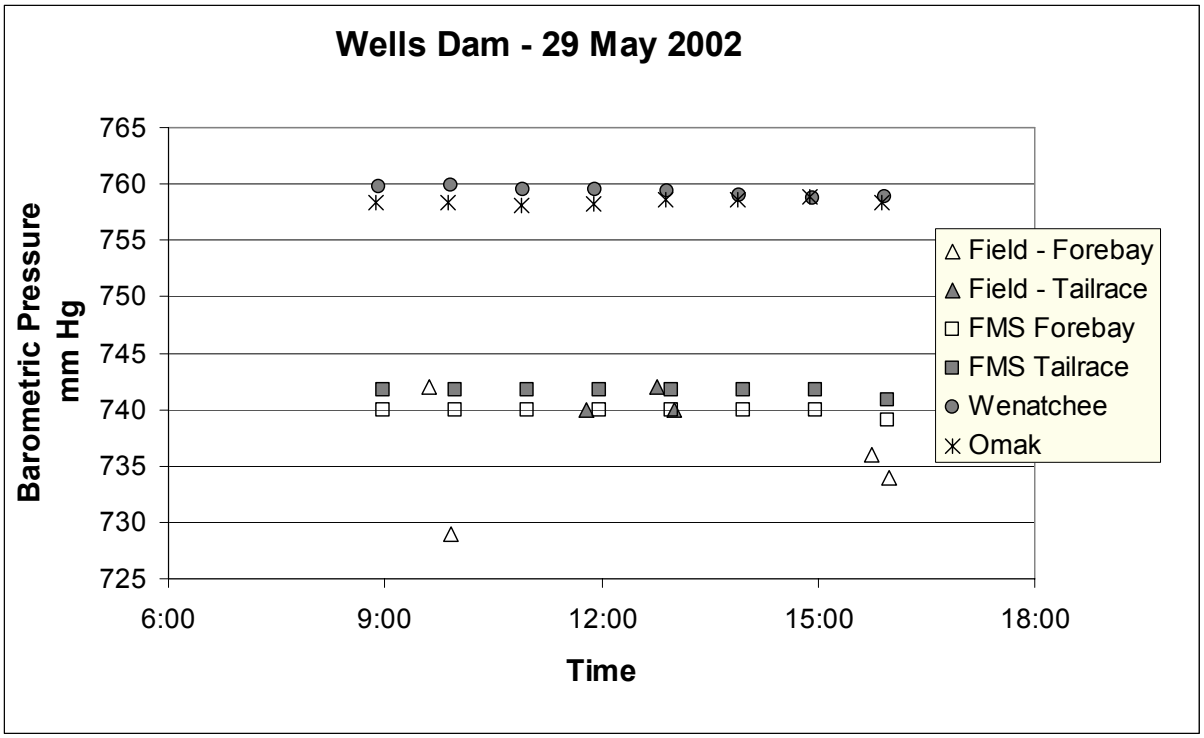

Figure 3. Barometric Pressure at Wells Dam (Paired FMS and Ecology Field Stations) and at Nearby Weather Stations, May 29, 2002

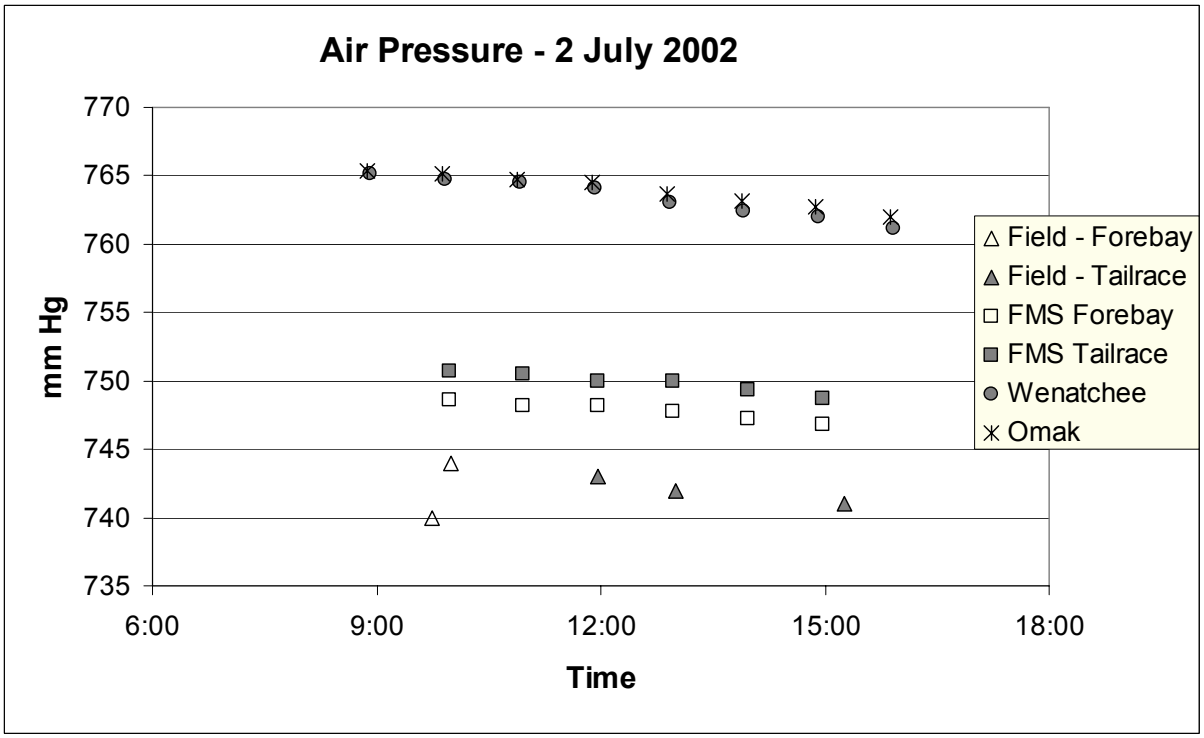

Figure 4. Barometric Pressure at Wells Dam (Paired FMS and Ecology Field Stations) and at Nearby Weather Stations, July 2, 2002

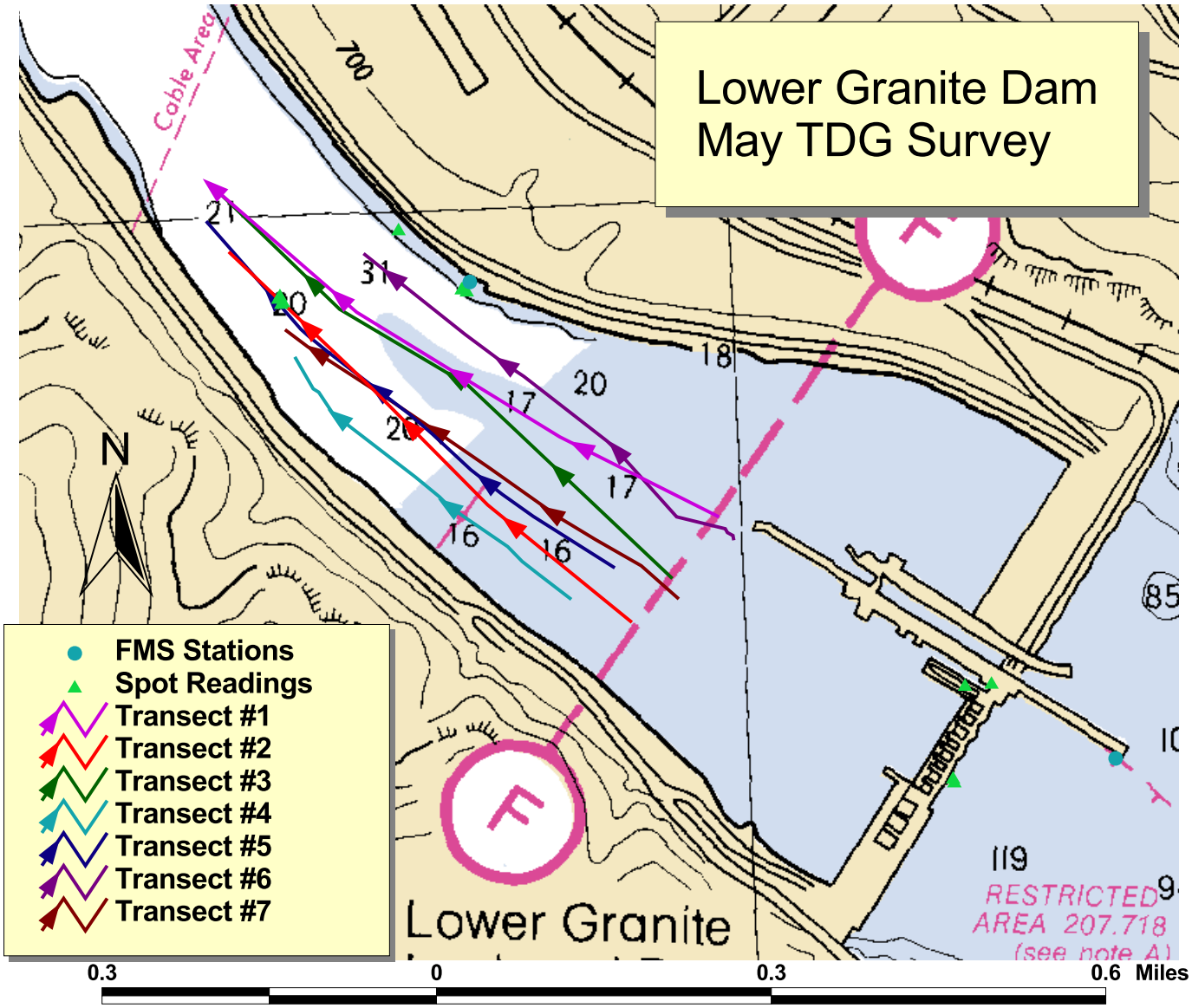

Figure 5. Data Collection Locations at Lower Granite Dam, May 14, 2002

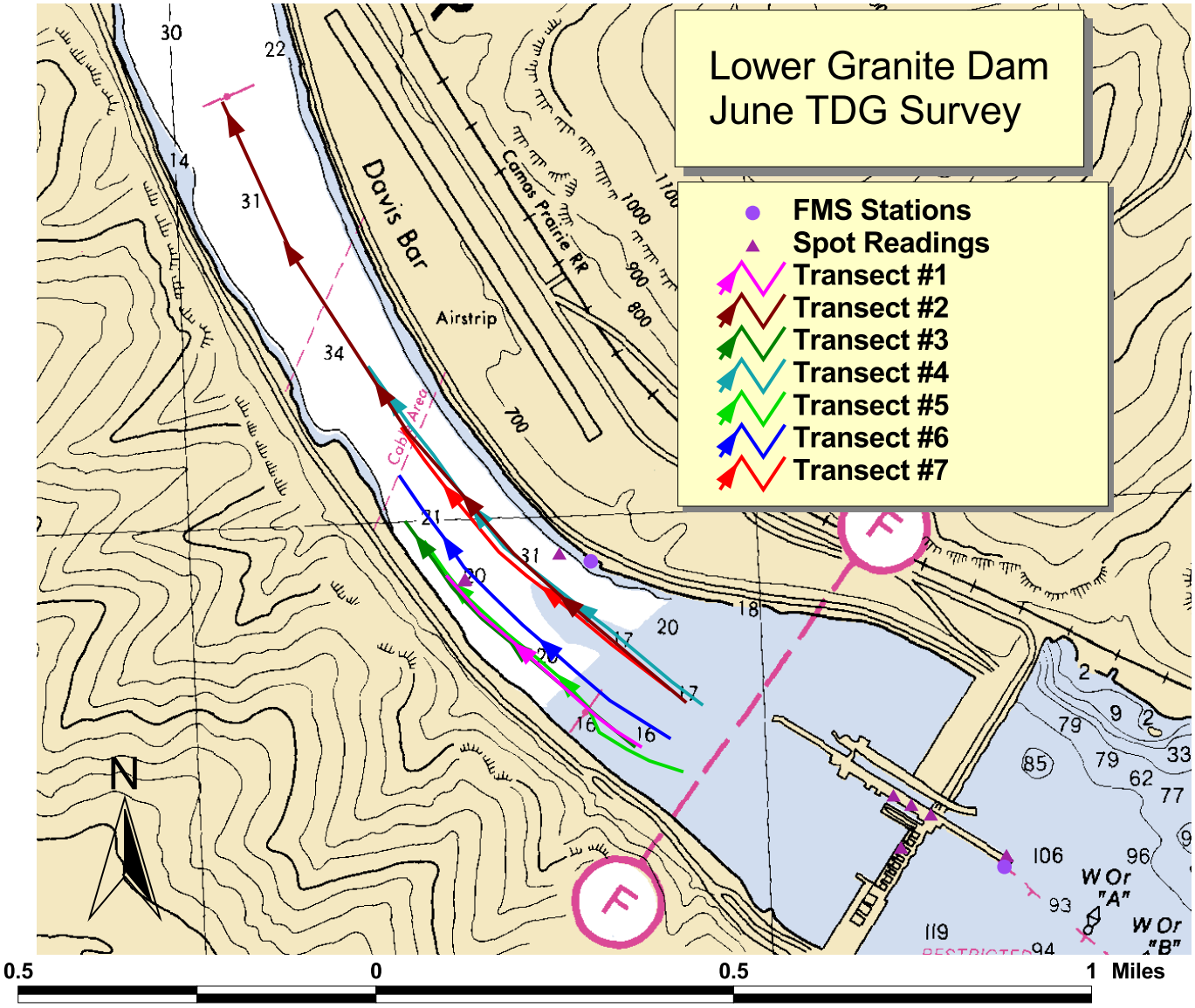

Figure 6. Data Collection Locations at Lower Granite Dam, June 10, 2002

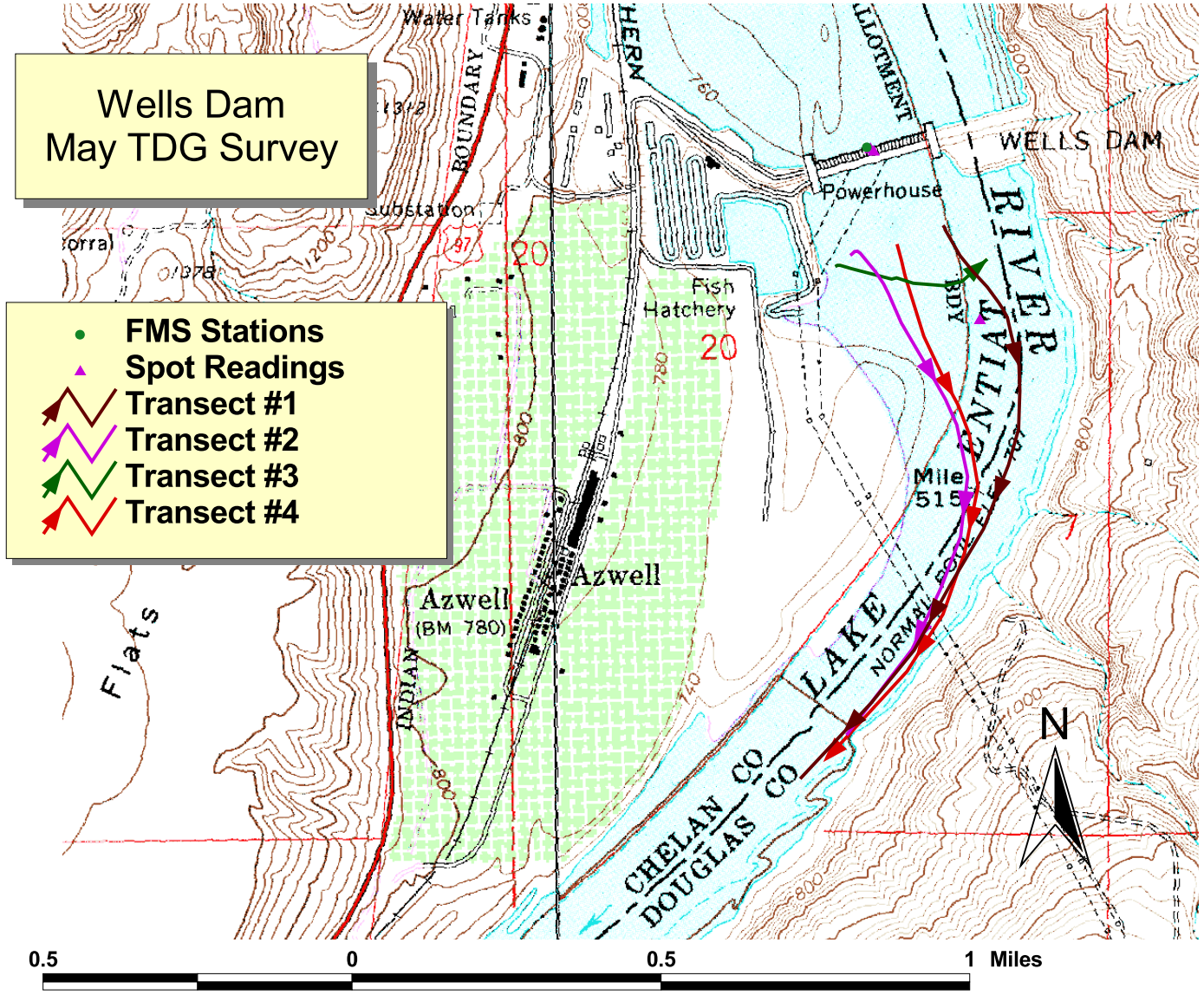

Figure 7. Data Collection Locations at Wells Dam, May 29, 2002

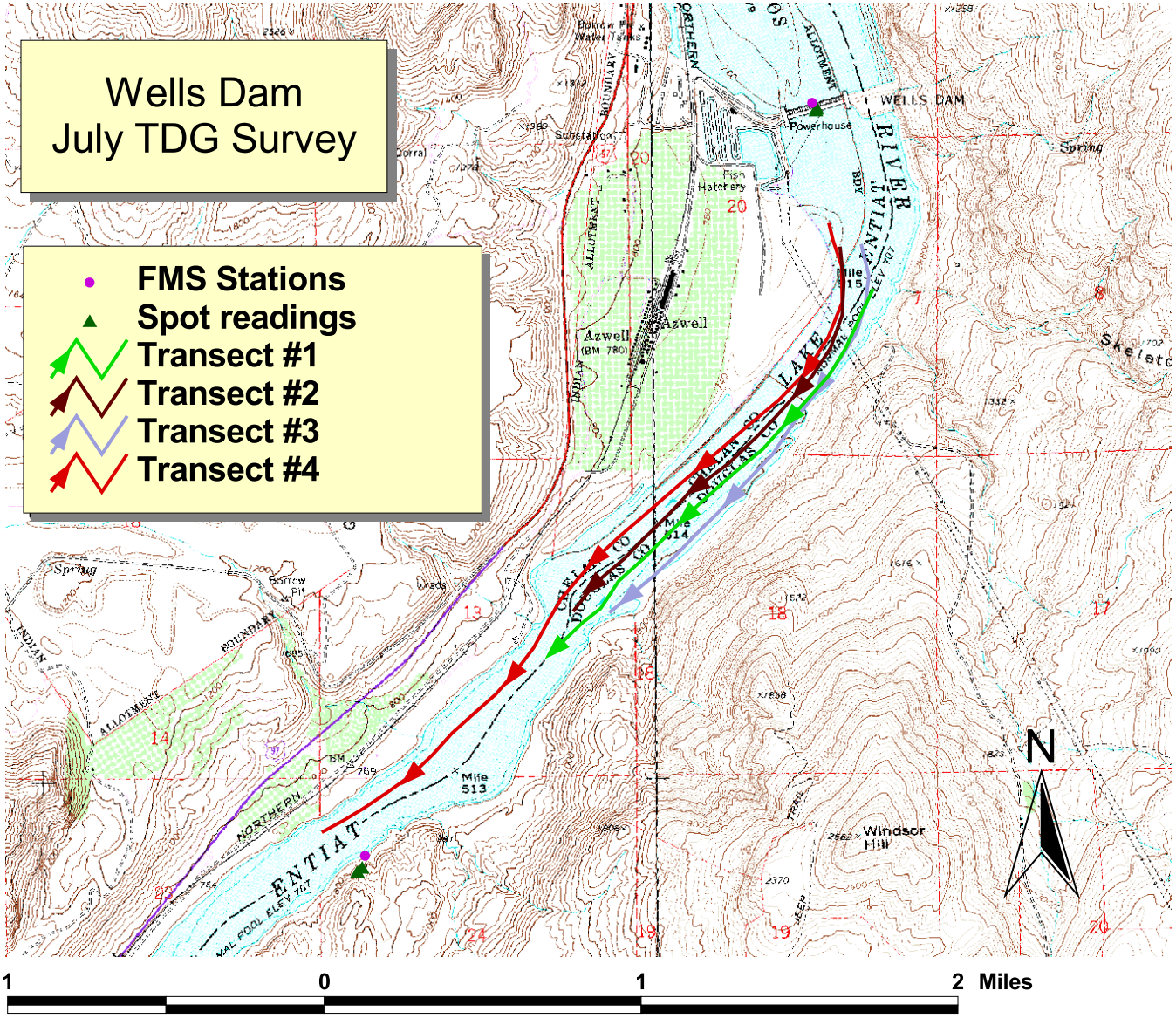

Figure 8. Data Collection Locations at Wells Dam, July 2, 2002

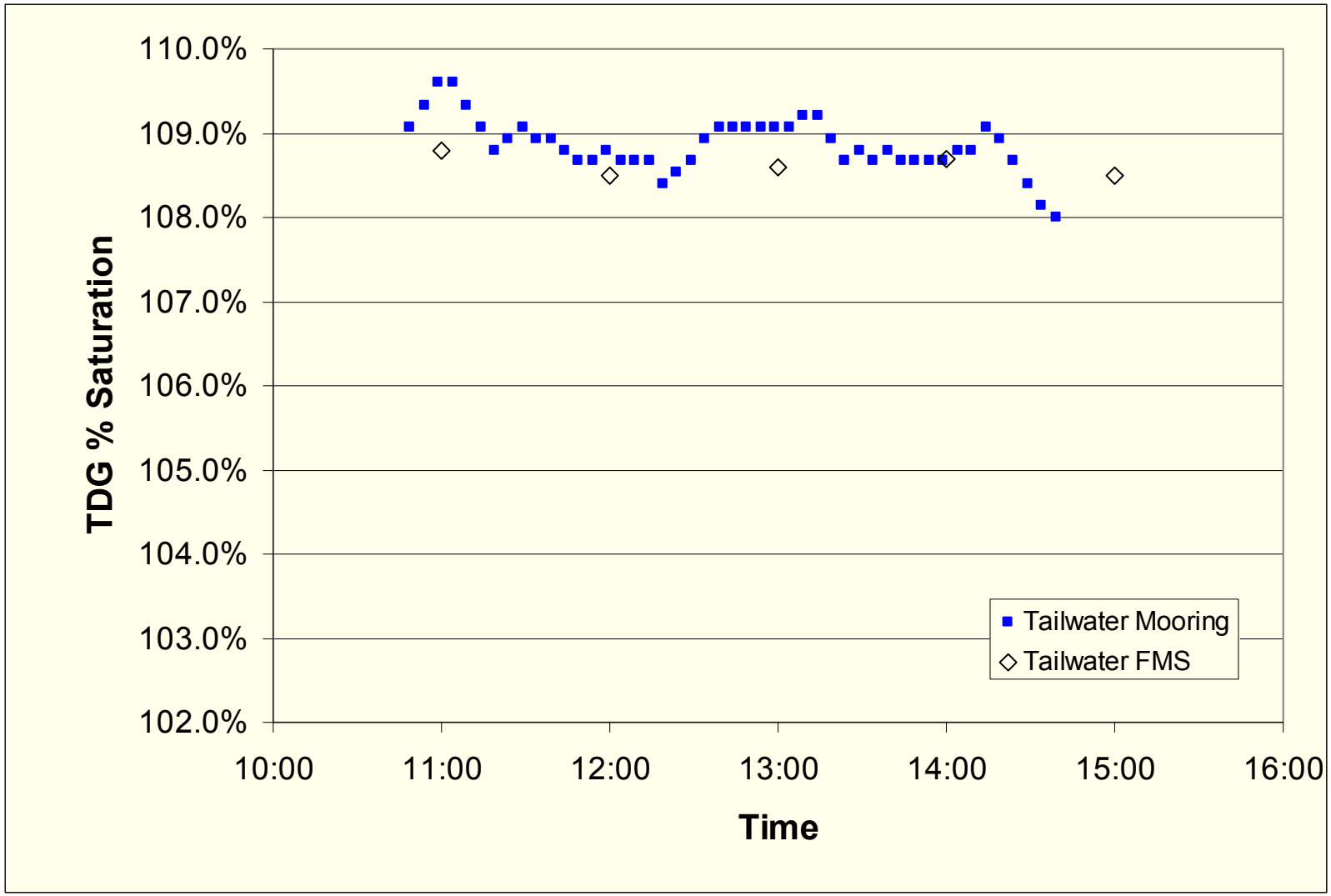

Figure 9. TDG from Tailwater Mooring, Lower Granite Dam, May 14, 2002

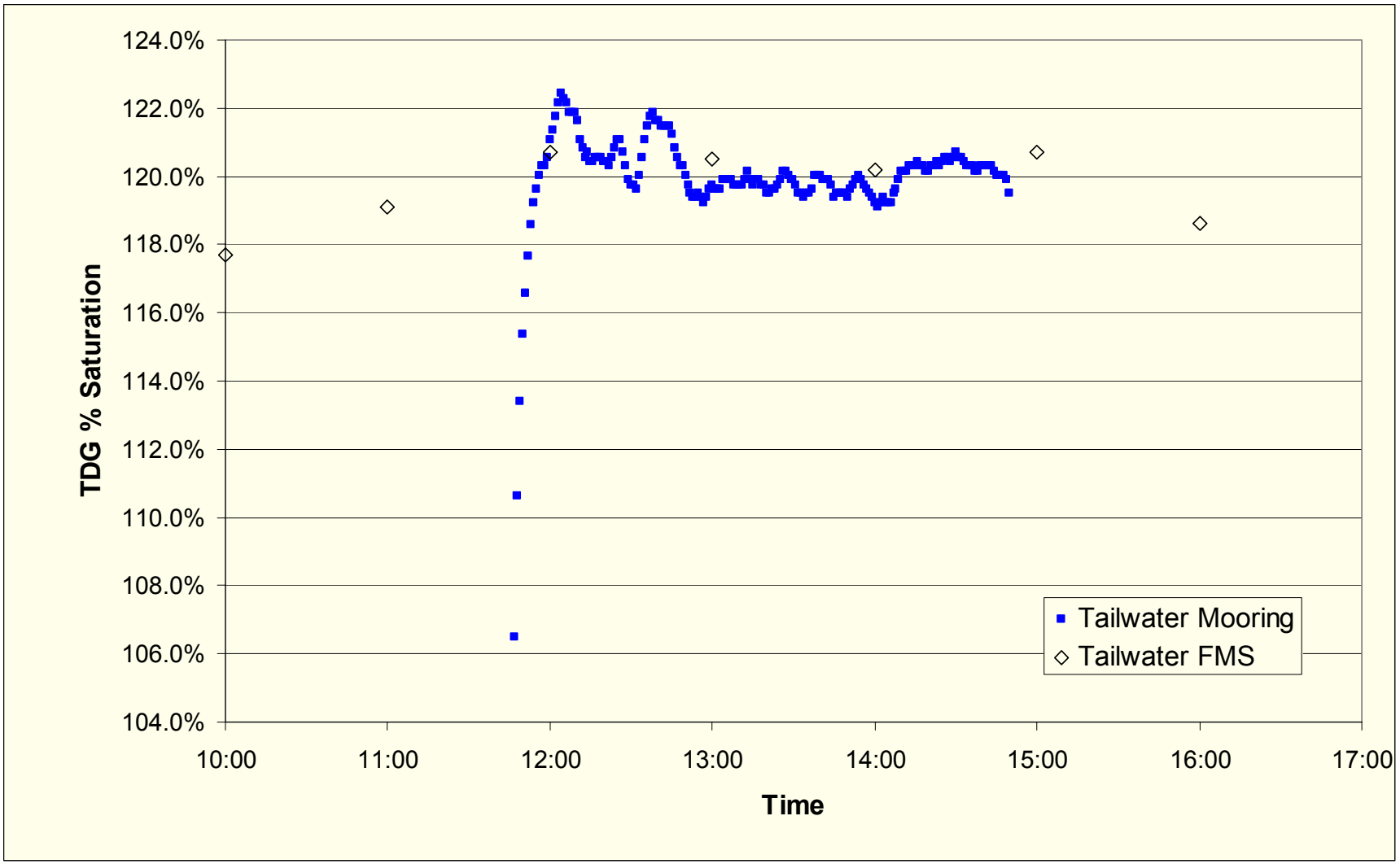

Figure 10. TDG from Tailwater Mooring, Lower Granite Dam, June 10, 2002

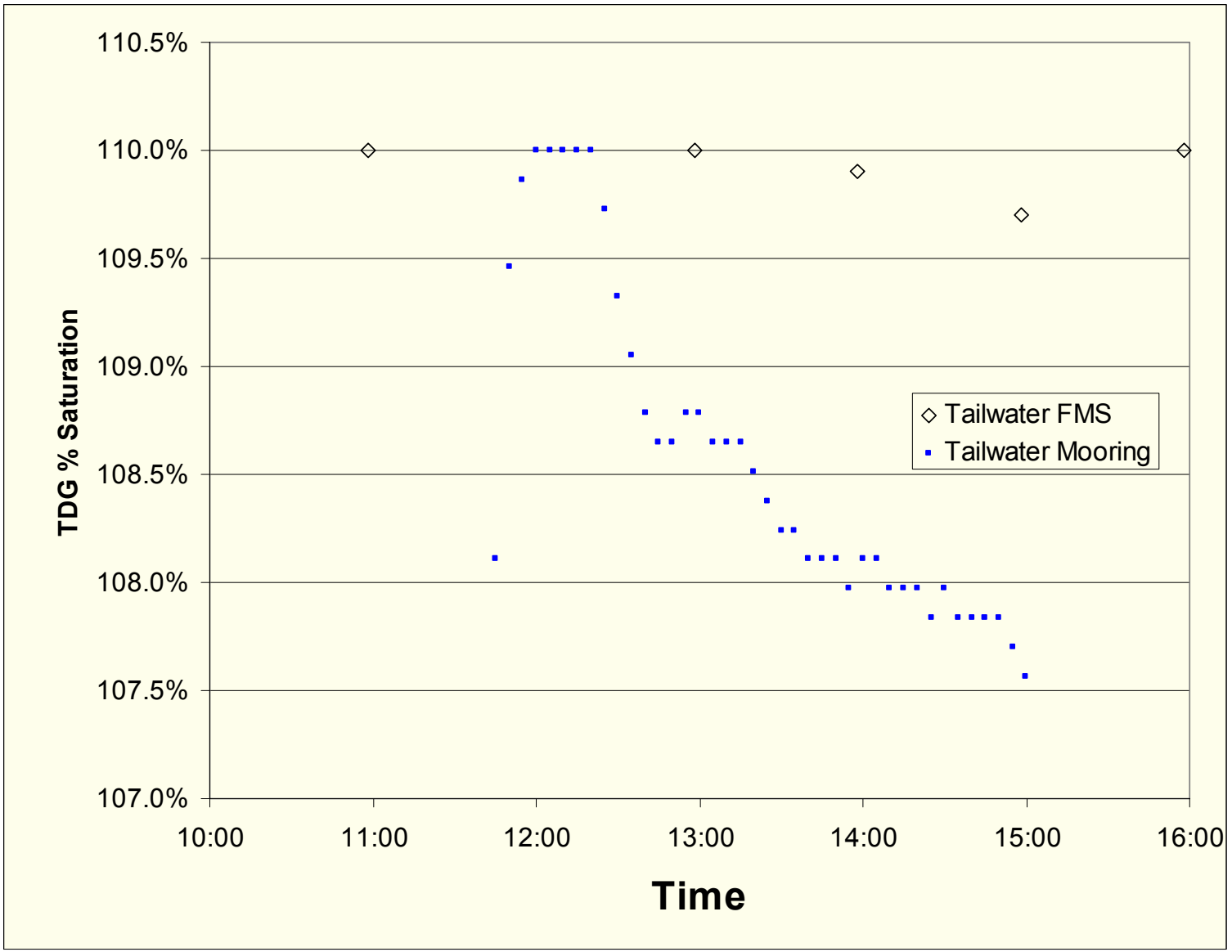

Figure 11. TDG from Tailwater Mooring, Wells Dam, May 29, 2002

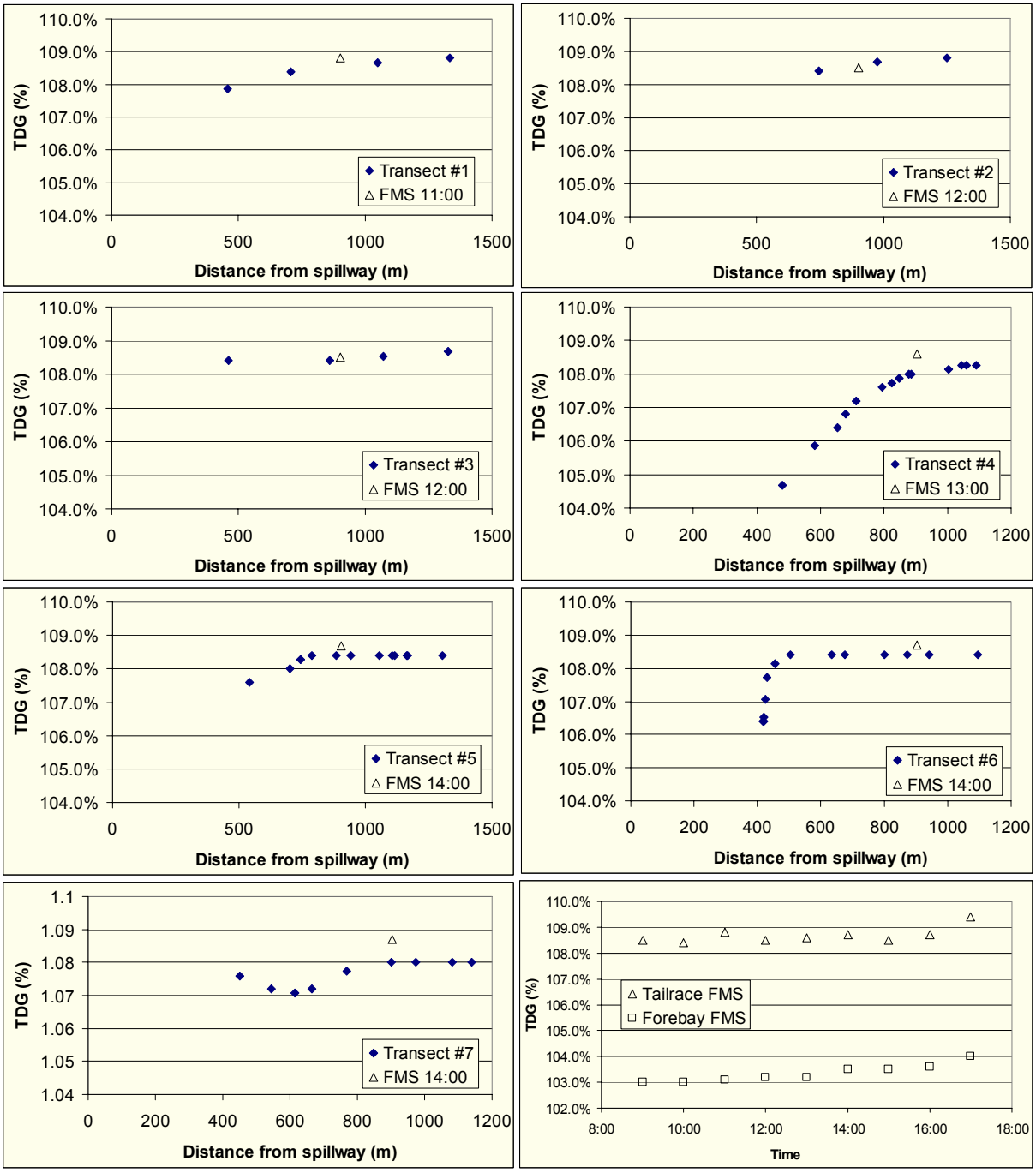

Figure 12. Drift Transect TDG Measurements, Lower Granite Dam, May 14, 2002 (with FMS data)

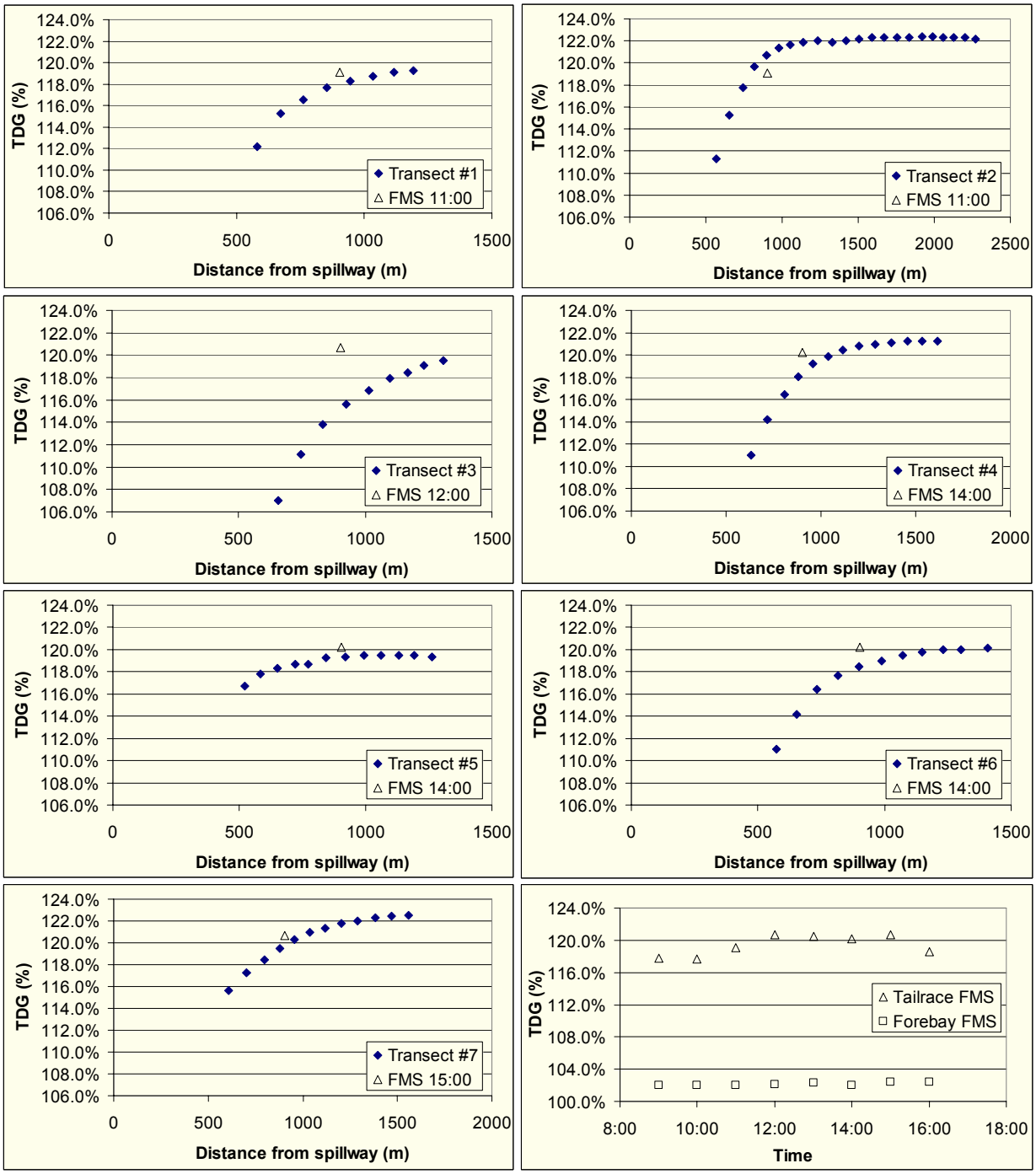

Figure 13. Drift Transect TDG Measurements, Lower Granite Dam, June 10, 2002 (with FMS data)

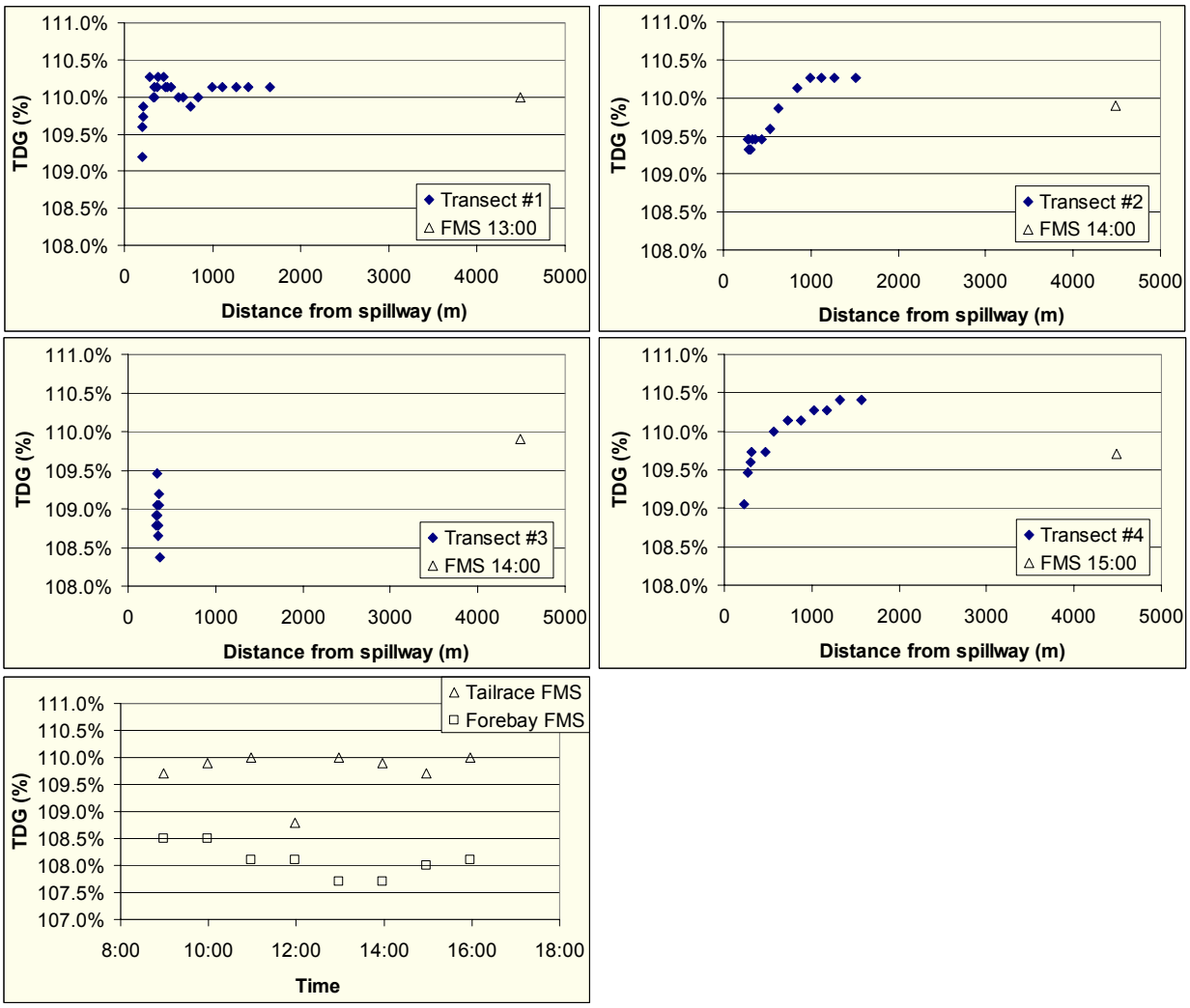

Figure 14. Drift Transect TDG Measurements, Wells Dam, May 29, 2002 (with FMS data)

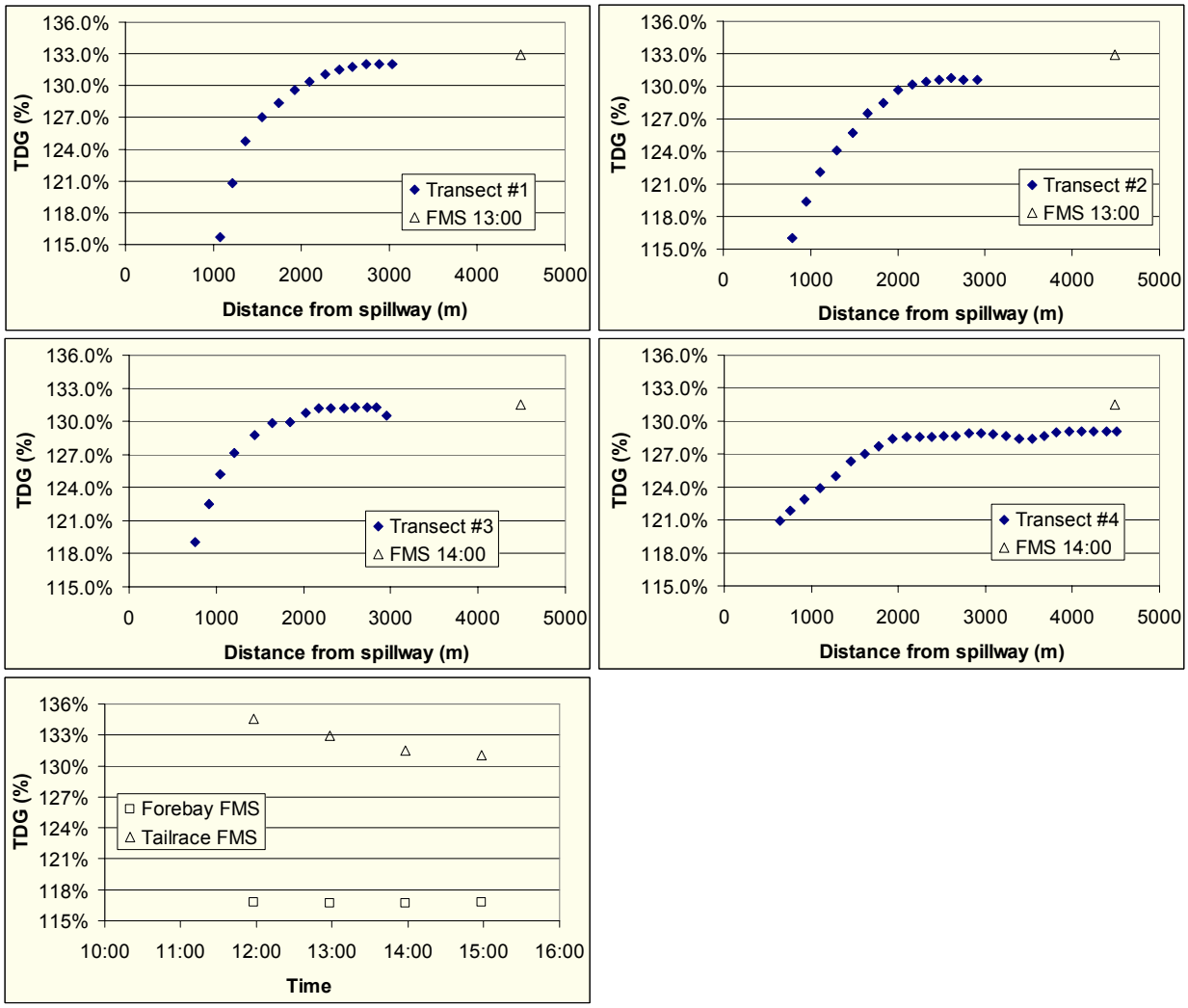

Figure 15. Drift Transect TDG Measurements, Wells Dam, July 2, 2002 (with FMS data)

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Figure 16. Lower Granite Tailrace, June 10, 2002, showing end of aerated zone

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Table 2. Data Quality Analysis for Lower Granite Dam, May 14, 2002

Field Total Dissolved Gas Comparisons

Forebay - morning

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
771	795	799	24	28	4	103.0%	105.1%	105.6%	2.1%	2.6%	0.5%

Tailrace-morning

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
813	811	812	-2	-1	1	108.4%	107.5%	107.6%	-0.9%	-0.8%	0.1%

Tailrace-afternoon

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
	813	818			5		108.4%	109.1%			0.7%
	818	820			2		109.1%	109.3%			0.3%
	813	815			2		108.4%	108.7%			0.3%
813	813		0			108.7%	108.4%		-0.3%		
	802	811			9		106.9%	108.1%			1.2%
	806	810			4		107.5%	108.0%			0.5%

Forebay - afternoon

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
772	768	767	-4	-5	-1	103.6%	103.1%	103.0%	-0.5%	-0.6%	-0.1%

RMS error	(Target = 5)	12.2	16.4	**4.3**		(Target = 1%)	1.2%	1.6%	**0.6%**

Table 2, continued

Field GPS Comparisons

		Benchmark (NAD83)		GPS (NAD83)		Difference (dd)		Difference (sec)		Difference (m)
		Lat	Long	Lat	Long	Lat	Long	Lat	Long	
LMK001	Ecology	47.04624	122.80719	47.04625	122.80725	0.00001	0.00006	0.02490	0.24662	4.8
LMK001	Ecology	47.04624	122.80719	47.04625	122.80720	0.00001	0.00001	0.02490	0.05162	1.2
LMK001	Ecology	47.04624	122.80719	47.04625	122.80718	0.00001	0.00000	0.02490	-0.01338	0.8
LMK005	USACE "33+96.17"	46.65916	117.42962	46.65909	117.42848	-0.00007	-0.00114	-0.25567	-4.45467	87.6
LMK006	USACE "33+96.17"	46.65916	117.42962	46.65914	117.42850	-0.00002	-0.00112	-0.06067	-4.37667	85.8
LMK071	USACE "38+84.76"	46.66026	117.42853	46.66034	117.42821	0.00008	-0.00032	0.30767	-1.23933	25.8
LMK072	USACE "38+84.76"	46.66026	117.42853	46.66035	117.42771	0.00009	-0.00082	0.34667	-3.18933	63.3
	Mean							0.05896	-1.85359	**38.5**
										(Target = 50)

Barometric Pressure Comparisons

Field Air Pressure (mm Hg)

Time	Location	Field	FMS	Difference	Diff^2
8:59	Forebay	756	748.2	7.8	60.8
9:07	Forebay	757	748.2	8.8	77.4
13:35	Tailrace	738	746.8	-8.8	77.4
13:39	Tailrace	740	746.8	-6.8	46.2
13:51	Tailrace	750	746.1	3.9	15.2
14:20	Tailrace	749	746.1	2.9	8.4
15:40	Forebay	745	746.0	-1.0	1.0
	RMSE			6.4	(Target = 1)

Air Pressures used in TDG calculations

Time	Field	FMS	Difference	Diff^2
9:05	756.5	748.2	8.3	68.9
10:20	750.0	750.0	0.0	0.0
14:12	750.0	747.8	2.2	4.8
15:40	745.0	745.3	-0.3	0.1
			4.3	

Laboratory Postcalibration - water bath

	DS15	DS16	Difference	Target
Temperature	18.54	18.51	**0.03**	0.5
DO (mg/L)	8.74	8.74	**0.00**	0.5
DO %Sat	92.9	88.4	4.5	5%
SpCond	268	272	**4**	14
pH	8.33	8.43	**0.10**	0.5
TDG	758	773	15	5

Laboratory Postcalibration - air

	DS15	DS16	Standard	DS15-Std	SD16-Std	Target
TDG	764	765	763.8	**0**	**1**	5
	965	965	964	**1**	**1**	5

Table 3. Data Quality Analysis for Lower Granite Dam, June 10, 2002

Field Total Dissolved Gas Comparisons

Forebay - morning

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
759	766	767	7	8	1	102.0%	101.6%	101.7%	-0.4%	-0.3%	0.1%

Tailrace-morning

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
890	903	903	13	13	0	119.1%	119.8%	119.8%	0.7%	0.7%	0.0%

Tailrace-afternoon

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
	917	889			-28		121.6%	117.9%			-3.7%
898.5		899		0.5		120.4%		119.2%		-1.1%	
	904	901			-3		119.9%	119.5%			-0.4%
RMS error		(Target = 5)	10.4	8.8	14.1			(Target = 1%)	**0.5%**	**0.8%**	1.9%
RMS error w/ outlier removed					**1.8**						**0.2%**

Field GPS Comparisons

		Benchmark (NAD83)		GPS (NAD83)		Difference (dd)		Difference (sec)		Difference (m)
		Lat	Long	Lat	Long	Lat	Long	Lat	Long	
LMK001	Ecology	47.04624	122.80719	47.04628	122.80715	0.00004	-0.00004	0.15490	-0.14338	5.2
LMK002	Ecology	47.04624	122.80719	47.04628	122.80715	0.00004	-0.00004	0.15490	-0.14338	5.2
LMK003	Ecology	47.04624	122.80719	47.04628	122.80715	0.00004	-0.00004	0.15490	-0.14338	5.2
LMK004	USACE "38+84.76"	46.66026	117.42853	46.66072	117.42963	0.00046	0.00111	1.77667	4.31167	98.5
LMK005	USACE "38+84.76"	46.66026	117.42853	46.66052	117.42912	0.00026	0.00059	0.99667	2.29667	53.2
LMK006	USACE "38+84.76"	46.66026	117.42853	46.66030	117.42855	0.00004	0.00002	0.15167	0.08667	4.6
	Mean							0.56495	1.04414	**28.7**
										(Target = 50)

Table 3, continued

Field Air Pressure Comparisons

Field Air Pressure (mm Hg)

Time	Location	Field	FMS	Difference	Diff^2
8:40	Forebay	752	744.0	8.0	64.0
8:50	Forebay	752	744.0	8.0	64.0
9:09	Forebay	752	744.0	8.0	64.0
10:22	Tailrace	753	746.5	6.5	42.3
10:37	Tailrace	754	746.5	7.5	56.3
13:34	Tailrace	754	746.9	7.1	50.4
14:40	Tailrace	750	746.3	3.7	13.7
	RMSE			7.1	(Target = 1)

Air Pressures used in TDG calculations

Time	Field	FMS	Difference	Diff^2
9:00	754.0	744.0	10.0	100.0
10:38	754.0	747.2	6.8	46.2
13:27	754.0	746.6	7.4	54.8
			8.2	

Laboratory Postcalibration - water bath

	DS15	DS16	Difference	Target
Temperature	19.92	19.88	**0.04**	0.5
DO (mg/L)	8.61	8.55	**0.06**	0.5
DO %Sat	94.4	93.6	0.8	5%
SpCond	287	294	**7**	15
pH	8.62	8.59	**0.03**	0.5
TDG	771	772	**1**	5

Laboratory Postcalibration - air

	DS15	DS16	Standard	DS15-Std	SD16-Std	Target
TDG	759	761	759.9	**-1**	**1**	5
	959	960	960	**-1**	**0**	5

Table 4. Data Quality Analysis for Wells Dam, May 29, 2002

Field Total Dissolved Gas Comparisons

Forebay - morning

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
803	818	811	15	8	-7	108.5%	111.3%	110.3%	2.8%	1.8%	-1.0%

Tailrace-morning

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
814	814		0			110.0%	110.0%		0.0%		
	814	814			0		110.0%	110.0%			0.0%

Forebay - afternoon

TDG (mmHg)			Residual			TDG %Sat			Residual		
FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16	FMS	DS15	DS16	DS15-FMS	DS16-FMS	DS15-DS16
799	803	810	4	11	7	108.1%	109.3%	110.2%	1.2%	2.1%	1.0%

RMS error	(Target = 5)	9.0	9.6	5.7		(Target = 1%)	1.7%	2.0%	0.8%		

Field GPS Comparisons

			Benchmark (NAD83)		GPS (NAD83)		Difference (dd)		Difference (sec)		Difference (m)
			Lat	Long	Lat	Long	Lat	Long	Lat	Long	
LMK001	Ecology		47.04624	122.80719	47.04628	122.80722	0.00004	0.00003	0.15	0.12	5.0
LMK002	Ecology		47.04624	122.80719	47.04628	122.80722	0.00004	0.00003	0.15490	0.11662	5.0
LMK003	Forebay FMS		47.94730	119.86522	47.94728	119.86510	-0.00002	-0.00012	-0.06500	-0.45500	8.9
LMK004	Forebay FMS		47.94730	119.86522	47.94727	119.86510	-0.00003	-0.00012	-0.13000	-0.45500	9.5
LMK007	Forebay FMS		47.94730	119.86522	47.94722	119.86498	-0.00008	-0.00023	-0.32500	-0.91000	19.7
LMK008	Forebay FMS		47.94730	119.86522	47.94722	119.86498	-0.00008	-0.00023	-0.32500	-0.91000	19.7
LMK005	Tailwater FMS		47.91302	119.89602	47.91332	119.89597	0.00030	-0.00005	1.17000	-0.19500	33.6
LMK006	Tailwater FMS		47.91302	119.89602	47.91307	119.89588	0.00005	-0.00013	0.19500	-0.52000	11.4
		Mean							0.10372	-0.40147	14.1
											(Target = 50)

Table 4, continued

Field Air Pressure Comparisons

Field Air Pressure (mm Hg)

Time	Location	Field	FMS	Difference	Diff^2
9:37	Forebay	742	740	2.0	4.0
9:55	Forebay	729	740	-11.0	121.0
11:35	Tailrace	740	742	-1.8	3.2
11:48	Tailrace	740	742	-1.8	3.2
12:46	Tailrace	742	742	0.2	0.0
13:00	Tailrace	740	742	-1.8	3.2
15:45	Forebay	736	739	-3.0	9.0
15:59	Forebay	734	739	-5.0	25.0
	RMSE			4.6	(Target = 1)

Air Pressures used in TDG calculations

Time	Field	FMS	Difference	Diff^2
10:20	735.0	740.0	-5.0	25.0
12:10	740.0	741.8	-1.8	3.2
15:55	735.0	740.8	-5.8	33.6
			4.5	

Laboratory Postcalibration - water bath

	DS15	DS16	Difference	Target
Temperature	19.42	19.38	**0.04**	0.5
DO (mg/L)	2.75	9.07	6.32	0.5
DO %Sat	29.9	99.1	69.2	5%
SpCond	277	282	**5**	14
pH	8.37	8.33	**0.04**	0.5
TDG	775	776	**1**	5

Laboratory Postcalibration - air

	DS15	DS16	Standard	DS15-Std	SD16-Std	Target
TDG	762	762	762.4	**0**	**0**	5
	763	763	762.9	**0**	**0**	5
	962	963	962	**0**	**1**	5

Table 5. Data Quality Analysis for Wells Dam, July 2, 2002

Field Total Dissolved Gas Comparisons

Forebay - morning

TDG (mmHg)			Residual	TDG %Sat			Residual
FMS	DS15	DS16	DS15-FMS	FMS	DS15	DS16	DS15-FMS
874	870		-4	117.3%	116.9%		-0.4%

Tailrace-morning

TDG (mmHg)			Residual	TDG %Sat			Residual
FMS	DS15	DS16	DS15-FMS	FMS	DS15	DS16	DS15-FMS
1003	986		-17	134.6%	132.8%		-1.8%

Tailrace-afternoon

TDG (mmHg)			Residual	TDG %Sat			Residual
FMS	DS15	DS16	DS15-FMS	FMS	DS15	DS16	DS15-FMS
975	957		-18	131.3%	129.1%		-2.2%

RMS error	(Target = 5)	14.5		(Target = 1%)	1.7%	

Field GPS Comparisons

		Benchmark (NAD83)		GPS (NAD83)		Difference (dd)		Difference (sec)		Difference (m)
		Lat	Long	Lat	Long	Lat	Long	Lat	Long	
LMK001	Ecology	47.04624	122.80719	47.04625	122.80720	0.00001	0.00001	0.02	0.05	1.2
LMK002	Ecology	47.04624	122.80719	47.04625	122.80722	0.00001	0.00003	0.02490	0.11662	2.4
LMK003	Forebay FMS	47.94730	119.86522	47.94697	119.86500	-0.00033	-0.00022	-1.30000	-0.84500	40.5
LMK004	Forebay FMS	47.94730	119.86522	47.94703	119.86495	-0.00027	-0.00027	-1.04000	-1.04000	35.7
LMK005	Forebay FMS	47.94730	119.86522	47.94707	119.86493	-0.00023	-0.00028	-0.91000	-1.10500	33.5
LMK006	Tailwater FMS	47.91302	119.89602	47.91227	119.89658	-0.00075	0.00057	-2.92500	2.21000	93.6
LMK007	Tailwater FMS	47.91302	119.89602	47.91227	119.89652	-0.00075	0.00050	-2.92500	1.95000	91.4
LMK008	Tailwater FMS	47.91302	119.89602	47.91248	119.89623	-0.00053	0.00022	-2.08000	0.84500	61.5
	Mean							-1.39128	0.27291	45.0
										(Target = 50)

Table 5, continued

Field Air Pressure Comparisons

Field Air Pressure (mm Hg)

Time	Location	Field	FMS	Difference	Diff^2
9:45	Forebay	740	748.6	-8.6	74.0
10:00	Forebay	744	748.6	-4.6	21.2
11:58	Tailrace	743	751.8	-8.8	77.4
13:00	Tailrace	742	751.8	-9.8	96.0
15:16	Tailrace	741	750.5	-9.5	90.3
	RMSE			8.5	(Target = 1)

Air Pressures used in TDG calculations

Time	Field	FMS	Difference	Diff^2
10:03	744.0	745.0	-1.0	1.0
12:15	742.7	746.8	-4.1	17.0
14:28	744.8	747.8	-3.0	9.0
			3.0	

Laboratory Postcalibration - bath

	DS15	DS16	Difference	Target
Temperature	19.79	19.75	**0.04**	0.5
DO (mg/L)	7.83	8.6	0.77	0.5
DO %Sat	85	93.3	8.3	5%
SpCond	333	342	**9**	5
pH	8.67	8.66	**0.01**	0.5
TDG	767	769	**2**	5

Laboratory Postcalibration - air

	DS15	DS16	Standard	DS15-Std	SD16-Std	Target
TDG	761	761	762	**-1**	**-1**	5
	962	962	961	**1**	**1**	5
DO %Sat	105.3		100	5		5
DO %Sat	107.4		100	7		5

Laboratory Postcalibration - standards

	DS15	DS16	Standard	DS15-Std	SD16-Std	Target
SpCond	106.6	109.4	99.8	6.8	9.6	5
SpCond	1013	1023	996	**17**	**27**	50
pH	7.06	6.86	7.00	**0.06**	**0.14**	0.5
pH	9.95	9.92	10.01	**0.06**	**0.09**	0.5

Table 6. GPS data for Lower Granite Dam, May 14, 2002

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
		46	39.579	N	117	25.768	W		Foot of the Spillway		46.659655	117.429464	
									Tailwater FMS		46.665828	117.437130	903
1	LMK001	47	2.460	N	122	48.210	W	161	WDOE Benchmark		47.041000	122.803500	
2	LMK002	47	2.775	N	122	48.435	W	161	WDOE Benchmark		47.046250	122.807250	
3	LMK003	47	2.775	N	122	48.432	W	161	WDOE Benchmark		47.046250	122.807200	
4	LMK004	47	2.775	N	122	48.431	W	161	WDOE Benchmark		47.046250	122.807183	
5	LMK005	46	39.538	N	117	25.770	W	774	USACE "33+96.17"		46.658967	117.429500	
6	LMK006	46	39.541	N	117	25.771	W	764	USACE "33+96.17"		46.659017	117.429517	
7	LMK007	46	39.936	N	117	26.300	W	764	Tailwater FMS		46.665600	117.438333	947
8	LMK008	46	39.938	N	117	26.304	W	764	Tailwater FMS		46.665633	117.438400	953
9	LMK009	46	39.938	N	117	26.305	W	764	Tailwater FMS		46.665633	117.438417	954
10	LMK010	46	39.986	N	117	26.374	W	551	Tailwater FMS		46.666433	117.439567	1079
11	LMK011	46	39.932	N	117	26.510	W	610	Tailwater Mooring		46.665533	117.441833	1149
12	LMK012	46	39.936	N	117	26.513	W	600	Tailwater Mooring		46.665600	117.441883	1157
13	LMK013	46	39.752	N	117	26.024	W	610	Transect #1	11:10:00	46.662533	117.433733	457
14	LMK014	46	39.819	N	117	26.200	W	607	Transect #1	11:15:00	46.663650	117.436667	707
15	LMK015	46	39.922	N	117	26.424	W	610	Transect #1	11:20:00	46.665367	117.440400	1050
16	LMK016	46	40.027	N	117	26.586	W	607	Transect #1	11:25:00	46.667117	117.443100	1332
17	LMK017	46	39.672	N	117	26.127	W	630	Transect #2	11:30:00	46.661200	117.435450	489
18	LMK018	46	39.768	N	117	26.285	W	627	Transect #2	11:35:00	46.662800	117.438083	746
19	LMK019	46	39.864	N	117	26.412	W	633	Transect #2	11:40:00	46.664400	117.440200	976
20	LMK020	46	39.973	N	117	26.566	W	630	Transect #2	11:45:00	46.666217	117.442767	1251
21	LMK021	46	39.705	N	117	26.079	W	636	Transect #3	11:50:00	46.661750	117.434650	460
22	LMK022	46	39.862	N	117	26.302	W	636	Transect #3	11:55:00	46.664367	117.438367	859
23	LMK023	46	39.925	N	117	26.443	W	646	Transect #3	12:00:00	46.665417	117.440717	1072
24	LMK024	46	40.026	N	117	26.583	W	620	Transect #3	12:05:00	46.667100	117.443050	1328
25	LMK025	46	39.670	N	117	26.134	W	600	Transect #4	13:13:30	46.661167	117.435567	496
26	LMK026	46	39.692	N	117	26.194	W	650	Transect #4	13:15:00	46.661533	117.436567	581
27	LMK027	46	39.713	N	117	26.231	W	653	Transect #4	13:16:00	46.661883	117.437183	640
28	LMK028	46	39.723	N	117	26.248	W	673	Transect #4	13:17:00	46.662050	117.437467	667
29	LMK029	46	39.735	N	117	26.264	W	659	Transect #4	13:18:00	46.662250	117.437733	695
30	LMK030	46	39.768	N	117	26.328	W	646	Transect #4	13:20:00	46.662800	117.438800	794
31	LMK031	46	39.776	N	117	26.339	W	643	Transect #4	13:21:00	46.662933	117.438983	814
32	LMK032	46	39.786	N	117	26.355	W	640	Transect #4	13:22:00	46.663100	117.439250	840
33	LMK033	46	39.792	N	117	26.365	W	640	Transect #4	13:23:00	46.663200	117.439417	857
34	LMK034	46	39.844	N	117	26.456	W	640	Transect #4	13:25:00	46.664067	117.440933	1004

Table 6, continued

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
35	LMK035	46	39.861	N	117	26.471	W	636	Transect #4	13:26:30	46.664350	117.441183	1037
36	LMK036	46	39.864	N	117	26.477	W	636	Transect #4	13:27:30	46.664400	117.441283	1046
37	LMK037	46	39.889	N	117	26.496	W	623	Transect #4	13:30:00	46.664817	117.441600	1091
38	LMK038	46	39.715	N	117	26.144	W	650	Transect #5	13:35:00	46.661917	117.435733	541
39	LMK039	46	39.758	N	117	26.234	W	650	Transect #5	13:37:00	46.662633	117.437233	680
40	LMK040	46	39.776	N	117	26.268	W	646	Transect #5	13:38:00	46.662933	117.437800	734
41	LMK041	46	39.796	N	117	26.302	W	643	Transect #5	13:40:00	46.663267	117.438367	790
42	LMK042	46	39.825	N	117	26.344	W	643	Transect #5	13:41:30	46.663750	117.439067	864
43	LMK043	46	39.841	N	117	26.369	W	640	Transect #5	13:43:00	46.664017	117.439483	906
44	LMK044	46	39.892	N	117	26.459	W	636	Transect #5	13:45:00	46.664867	117.440983	1054
45	LMK045	46	39.905	N	117	26.479	W	633	Transect #5	13:46:30	46.665083	117.441317	1089
46	LMK046	46	39.911	N	117	26.488	W	633	Transect #5	13:47:00	46.665183	117.441467	1104
47	LMK047	46	39.921	N	117	26.500	W	630	Transect #5	13:48:00	46.665350	117.441667	1127
48	LMK048	46	39.998	N	117	26.590	W	646	Transect #5	13:50:00	46.666633	117.443167	1303
49	LMK049	46	39.733	N	117	26.008	W	659	Transect #6	13:55:00	46.662217	117.433467	418
50	LMK050	46	39.737	N	117	26.009	W	650	Transect #6	13:58:00	46.662283	117.433483	424
51	LMK051	46	39.739	N	117	26.015	W	650	Transect #6	14:00:30	46.662317	117.433583	432
52	LMK052	46	39.742	N	117	26.017	W	650	Transect #6	14:02:20	46.662367	117.433617	438
53	LMK053	46	39.753	N	117	26.072	W	646	Transect #6	14:05:00	46.662550	117.434533	504
54	LMK054	46	39.805	N	117	26.134	W	640	Transect #6	14:07:00	46.663417	117.435567	627
55	LMK055	46	39.814	N	117	26.147	W	636	Transect #6	14:08:00	46.663567	117.435783	650
56	LMK056	46	39.867	N	117	26.238	W	640	Transect #6	14:10:00	46.664450	117.437300	802
57	LMK057	46	39.879	N	117	26.262	W	640	Transect #6	14:11:00	46.664650	117.437700	840
58	LMK058	46	39.902	N	117	26.303	W	640	Transect #6	14:12:00	46.665033	117.438383	907
59	LMK059	46	39.968	N	117	26.414	W	633	Transect #6/ Tailwater FMS	14:15:00	46.666133	117.440233	1094
60	LMK060	46	39.689	N	117	26.073	W	656	Transect #7	14:20:00	46.661483	117.434550	439
61	LMK061	46	39.716	N	117	26.114	W	659	Transect #7	14:21:00	46.661933	117.435233	508
62	LMK062	46	39.738	N	117	26.165	W	656	Transect #7	14:22:00	46.662300	117.436083	585
63	LMK063	46	39.755	N	117	26.202	W	656	Transect #7	14:23:00	46.662583	117.436700	642
64	LMK064	46	39.797	N	117	26.281	W	656	Transect #7	14:25:00	46.663283	117.438017	768
65	LMK065	46	39.826	N	117	26.338	W	666	Transect #7	14:26:30	46.663767	117.438967	858
66	LMK066	46	39.855	N	117	26.395	W	663	Transect #7	14:28:00	46.664250	117.439917	948
67	LMK067	46	39.897	N	117	26.481	W	646	Transect #7	14:30:00	46.664950	117.441350	1083
68	LMK068	46	39.911	N	117	26.506	W	643	Transect #7	14:31:00	46.665183	117.441767	1123
69	LMK069	46	39.933	N	117	26.508	W	650	Tailwater Mooring	14:35:00	46.665550	117.441800	1148
70	LMK070	46	39.938	N	117	26.511	W	659	Tailwater Mooring	14:40:00	46.665633	117.441850	1157
71	LMK071	46	39.613	N	117	25.754	W	676	USACE "38+84.76"		46.660217	117.429233	
72	LMK072	46	39.614	N	117	25.724	W	784	USACE "38+84.76"		46.660233	117.428733	

Table 7. GPS data for Lower Granite Dam, June 10, 2002

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
									Foot of the Spillway		46.659655	117.429464	
									Tailwater FMS		46.665828	117.437130	903
1	LMK001	47	2.777	N	122	48.429	W	141	WDOE Benchmark		47.046283	122.807150	
2	LMK002	47	2.777	N	122	48.429	W	138	WDOE Benchmark		47.046283	122.807150	
3	LMK003	47	2.777	N	122	48.429	W	131	WDOE Benchmark		47.046283	122.807150	
4	LMK004	46	39.643	N	117	25.778	W	128	USACE "33+96.17"		46.660717	117.429633	
5	LMK005	46	39.631	N	117	25.747	W	748	USACE "33+96.17"		46.660517	117.429117	
6	LMK006	46	39.618	N	117	25.713	W	748	USACE "33+96.17"		46.660300	117.428550	
7	LMK007	46	39.564	N	117	25.583	W	722	Forebay FMS		46.659400	117.426383	
8	LMK008	46	39.565	N	117	25.583	W	751	Forebay FMS		46.659417	117.426383	
9	LMK009	46	39.565	N	117	25.583	W	758	Test		46.659417	117.426383	
10	LMK010	46	39.714	N	117	26.218	W	614	Transect #1	10:54:30	46.661900	117.436967	625
11	LMK011	46	39.735	N	117	26.263	W	614	Transect #1	10:55:15	46.662250	117.437717	693
12	LMK012	46	39.752	N	117	26.293	W	617	Transect #1	10:55:48	46.662533	117.438217	741
13	LMK013	46	39.809	N	117	26.379	W	627	Transect #1	10:57:23	46.663483	117.439650	887
14	LMK014	46	39.846	N	117	26.435	W	627	Transect #1	10:58:23	46.664100	117.440583	983
15	LMK015	46	39.884	N	117	26.494	W	627	Transect #1	10:59:35	46.664733	117.441567	1084
16	LMK016	46	39.932	N	117	26.551	W	620	Transect #1	11:01:00	46.665533	117.442517	1193
17	LMK017	46	39.766	N	117	26.136	W	633	Transect #2	11:11:10	46.662767	117.435600	583
18	LMK018	46	39.817	N	117	26.218	W	636	Transect #2	11:12:45	46.663617	117.436967	723
19	LMK019	46	39.887	N	117	26.328	W	633	Transect #2	11:15:11	46.664783	117.438800	914
20	LMK020	46	39.955	N	117	26.430	W	627	Transect #2	11:17:30	46.665917	117.440500	1094
21	LMK021	46	40.108	N	117	26.609	W	630	Transect #2	11:21:20	46.668467	117.443483	1452
22	LMK022	46	40.330	N	117	26.801	W	630	Transect #2	11:26:58	46.672167	117.446683	1916
23	LMK023	46	40.518	N	117	26.913	W	630	Transect #2	11:32:00	46.675300	117.448550	2271
24	LMK024	46	39.714	N	117	26.229	W	659	Transect #3	12:04:48	46.661900	117.437150	638
25	LMK025	46	39.754	N	117	26.294	W	650	Transect #3	12:06:00	46.662567	117.438233	744
26	LMK026	46	39.789	N	117	26.349	W	640	Transect #3	12:07:02	46.663150	117.439150	836
27	LMK027	46	39.823	N	117	26.402	W	636	Transect #3	12:08:00	46.663717	117.440033	925
28	LMK028	46	39.877	N	117	26.490	W	640	Transect #3	12:09:40	46.664617	117.441500	1073
29	LMK029	46	39.908	N	117	26.530	W	633	Transect #3 / Tailwater Mooring	12:10:37	46.665133	117.442167	1146
30	LMK030	46	39.918	N	117	26.542	W	630	Transect #3	12:11:00	46.665300	117.442367	1169
31	LMK031	46	39.949	N	117	26.570	W	627	Transect #3	12:12:00	46.665817	117.442833	1230
32	LMK032	46	40.000	N	117	26.620	W	627	Transect #3	12:13:22	46.666667	117.443667	1337
33	LMK033	46	39.926	N	117	26.518	W	627	Tailwater Mooring		46.665433	117.441967	1151
34	LMK034	46	39.925	N	117	26.520	W	627	Tailwater Mooring		46.665417	117.442000	1153

Table 7, continued

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
35	LMK035	46	39.762	N	117	26.107	W	663	Transect #4	13:22:03	46.662700	117.435117	549
36	LMK036	46	39.792	N	117	26.160	W	650	Transect #4	13:23:04	46.663200	117.436000	636
37	LMK037	46	39.860	N	117	26.269	W	636	Transect #4	13:25:10	46.664333	117.437817	824
38	LMK038	46	39.882	N	117	26.308	W	640	Transect #4	13:26:05	46.664700	117.438467	888
39	LMK039	46	39.907	N	117	26.350	W	636	Transect #4 / Tailwater FMS	13:27:01	46.665117	117.439167	959
40	LMK040	46	39.934	N	117	26.397	W	633	Transect #4	13:28:00	46.665567	117.439950	1037
41	LMK041	46	39.964	N	117	26.447	W	682	Transect #4	13:29:06	46.666067	117.440783	1121
42	LMK042	46	40.039	N	117	26.527	W	627	Transect #4	13:31:02	46.667317	117.442117	1289
43	LMK043	46	40.079	N	117	26.565	W	630	Transect #4	13:32:02	46.667983	117.442750	1375
44	LMK044	46	40.116	N	117	26.604	W	627	Transect #4	13:33:00	46.668600	117.443400	1458
45	LMK045	46	40.190	N	117	26.674	W	640	Transect #4	13:35:02	46.669833	117.444567	1617
46	LMK046	46	39.682	N	117	26.146	W	636	Transect #5	13:43:56	46.661367	117.435767	518
47	LMK047	46	39.697	N	117	26.205	W	571	Transect #5	13:45:14	46.661617	117.436750	598
48	LMK048	46	39.712	N	117	26.244	W	623	Transect #5	13:46:03	46.661867	117.437400	654
49	LMK049	46	39.734	N	117	26.292	W	623	Transect #5	13:47:06	46.662233	117.438200	726
50	LMK050	46	39.766	N	117	26.310	W	640	Transect #5	13:48:00	46.662767	117.438500	772
51	LMK051	46	39.798	N	117	26.351	W	630	Transect #5	13:49:03	46.663300	117.439183	846
52	LMK052	46	39.827	N	117	26.396	W	633	Transect #5	13:50:01	46.663783	117.439933	922
53	LMK053	46	39.858	N	117	26.447	W	627	Transect #5	13:51:11	46.664300	117.440783	1008
54	LMK054	46	39.882	N	117	26.483	W	623	Transect #5	13:52:07	46.664700	117.441383	1070
55	LMK055	46	39.911	N	117	26.525	W	627	Transect #5 / Tailwater Mooring	13:53:10	46.665183	117.442083	1144
56	LMK056	46	39.937	N	117	26.553	W	617	Transect #5	13:54:07	46.665617	117.442550	1200
57	LMK057	46	39.975	N	117	26.587	W	614	Transect #5	13:55:12	46.666250	117.443117	1275
58	LMK058	46	39.723	N	117	26.166	W	623	Transect #6	14:06:00	46.662050	117.436100	573
59	LMK059	46	39.772	N	117	26.271	W	617	Transect #6	14:08:01	46.662867	117.437850	734
60	LMK060	46	39.810	N	117	26.330	W	614	Transect #6	14:09:14	46.663500	117.438833	834
61	LMK061	46	39.836	N	117	26.370	W	620	Transect #6	14:10:02	46.663933	117.439500	903
62	LMK062	46	39.868	N	117	26.419	W	623	Transect #6	14:11:00	46.664467	117.440317	987
63	LMK063	46	39.904	N	117	26.469	W	636	Transect #6	14:12:05	46.665067	117.441150	1077
64	LMK064	46	39.941	N	117	26.519	W	627	Transect #6	14:13:17	46.665683	117.441983	1168
65	LMK065	46	39.979	N	117	26.553	W	627	Transect #6	14:14:10	46.666317	117.442550	1245
66	LMK066	46	40.014	N	117	26.589	W	627	Transect #6	14:15:15	46.666900	117.443150	1320
67	LMK067	46	40.056	N	117	26.627	W	623	Transect #6	14:16:00	46.667600	117.443783	1407
68	LMK068	46	39.953	N	117	26.350	W	633	Tailwater FMS		46.665883	117.439167	1015
69	LMK069	46	39.782	N	117	26.163	W	630	Transect #7	14:29:12	46.663033	117.436050	628
70	LMK070	46	39.840	N	117	26.264	W	627	Transect #7	14:31:00	46.664000	117.437733	796
71	LMK071	46	39.871	N	117	26.313	W	630	Transect #7	14:32:01	46.664517	117.438550	880
72	LMK072	46	39.899	N	117	26.359	W	630	Transect #7	14:33:01	46.664983	117.439317	958

Table 7, continued

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
73	LMK073	46	39.928	N	117	26.410	W	630	Transect #7	14:34:05	46.665467	117.440167	1043
74	LMK074	46	39.958	N	117	26.456	W	630	Transect #7	14:35:04	46.665967	117.440933	1123
75	LMK075	46	40.032	N	117	26.538	W	630	Transect #7	14:37:00	46.667200	117.442300	1291
76	LMK076	46	40.074	N	117	26.582	W	630	Transect #7	14:38:01	46.667900	117.443033	1384
77	LMK077	46	40.114	N	117	26.620	W	633	Transect #7	14:39:00	46.668567	117.443667	1470

Table 8. GPS data for Wells Dam, May 29, 2002

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
									Foot of the Spillway		47.947046	119.863690	
									Tailwater FMS		47.913017	119.896017	4490
1	LMK001	47	2.777	N	122	48.433	W	141	WDOE Benchmark		47.046283	122.807217	
2	LMK002	47	2.777	N	122	48.433	W	141	WDOE Benchmark		47.046283	122.807217	
3	LMK003	47	56.837	N	119	51.906	W	820	Forebay FMS		47.947283	119.865100	
4	LMK004	47	56.836	N	119	51.906	W	804	Forebay FMS		47.947267	119.865100	
5	LMK005	47	54.799	N	119	53.758	W	702	Tailwater FMS		47.913317	119.895967	4460
6	LMK006	47	54.784	N	119	53.753	W	722	Tailwater FMS		47.913067	119.895883	4480
7	LMK007	47	56.594	N	119	51.680	W	745	Tailwater Mooring		47.943233	119.861333	459
8	LMK008	47	56.594	N	119	51.680	W	745	Tailwater Mooring		47.943233	119.861333	459
9	LMK009	47	56.727	N	119	51.754	W	741	Transect #1	12:55:00	47.945450	119.862567	196
10	LMK010	47	56.723	N	119	51.750	W	738	Transect #1	12:57:30	47.945383	119.862500	205
11	LMK011	47	56.722	N	119	51.750	W	738	Transect #1	12:58:30	47.945367	119.862500	207
12	LMK012	47	56.721	N	119	51.750	W	741	Transect #1	13:00:00	47.945350	119.862500	209
13	LMK013	47	56.684	N	119	51.719	W	738	Transect #1	13:01:30	47.944733	119.861983	287
14	LMK014	47	56.662	N	119	51.693	W	735	Transect #1	13:02:30	47.944367	119.861550	338
15	LMK015	47	56.640	N	119	51.663	W	735	Transect #1	13:03:30	47.944000	119.861050	392
16	LMK016	47	56.618	N	119	51.639	W	732	Transect #1	13:05:00	47.943633	119.860650	442
17	LMK017	47	56.608	N	119	51.630	W	728	Transect #1	13:06:30	47.943467	119.860500	464
18	LMK018	47	56.597	N	119	51.621	W	725	Transect #1	13:07:40	47.943283	119.860350	487
19	LMK019	47	56.571	N	119	51.613	W	728	Transect #1	13:08:30	47.942850	119.860217	534
20	LMK020	47	56.529	N	119	51.598	W	728	Transect #1	13:10:00	47.942150	119.859967	612
21	LMK021	47	56.493	N	119	51.596	W	725	Transect #1	13:11:30	47.941550	119.859933	673
22	LMK022	47	56.439	N	119	51.600	W	722	Transect #1	13:12:30	47.940650	119.860000	763
23	LMK023	47	56.389	N	119	51.621	W	725	Transect #1	13:13:30	47.939817	119.860350	842
24	LMK024	47	56.299	N	119	51.675	W	725	Transect #1	13:15:00	47.938317	119.861250	989
25	LMK025	47	56.220	N	119	51.746	W	702	Transect #1	13:16:30	47.937000	119.862433	1122
26	LMK026	47	56.129	N	119	51.822	W	719	Transect #1	13:17:30	47.935483	119.863700	1287
27	LMK027	47	56.055	N	119	51.913	W	715	Transect #1	13:18:30	47.934250	119.865217	1429
28	LMK028	47	55.949	N	119	52.062	W	715	Transect #1	13:20:00	47.932483	119.867700	1648
29	LMK029	47	56.686	N	119	51.949	W	719	Transect #2	13:30:00	47.944767	119.865817	299
30	LMK030	47	56.688	N	119	51.944	W	725	Transect #2	13:31:30	47.944800	119.865733	293
31	LMK031	47	56.691	N	119	51.940	W	725	Transect #2	13:32:30	47.944850	119.865667	285
32	LMK032	47	56.692	N	119	51.934	W	725	Transect #2	13:33:30	47.944867	119.865567	280
33	LMK033	47	56.689	N	119	51.928	W	725	Transect #2	13:35:00	47.944817	119.865467	281
34	LMK034	47	56.662	N	119	51.896	W	725	Transect #2	13:36:30	47.944367	119.864933	312

Table 8, continued

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
35	LMK035	47	56.645	N	119	51.879	W	725	Transect #2	13:37:30	47.944083	119.864650	337
36	LMK036	47	56.631	N	119	51.869	W	722	Transect #2	13:38:30	47.943850	119.864483	361
37	LMK037	47	56.590	N	119	51.843	W	719	Transect #2	13:40:00	47.943167	119.864050	433
38	LMK038	47	56.528	N	119	51.790	W	719	Transect #2	13:41:30	47.942133	119.863167	548
39	LMK039	47	56.482	N	119	51.752	W	722	Transect #2	13:42:30	47.941367	119.862533	638
40	LMK040	47	56.446	N	119	51.729	W	722	Transect #2	13:43:30	47.940767	119.862150	708
41	LMK041	47	56.373	N	119	51.707	W	709	Transect #2	13:45:00	47.939550	119.861783	846
42	LMK042	47	56.288	N	119	51.723	W	696	Transect #2	13:46:30	47.938133	119.862050	1000
43	LMK043	47	56.216	N	119	51.765	W	689	Transect #2	13:47:30	47.936933	119.862750	1128
44	LMK044	47	56.130	N	119	51.826	W	682	Transect #2	13:48:30	47.935500	119.863767	1285
45	LMK045	47	56.010	N	119	51.965	W	673	Transect #2	13:50:00	47.933500	119.866083	1518
46	LMK046	47	56.670	N	119	51.980	W	719	Transect #3	14:17:30	47.944500	119.866333	345
47	LMK047	47	56.672	N	119	51.976	W	715	Transect #3	14:18:20	47.944533	119.866267	339
48	LMK048	47	56.672	N	119	51.975	W	715	Transect #3	14:20:00	47.944533	119.866250	339
49	LMK049	47	56.672	N	119	51.973	W	715	Transect #3	14:21:00	47.944533	119.866217	337
50	LMK050	47	56.672	N	119	51.970	W	715	Transect #3	14:22:00	47.944533	119.866167	335
51	LMK051	47	56.667	N	119	51.946	W	719	Transect #3	14:23:00	47.944450	119.865767	328
52	LMK052	47	56.652	N	119	51.863	W	705	Transect #3	14:24:00	47.944200	119.864383	321
53	LMK053	47	56.654	N	119	51.852	W	705	Transect #3	14:25:00	47.944233	119.864200	315
54	LMK054	47	56.646	N	119	51.817	W	712	Transect #3	14:26:00	47.944100	119.863617	328
55	LMK055	47	56.642	N	119	51.751	W	715	Transect #3	14:27:00	47.944033	119.862517	347
56	LMK056	47	56.648	N	119	51.716	W	719	Transect #3	14:28:00	47.944133	119.861933	350
57	LMK057	47	56.679	N	119	51.662	W	722	Transect #3	14:30:00	47.944650	119.861033	332
58	LMK058	47	56.701	N	119	51.851	W	725	Transect #4	14:40:00	47.945017	119.864183	229
59	LMK059	47	56.677	N	119	51.841	W	725	Transect #4	14:41:30	47.944617	119.864017	272
60	LMK060	47	56.662	N	119	51.836	W	725	Transect #4	14:42:30	47.944367	119.863933	299
61	LMK061	47	56.655	N	119	51.834	W	725	Transect #4	14:43:30	47.944250	119.863900	312
62	LMK062	47	56.571	N	119	51.796	W	722	Transect #4	14:45:00	47.942850	119.863267	468
63	LMK063	47	56.516	N	119	51.759	W	722	Transect #4	14:46:30	47.941933	119.862650	574
64	LMK064	47	56.473	N	119	51.725	W	722	Transect #4	14:47:30	47.941217	119.862083	660
65	LMK065	47	56.432	N	119	51.703	W	719	Transect #4	14:48:30	47.940533	119.861717	740
66	LMK066	47	56.359	N	119	51.685	W	719	Transect #4	14:50:00	47.939317	119.861417	877
67	LMK067	47	56.266	N	119	51.714	W	712	Transect #4	14:51:30	47.937767	119.861900	1041
68	LMK068	47	56.179	N	119	51.761	W	712	Transect #4	14:52:30	47.936317	119.862683	1197
69	LMK069	47	56.099	N	119	51.837	W	715	Transect #4	14:53:30	47.934983	119.863950	1343
70	LMK070	47	55.986	N	119	51.994	W	712	Transect #4	14:55:00	47.933100	119.866567	1567
71	LMK071	47	56.833	N	119	51.899	W	823	Forebay FMS		47.947217	119.864983	98
72	LMK072	47	56.833	N	119	51.899	W	810	Forebay FMS		47.947217	119.864983	98

Table 9. GPS data for Wells Dam, July 2, 2002

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
									Foot of the Spillway		47.947046	119.863690	
									Tailwater FMS		47.913017	119.896017	4490
1	LMK001	47	2.775	N	122	48.432	W	128	WDOE Benchmark		47.913017	119.896017	
2	LMK002	47	2.775	N	122	48.433	W	128	WDOE Benchmark		47.046250	122.807217	
3	LMK003	47	56.818	N	119	51.900	W	128	Forebay FMS		47.946967	119.865000	
4	LMK004	47	56.822	N	119	51.897	W	128	Forebay FMS		47.947033	119.864950	
5	LMK005	47	56.824	N	119	51.896	W	128	Forebay FMS		47.947067	119.864933	
6	LMK006	47	54.736	N	119	53.795	W	128	Tailwater FMS		47.912267	119.896583	4583
7	LMK007	47	54.736	N	119	53.791	W	128	Tailwater FMS		47.912267	119.896517	4581
8	LMK008	47	54.749	N	119	53.774	W	128	Tailwater FMS		47.912483	119.896233	4549
9	LMK009	47	56.327	N	119	51.670	W	128	Transect #1	12:49:00	47.938783	119.861167	939
10	LMK010	47	56.163	N	119	51.784	W	128	Transect #1	12:51:02	47.936050	119.863067	1225
11	LMK011	47	56.091	N	119	51.852	W	128	Transect #1	12:51:59	47.934850	119.864200	1358
12	LMK012	47	55.888	N	119	52.126	W	128	Transect #1	12:54:11	47.931467	119.868767	1775
13	LMK013	47	55.813	N	119	52.262	W	128	Transect #1	12:55:10	47.930217	119.871033	1952
14	LMK014	47	55.737	N	119	52.390	W	128	Transect #1	12:56:13	47.928950	119.873167	2135
15	LMK015	47	55.669	N	119	52.496	W	128	Transect #1	12:57:11	47.927817	119.874933	2299
16	LMK016	47	55.596	N	119	52.607	W	128	Transect #1	12:58:19	47.926600	119.876783	2476
17	LMK017	47	55.53	N	119	52.716	W	128	Transect #1	12:59:27	47.925500	119.878600	2644
18	LMK018	47	55.455	N	119	52.792	W	128	Transect #1	13:00:24	47.924250	119.879867	2810
19	LMK019	47	55.416	N	119	52.866	W	128	Transect #1	13:01:11	47.923600	119.881100	2915
20	LMK020	47	55.359	N	119	52.956	W	128	Transect #1	13:02:12	47.922650	119.882600	3060
21	LMK021	47	56.443	N	119	51.804	W	128	Transect #2	13:14:25	47.940717	119.863400	705
22	LMK022	47	56.347	N	119	51.789	W	128	Transect #2	13:15:35	47.939117	119.863150	884
23	LMK023	47	56.254	N	119	51.798	W	128	Transect #2	13:16:42	47.937567	119.863300	1056
24	LMK024	47	56.165	N	119	51.845	W	131	Transect #2	13:17:37	47.936083	119.864083	1221
25	LMK025	47	56.087	N	119	51.922	W	131	Transect #2	13:18:23	47.934783	119.865367	1371
26	LMK026	47	55.975	N	119	52.074	W	131	Transect #2	13:19:42	47.932917	119.867900	1604
27	LMK027	47	55.925	N	119	52.147	W	131	Transect #2	13:20:20	47.932083	119.869117	1714
28	LMK028	47	55.851	N	119	52.264	W	131	Transect #2	13:21:16	47.930850	119.871067	1885
29	LMK029	47	55.809	N	119	52.348	W	131	Transect #2	13:21:52	47.930150	119.872467	1991
30	LMK030	47	55.775	N	119	52.421	W	131	Transect #2	13:22:33	47.929583	119.873683	2082
31	LMK031	47	55.717	N	119	52.504	W	131	Transect #2	13:23:20	47.928617	119.875067	2220
32	LMK032	47	55.651	N	119	52.604	W	131	Transect #2	13:24:24	47.927517	119.876733	2382
33	LMK033	47	55.590	N	119	52.695	W	131	Transect #2	13:25:24	47.926500	119.878250	2532
34	LMK034	47	55.553	N	119	52.763	W	131	Transect #2	13:26:10	47.925883	119.879383	2630

Table 9, continued

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
35	LMK035	47	55.520	N	119	52.819	W	131	Transect #2	13:26:49	47.925333	119.880317	2716
36	LMK036	47	55.448	N	119	52.904	W	131	Transect #2	13:27:51	47.924133	119.881733	2884
37	LMK037	47	56.450	N	119	51.717	W	131	Transect #3	13:38:40	47.940833	119.861950	704
38	LMK038	47	56.362	N	119	51.688	W	131	Transect #3	13:39:40	47.939367	119.861467	871
39	LMK039	47	56.286	N	119	51.702	W	131	Transect #3	13:40:46	47.938100	119.861700	1007
40	LMK040	47	56.207	N	119	51.739	W	131	Transect #3	13:41:36	47.936783	119.862317	1147
41	LMK041	47	56.137	N	119	51.804	W	131	Transect #3	13:42:30	47.935617	119.863400	1272
42	LMK042	47	56.056	N	119	51.890	W	131	Transect #3	13:42:57	47.934267	119.864833	1425
43	LMK043	47	55.982	N	119	51.978	W	131	Transect #3	13:43:42	47.933033	119.866300	1572
44	LMK044	47	55.874	N	119	52.086	W	131	Transect #3	13:44:42	47.931233	119.868100	1791
45	LMK045	47	55.792	N	119	52.204	W	131	Transect #3	13:45:42	47.929867	119.870067	1970
46	LMK046	47	55.715	N	119	52.310	W	131	Transect #3	13:46:44	47.928583	119.871833	2143
47	LMK047	47	55.657	N	119	52.399	W	131	Transect #3	13:47:45	47.927617	119.873317	2279
48	LMK048	47	55.595	N	119	52.489	W	131	Transect #3	13:48:45	47.926583	119.874817	2424
49	LMK049	47	55.540	N	119	52.579	W	131	Transect #3	13:49:45	47.925667	119.876317	2559
50	LMK050	47	55.487	N	119	52.675	W	131	Transect #3	13:50:45	47.924783	119.877917	2696
51	LMK051	47	55.443	N	119	52.756	W	131	Transect #3	13:51:45	47.924050	119.879267	2811
52	LMK052	47	56.508	N	119	51.848	W	131	Transect #4	14:01:14	47.941800	119.864133	585
53	LMK053	47	56.459	N	119	51.832	W	131	Transect #4	14:02:22	47.940983	119.863867	675
54	LMK054	47	56.389	N	119	51.797	W	131	Transect #4	14:03:22	47.939817	119.863283	805
55	LMK055	47	56.290	N	119	51.797	W	131	Transect #4	14:04:22	47.938167	119.863283	989
56	LMK056	47	56.195	N	119	51.854	W	131	Transect #4	14:05:22	47.936583	119.864233	1165
57	LMK057	47	56.101	N	119	51.943	W	131	Transect #4	14:06:22	47.935017	119.865717	1348
58	LMK058	47	56.023	N	119	52.058	W	131	Transect #4	14:07:22	47.933717	119.867633	1513
59	LMK059	47	55.954	N	119	52.184	W	131	Transect #4	14:08:22	47.932567	119.869733	1674
60	LMK060	47	55.888	N	119	52.301	W	131	Transect #4	14:09:22	47.931467	119.871683	1834
61	LMK061	47	55.823	N	119	52.413	W	131	Transect #4	14:10:22	47.930383	119.873550	1995
62	LMK062	47	55.765	N	119	52.515	W	131	Transect #4	14:11:22	47.929417	119.875250	2143
63	LMK063	47	55.706	N	119	52.616	W	131	Transect #4	14:12:22	47.928433	119.876933	2295
64	LMK064	47	55.652	N	119	52.714	W	131	Transect #4	14:13:22	47.927533	119.878567	2439
65	LMK065	47	55.601	N	119	52.795	W	131	Transect #4	14:14:22	47.926683	119.879917	2569
66	LMK066	47	55.542	N	119	52.877	W	131	Transect #4	14:15:22	47.925700	119.881283	2714
67	LMK067	47	55.481	N	119	52.954	W	131	Transect #4	14:16:22	47.924683	119.882567	2860
68	LMK068	47	55.415	N	119	53.011	W	131	Transect #4	14:17:22	47.923583	119.883517	3001
69	LMK069	47	55.348	N	119	53.066	W	131	Transect #4	14:18:22	47.922467	119.884433	3143
70	LMK070	47	55.285	N	119	53.139	W	131	Transect #4	14:19:22	47.921417	119.885650	3290
71	LMK071	47	55.221	N	119	53.222	W	131	Transect #4	14:20:22	47.920350	119.887033	3444
72	LMK072	47	55.169	N	119	53.313	W	131	Transect #4	14:21:22	47.919483	119.888550	3585

Table 9, continued

ID	Name	Latitude Degrees	Latitude Minutes		Longitude Degrees	Longitude Minutes		Altitude (ft)	Comment	Time	Latitude (dd, NAD83)	Longitude (dd, NAD83)	Distance from Spillway (m)
73	LMK073	47	55.116	N	119	53.401	W	131	Transect #4	14:22:22	47.918600	119.890017	3726
74	LMK074	47	55.058	N	119	53.480	W	131	Transect #4	14:23:22	47.917633	119.891333	3869
75	LMK075	47	55.001	N	119	53.569	W	131	Transect #4	14:24:22	47.916683	119.892817	4018
76	LMK076	47	54.954	N	119	53.669	W	131	Transect #4	14:25:22	47.915900	119.894483	4159
77	LMK077	47	54.910	N	119	53.766	W	131	Transect #4	14:26:22	47.915167	119.896100	4294
78	LMK078	47	54.880	N	119	53.842	W	131	Transect #4 / nr Tailwater FMS	14:27:02	47.914667	119.897367	4393
79	LMK079	47	54.847	N	119	53.935	W	131	Transect #4	14:28:02	47.914117	119.898917	4510
80	LMK080	47	47.854	N	119	59.183	W	131	Chelan Falls Boat Launch		47.797567	119.986383	18994
81	LMK081	47	47.844	N	119	59.170	W	131	Chelan Falls Boat Launch		47.797400	119.986167	19003

Table 10. Datasonde 15 data for Lower Granite Dam, May 14, 2002

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
14-May-02	9:00	756.5	9.7	91.3	10.4	89.8	7.9	4.8	796	105.2%		Forebay FMS	
14-May-02	9:05	756.5	9.7	90.6	10.4	89.7	7.9	5.0	795	105.1%		Forebay FMS	
14-May-02	10:15	750.0	9.7	93.9	10.8	89.5	7.8	5.1	804	107.2%	N	Tailwater FMS	
14-May-02	10:20	750.0	9.7	93.2	10.7	89.5	7.8	4.7	811	108.1%		Tailwater FMS	
14-May-02	10:50	750.0	9.7	95.5	10.9	89.5	7.7	1.0	813	108.4%	N	Tailwater Mooring	
14-May-02	10:51	750.0	9.7	95.3	10.9	89.8	7.7	1.0	816	108.8%	N	Tailwater Mooring	
14-May-02	10:55	750.0	9.7	95.6	10.9	89.7	7.7	0.6	818	109.1%		Tailwater Mooring	
14-May-02	11:10	750.0	9.7	94.5	10.8	89.8	7.8	5.0	809	107.9%	N	Transect #1	457
14-May-02	11:15	750.0	9.7	94.1	10.8	89.7	7.7	4.7	813	108.4%		Transect #1	707
14-May-02	11:20	750.0	9.7	93.6	10.7	89.6	7.8	5.0	815	108.7%		Transect #1	1050
14-May-02	11:25	750.0	9.7	93.3	10.7	89.5	7.7	5.0	816	108.8%		Transect #1	1332
14-May-02	11:35	750.0	9.7	92.6	10.6	89.7	7.7	4.7	813	108.4%		Transect #2	746
14-May-02	11:40	750.0	9.7	93.6	10.7	90.8	7.8	4.8	815	108.7%		Transect #2	976
14-May-02	11:45	750.0	9.7	94.1	10.8	90.9	7.7	4.7	816	108.8%		Transect #2	1251
14-May-02	11:50	750.0	9.7	93.9	10.7	89.0	7.7	4.5	813	108.4%		Transect #3	460
14-May-02	11:55	750.0	9.7	92.3	10.6	89.6	7.7	4.8	813	108.4%		Transect #3	859
14-May-02	12:00	750.0	9.7	93.5	10.7	89.7	7.8	4.8	814	108.5%		Transect #3	1072
14-May-02	12:05	750.0	9.7	94.7	10.8	89.6	7.7	4.7	815	108.7%		Transect #3	1328
14-May-02	13:13	750.0	9.7	88.4	10.1	89.5	7.7	3.1	785	104.7%	N	Transect #4	479
14-May-02	13:15	750.0	9.7	87.0	10.0	89.9	7.7	5.2	794	105.9%	N	Transect #4	581
14-May-02	13:16	750.0	9.7	88.3	10.1	89.8	7.7	5.2	798	106.4%	N	Transect #4	653
14-May-02	13:17	750.0	9.7	89.3	10.2	89.9	7.7	5.1	801	106.8%	N	Transect #4	680
14-May-02	13:18	750.0	9.7	90.1	10.3	89.8	7.7	5.3	804	107.2%	N	Transect #4	713
14-May-02	13:20	750.0	9.7	90.3	10.3	89.8	7.7	5.3	807	107.6%	N	Transect #4	794
14-May-02	13:21	750.0	9.7	90.7	10.4	89.8	7.7	5.4	808	107.7%	N	Transect #4	825
14-May-02	13:22	750.0	9.7	90.9	10.4	89.8	7.7	5.2	809	107.9%	N	Transect #4	849
14-May-02	13:23	750.0	9.7	91.1	10.4	89.9	7.7	5.3	810	108.0%		Transect #4	878
14-May-02	13:23	750.0	9.7	91.1	10.4	89.7	7.7	5.3	810	108.0%		Transect #4	885
14-May-02	13:25	750.0	9.8	92.3	10.6	89.7	7.7	5.1	811	108.1%		Transect #4	1004
14-May-02	13:27	750.0	9.7	92.9	10.6	89.8	7.7	5.3	812	108.3%		Transect #4	1044
14-May-02	13:28	750.0	9.7	92.5	10.6	89.8	7.7	5.2	812	108.3%		Transect #4	1059
14-May-02	13:30	750.0	9.7	91.6	10.5	93.3	7.7	5.2	812	108.3%		Transect #4	1091
14-May-02	13:35	750.0	9.7	92.8	10.6	89.8	7.7	3.4	807	107.6%	N	Transect #5	541
14-May-02	13:37	750.0	9.7	105.0	12.0	90.1	7.7	3.5	810	108.0%	N	Transect #5	703

Table 10, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
14-May-02	13:38	750.0	9.7	101.3	17.8	89.8	7.7	5.2	812	108.3%	N	Transect #5	745
14-May-02	13:40	750.0	9.7	99.4	11.4	89.7	7.7	5.0	813	108.4%		Transect #5	790
14-May-02	13:42	750.0	9.7	98.3	11.2	89.8	7.7	5.0	813	108.4%		Transect #5	883
14-May-02	13:43	750.0	9.7	98.3	11.2	89.7	7.7	5.0	813	108.4%		Transect #5	941
14-May-02	13:45	750.0	9.7	97.5	11.2	89.7	7.7	5.0	813	108.4%		Transect #5	1054
14-May-02	13:47	750.0	9.7	99.8	11.4	89.4	7.7	5.0	813	108.4%		Transect #5	1104
14-May-02	13:47	750.0	9.7	98.5	11.3	89.8	7.7	5.0	813	108.4%		Transect #5	1114
14-May-02	13:48	750.0	9.7	98.6	11.2	89.7	7.7	4.9	813	108.4%		Transect #5	1163
14-May-02	13:48	750.0	9.7	98.1	11.2	89.8	7.7	4.7	813	108.4%		Transect #5	1168
14-May-02	13:50	750.0	9.7	97.3	11.1	89.8	7.7	4.9	813	108.4%		Transect #5	1303
14-May-02	13:55	750.0	9.8	95.8	10.9	89.8	7.7	5.1	798	106.4%	N	Transect #6	418
14-May-02	13:55	750.0	9.8	103.1	11.8	89.9	7.7	5.2	799	106.5%	N	Transect #6	419
14-May-02	13:55	750.0	9.8	95.2	10.9	90.1	7.7	4.9	798	106.4%	N	Transect #6	419
14-May-02	13:58	750.0	9.8	96.4	11.0	89.8	7.7	4.8	803	107.1%	N	Transect #6	425
14-May-02	14:00	750.0	9.8	95.9	11.0	89.9	7.7	4.8	808	107.7%	N	Transect #6	431
14-May-02	14:03	750.0	9.8	96.6	11.0	89.8	7.7	4.9	811	108.1%	N	Transect #6	454
14-May-02	14:05	750.0	9.7	96.0	11.0	89.8	7.7	4.9	813	108.4%		Transect #6	504
14-May-02	14:07	750.0	9.7	96.3	11.0	90.1	7.7	5.0	813	108.4%		Transect #6	635
14-May-02	14:08	750.0	9.8	97.0	11.1	89.8	7.8	4.9	813	108.4%		Transect #6	677
14-May-02	14:10	750.0	9.8	97.7	11.2	90.1	7.7	5.0	813	108.4%		Transect #6	802
14-May-02	14:11	750.0	9.8	95.5	10.9	89.7	7.7	5.0	813	108.4%		Transect #6	873
14-May-02	14:12	750.0	9.8	95.6	10.9	89.7	7.8	5.1	813	108.4%		Transect #6 / Tailwater FMS	941
14-May-02	14:15	750.0	9.8	95.9	11.0	89.6	7.7	5.0	813	108.4%		Transect #6	1094
14-May-02	14:20	750.0	9.8	90.8	10.4	270.0	7.7	2.5	807	107.6%	N	Transect #7	451
14-May-02	14:21	750.0	9.8	95.5	11.1	82.2	7.7	4.3	804	107.2%	N	Transect #7	544
14-May-02	14:22	750.0	9.8	156.7	17.9	89.9	7.7	3.6	803	107.1%	N	Transect #7	614
14-May-02	14:23	750.0	9.8	110.1	12.6	90.1	7.7	3.4	804	107.2%	N	Transect #7	666
14-May-02	14:25	750.0	9.8	97.9	11.2	89.9	7.7	4.5	808	107.7%	N	Transect #7	768
14-May-02	14:27	750.0	9.8	97.2	11.1	89.9	7.7	4.8	810	108.0%		Transect #7	901
14-May-02	14:28	750.0	9.8	96.0	11.0	89.9	7.7	4.7	810	108.0%		Transect #7	974
14-May-02	14:30	750.0	9.8	96.1	11.0	89.6	7.7	5.1	810	108.0%		Transect #7	1083
14-May-02	14:31	750.0	9.8	95.9	11.0	89.6	7.7	4.9	810	108.0%		Transect #7	1140

Table 10, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
14-May-02	14:35	750.0	9.8	97.6	11.1	89.9	7.7	0.5	802	106.9%	N	Tailwater Mooring	
14-May-02	14:40	750.0	9.8	97.6	11.2	89.9	7.7	0.3	806	107.5%		Tailwater Mooring	
14-May-02	15:40	745.0	9.9	91.3	10.4	90.1	7.7	5.1	768	103.1%		Forebay FMS	

N = Measurement not at equilibrium

Table 11. Datasonde 16 data for Lower Granite Dam, May 14, 2002

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments
14-May-02	8:54	756.5	9.7	97.2	11.1	91.1	7.9	5.0	799	105.6%	N	Forebay FMS
14-May-02	8:59	756.5	9.7	97.4	11.1	91.1	7.9	5.0	802	106.0%	N	Forebay FMS
14-May-02	9:04	756.5	9.7	97.6	11.2	91.3	7.9	5.0	799	105.6%		Forebay FMS
14-May-02	10:14	750.0	9.7	102.2	11.7	90.8	7.8	5.1	811	108.1%		Tailwater FMS
14-May-02	10:19	750.0	9.7	103.0	11.8	91.1	7.8	4.4	812	108.3%		Tailwater FMS
14-May-02	10:49	750.0	9.6	105.4	12.1	91.0	7.8	0.7	818	109.1%		Tailwater Mooring
14-May-02	10:54	750.0	9.6	105.4	12.1	91.0	7.8	0.7	820	109.3%		Tailwater Mooring
14-May-02	10:59	750.0	9.6	105.8	12.1	91.1	7.8	0.8	822	109.6%		Tailwater Mooring
14-May-02	11:04	750.0	9.7	105.6	12.1	91.0	7.8	0.8	822	109.6%		Tailwater Mooring
14-May-02	11:09	750.0	9.6	105.4	12.1	91.0	7.8	0.8	820	109.3%		Tailwater Mooring
14-May-02	11:14	750.0	9.6	104.9	12.0	90.9	7.8	0.9	818	109.1%		Tailwater Mooring
14-May-02	11:19	750.0	9.6	104.7	12.0	91.0	7.8	0.8	816	108.8%		Tailwater Mooring
14-May-02	11:24	750.0	9.7	105.1	12.0	91.0	7.8	0.8	817	108.9%		Tailwater Mooring
14-May-02	11:29	750.0	9.6	105.1	12.0	90.9	7.8	0.8	818	109.1%		Tailwater Mooring
14-May-02	11:34	750.0	9.7	104.8	12.0	91.0	7.8	0.7	817	108.9%		Tailwater Mooring
14-May-02	11:39	750.0	9.6	105.0	12.0	90.9	7.9	0.7	817	108.9%		Tailwater Mooring
14-May-02	11:44	750.0	9.6	104.8	12.0	91.0	7.8	0.8	816	108.8%		Tailwater Mooring
14-May-02	11:49	750.0	9.7	105.1	12.0	90.9	7.8	0.8	815	108.7%		Tailwater Mooring
14-May-02	11:54	750.0	9.7	105.0	12.0	91.1	7.8	0.7	815	108.7%		Tailwater Mooring
14-May-02	11:59	750.0	9.7	104.9	12.0	91.0	7.8	0.8	816	108.8%		Tailwater Mooring
14-May-02	12:04	750.0	9.7	104.7	12.0	90.9	7.8	0.8	815	108.7%		Tailwater Mooring
14-May-02	12:09	750.0	9.7	104.3	12.0	91.0	7.8	0.8	815	108.7%		Tailwater Mooring
14-May-02	12:14	750.0	9.7	104.5	12.0	90.9	7.8	0.8	815	108.7%		Tailwater Mooring
14-May-02	12:19	750.0	9.7	104.5	12.0	91.1	7.8	0.8	813	108.4%		Tailwater Mooring
14-May-02	12:24	750.0	9.7	104.7	12.0	91.1	7.8	0.8	814	108.5%		Tailwater Mooring
14-May-02	12:29	750.0	9.7	105.0	12.0	91.1	7.8	0.8	815	108.7%		Tailwater Mooring
14-May-02	12:34	750.0	9.7	105.2	12.1	91.1	7.8	0.9	817	108.9%		Tailwater Mooring
14-May-02	12:39	750.0	9.7	105.2	12.1	91.1	7.8	0.8	818	109.1%		Tailwater Mooring
14-May-02	12:44	750.0	9.7	105.5	12.1	91.1	7.8	0.8	818	109.1%		Tailwater Mooring
14-May-02	12:49	750.0	9.7	105.4	12.1	91.3	7.8	0.8	818	109.1%		Tailwater Mooring
14-May-02	12:54	750.0	9.7	105.4	12.1	91.1	7.8	0.8	818	109.1%		Tailwater Mooring
14-May-02	12:59	750.0	9.7	105.3	12.1	91.1	7.8	0.7	818	109.1%		Tailwater Mooring
14-May-02	13:04	750.0	9.7	105.5	12.1	91.1	7.8	0.8	818	109.1%		Tailwater Mooring
14-May-02	13:09	750.0	9.7	105.8	12.1	91.3	7.8	0.7	819	109.2%		Tailwater Mooring

Table 11, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments
14-May-02	13:14	750.0	9.7	105.7	12.1	91.3	7.8	0.8	819	109.2%		Tailwater Mooring
14-May-02	13:19	750.0	9.7	105.3	12.1	91.3	7.8	0.8	817	108.9%		Tailwater Mooring
14-May-02	13:24	750.0	9.7	104.7	12.0	91.2	7.8	0.8	815	108.7%		Tailwater Mooring
14-May-02	13:29	750.0	9.7	105.0	12.0	91.2	7.8	0.9	816	108.8%		Tailwater Mooring
14-May-02	13:34	750.0	9.7	104.8	12.0	91.2	7.8	0.7	815	108.7%		Tailwater Mooring
14-May-02	13:39	750.0	9.7	105.3	12.1	91.2	7.8	0.8	816	108.8%		Tailwater Mooring
14-May-02	13:44	750.0	9.7	105.0	12.0	91.5	7.8	0.9	815	108.7%		Tailwater Mooring
14-May-02	13:49	750.0	9.7	105.2	12.0	91.2	7.8	0.7	815	108.7%		Tailwater Mooring
14-May-02	13:54	750.0	9.7	105.0	12.0	91.4	7.8	0.9	815	108.7%		Tailwater Mooring
14-May-02	13:59	750.0	9.7	105.3	12.0	91.2	7.8	0.8	815	108.7%		Tailwater Mooring
14-May-02	14:04	750.0	9.7	105.4	12.1	91.2	7.8	0.8	816	108.8%		Tailwater Mooring
14-May-02	14:09	750.0	9.7	105.4	12.1	91.5	7.8	0.8	816	108.8%		Tailwater Mooring
14-May-02	14:14	750.0	9.7	105.4	12.1	91.4	7.8	0.8	818	109.1%		Tailwater Mooring
14-May-02	14:19	750.0	9.7	105.2	12.0	91.2	7.8	0.8	817	108.9%		Tailwater Mooring
14-May-02	14:24	750.0	9.7	105.1	12.0	91.4	7.8	0.7	815	108.7%		Tailwater Mooring
14-May-02	14:29	750.0	9.8	104.7	12.0	91.2	7.8	0.7	813	108.4%		Tailwater Mooring
14-May-02	14:34	750.0	9.7	104.3	11.9	91.4	7.8	0.6	811	108.1%		Tailwater Mooring
14-May-02	14:39	750.0	9.7	106.3	12.2	91.5	7.7	0.2	810	108.0%		Tailwater Mooring
14-May-02	15:34	745.0	9.8	101.3	11.6	91.7	7.8	5.1	767	103.0%		Forebay FMS

N = Measurement not at equilibrium

Table 12. Datasonde 15 data for Lower Granite Dam, June 10, 2002

Date	Time	BP	Temp	DO	DO	SpCond	pH	Depth	TDG	TDG	Data	
		mmHg	degC	%Sat	mg/l	mS/cm	Units	meters	mmHg	%Sat	Qualifier	Comments
10-Jun-02	8:49	754.0	11.8	90.7	9.8	70.1	8.2	2.1	751	99.6%	N	Forebay FMS
10-Jun-02	8:50	754.0	11.8	87.7	9.5	69.9	7.7	2.2	754	100.0%	N	Forebay FMS
10-Jun-02	8:51	754.0	11.8	88.1	9.6	69.9	7.6	2.2	756	100.3%	N	Forebay FMS
10-Jun-02	8:52	754.0	11.8	87.7	9.5	70.0	7.6	2.2	758	100.5%	N	Forebay FMS
10-Jun-02	8:53	754.0	11.8	88.2	9.6	70.0	7.6	2.2	760	100.8%	N	Forebay FMS
10-Jun-02	8:54	754.0	11.8	87.7	9.5	70.1	7.7	2.2	762	101.1%	N	Forebay FMS
10-Jun-02	8:55	754.0	11.8	89.0	9.7	70.9	7.6	5.0	766	101.6%	N	Forebay FMS
10-Jun-02	8:56	754.0	11.8	89.1	9.7	70.5	7.6	5.0	767	101.7%		Forebay FMS
10-Jun-02	8:57	754.0	11.8	89.1	9.7	70.7	7.6	5.0	767	101.7%		Forebay FMS
10-Jun-02	8:58	754.0	11.8	89.1	9.7	71.0	7.6	5.0	767	101.7%		Forebay FMS
10-Jun-02	8:59	754.0	11.8	88.9	9.7	71.2	7.6	5.0	766	101.6%		Forebay FMS
10-Jun-02	9:00	754.0	11.8	89.0	9.7	71.1	7.6	5.0	766	101.6%		Forebay FMS
10-Jun-02	9:01	754.0	11.8	88.9	9.7	71.1	7.6	5.0	766	101.6%		Forebay FMS
10-Jun-02	9:02	754.0	11.8	89.1	9.7	70.7	7.6	5.0	765	101.5%		Forebay FMS
10-Jun-02	9:03	754.0	11.8	89.0	9.7	70.5	7.6	5.0	765	101.5%		Forebay FMS
10-Jun-02	9:04	754.0	11.8	89.0	9.7	70.5	7.6	5.0	765	101.5%		Forebay FMS
10-Jun-02	9:05	754.0	11.8	89.0	9.7	70.5	7.6	5.0	765	101.5%		Forebay FMS
10-Jun-02	9:06	754.0	11.8	89.0	9.7	70.6	7.6	5.0	764	101.3%		Forebay FMS
10-Jun-02	9:07	754.0	11.8	88.9	9.7	71.0	7.6	5.0	764	101.3%		Forebay FMS
10-Jun-02	10:21	754.0	11.8	105.7	11.5	72.9	8.0	1.2	798	105.8%	N	Tailwater FMS
10-Jun-02	10:22	754.0	11.7	107.3	11.7	73.3	7.9	0.5	825	109.4%	N	Tailwater FMS
10-Jun-02	10:23	754.0	11.7	108.7	11.8	73.2	7.9	0.3	848	112.5%	N	Tailwater FMS
10-Jun-02	10:24	754.0	11.7	109.2	11.9	73.3	7.9	0.5	864	114.6%	N	Tailwater FMS
10-Jun-02	10:25	754.0	11.7	108.5	11.8	73.4	7.8	1.1	874	115.9%	N	Tailwater FMS
10-Jun-02	10:26	754.0	11.7	110.4	12.0	73.4	7.8	0.3	882	117.0%	N	Tailwater FMS
10-Jun-02	10:27	754.0	11.7	108.6	11.8	73.3	7.8	0.3	887	117.6%	N	Tailwater FMS
10-Jun-02	10:28	754.0	11.7	111.2	12.1	73.6	7.8	0.3	886	117.5%	N	Tailwater FMS
10-Jun-02	10:29	754.0	11.7	108.6	11.8	73.7	7.8	1.9	894	118.6%	N	Tailwater FMS
10-Jun-02	10:30	754.0	11.7	108.9	11.8	73.4	7.8	1.6	896	118.8%	N	Tailwater FMS
10-Jun-02	10:31	754.0	11.7	108.7	11.8	73.6	7.8	1.5	897	119.0%	N	Tailwater FMS
10-Jun-02	10:32	754.0	11.7	109.6	11.9	73.3	7.8	0.5	896	118.8%	N	Tailwater FMS
10-Jun-02	10:33	754.0	11.7	109.6	11.9	73.7	7.8	0.5	897	119.0%	N	Tailwater FMS
10-Jun-02	10:34	754.0	11.7	107.4	11.7	73.6	7.8	4.0	905	120.0%		Tailwater FMS
10-Jun-02	10:35	754.0	11.7	106.5	11.6	73.6	7.8	4.0	905	120.0%		Tailwater FMS
10-Jun-02	10:36	754.0	11.7	106.5	11.6	73.4	7.8	4.1	904	119.9%		Tailwater FMS

Table 12, continued

Date	Time	BP	Temp	DO	DO	SpCond	pH	Depth	TDG	TDG	Data	
		mmHg	degC	%Sat	mg/l	mS/cm	Units	meters	mmHg	%Sat	Qualifier	Comments
10-Jun-02	10:37	754.0	11.7	106.7	11.6	73.3	7.8	4.1	904	119.9%		Tailwater FMS
10-Jun-02	10:38	754.0	11.7	106.7	11.6	73.3	7.8	4.2	903	119.8%		Tailwater FMS
10-Jun-02	11:47	754.0	11.7	105.3	11.5	72.9	7.7	4.7	803	106.5%	N	Tailwater Mooring
10-Jun-02	11:48	754.0	11.7	106.9	11.6	73.4	7.7	4.7	834	110.6%	N	Tailwater Mooring
10-Jun-02	11:49	754.0	11.7	107.5	11.7	73.3	7.7	4.6	855	113.4%	N	Tailwater Mooring
10-Jun-02	11:50	754.0	11.7	107.5	11.7	73.4	7.7	4.7	870	115.4%	N	Tailwater Mooring
10-Jun-02	11:51	754.0	11.7	116.0	12.6	73.6	7.6	3.5	879	116.6%	N	Tailwater Mooring
10-Jun-02	11:52	754.0	11.7	124.0	13.5	73.4	7.6	2.7	887	117.6%	N	Tailwater Mooring
10-Jun-02	11:53	754.0	11.7	121.9	13.3	74.0	7.7	2.4	894	118.6%	N	Tailwater Mooring
10-Jun-02	11:54	754.0	11.7	122.7	13.3	74.2	7.7	2.4	899	119.2%	N	Tailwater Mooring
10-Jun-02	11:55	754.0	11.7	120.7	13.1	74.2	7.6	2.3	902	119.6%	N	Tailwater Mooring
10-Jun-02	11:56	754.0	11.7	119.1	13.0	74.2	7.6	2.4	905	120.0%	N	Tailwater Mooring
10-Jun-02	11:57	754.0	11.7	121.2	13.2	74.2	7.6	2.6	907	120.3%		Tailwater Mooring
10-Jun-02	11:58	754.0	11.7	114.6	12.5	74.0	7.6	2.4	907	120.3%		Tailwater Mooring
10-Jun-02	11:59	754.0	11.7	112.6	12.2	74.0	7.6	2.5	909	120.6%		Tailwater Mooring
10-Jun-02	12:00	754.0	11.7	113.6	12.3	73.9	7.6	2.5	913	121.1%		Tailwater Mooring
10-Jun-02	12:01	754.0	11.7	119.1	12.9	73.9	7.6	2.5	915	121.4%		Tailwater Mooring
10-Jun-02	12:02	754.0	11.8	131.7	14.3	74.0	7.6	2.2	918	121.8%		Tailwater Mooring
10-Jun-02	12:03	754.0	11.8	116.7	12.7	73.9	7.6	2.2	921	122.1%		Tailwater Mooring
10-Jun-02	12:04	754.0	11.8	119.2	13.0	73.9	7.6	2.4	923	122.4%		Tailwater Mooring
10-Jun-02	12:05	754.0	11.8	120.3	13.1	74.0	7.6	2.3	922	122.3%		Tailwater Mooring
10-Jun-02	12:06	754.0	11.7	117.1	12.7	74.0	7.6	2.4	921	122.1%		Tailwater Mooring
10-Jun-02	12:07	754.0	11.7	117.2	12.7	74.0	7.6	2.5	919	121.9%		Tailwater Mooring
10-Jun-02	12:08	754.0	11.7	112.0	12.2	74.0	7.6	2.8	919	121.9%		Tailwater Mooring
10-Jun-02	12:09	754.0	11.7	112.7	12.3	74.0	7.6	3.1	919	121.9%		Tailwater Mooring
10-Jun-02	12:10	754.0	11.7	112.9	12.3	73.9	7.6	2.8	917	121.6%		Tailwater Mooring
10-Jun-02	12:11	754.0	11.7	112.1	12.2	74.2	7.6	2.7	913	121.1%		Tailwater Mooring
10-Jun-02	12:12	754.0	11.7	114.3	12.4	74.2	7.6	3.0	911	120.8%		Tailwater Mooring
10-Jun-02	12:13	754.0	11.7	113.5	12.3	74.2	7.6	2.8	909	120.6%		Tailwater Mooring
10-Jun-02	12:14	754.0	11.7	115.5	12.6	74.2	7.7	3.5	910	120.7%		Tailwater Mooring
10-Jun-02	12:15	754.0	11.7	119.0	12.9	74.2	7.6	2.6	908	120.4%		Tailwater Mooring
10-Jun-02	12:16	754.0	11.7	115.8	12.6	74.3	7.6	2.9	908	120.4%		Tailwater Mooring
10-Jun-02	12:17	754.0	11.7	114.2	12.4	74.2	7.6	3.1	909	120.6%		Tailwater Mooring
10-Jun-02	12:18	754.0	11.7	113.7	12.4	74.3	7.6	2.8	909	120.6%		Tailwater Mooring
10-Jun-02	12:19	754.0	11.7	115.9	12.6	74.0	7.7	3.2	909	120.6%		Tailwater Mooring
10-Jun-02	12:20	754.0	11.7	113.4	12.3	74.0	7.6	2.8	908	120.4%		Tailwater Mooring

Table 12, continued

Date	Time	BP	Temp	DO	DO	SpCond	pH	Depth	TDG	TDG	Data	
		mmHg	degC	%Sat	mg/l	mS/cm	Units	meters	mmHg	%Sat	Qualifier	Comments
10-Jun-02	12:21	754.0	11.7	113.1	12.3	74.2	7.6	2.8	908	120.4%		Tailwater Mooring
10-Jun-02	12:22	754.0	11.7	115.0	12.5	74.3	7.6	2.8	907	120.3%		Tailwater Mooring
10-Jun-02	12:23	754.0	11.7	119.1	13.0	74.3	7.6	3.0	909	120.6%		Tailwater Mooring
10-Jun-02	12:24	754.0	11.7	118.5	12.9	74.4	7.6	3.1	911	120.8%		Tailwater Mooring
10-Jun-02	12:25	754.0	11.7	118.9	12.9	74.2	7.6	3.1	913	121.1%		Tailwater Mooring
10-Jun-02	12:26	754.0	11.7	124.8	13.6	74.2	7.6	2.8	913	121.1%		Tailwater Mooring
10-Jun-02	12:27	754.0	11.7	114.9	12.5	74.4	7.6	2.5	910	120.7%		Tailwater Mooring
10-Jun-02	12:28	754.0	11.7	115.7	12.6	74.3	7.6	2.3	907	120.3%		Tailwater Mooring
10-Jun-02	12:29	754.0	11.7	111.3	12.1	74.4	7.6	2.4	904	119.9%		Tailwater Mooring
10-Jun-02	12:30	754.0	11.7	116.2	12.6	74.4	7.6	2.9	903	119.8%		Tailwater Mooring
10-Jun-02	12:31	754.0	11.7	111.1	12.1	74.3	7.6	3.3	903	119.8%		Tailwater Mooring
10-Jun-02	12:32	754.0	11.7	111.6	12.1	74.3	7.7	3.1	902	119.6%		Tailwater Mooring
10-Jun-02	12:33	754.0	11.7	115.9	12.6	74.3	7.6	2.7	905	120.0%		Tailwater Mooring
10-Jun-02	12:34	754.0	11.7	113.1	12.3	74.3	7.6	2.3	909	120.6%		Tailwater Mooring
10-Jun-02	12:35	754.0	11.7	118.3	12.7	74.3	7.6	2.4	913	121.1%		Tailwater Mooring
10-Jun-02	12:36	754.0	11.7	112.5	12.2	74.2	7.6	2.4	916	121.5%		Tailwater Mooring
10-Jun-02	12:37	754.0	11.7	114.3	12.4	74.3	7.6	2.6	918	121.8%		Tailwater Mooring
10-Jun-02	12:38	754.0	11.7	113.1	12.3	74.2	7.6	3.1	919	121.9%		Tailwater Mooring
10-Jun-02	12:39	754.0	11.7	114.5	12.5	74.3	7.6	2.6	917	121.6%		Tailwater Mooring
10-Jun-02	12:40	754.0	11.7	115.6	12.6	74.0	7.7	3.4	917	121.6%		Tailwater Mooring
10-Jun-02	12:41	754.0	11.7	118.8	12.9	74.2	7.6	3.3	916	121.5%		Tailwater Mooring
10-Jun-02	12:42	754.0	11.7	113.5	12.3	74.2	7.6	2.9	916	121.5%		Tailwater Mooring
10-Jun-02	12:43	754.0	11.7	116.0	12.6	74.0	7.6	3.3	916	121.5%		Tailwater Mooring
10-Jun-02	12:44	754.0	11.7	111.4	12.1	74.0	7.6	3.4	916	121.5%		Tailwater Mooring
10-Jun-02	12:45	754.0	11.7	112.1	12.2	74.0	7.6	3.7	914	121.2%		Tailwater Mooring
10-Jun-02	12:46	754.0	11.7	113.4	12.3	74.2	7.6	3.4	911	120.8%		Tailwater Mooring
10-Jun-02	12:47	754.0	11.7	112.8	12.3	74.2	7.6	3.4	909	120.6%		Tailwater Mooring
10-Jun-02	12:48	754.0	11.7	116.3	12.7	74.2	7.6	3.9	907	120.3%		Tailwater Mooring
10-Jun-02	12:49	754.0	11.7	113.5	12.4	74.0	7.6	4.1	907	120.3%		Tailwater Mooring
10-Jun-02	12:50	754.0	11.7	111.1	12.1	74.0	7.6	3.8	905	120.0%		Tailwater Mooring
10-Jun-02	12:51	754.0	11.7	113.6	12.4	74.0	7.6	3.4	903	119.8%		Tailwater Mooring
10-Jun-02	12:52	754.0	11.7	110.2	12.0	74.0	7.6	3.6	901	119.5%		Tailwater Mooring
10-Jun-02	12:53	754.0	11.7	110.3	12.0	74.2	7.6	3.3	900	119.4%		Tailwater Mooring
10-Jun-02	12:54	754.0	11.7	112.6	12.3	74.0	7.6	3.7	900	119.4%		Tailwater Mooring
10-Jun-02	12:55	754.0	11.7	110.2	12.0	74.2	7.6	3.6	901	119.5%		Tailwater Mooring
10-Jun-02	12:56	754.0	11.7	111.6	12.1	74.0	7.6	3.3	900	119.4%		Tailwater Mooring

Table 12, continued

Date	Time	BP	Temp	DO	DO	SpCond	pH	Depth	TDG	TDG	Data	
		mmHg	degC	%Sat	mg/l	mS/cm	Units	meters	mmHg	%Sat	Qualifier	Comments
10-Jun-02	12:57	754.0	11.7	113.9	12.4	74.2	7.6	3.2	899	119.2%		Tailwater Mooring
10-Jun-02	12:58	754.0	11.7	112.7	12.3	74.0	7.6	3.5	900	119.4%		Tailwater Mooring
10-Jun-02	12:59	754.0	11.7	111.1	12.1	74.2	7.6	3.9	902	119.6%		Tailwater Mooring
10-Jun-02	13:00	754.0	11.7	110.5	12.0	74.0	7.6	4.0	903	119.8%		Tailwater Mooring
10-Jun-02	13:01	754.0	11.7	110.8	12.1	74.0	7.6	3.6	902	119.6%		Tailwater Mooring
10-Jun-02	13:02	754.0	11.7	111.3	12.1	74.0	7.6	3.7	902	119.6%		Tailwater Mooring
10-Jun-02	13:03	754.0	11.7	119.1	13.0	74.2	7.6	3.2	902	119.6%		Tailwater Mooring
10-Jun-02	13:04	754.0	11.7	111.2	12.1	74.0	7.6	3.8	904	119.9%		Tailwater Mooring
10-Jun-02	13:05	754.0	11.7	111.5	12.1	74.2	7.7	3.7	904	119.9%		Tailwater Mooring
10-Jun-02	13:06	754.0	11.7	114.0	12.4	74.2	7.6	3.3	904	119.9%		Tailwater Mooring
10-Jun-02	13:07	754.0	11.7	110.8	12.1	74.0	7.6	3.6	904	119.9%		Tailwater Mooring
10-Jun-02	13:08	754.0	11.7	110.2	12.0	74.0	7.6	3.4	903	119.8%		Tailwater Mooring
10-Jun-02	13:09	754.0	11.7	111.5	12.1	74.2	7.6	3.5	903	119.8%		Tailwater Mooring
10-Jun-02	13:10	754.0	11.7	111.5	12.1	74.2	7.6	3.5	903	119.8%		Tailwater Mooring
10-Jun-02	13:11	754.0	11.7	111.5	12.1	74.2	7.6	3.1	903	119.8%		Tailwater Mooring
10-Jun-02	13:12	754.0	11.7	112.9	12.3	74.2	7.6	3.2	904	119.9%		Tailwater Mooring
10-Jun-02	13:13	754.0	11.7	111.7	12.2	74.2	7.6	3.1	906	120.2%		Tailwater Mooring
10-Jun-02	13:14	754.0	11.7	113.9	12.4	74.2	7.6	2.9	904	119.9%		Tailwater Mooring
10-Jun-02	13:15	754.0	11.7	110.7	12.1	74.2	7.7	3.3	903	119.8%		Tailwater Mooring
10-Jun-02	13:16	754.0	11.7	112.6	12.2	74.2	7.6	3.5	904	119.9%		Tailwater Mooring
10-Jun-02	13:17	754.0	11.7	113.8	12.4	74.2	7.6	3.4	904	119.9%		Tailwater Mooring
10-Jun-02	13:18	754.0	11.7	116.6	12.7	74.2	7.6	2.8	903	119.8%		Tailwater Mooring
10-Jun-02	13:19	754.0	11.7	113.8	12.4	74.2	7.7	3.0	903	119.8%		Tailwater Mooring
10-Jun-02	13:20	754.0	11.7	113.1	12.3	74.3	7.6	2.9	901	119.5%		Tailwater Mooring
10-Jun-02	13:21	754.0	11.7	116.4	12.7	74.3	7.6	3.0	901	119.5%		Tailwater Mooring
10-Jun-02	13:22	754.0	11.7	112.1	12.2	74.4	7.6	3.2	902	119.6%		Tailwater Mooring
10-Jun-02	13:23	754.0	11.7	112.1	12.2	74.4	7.6	3.0	902	119.6%		Tailwater Mooring
10-Jun-02	13:24	754.0	11.7	112.7	12.3	74.4	7.6	3.3	903	119.8%		Tailwater Mooring
10-Jun-02	13:25	754.0	11.7	111.3	12.1	74.4	7.6	3.7	904	119.9%		Tailwater Mooring
10-Jun-02	13:26	754.0	11.7	113.5	12.4	74.4	7.6	3.7	906	120.2%		Tailwater Mooring
10-Jun-02	13:27	754.0	11.7	114.4	12.2	74.4	7.6	3.6	906	120.2%		Tailwater Mooring
10-Jun-02	13:28	754.0	11.7	111.0	12.1	74.4	7.6	3.7	905	120.0%		Tailwater Mooring
10-Jun-02	13:29	754.0	11.7	111.4	12.1	74.4	7.6	3.0	904	119.9%		Tailwater Mooring
10-Jun-02	13:30	754.0	11.7	110.8	12.1	74.4	7.6	3.3	904	119.9%		Tailwater Mooring
10-Jun-02	13:31	754.0	11.7	114.3	12.4	74.4	7.6	3.3	903	119.8%		Tailwater Mooring
10-Jun-02	13:32	754.0	11.7	112.1	12.2	74.3	7.6	2.9	901	119.5%		Tailwater Mooring

Table 12, continued

Date	Time	BP	Temp	DO	DO	SpCond	pH	Depth	TDG	TDG	Data	
		mmHg	degC	%Sat	mg/l	mS/cm	Units	meters	mmHg	%Sat	Qualifier	Comments
10-Jun-02	13:33	754.0	11.7	112.2	12.2	74.4	7.6	3.1	901	119.5%		Tailwater Mooring
10-Jun-02	13:34	754.0	11.7	111.6	12.1	74.5	7.6	2.9	900	119.4%		Tailwater Mooring
10-Jun-02	13:35	754.0	11.7	111.8	12.2	74.5	7.6	2.9	901	119.5%		Tailwater Mooring
10-Jun-02	13:36	754.0	11.7	112.0	12.2	74.4	7.6	3.2	901	119.5%		Tailwater Mooring
10-Jun-02	13:37	754.0	11.7	113.0	12.3	74.4	7.6	3.4	902	119.6%		Tailwater Mooring
10-Jun-02	13:38	754.0	11.7	112.1	12.2	74.5	7.6	3.4	905	120.0%		Tailwater Mooring
10-Jun-02	13:39	754.0	11.7	114.9	12.5	74.3	7.6	3.5	905	120.0%		Tailwater Mooring
10-Jun-02	13:40	754.0	11.7	114.3	12.4	74.4	7.6	3.6	905	120.0%		Tailwater Mooring
10-Jun-02	13:41	754.0	11.7	116.2	12.6	74.4	7.6	3.3	904	119.9%		Tailwater Mooring
10-Jun-02	13:42	754.0	11.7	110.8	12.0	74.4	7.6	3.8	904	119.9%		Tailwater Mooring
10-Jun-02	13:43	754.0	11.7	118.5	12.9	74.3	7.6	3.4	904	119.9%		Tailwater Mooring
10-Jun-02	13:44	754.0	11.7	110.3	12.0	74.3	7.6	3.4	903	119.8%		Tailwater Mooring
10-Jun-02	13:45	754.0	11.7	122.4	13.3	74.5	7.6	2.6	900	119.4%		Tailwater Mooring
10-Jun-02	13:46	754.0	11.7	111.9	12.2	74.4	7.6	3.5	901	119.5%		Tailwater Mooring
10-Jun-02	13:47	754.0	11.7	112.8	12.3	74.4	7.6	3.1	901	119.5%		Tailwater Mooring
10-Jun-02	13:48	754.0	11.7	113.0	12.3	74.4	7.6	3.1	901	119.5%		Tailwater Mooring
10-Jun-02	13:49	754.0	11.7	112.2	12.2	74.3	7.6	3.4	901	119.5%		Tailwater Mooring
10-Jun-02	13:50	754.0	11.7	112.2	12.2	74.5	7.6	3.0	900	119.4%		Tailwater Mooring
10-Jun-02	13:51	754.0	11.7	112.4	12.2	74.4	7.6	3.6	902	119.6%		Tailwater Mooring
10-Jun-02	13:52	754.0	11.7	113.7	12.4	74.4	7.6	3.8	903	119.8%		Tailwater Mooring
10-Jun-02	13:53	754.0	11.7	118.4	12.9	74.4	7.6	3.4	904	119.9%		Tailwater Mooring
10-Jun-02	13:54	754.0	11.7	111.5	12.1	74.4	7.6	3.7	905	120.0%		Tailwater Mooring
10-Jun-02	13:55	754.0	11.7	111.7	12.1	74.4	7.6	3.4	904	119.9%		Tailwater Mooring
10-Jun-02	13:56	754.0	11.7	122.0	13.3	74.4	7.6	2.7	903	119.8%		Tailwater Mooring
10-Jun-02	13:57	754.0	11.7	110.5	12.0	74.4	7.6	2.8	902	119.6%		Tailwater Mooring
10-Jun-02	13:58	754.0	11.7	115.3	12.5	74.4	7.6	2.6	901	119.5%		Tailwater Mooring
10-Jun-02	13:59	754.0	11.7	116.2	12.6	74.4	7.6	2.5	900	119.4%		Tailwater Mooring
10-Jun-02	14:00	754.0	11.7	111.5	12.1	74.5	7.6	2.8	899	119.2%		Tailwater Mooring
10-Jun-02	14:01	754.0	11.7	112.5	12.2	74.5	7.6	2.8	898	119.1%		Tailwater Mooring
10-Jun-02	14:02	754.0	11.7	111.2	12.1	74.7	7.6	2.8	899	119.2%		Tailwater Mooring
10-Jun-02	14:03	754.0	11.7	112.0	12.2	74.5	7.6	2.9	900	119.4%		Tailwater Mooring
10-Jun-02	14:04	754.0	11.7	112.5	12.2	74.5	7.6	2.7	899	119.2%		Tailwater Mooring
10-Jun-02	14:05	754.0	11.7	114.6	12.5	74.5	7.6	2.6	899	119.2%		Tailwater Mooring
10-Jun-02	14:06	754.0	11.7	112.2	12.2	74.7	7.6	2.5	899	119.2%		Tailwater Mooring
10-Jun-02	14:07	754.0	11.7	116.8	12.7	74.7	7.6	2.7	901	119.5%		Tailwater Mooring
10-Jun-02	14:08	754.0	11.7	124.9	13.6	74.5	7.6	2.9	902	119.6%		Tailwater Mooring

Table 12, continued

Date	Time	BP	Temp	DO	DO	SpCond	pH	Depth	TDG	TDG	Data	
		mmHg	degC	%Sat	mg/l	mS/cm	Units	meters	mmHg	%Sat	Qualifier	Comments
10-Jun-02	14:09	754.0	11.7	114.1	12.4	74.7	7.6	2.7	904	119.9%		Tailwater Mooring
10-Jun-02	14:10	754.0	11.7	113.3	12.3	74.4	7.6	2.9	906	120.2%		Tailwater Mooring
10-Jun-02	14:11	754.0	11.7	119.4	13.0	74.5	7.6	2.7	906	120.2%		Tailwater Mooring
10-Jun-02	14:12	754.0	11.7	115.9	12.6	74.4	7.6	2.8	906	120.2%		Tailwater Mooring
10-Jun-02	14:13	754.0	11.7	112.6	12.3	74.5	7.6	2.7	907	120.3%		Tailwater Mooring
10-Jun-02	14:14	754.0	11.7	114.9	12.5	74.5	7.6	2.6	907	120.3%		Tailwater Mooring
10-Jun-02	14:15	754.0	11.7	114.2	12.4	74.5	7.6	2.6	907	120.3%		Tailwater Mooring
10-Jun-02	14:16	754.0	11.7	113.3	12.3	74.5	7.6	2.6	908	120.4%		Tailwater Mooring
10-Jun-02	14:17	754.0	11.7	113.8	12.4	74.7	7.6	2.5	907	120.3%		Tailwater Mooring
10-Jun-02	14:18	754.0	11.7	112.8	12.3	74.5	7.6	2.8	907	120.3%		Tailwater Mooring
10-Jun-02	14:19	754.0	11.7	114.9	12.5	74.5	7.6	2.5	906	120.2%		Tailwater Mooring
10-Jun-02	14:20	754.0	11.7	112.7	12.3	74.4	7.6	2.6	906	120.2%		Tailwater Mooring
10-Jun-02	14:21	754.0	11.7	114.7	12.5	74.5	7.6	2.7	907	120.3%		Tailwater Mooring
10-Jun-02	14:22	754.0	11.7	119.3	13.0	74.5	7.6	2.8	907	120.3%		Tailwater Mooring
10-Jun-02	14:23	754.0	11.7	116.7	12.7	74.5	7.6	3.2	908	120.4%		Tailwater Mooring
10-Jun-02	14:24	754.0	11.7	113.3	12.3	74.5	7.6	2.5	907	120.3%		Tailwater Mooring
10-Jun-02	14:25	754.0	11.7	115.7	12.6	74.5	7.6	2.4	908	120.4%		Tailwater Mooring
10-Jun-02	14:26	754.0	11.7	113.1	12.3	74.7	7.6	2.6	909	120.6%		Tailwater Mooring
10-Jun-02	14:27	754.0	11.7	123.2	13.4	74.5	7.6	2.6	909	120.6%		Tailwater Mooring
10-Jun-02	14:28	754.0	11.7	116.5	12.7	74.5	7.6	2.4	908	120.4%		Tailwater Mooring
10-Jun-02	14:29	754.0	11.7	113.8	12.4	74.5	7.6	2.5	909	120.6%		Tailwater Mooring
10-Jun-02	14:30	754.0	11.7	116.9	12.7	74.7	7.6	2.7	910	120.7%		Tailwater Mooring
10-Jun-02	14:31	754.0	11.7	119.8	13.0	74.5	7.6	2.5	909	120.6%		Tailwater Mooring
10-Jun-02	14:32	754.0	11.7	122.9	13.4	74.7	7.6	2.6	909	120.6%		Tailwater Mooring
10-Jun-02	14:33	754.0	11.7	115.3	12.5	74.5	7.6	2.6	908	120.4%		Tailwater Mooring
10-Jun-02	14:34	754.0	11.7	114.0	12.4	74.5	7.6	2.7	907	120.3%		Tailwater Mooring
10-Jun-02	14:35	754.0	11.7	112.5	12.2	74.5	7.6	2.7	907	120.3%		Tailwater Mooring
10-Jun-02	14:36	754.0	11.7	112.6	12.3	74.7	7.6	3.2	907	120.3%		Tailwater Mooring
10-Jun-02	14:37	754.0	11.7	112.4	12.2	74.4	7.6	2.9	906	120.2%		Tailwater Mooring
10-Jun-02	14:38	754.0	11.7	112.9	12.3	74.4	7.6	2.9	906	120.2%		Tailwater Mooring
10-Jun-02	14:39	754.0	11.7	111.9	12.2	74.5	7.6	2.7	907	120.3%		Tailwater Mooring
10-Jun-02	14:40	754.0	11.7	112.8	12.3	74.5	7.6	3.0	907	120.3%		Tailwater Mooring
10-Jun-02	14:41	754.0	11.7	114.0	12.4	74.5	7.6	2.5	907	120.3%		Tailwater Mooring
10-Jun-02	14:42	754.0	11.7	113.7	12.4	74.4	7.6	2.9	907	120.3%		Tailwater Mooring
10-Jun-02	14:43	754.0	11.7	114.1	12.4	74.5	7.6	2.7	907	120.3%		Tailwater Mooring
10-Jun-02	14:44	754.0	11.7	112.6	12.3	74.7	7.6	2.8	906	120.2%		Tailwater Mooring

Table 12, continued

Date	Time	BP	Temp	DO	DO	SpCond	pH	Depth	TDG	TDG	Data	
		mmHg	degC	%Sat	mg/l	mS/cm	Units	meters	mmHg	%Sat	Qualifier	Comments
10-Jun-02	14:45	754.0	11.7	114.3	12.4	74.5	7.6	2.6	905	120.0%		Tailwater Mooring
10-Jun-02	14:46	754.0	11.7	112.3	12.2	74.7	7.6	2.6	905	120.0%		Tailwater Mooring
10-Jun-02	14:47	754.0	11.7	112.2	12.2	74.7	7.6	2.7	905	120.0%		Tailwater Mooring
10-Jun-02	14:48	754.0	11.7	115.2	12.5	74.7	7.6	2.5	905	120.0%		Tailwater Mooring
10-Jun-02	14:49	754.0	11.7	112.1	12.2	74.5	7.6	2.4	904	119.9%		Tailwater Mooring
10-Jun-02	14:50	754.0	11.7	114.1	12.4	5.6	7.6	0.1	901	119.5%		Tailwater Mooring

N = Measurement not at equilibrium

Table 13. Datasonde 16 data for Lower Granite Dam, June 10, 2002

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
10-Jun-02	8:48	754.0	11.8	91.3	9.9	71.9	8.1	1.4	751	99.6%	N	Forebay FMS	
10-Jun-02	8:49	754.0	11.8	91.1	9.9	72.3	8.0	1.4	754	100.0%	N	Forebay FMS	
10-Jun-02	8:50	754.0	11.8	90.7	9.9	72.1	8.0	1.5	756	100.3%	N	Forebay FMS	
10-Jun-02	8:51	754.0	11.8	85.5	9.3	72.0	8.0	1.5	758	100.5%	N	Forebay FMS	
10-Jun-02	8:52	754.0	11.8	83.6	9.1	72.0	8.0	1.5	759	100.7%	N	Forebay FMS	
10-Jun-02	8:53	754.0	11.7	91.1	9.9	72.7	7.9	5.0	765	101.5%	N	Forebay FMS	
10-Jun-02	8:54	754.0	11.7	91.5	10.0	73.0	7.9	5.1	766	101.6%	N	Forebay FMS	
10-Jun-02	8:55	754.0	11.7	91.3	9.9	72.6	7.9	5.1	767	101.7%		Forebay FMS	
10-Jun-02	8:56	754.0	11.7	91.7	10.0	72.5	7.9	5.1	767	101.7%		Forebay FMS	
10-Jun-02	8:57	754.0	11.7	91.9	10.0	72.6	7.9	5.1	768	101.9%		Forebay FMS	
10-Jun-02	8:58	754.0	11.7	91.7	10.0	72.5	7.8	5.1	768	101.9%		Forebay FMS	
10-Jun-02	8:59	754.0	11.7	91.8	10.0	73.0	7.8	5.1	768	101.9%		Forebay FMS	
10-Jun-02	9:00	754.0	11.7	91.1	9.9	73.0	7.9	5.1	767	101.7%		Forebay FMS	
10-Jun-02	9:01	754.0	11.7	91.2	9.9	73.0	7.8	5.1	767	101.7%		Forebay FMS	
10-Jun-02	9:02	754.0	11.7	90.4	9.8	72.6	7.7	5.1	767	101.7%		Forebay FMS	
10-Jun-02	9:03	754.0	11.7	90.5	9.8	72.6	7.6	5.1	766	101.6%		Forebay FMS	
10-Jun-02	9:04	754.0	11.7	90.3	9.8	72.5	7.5	5.1	766	101.6%		Forebay FMS	
10-Jun-02	9:05	754.0	11.7	89.8	9.8	72.6	7.6	5.1	766	101.6%		Forebay FMS	
10-Jun-02	9:06	754.0	11.7	90.2	9.8	72.7	7.6	5.1	765	101.5%		Forebay FMS	
10-Jun-02	9:07	754.0	11.7	89.9	9.8	72.7	7.7	5.1	765	101.5%		Forebay FMS	
10-Jun-02	9:08	754.0	11.7	89.6	9.8	72.7	7.7	5.1	765	101.5%		Forebay FMS	
10-Jun-02	10:19	754.0	11.7	95.8	10.4	74.1	8.4	0.8	763	101.2%	N	Tailwater FMS	
10-Jun-02	10:20	754.0	11.7	109.0	11.9	74.6	8.0	1.4	804	106.6%	N	Tailwater FMS	
10-Jun-02	10:21	754.0	11.7	116.8	12.7	74.8	8.0	0.9	829	109.9%	N	Tailwater FMS	
10-Jun-02	10:22	754.0	11.7	110.2	11.7	75.1	7.9	0.4	847	112.3%	N	Tailwater FMS	
10-Jun-02	10:23	754.0	11.7	108.8	11.8	75.3	7.9	0.5	864	114.6%	N	Tailwater FMS	
10-Jun-02	10:24	754.0	11.7	109.1	11.9	75.4	7.9	0.5	874	115.9%	N	Tailwater FMS	
10-Jun-02	10:25	754.0	11.7	109.7	11.9	75.3	7.9	1.2	882	117.0%	N	Tailwater FMS	
10-Jun-02	10:26	754.0	11.7	118.4	12.9	75.3	7.9	0.3	887	117.6%	N	Tailwater FMS	
10-Jun-02	10:27	754.0	11.7	109.7	11.9	75.3	7.9	0.4	890	118.0%	N	Tailwater FMS	
10-Jun-02	10:28	754.0	11.7	108.0	11.8	75.3	7.9	0.4	889	117.9%	N	Tailwater FMS	
10-Jun-02	10:29	754.0	11.7	110.1	12.0	74.8	7.8	1.5	895	118.7%	N	Tailwater FMS	
10-Jun-02	10:30	754.0	11.7	109.8	12.0	74.8	7.8	1.6	897	119.0%		Tailwater FMS	
10-Jun-02	10:31	754.0	11.7	110.1	12.0	75.1	7.8	0.8	897	119.0%		Tailwater FMS	

Table 13, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
10-Jun-02	10:32	754.0	11.7	111.7	12.2	75.3	7.8	0.4	897	119.0%		Tailwater FMS	
10-Jun-02	10:33	754.0	11.7	111.4	12.1	75.3	7.8	0.4	898	119.1%		Tailwater FMS	
10-Jun-02	10:34	754.0	11.7	109.8	12.0	74.8	7.8	3.7	904	119.9%		Tailwater FMS	
10-Jun-02	10:35	754.0	11.7	108.9	11.9	74.8	7.8	3.7	904	119.9%		Tailwater FMS	
10-Jun-02	10:36	754.0	11.7	108.8	11.8	74.8	7.8	3.7	904	119.9%		Tailwater FMS	
10-Jun-02	10:37	754.0	11.7	108.6	11.8	74.8	7.8	3.7	904	119.9%		Tailwater FMS	
10-Jun-02	10:38	754.0	11.7	108.5	11.8	74.8	7.8	3.7	903	119.8%		Tailwater FMS	
10-Jun-02	10:54	754.0	11.7	109.2	11.9	74.8	7.8	3.3	846	112.2%	N	Transect #1	580
10-Jun-02	10:55	754.0	11.7	110.0	12.0	74.8	7.8	5.7	869	115.3%	N	Transect #1	671
10-Jun-02	10:56	754.0	11.7	110.1	12.0	74.9	7.7	4.9	879	116.6%	N	Transect #1	760
10-Jun-02	10:57	754.0	11.7	110.0	12.0	74.9	7.8	4.7	887	117.6%	N	Transect #1	852
10-Jun-02	10:58	754.0	11.7	110.3	12.0	74.9	7.7	4.5	892	118.3%	N	Transect #1	946
10-Jun-02	10:59	754.0	11.7	109.6	11.9	74.7	7.7	4.5	895	118.7%	N	Transect #1	1035
10-Jun-02	11:00	754.0	11.7	109.4	11.9	74.7	7.7	4.8	898	119.1%	N	Transect #1	1116
10-Jun-02	11:01	754.0	11.7	109.2	11.9	74.7	7.8	4.9	899	119.2%	N	Transect #1	1193
10-Jun-02	11:11	754.0	11.7	103.7	11.3	75.1	7.8	3.4	839	111.3%	N	Transect #2	568
10-Jun-02	11:12	754.0	11.7	112.1	12.2	75.3	7.7	4.8	869	115.3%	N	Transect #2	657
10-Jun-02	11:13	754.0	11.7	113.7	12.4	75.4	7.7	4.9	888	117.8%	N	Transect #2	743
10-Jun-02	11:14	754.0	11.7	113.5	12.4	75.2	7.7	5.2	902	119.6%	N	Transect #2	821
10-Jun-02	11:15	754.0	11.7	113.2	12.3	75.1	7.7	6.2	910	120.7%	N	Transect #2	899
10-Jun-02	11:16	754.0	11.7	112.5	12.3	75.1	7.7	5.7	915	121.4%	N	Transect #2	977
10-Jun-02	11:17	754.0	11.7	112.3	12.2	75.1	7.7	5.4	917	121.6%	N	Transect #2	1055
10-Jun-02	11:18	754.0	11.7	111.9	12.2	75.2	7.7	5.6	919	121.9%	N	Transect #2	1141
10-Jun-02	11:19	754.0	11.7	113.7	12.4	75.1	7.7	5.6	920	122.0%	N	Transect #2	1234
10-Jun-02	11:20	754.0	11.7	112.1	12.2	75.1	7.7	4.7	919	121.9%	N	Transect #2	1328
10-Jun-02	11:21	754.0	11.7	111.7	12.2	74.8	7.7	4.8	920	122.0%	N	Transect #2	1421
10-Jun-02	11:22	754.0	11.7	110.9	12.1	75.1	7.7	4.8	921	122.1%	N	Transect #2	1507
10-Jun-02	11:23	754.0	11.7	111.3	12.1	75.2	7.7	4.7	922	122.3%		Transect #2	1589
10-Jun-02	11:24	754.0	11.7	110.4	12.0	74.9	7.7	4.9	922	122.3%		Transect #2	1672
10-Jun-02	11:25	754.0	11.7	110.5	12.0	75.1	7.7	4.8	922	122.3%		Transect #2	1754
10-Jun-02	11:26	754.0	11.7	110.6	12.0	75.1	7.7	4.8	922	122.3%		Transect #2	1836
10-Jun-02	11:27	754.0	11.7	110.4	12.0	74.9	7.7	4.7	923	122.4%		Transect #2	1918
10-Jun-02	11:28	754.0	11.7	109.7	11.9	74.9	7.7	4.8	923	122.4%		Transect #2	1989
10-Jun-02	11:29	754.0	11.7	111.0	12.1	75.1	7.7	4.7	922	122.3%		Transect #2	2059
10-Jun-02	11:30	754.0	11.7	111.0	12.1	74.9	7.7	4.8	922	122.3%		Transect #2	2130

Table 13, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
10-Jun-02	11:31	754.0	11.7	110.8	12.1	74.9	7.7	4.8	922	122.3%		Transect #2	2201
10-Jun-02	11:32	754.0	11.7	111.2	12.1	74.9	7.7	4.7	921	122.1%		Transect #2	2271
10-Jun-02	12:05	754.0	11.7	105.4	11.5	75.1	7.7	3.9	807	107.0%	N	Transect #3	656
10-Jun-02	12:06	754.0	11.7	109.6	11.9	75.1	7.7	4.7	838	111.1%	N	Transect #3	744
10-Jun-02	12:07	754.0	11.7	109.9	12.0	75.2	7.7	4.9	858	113.8%	N	Transect #3	833
10-Jun-02	12:08	754.0	11.7	110.1	12.0	75.2	7.7	5.0	872	115.6%	N	Transect #3	925
10-Jun-02	12:09	754.0	11.7	109.8	12.0	75.2	7.7	4.8	881	116.8%	N	Transect #3	1014
10-Jun-02	12:10	754.0	11.7	109.4	11.9	74.9	7.7	4.8	889	117.9%	N	Transect #3 / Tailwater Mooring	1098
10-Jun-02	12:11	754.0	11.7	109.3	11.9	74.9	7.7	4.4	893	118.4%	N	Transect #3	1169
10-Jun-02	12:12	754.0	11.7	109.4	11.9	75.1	7.7	4.8	898	119.1%	N	Transect #3	1230
10-Jun-02	12:13	754.0	11.7	109.8	12.0	74.9	7.7	4.2	901	119.5%	N	Transect #3	1308
10-Jun-02	13:23	754.0	11.7	111.9	12.2	75.4	7.7	4.4	837	111.0%	N	Transect #4	631
10-Jun-02	13:24	754.0	11.7	111.4	12.1	75.3	7.7	4.5	861	114.2%	N	Transect #4	720
10-Jun-02	13:25	754.0	11.7	112.2	12.2	75.6	7.7	4.5	878	116.4%	N	Transect #4	809
10-Jun-02	13:26	754.0	11.7	111.7	12.2	75.6	7.7	4.6	890	118.0%	N	Transect #4	882
10-Jun-02	13:27	754.0	11.7	111.2	12.1	75.4	7.7	4.6	899	119.2%	N	Transect #4 / Tailwater FMS	957
10-Jun-02	13:28	754.0	11.7	111.3	12.1	75.6	7.7	4.6	904	119.9%	N	Transect #4	1037
10-Jun-02	13:29	754.0	11.7	110.2	12.0	75.3	7.7	4.7	908	120.4%	N	Transect #4	1114
10-Jun-02	13:30	754.0	11.7	109.9	12.0	75.3	7.7	4.7	911	120.8%	N	Transect #4	1199
10-Jun-02	13:31	754.0	11.7	110.2	12.0	75.4	7.7	4.7	912	121.0%	N	Transect #4	1286
10-Jun-02	13:32	754.0	11.7	109.2	11.9	75.3	7.7	4.7	913	121.1%	N	Transect #4	1372
10-Jun-02	13:33	754.0	11.7	110.3	12.0	75.4	7.7	4.7	914	121.2%		Transect #4	1458
10-Jun-02	13:34	754.0	11.7	109.7	12.0	75.4	7.7	5.1	914	121.2%		Transect #4	1536
10-Jun-02	13:35	754.0	11.7	109.4	11.9	75.4	7.7	5.0	914	121.2%		Transect #4	1614
10-Jun-02	13:44	754.0	11.7	107.0	11.7	75.5	7.7	3.5	880	116.7%	N	Transect #5	522
10-Jun-02	13:45	754.0	11.7	110.0	12.0	75.7	7.7	4.4	888	117.8%	N	Transect #5	584
10-Jun-02	13:46	754.0	11.7	109.7	12.0	75.6	7.7	4.5	892	118.3%	N	Transect #5	651
10-Jun-02	13:47	754.0	11.7	109.2	11.9	75.5	7.7	4.6	895	118.7%		Transect #5	720
10-Jun-02	13:48	754.0	11.7	109.5	11.9	75.8	7.7	3.4	895	118.7%		Transect #5	772
10-Jun-02	13:49	754.0	11.7	109.8	12.0	75.7	7.7	4.0	899	119.2%		Transect #5	843
10-Jun-02	13:50	754.0	11.7	110.0	12.0	75.5	7.7	4.4	900	119.4%		Transect #5	921
10-Jun-02	13:51	754.0	11.7	109.6	11.9	75.4	7.7	4.6	901	119.5%		Transect #5	994
10-Jun-02	13:52	754.0	11.7	109.2	11.9	75.5	7.7	4.6	901	119.5%		Transect #5	1062
10-Jun-02	13:53	754.0	11.7	109.7	11.9	75.4	7.6	4.5	901	119.5%		Transect #5 / Tailwater Mooring	1132
10-Jun-02	13:54	754.0	11.7	108.7	11.8	75.5	7.7	4.6	901	119.5%		Transect #5	1193

Table 13, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
10-Jun-02	13:55	754.0	11.7	108.8	11.8	75.3	7.6	4.6	900	119.4%		Transect #5	1261
10-Jun-02	14:06	754.0	11.7	107.3	11.7	75.4	7.7	2.3	837	111.0%	N	Transect #6	573
10-Jun-02	14:07	754.0	11.7	116.7	12.7	75.7	7.8	3.3	861	114.2%	N	Transect #6	653
10-Jun-02	14:08	754.0	11.7	111.1	12.1	75.8	7.6	5.2	878	116.4%	N	Transect #6	732
10-Jun-02	14:09	754.0	11.7	110.6	12.1	75.6	7.7	4.6	887	117.6%	N	Transect #6	815
10-Jun-02	14:10	754.0	11.7	110.9	12.1	75.6	7.7	4.3	893	118.4%	N	Transect #6	900
10-Jun-02	14:11	754.0	11.7	110.1	12.0	75.4	7.7	4.7	897	119.0%	N	Transect #6	987
10-Jun-02	14:12	754.0	11.7	110.8	12.1	75.6	7.7	4.5	901	119.5%	N	Transect #6	1070
10-Jun-02	14:13	754.0	11.7	111.0	12.1	75.5	7.7	4.6	903	119.8%	N	Transect #6	1147
10-Jun-02	14:14	754.0	11.7	110.1	12.0	75.4	7.7	4.6	905	120.0%		Transect #6	1230
10-Jun-02	14:15	754.0	11.7	109.5	11.9	75.4	7.7	4.7	905	120.0%		Transect #6	1303
10-Jun-02	14:16	754.0	11.7	109.7	11.9	75.4	7.7	4.8	906	120.2%		Transect #6	1407
10-Jun-02	14:29	754.0	11.7	111.7	12.2	75.7	7.6	4.1	872	115.6%	N	Transect #7	610
10-Jun-02	14:30	754.0	11.7	111.7	12.2	75.6	7.7	4.1	884	117.2%	N	Transect #7	703
10-Jun-02	14:31	754.0	11.7	112.0	12.2	75.7	7.7	4.1	893	118.4%	N	Transect #7	796
10-Jun-02	14:32	754.0	11.7	112.1	12.2	75.4	7.7	4.2	901	119.5%	N	Transect #7	879
10-Jun-02	14:33	754.0	11.7	112.0	12.2	75.6	7.7	4.2	907	120.3%	N	Transect #7	957
10-Jun-02	14:34	754.0	11.7	112.0	12.2	75.4	7.7	4.3	912	121.0%	N	Transect #7	1036
10-Jun-02	14:35	754.0	11.7	111.8	12.2	75.4	7.7	4.2	915	121.4%	N	Transect #7	1118
10-Jun-02	14:36	754.0	11.7	111.1	12.1	75.5	7.7	4.3	918	121.8%	N	Transect #7	1204
10-Jun-02	14:37	754.0	11.7	111.9	12.2	75.4	7.7	4.3	920	122.0%	N	Transect #7	1291
10-Jun-02	14:38	754.0	11.7	111.1	12.1	75.4	7.7	4.2	922	122.3%	N	Transect #7	1383
10-Jun-02	14:39	754.0	11.7	111.5	12.1	75.7	7.7	4.3	923	122.4%	N	Transect #7	1470
10-Jun-02	14:40	754.0	11.7	111.8	12.2	75.4	7.7	4.2	924	122.5%		Transect #7	1557

N = Measurement not at equilibrium

Table 14. Datasonde 15 data for Wells Dam, May 29, 2002

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
29-May-02	9:50	735.0	11.1	*	*	115.2	8.0	5.0	805	109.5%	N	Forebay FMS	
29-May-02	9:55	735.0	11.1	*	*	115.8	8.0	4.9	820	111.6%	N	Forebay FMS	
29-May-02	10:00	735.0	11.1	*	*	115.7	8.0	5.2	823	112.0%		Forebay FMS	
29-May-02	10:05	735.0	11.1	*	*	115.4	8.0	5.2	823	112.0%		Forebay FMS	
29-May-02	10:10	735.0	11.1	*	*	114.9	8.0	5.0	822	111.8%		Forebay FMS	
29-May-02	10:15	735.0	11.1	*	*	115.3	8.0	5.1	820	111.6%		Forebay FMS	
29-May-02	10:18	735.0	11.1	*	*	115.3	7.9	4.9	819	111.4%		Forebay FMS	
29-May-02	10:20	735.0	11.1	*	*	114.9	8.0	4.7	818	111.3%		Forebay FMS	
29-May-02	11:50	740.0	11.3	*	*	116.2	7.9	0.5	741	100.1%	N	Tailwater FMS	
29-May-02	11:55	740.0	11.2	*	*	116.4	7.9	2.1	790	106.8%	N	Tailwater FMS	
29-May-02	12:00	740.0	11.2	*	*	116.7	7.9	1.6	807	109.1%	N	Tailwater FMS	
29-May-02	12:05	740.0	11.2	*	*	116.6	7.9	1.6	812	109.7%		Tailwater FMS	
29-May-02	12:10	740.0	11.2	*	*	116.6	7.9	1.2	814	110.0%		Tailwater FMS	
29-May-02	12:10	740.0	11.2	*	*	116.5	7.9	1.2	814	110.0%		Tailwater FMS	
29-May-02	12:10	740.0	11.2	*	*	116.5	7.9	1.1	814	110.0%		Tailwater FMS	
29-May-02	12:25	740.0	11.1	*	*	115.6	7.9	0.2	821	110.9%	N	Tailwater Mooring	
29-May-02	12:30	740.0	11.1	*	*	115.9	7.9	0.6	788	106.5%	N	Tailwater Mooring	
29-May-02	12:35	740.0	11.1	*	*	115.7	7.9	0.9	810	109.5%	N	Tailwater Mooring	
29-May-02	12:40	740.0	11.0	*	*	115.6	7.9	1.0	816	110.3%		Tailwater Mooring	
29-May-02	12:42	740.0	11.0	*	*	115.6	7.9	1.0	817	110.4%		Tailwater Mooring	
29-May-02	12:42	740.0	11.0	*	*	115.6	7.9	1.1	817	110.4%		Tailwater Mooring	
29-May-02	12:42	740.0	11.0	*	*	115.7	7.9	1.0	817	110.4%		Tailwater Mooring	
29-May-02	12:42	740.0	11.1	*	*	115.6	7.9	1.0	817	110.4%		Tailwater Mooring	
29-May-02	12:45	740.0	11.0	*	*	115.6	7.9	0.9	817	110.4%		Tailwater Mooring	
29-May-02	12:55	740.0	11.0	*	*	115.5	7.9	0.4	808	109.2%	N	Transect #1	196
29-May-02	12:57	740.0	11.0	*	*	115.3	7.9	0.8	811	109.6%	N	Transect #1	205
29-May-02	12:58	740.0	11.0	*	*	115.1	7.9	0.6	812	109.7%	N	Transect #1	207
29-May-02	13:00	740.0	11.0	*	*	115.3	7.9	0.7	813	109.9%	N	Transect #1	209
29-May-02	13:01	740.0	11.0	*	*	115.5	7.9	2.6	816	110.3%	N	Transect #1	280
29-May-02	13:02	740.0	11.0	*	*	115.6	7.9	0.9	814	110.0%		Transect #1	332
29-May-02	13:02	740.0	11.0	*	*	115.5	7.9	0.8	814	110.0%		Transect #1	334
29-May-02	13:02	740.0	11.0	*	*	115.5	7.9	1.1	815	110.1%		Transect #1	337
29-May-02	13:03	740.0	11.0	*	*	115.3	7.9	1.5	815	110.1%		Transect #1	368
29-May-02	13:03	740.0	11.0	*	*	115.7	7.9	1.8	816	110.3%		Transect #1	385

Table 14, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
29-May-02	13:05	740.0	11.0	*	*	115.8	7.9	2.1	816	110.3%		Transect #1	442
29-May-02	13:06	740.0	11.1	*	*	115.9	7.9	2.4	815	110.1%		Transect #1	462
29-May-02	13:07	740.0	11.1	*	*	116.1	7.9	2.5	815	110.1%		Transect #1	483
29-May-02	13:08	740.0	11.1	*	*	116.1	7.9	2.6	815	110.1%		Transect #1	527
29-May-02	13:10	740.0	11.1	*	*	115.9	7.9	2.4	814	110.0%		Transect #1	612
29-May-02	13:11	740.0	11.1	*	*	116.1	7.9	2.4	814	110.0%		Transect #1	668
29-May-02	13:12	740.0	11.1	*	*	115.6	7.9	2.0	813	109.9%		Transect #1	752
29-May-02	13:13	740.0	11.0	*	*	115.2	7.9	2.2	814	110.0%		Transect #1	834
29-May-02	13:15	740.0	11.0	*	*	115.1	7.9	2.3	815	110.1%		Transect #1	989
29-May-02	13:16	740.0	11.0	*	*	114.4	7.9	1.8	815	110.1%		Transect #1	1106
29-May-02	13:17	740.0	11.0	*	*	114.4	7.9	2.2	815	110.1%		Transect #1	1266
29-May-02	13:18	740.0	11.0	*	*	114.8	7.9	2.1	815	110.1%		Transect #1	1409
29-May-02	13:20	740.0	11.0	*	*	114.4	7.9	2.0	815	110.1%		Transect #1	1648
29-May-02	13:30	740.0	11.0	*	*	113.7	7.9	1.6	809	109.3%		Transect #2	299
29-May-02	13:31	740.0	11.0	*	*	113.7	7.9	1.6	809	109.3%		Transect #2	293
29-May-02	13:32	740.0	11.0	*	*	113.9	7.9	2.2	810	109.5%		Transect #2	287
29-May-02	13:35	740.0	11.0	*	*	113.9	7.9	1.8	810	109.5%		Transect #2	281
29-May-02	13:36	740.0	11.0	*	*	113.5	7.9	2.0	809	109.3%		Transect #2	310
29-May-02	13:37	740.0	11.0	*	*	113.5	7.9	2.6	810	109.5%		Transect #2	334
29-May-02	13:38	740.0	11.0	*	*	113.4	7.9	2.5	810	109.5%		Transect #2	358
29-May-02	13:40	740.0	11.0	*	*	113.4	7.9	2.2	810	109.5%		Transect #2	433
29-May-02	13:41	740.0	11.0	*	*	113.5	7.9	2.5	811	109.6%		Transect #2	538
29-May-02	13:42	740.0	11.0	*	*	113.5	7.9	2.4	813	109.9%		Transect #2	633
29-May-02	13:45	740.0	11.0	*	*	113.6	7.9	2.5	815	110.1%		Transect #2	846
29-May-02	13:46	740.0	11.0	*	*	113.6	7.9	2.5	816	110.3%		Transect #2	991
29-May-02	13:47	740.0	11.0	*	*	113.6	7.9	2.3	816	110.3%		Transect #2	1115
29-May-02	13:48	740.0	11.0	*	*	113.9	7.9	2.6	816	110.3%		Transect #2	1268
29-May-02	13:50	740.0	11.0	*	*	113.9	7.9	2.1	816	110.3%		Transect #2	1518
29-May-02	14:15	740.0	11.0	*	*	114.0	7.9	1.0	802	108.4%	N	Transect #3	363
29-May-02	14:17	740.0	11.0	*	*	113.9	7.9	1.1	804	108.6%		Transect #3	345
29-May-02	14:20	740.0	11.0	*	*	113.7	7.9	1.6	805	108.8%		Transect #3	339
29-May-02	14:21	740.0	11.0	*	*	114.1	7.9	1.0	805	108.8%		Transect #3	337
29-May-02	14:22	740.0	11.0	*	*	113.9	7.9	1.4	806	108.9%		Transect #3	334
29-May-02	14:23	740.0	11.0	*	*	114.2	7.9	2.3	807	109.1%		Transect #3	327
29-May-02	14:24	740.0	11.0	*	*	114.1	7.9	1.8	806	108.9%		Transect #3	321

Table 14, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
29-May-02	14:25	740.0	11.0	*	*	114.2	7.9	0.8	805	108.8%		Transect #3	315
29-May-02	14:26	740.0	11.0	*	*	114.9	7.9	0.8	806	108.9%		Transect #3	331
29-May-02	14:27	740.0	11.0	*	*	115.1	7.9	0.7	807	109.1%		Transect #3	347
29-May-02	14:28	740.0	11.0	*	*	115.1	7.9	0.2	808	109.2%		Transect #3	349
29-May-02	14:30	740.0	11.0	*	*	115.5	7.9	0.4	810	109.5%		Transect #3	332
29-May-02	14:40	740.0	11.0	*	*	115.2	7.9	0.6	807	109.1%	N	Transect #4	229
29-May-02	14:41	740.0	11.0	*	*	115.1	7.9	2.7	810	109.5%	N	Transect #4	268
29-May-02	14:42	740.0	11.0	*	*	115.2	7.9	2.6	811	109.6%	N	Transect #4	295
29-May-02	14:43	740.0	11.0	*	*	115.1	7.9	2.8	812	109.7%		Transect #4	310
29-May-02	14:45	740.0	11.0	*	*	115.0	7.9	2.6	812	109.7%		Transect #4	468
29-May-02	14:46	740.0	11.0	*	*	115.5	7.9	2.8	814	110.0%		Transect #4	564
29-May-02	14:48	740.0	11.0	*	*	115.4	7.9	2.7	815	110.1%		Transect #4	729
29-May-02	14:50	740.0	11.0	*	*	115.5	7.9	2.6	815	110.1%		Transect #4	877
29-May-02	14:51	740.0	11.0	*	*	115.4	7.9	2.5	816	110.3%		Transect #4	1026
29-May-02	14:52	740.0	11.0	*	*	115.5	7.9	2.6	816	110.3%		Transect #4	1178
29-May-02	14:53	740.0	11.0	*	*	115.4	7.9	2.8	817	110.4%		Transect #4	1322
29-May-02	14:55	740.0	11.0	*	*	115.5	7.9	2.4	817	110.4%		Transect #4	1567
29-May-02	15:45	735.0	11.0	*	*	115.3	7.9	2.2	785	106.8%	N	Forebay FMS	
29-May-02	15:50	735.0	11.0	*	*	115.1	7.9	5.2	800	108.8%	N	Forebay FMS	
29-May-02	15:55	735.0	11.0	*	*	115.0	7.9	5.5	803	109.3%		Forebay FMS	

* = Does not meet data quality criteria

N = Measurement not at equilibrium

Table 15. Datasonde 16 data for Wells Dam, May 29, 2002

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments
29-May-02	9:55	735.0	11.1	102.1	11.2	119.0	8.1	4.3	761	103.5%	N	Forebay FMS
29-May-02	10:00	735.0	11.1	99.7	10.9	118.5	8.1	4.9	799	108.7%	N	Forebay FMS
29-May-02	10:05	735.0	11.1	99.8	10.9	118.6	8.1	5.0	809	110.1%		Forebay FMS
29-May-02	10:10	735.0	11.1	99.3	10.9	118.5	8.0	4.7	811	110.3%		Forebay FMS
29-May-02	10:15	735.0	11.1	99.6	10.9	118.3	8.0	4.8	812	110.5%		Forebay FMS
29-May-02	10:18	735.0	11.1	99.6	10.9	118.3	8.0	4.7	811	110.3%		Forebay FMS
29-May-02	10:18	735.0	11.1	99.2	10.9	118.3	8.0	4.6	811	110.3%		Forebay FMS
29-May-02	10:20	735.0	11.1	99.4	10.9	118.3	8.0	4.6	811	110.3%		Forebay FMS
29-May-02	11:40	740.0	11.0	105.5	11.6	118.3	7.9	0.4	767	103.6%	N	Tailwater Mooring
29-May-02	11:45	740.0	11.0	105.6	11.6	118.1	8.0	0.4	800	108.1%	N	Tailwater Mooring
29-May-02	11:50	740.0	11.0	105.9	11.6	118.1	8.0	0.4	810	109.5%	N	Tailwater Mooring
29-May-02	11:55	740.0	11.0	105.9	11.6	118.3	8.0	0.5	813	109.9%		Tailwater Mooring
29-May-02	12:00	740.0	11.0	106.0	11.6	118.2	8.0	0.4	814	110.0%		Tailwater Mooring
29-May-02	12:05	740.0	11.0	105.8	11.6	117.9	8.0	0.5	814	110.0%		Tailwater Mooring
29-May-02	12:10	740.0	11.0	105.8	11.6	118.4	8.0	0.4	814	110.0%		Tailwater Mooring
29-May-02	12:15	740.0	11.0	105.7	11.6	118.2	8.0	0.5	814	110.0%		Tailwater Mooring
29-May-02	12:20	740.0	11.0	105.6	11.6	118.2	8.0	0.4	814	110.0%		Tailwater Mooring
29-May-02	12:25	740.0	11.0	105.5	11.6	118.2	8.0	0.0	812	109.7%		Tailwater Mooring
29-May-02	12:30	740.0	11.0	104.6	11.5	117.8	8.0	0.0	809	109.3%		Tailwater Mooring
29-May-02	12:35	740.0	11.0	104.5	11.5	117.8	8.0	0.0	807	109.1%		Tailwater Mooring
29-May-02	12:40	740.0	11.0	104.4	11.5	117.8	8.0	0.0	805	108.8%		Tailwater Mooring
29-May-02	12:45	740.0	11.0	104.3	11.5	117.9	8.0	0.0	804	108.6%		Tailwater Mooring
29-May-02	12:50	740.0	11.0	104.5	11.5	117.3	8.0	0.2	804	108.6%		Tailwater Mooring
29-May-02	12:55	740.0	11.0	104.5	11.5	117.2	8.0	0.2	805	108.8%		Tailwater Mooring
29-May-02	13:00	740.0	11.0	103.4	11.4	116.7	8.0	0.2	805	108.8%		Tailwater Mooring
29-May-02	13:05	740.0	11.0	104.2	11.5	116.8	8.0	0.2	804	108.6%		Tailwater Mooring
29-May-02	13:10	740.0	11.0	103.8	11.4	116.7	8.0	0.2	804	108.6%		Tailwater Mooring
29-May-02	13:15	740.0	11.0	104.3	11.5	116.4	8.0	0.2	804	108.6%		Tailwater Mooring
29-May-02	13:20	740.0	11.0	104.9	11.5	116.5	8.0	0.2	803	108.5%		Tailwater Mooring
29-May-02	13:25	740.0	11.0	104.7	11.5	116.4	8.0	0.2	802	108.4%		Tailwater Mooring
29-May-02	13:30	740.0	10.9	104.2	11.5	115.6	8.0	0.2	801	108.2%		Tailwater Mooring
29-May-02	13:35	740.0	10.9	104.2	11.5	115.5	8.0	0.2	801	108.2%		Tailwater Mooring
29-May-02	13:40	740.0	10.9	104.6	11.5	115.6	8.0	0.2	800	108.1%		Tailwater Mooring
29-May-02	13:45	740.0	11.0	104.7	11.5	115.9	8.0	0.2	800	108.1%		Tailwater Mooring

Table 15, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond mS/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments
29-May-02	13:50	740.0	11.0	104.5	11.5	115.8	8.0	0.2	800	108.1%		Tailwater Mooring
29-May-02	13:55	740.0	11.0	105.0	11.5	116.2	8.0	0.2	799	108.0%		Tailwater Mooring
29-May-02	14:00	740.0	11.0	104.9	11.5	116.1	8.0	0.1	800	108.1%		Tailwater Mooring
29-May-02	14:05	740.0	11.0	104.7	11.5	116.4	8.0	0.2	800	108.1%		Tailwater Mooring
29-May-02	14:10	740.0	11.0	104.7	11.5	116.4	8.0	0.2	799	108.0%		Tailwater Mooring
29-May-02	14:15	740.0	11.0	104.5	11.5	117.3	8.0	0.2	799	108.0%		Tailwater Mooring
29-May-02	14:20	740.0	11.0	104.7	11.5	117.6	8.0	0.2	799	108.0%		Tailwater Mooring
29-May-02	14:25	740.0	11.0	104.9	11.5	117.5	8.0	0.2	798	107.8%		Tailwater Mooring
29-May-02	14:30	740.0	11.0	105.0	11.5	117.8	8.0	0.2	799	108.0%		Tailwater Mooring
29-May-02	14:35	740.0	10.9	104.9	11.5	118.0	8.0	0.1	798	107.8%		Tailwater Mooring
29-May-02	14:40	740.0	10.9	105.2	11.6	118.0	8.0	0.1	798	107.8%		Tailwater Mooring
29-May-02	14:45	740.0	10.9	105.2	11.6	118.1	8.0	0.2	798	107.8%		Tailwater Mooring
29-May-02	14:50	740.0	10.9	104.7	11.5	118.1	8.0	0.2	798	107.8%		Tailwater Mooring
29-May-02	14:55	740.0	10.9	104.5	11.5	118.1	8.0	0.2	797	107.7%		Tailwater Mooring
29-May-02	15:00	740.0	10.9	105.0	11.6	118.0	8.0	0.3	796	107.6%		Tailwater Mooring
29-May-02	15:45	735.0	11.0	101.0	11.1	117.6	7.9	4.9	795	108.2%	N	Forebay FMS
29-May-02	15:50	735.0	10.9	99.6	11.0	117.4	7.9	5.2	806	109.7%	N	Forebay FMS
29-May-02	15:55	735.0	10.9	99.3	10.9	117.7	7.9	5.4	809	110.1%	N	Forebay FMS
29-May-02	15:56	735.0	10.9	98.6	10.8	117.7	7.9	5.8	810	110.2%		Forebay FMS

N = Measurement not at equilibrium

Table 16. Datasonde 15 data for Wells Dam, July 2, 2002

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond ms/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
2-Jul-02	9:45	744.1	13.6	*	*	115.1	8.1	2.7	781	105.0%	N	Forebay FMS	
2-Jul-02	9:46	744.1	13.6	*	*	115.5	8.0	2.8	805	108.2%	N	Forebay FMS	
2-Jul-02	9:47	744.1	13.6	*	*	115.5	8.0	2.7	823	110.6%	N	Forebay FMS	
2-Jul-02	9:48	744.1	13.6	*	*	115.7	8.0	2.8	836	112.4%	N	Forebay FMS	
2-Jul-02	9:49	744.1	13.6	*	*	116.0	8.0	6.2	852	114.5%	N	Forebay FMS	
2-Jul-02	9:50	744.1	13.6	*	*	115.7	8.0	6.1	859	115.4%	N	Forebay FMS	
2-Jul-02	9:51	744.1	13.6	*	*	115.6	8.0	6.2	864	116.1%	N	Forebay FMS	
2-Jul-02	9:52	744.1	13.6	*	*	115.9	8.0	6.2	867	116.5%	N	Forebay FMS	
2-Jul-02	9:53	744.0	13.6	*	*	116.2	8.0	6.3	869	116.8%	N	Forebay FMS	
2-Jul-02	9:54	744.0	13.6	*	*	116.0	8.0	5.9	870	116.9%		Forebay FMS	
2-Jul-02	9:55	744.0	13.6	*	*	116.0	8.0	5.6	870	116.9%		Forebay FMS	
2-Jul-02	9:56	744.0	13.6	*	*	116.1	8.0	6.0	871	117.1%		Forebay FMS	
2-Jul-02	9:57	744.0	13.6	*	*	116.0	8.0	5.0	870	116.9%		Forebay FMS	
2-Jul-02	9:58	744.0	13.6	*	*	115.6	8.0	5.4	870	116.9%		Forebay FMS	
2-Jul-02	9:59	744.0	13.6	*	*	116.4	7.9	4.6	870	116.9%		Forebay FMS	
2-Jul-02	10:00	744.0	13.6	*	*	115.6	8.0	5.3	871	117.1%		Forebay FMS	
2-Jul-02	10:01	744.0	13.6	*	*	115.7	7.9	4.6	870	116.9%		Forebay FMS	
2-Jul-02	10:02	744.0	13.6	*	*	116.1	7.9	4.7	870	116.9%		Forebay FMS	
2-Jul-02	10:03	744.0	13.6	*	*	116.1	7.9	4.7	870	116.9%		Forebay FMS	
2-Jul-02	10:04	743.9	13.6	*	*	116.0	7.9	5.7	872	117.2%		Forebay FMS	
2-Jul-02	10:05	743.9	13.6	*	*	116.5	7.9	4.1	870	116.9%		Forebay FMS	
2-Jul-02	10:06	743.9	13.6	*	*	116.0	7.9	5.0	871	117.1%		Forebay FMS	
2-Jul-02	10:07	743.9	13.6	*	*	115.5	8.0	5.9	872	117.2%		Forebay FMS	
2-Jul-02	10:08	743.9	13.6	*	*	116.0	8.0	5.0	871	117.1%		Forebay FMS	
2-Jul-02	10:09	743.9	13.6	*	*	116.4	7.9	4.3	870	117.0%		Forebay FMS	
2-Jul-02	10:10	743.9	13.6	*	*	116.0	7.9	5.8	872	117.2%		Forebay FMS	
2-Jul-02	11:57	742.8	13.8	*	*	114.8	8.0	2.2	792	106.6%	N	Tailwater FMS	
2-Jul-02	11:58	742.8	13.8	*	*	115.3	7.9	2.2	830	111.7%	N	Tailwater FMS	
2-Jul-02	11:59	742.8	13.8	*	*	115.3	7.9	2.2	862	116.0%	N	Tailwater FMS	
2-Jul-02	12:00	742.8	13.8	*	*	115.7	7.9	2.1	891	119.9%	N	Tailwater FMS	
2-Jul-02	12:01	742.8	13.8	*	*	115.9	7.9	2.1	915	123.2%	N	Tailwater FMS	
2-Jul-02	12:02	742.8	13.8	*	*	115.6	7.9	2.1	933	125.6%	N	Tailwater FMS	
2-Jul-02	12:03	742.8	13.8	*	*	115.9	7.9	2.1	948	127.6%	N	Tailwater FMS	
2-Jul-02	12:04	742.8	13.8	*	*	115.6	7.9	2.1	957	128.8%	N	Tailwater FMS	

Table 16, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond ms/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
2-Jul-02	12:05	742.8	13.8	*	*	115.6	7.9	2.1	965	129.9%	N	Tailwater FMS	
2-Jul-02	12:06	742.8	13.8	*	*	115.6	7.9	2.1	971	130.7%	N	Tailwater FMS	
2-Jul-02	12:07	742.8	13.8	*	*	115.7	7.9	2.1	976	131.4%	N	Tailwater FMS	
2-Jul-02	12:08	742.7	13.8	*	*	115.7	8.0	2.1	978	131.7%	N	Tailwater FMS	
2-Jul-02	12:09	742.7	13.8	*	*	115.6	7.9	2.2	981	132.1%	N	Tailwater FMS	
2-Jul-02	12:10	742.7	13.8	*	*	115.6	7.9	2.2	982	132.2%	N	Tailwater FMS	
2-Jul-02	12:11	742.7	13.8	*	*	115.6	7.9	2.2	983	132.4%	N	Tailwater FMS	
2-Jul-02	12:12	742.7	13.8	*	*	115.7	7.9	2.2	984	132.5%	N	Tailwater FMS	
2-Jul-02	12:13	742.7	13.8	*	*	115.6	8.0	2.2	985	132.6%		Tailwater FMS	
2-Jul-02	12:14	742.7	13.8	*	*	115.9	8.0	2.2	985	132.6%		Tailwater FMS	
2-Jul-02	12:15	742.7	13.8	*	*	115.6	8.0	2.2	986	132.8%		Tailwater FMS	
2-Jul-02	12:16	742.7	13.8	*	*	115.6	7.9	2.2	985	132.6%		Tailwater FMS	
2-Jul-02	12:17	742.7	13.8	*	*	115.3	8.0	2.1	984	132.5%		Tailwater FMS	
2-Jul-02	12:18	742.6	13.8	*	*	115.6	7.9	2.2	984	132.5%		Tailwater FMS	
2-Jul-02	12:19	742.6	13.8	*	*	115.6	7.9	2.1	983	132.4%		Tailwater FMS	
2-Jul-02	12:20	742.6	13.8	*	*	115.5	8.0	2.1	983	132.4%		Tailwater FMS	
2-Jul-02	12:21	742.6	13.8	*	*	115.8	8.0	2.1	983	132.4%		Tailwater FMS	
2-Jul-02	12:22	742.6	13.8	*	*	115.8	8.0	2.1	983	132.4%		Tailwater FMS	
2-Jul-02	12:23	742.6	13.8	*	*	116.0	7.9	2.1	982	132.2%		Tailwater FMS	
2-Jul-02	12:24	742.6	13.8	*	*	116.0	8.0	2.1	982	132.2%		Tailwater FMS	
2-Jul-02	12:25	742.6	13.8	*	*	115.8	8.0	2.2	982	132.2%		Tailwater FMS	
2-Jul-02	12:26	742.6	13.8	*	*	115.9	7.9	1.9	981	132.1%		Tailwater FMS	
2-Jul-02	12:50	742.3	13.7	*	*	116.4	7.9	10.3	859	115.7%	N	Transect #1	1079
2-Jul-02	12:51	742.3	13.7	*	*	116.1	7.9	6.2	897	120.8%	N	Transect #1	1220
2-Jul-02	12:52	742.3	13.7	*	*	116.0	7.9	6.6	926	124.7%	N	Transect #1	1361
2-Jul-02	12:53	742.3	13.7	*	*	116.0	7.9	6.2	943	127.0%	N	Transect #1	1551
2-Jul-02	12:54	742.3	13.7	*	*	116.9	7.9	5.2	953	128.4%	N	Transect #1	1740
2-Jul-02	12:55	742.3	13.7	*	*	116.1	7.9	5.4	962	129.6%	N	Transect #1	1922
2-Jul-02	12:56	742.3	13.7	*	*	116.1	7.9	5.2	968	130.4%	N	Transect #1	2097
2-Jul-02	12:57	742.3	13.7	*	*	116.7	7.9	6.1	973	131.1%	N	Transect #1	2268
2-Jul-02	12:58	742.3	13.7	*	*	117.0	7.9	6.4	976	131.5%	N	Transect #1	2427
2-Jul-02	12:59	742.3	13.7	*	*	116.1	7.9	6.1	978	131.8%	N	Transect #1	2577
2-Jul-02	13:00	742.2	13.7	*	*	115.6	7.9	6.6	980	132.0%		Transect #1	2740
2-Jul-02	13:01	742.2	13.7	*	*	116.2	7.9	6.4	980	132.0%		Transect #1	2890
2-Jul-02	13:02	742.2	13.7	*	*	115.9	7.9	6.7	980	132.0%		Transect #1	3031

Table 16, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond ms/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
2-Jul-02	13:15	742.1	13.7	*	*	116.0	7.9	5.0	861	116.0%	N	Transect #2	794
2-Jul-02	13:16	742.1	13.7	*	*	117.1	7.9	4.8	886	119.4%	N	Transect #2	948
2-Jul-02	13:17	742.1	13.7	*	*	116.7	7.9	4.9	906	122.1%	N	Transect #2	1110
2-Jul-02	13:18	742.1	13.7	*	*	116.5	7.9	5.3	921	124.1%	N	Transect #2	1296
2-Jul-02	13:19	742.1	13.7	*	*	116.7	7.9	5.2	933	125.7%	N	Transect #2	1480
2-Jul-02	13:20	742.0	13.7	*	*	116.5	7.9	5.3	946	127.5%	N	Transect #2	1656
2-Jul-02	13:21	742.0	13.7	*	*	116.9	7.9	4.4	953	128.4%	N	Transect #2	1836
2-Jul-02	13:22	742.0	13.7	*	*	117.3	7.9	5.3	962	129.6%	N	Transect #2	2009
2-Jul-02	13:23	742.0	13.7	*	*	116.6	7.9	5.5	966	130.2%	N	Transect #2	2161
2-Jul-02	13:24	742.0	13.7	*	*	116.6	7.9	5.5	968	130.5%	N	Transect #2	2321
2-Jul-02	13:25	742.0	13.7	*	*	116.6	7.9	5.6	969	130.6%	N	Transect #2	2472
2-Jul-02	13:26	742.0	13.7	*	*	116.7	7.9	5.5	970	130.7%	N	Transect #2	2609
2-Jul-02	13:27	742.0	13.7	*	*	116.6	7.9	5.5	969	130.6%		Transect #2	2746
2-Jul-02	13:28	742.0	13.7	*	*	116.7	7.9	5.6	969	130.6%		Transect #2	2908
2-Jul-02	13:39	741.9	13.7	*	*	116.6	7.9	5.9	883	119.0%	N	Transect #3	759
2-Jul-02	13:40	741.9	13.7	*	*	116.7	7.9	5.9	909	122.5%	N	Transect #3	912
2-Jul-02	13:41	741.8	13.7	*	*	116.7	7.9	6.3	929	125.2%	N	Transect #3	1046
2-Jul-02	13:42	741.8	13.7	*	*	117.0	7.9	5.5	943	127.1%	N	Transect #3	1203
2-Jul-02	13:43	741.8	13.7	*	*	116.7	7.9	5.7	955	128.7%	N	Transect #3	1435
2-Jul-02	13:44	741.8	13.7	*	*	116.6	7.9	6.5	963	129.8%	N	Transect #3	1637
2-Jul-02	13:45	741.8	13.7	*	*	117.3	7.9	3.8	964	130.0%	N	Transect #3	1845
2-Jul-02	13:46	741.8	13.7	*	*	117.0	7.9	5.2	970	130.8%	N	Transect #3	2021
2-Jul-02	13:47	741.8	13.8	*	*	118.0	7.9	5.6	973	131.2%		Transect #3	2179
2-Jul-02	13:48	741.8	13.8	*	*	117.5	7.9	5.4	973	131.2%		Transect #3	2315
2-Jul-02	13:49	741.8	13.8	*	*	117.2	7.9	5.1	973	131.2%		Transect #3	2458
2-Jul-02	13:50	741.8	13.8	*	*	116.9	7.9	5.4	974	131.3%		Transect #3	2593
2-Jul-02	13:51	741.7	13.8	*	*	117.0	7.9	5.3	974	131.3%		Transect #3	2724
2-Jul-02	13:52	741.7	13.8	*	*	117.2	7.9	5.1	974	131.3%		Transect #3	2840
2-Jul-02	13:53	741.7	13.8	*	*	116.9	7.9	1.9	968	130.5%		Transect #3	2955
2-Jul-02	14:02	741.6	13.8	*	*	116.9	7.9	4.3	897	120.9%	N	Transect #4	646
2-Jul-02	14:03	741.6	13.8	*	*	117.4	7.9	4.6	904	121.9%	N	Transect #4	758
2-Jul-02	14:04	741.6	13.8	*	*	117.6	7.9	3.5	911	122.8%	N	Transect #4	922
2-Jul-02	14:05	741.6	13.8	*	*	117.1	7.9	4.4	919	123.9%	N	Transect #4	1101
2-Jul-02	14:06	741.6	13.7	*	*	117.5	7.9	4.3	927	125.0%	N	Transect #4	1281
2-Jul-02	14:07	741.6	13.7	*	*	117.3	7.9	4.5	937	126.3%	N	Transect #4	1452

Table 16, continued

Date	Time	BP mmHg	Temp degC	DO %Sat	DO mg/l	SpCond ms/cm	pH Units	Depth meters	TDG mmHg	TDG %Sat	Data Qualifier	Comments	Distance fm Spillway (m)
2-Jul-02	14:08	741.6	13.8	*	*	117.1	7.9	3.2	942	127.0%	N	Transect #4	1615
2-Jul-02	14:09	741.6	13.8	*	*	116.9	7.9	3.2	947	127.7%	N	Transect #4	1775
2-Jul-02	14:10	741.6	13.8	*	*	117.1	7.9	3.0	952	128.4%	N	Transect #4	1936
2-Jul-02	14:11	741.6	13.8	*	*	117.4	7.9	3.2	953	128.5%		Transect #4	2089
2-Jul-02	14:12	741.5	13.8	*	*	117.0	7.9	3.2	953	128.5%		Transect #4	2239
2-Jul-02	14:13	741.5	13.8	*	*	116.9	7.9	3.2	953	128.5%		Transect #4	2386
2-Jul-02	14:14	741.5	13.8	*	*	117.0	7.9	3.1	954	128.7%		Transect #4	2522
2-Jul-02	14:15	741.5	13.8	*	*	117.0	7.9	3.1	954	128.7%		Transect #4	2661
2-Jul-02	14:16	741.5	13.8	*	*	117.3	7.9	3.2	956	128.9%		Transect #4	2806
2-Jul-02	14:17	741.5	13.8	*	*	117.1	7.9	3.1	956	128.9%		Transect #4	2949
2-Jul-02	14:18	741.5	13.8	*	*	117.0	7.9	3.1	955	128.8%		Transect #4	3091
2-Jul-02	14:19	741.5	13.8	*	*	117.1	7.9	3.1	954	128.7%		Transect #4	3236
2-Jul-02	14:20	741.5	13.8	*	*	116.9	7.9	3.2	952	128.4%		Transect #4	3387
2-Jul-02	14:21	741.5	13.8	*	*	117.3	7.9	3.0	952	128.4%		Transect #4	3533
2-Jul-02	14:22	741.5	13.8	*	*	116.7	7.9	3.2	954	128.7%		Transect #4	3674
2-Jul-02	14:23	741.4	13.8	*	*	117.0	7.9	3.2	956	128.9%		Transect #4	3816
2-Jul-02	14:24	741.4	13.8	*	*	117.1	7.9	3.3	957	129.1%		Transect #4	3963
2-Jul-02	14:25	741.4	13.8	*	*	116.7	7.9	3.3	957	129.1%		Transect #4	4107
2-Jul-02	14:26	741.4	13.8	*	*	116.9	7.9	3.2	957	129.1%		Transect #4	4244
2-Jul-02	14:27	741.4	13.8	*	*	116.9	7.9	3.2	957	129.1%		Transect #4	4388
2-Jul-02	14:28	741.4	13.8	*	*	116.9	7.9	3.2	957	129.1%		Transect #4 / Tailwater FMS	4506

* = Data does not meet QA criteria

N = Measurement not at equilibrium

Table 17. FMS data for Lower Granite Dam, May 14, 2002

Station	Station #	DATE	HR	Temp at Sensor (degC)	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG (%Sat)	Spill (kcfs)	Total Flow (kcfs)	Forebay Elevation (ft)	Tailwater Elevation (ft)	Calculated Compensation Depth
LWG	1205	5/14/02	9:00	9.8	748.2	771	103.0%	17.1	61.1	734.7	634.9	1.0
LWG	1205	5/14/02	10:00	9.8	748.2	771	103.0%	17.1	61.8	734.7	635.0	1.0
LWG	1205	5/14/02	11:00	9.7	747.8	771	103.1%	17.2	59.7	734.8	634.3	1.0
LWG	1205	5/14/02	12:00	9.7	747.2	771	103.2%	17.5	66.7	734.8	634.9	1.0
LWG	1205	5/14/02	13:00	9.8	746.8	771	103.2%	17.2	60.3	734.9	634.5	1.1
LWG	1205	5/14/02	14:00	9.8	746.1	772	103.5%	17.2	62.5	734.9	634.3	1.1
LWG	1205	5/14/02	15:00	9.9	746.0	772	103.5%	17.2	71.5	734.8	635.0	1.1
LWG	1205	5/14/02	16:00	9.9	745.3	772	103.6%	17.3	72.3	734.8	634.5	1.2
LWG	1205	5/14/02	17:00	10.1	745.0	775	104.0%	17.2	74.5	734.6	634.7	1.3
LGNW	1202	5/14/02	9:00	9.7	750.5	814	108.5%	17.1	61.1	734.7	634.9	2.8
LGNW	1202	5/14/02	10:00	9.7	750.0	813	108.4%	17.1	61.8	734.7	635.0	2.7
LGNW	1202	5/14/02	11:00	9.7	750.0	816	108.8%	17.2	59.7	734.8	634.3	2.9
LGNW	1202	5/14/02	12:00	9.8	749.3	813	108.5%	17.5	66.7	734.8	634.9	2.8
LGNW	1202	5/14/02	13:00	9.8	748.7	813	108.6%	17.2	60.3	734.9	634.5	2.8
LGNW	1202	5/14/02	14:00	9.8	747.8	813	108.7%	17.2	62.5	734.9	634.3	2.8
LGNW	1202	5/14/02	15:00	9.8	747.5	811	108.5%	17.2	71.5	734.8	635.0	2.8
LGNW	1202	5/14/02	16:00	9.8	747.2	812	108.7%	17.3	72.3	734.8	634.5	2.8
LGNW	1202	5/14/02	17:00	9.9	746.9	817	109.4%	17.2	74.5	734.6	634.7	3.0

Table 18. FMS data for Lower Granite Dam, June 10, 2002

Station	Station #	DATE	HR	Temp at Sensor (degC)	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG (%Sat)	Spill (kcfs)	Total Flow (kcfs)	Forebay Elevation (ft)	Tailwater Elevation (ft)	Calculated Compensation Depth
LWG	1205	6/10/02	9:00	11.7	744.0	759	102.0%	50.9	56.9	734.4	632.6	0.7
LWG	1205	6/10/02	10:00	11.6	743.9	759	102.0%	51.5	57.6	734.7	632.5	0.7
LWG	1205	6/10/02	11:00	11.7	744.1	759	102.0%	63.2	69.3	734.8	633.2	0.6
LWG	1205	6/10/02	12:00	11.7	744.4	760	102.1%	73.6	81.4	734.9	633.6	0.7
LWG	1205	6/10/02	13:00	11.8	744.0	761	102.3%	67.5	75.3	735.1	632.8	0.7
LWG	1205	6/10/02	14:00	11.8	743.6	761	102.0%	65.4	71.5	735.2	633.0	0.8
LWG	1205	6/10/02	15:00	11.7	743.2	761	102.4%	73.9	80	735.4	633.0	0.8
LWG	1205	6/10/02	16:00	11.6	743.2	761	102.4%	56.1	62.2	735.7	632.4	0.8
LGNW	1202	6/10/02	9:00	11.7	746.9	880	117.8%	50.9	56.9	734.4	632.6	5.8
LGNW	1202	6/10/02	10:00	11.7	746.5	879	117.7%	51.5	57.6	734.7	632.5	5.8
LGNW	1202	6/10/02	11:00	11.6	747.2	890	119.1%	63.2	69.3	734.8	633.2	6.2
LGNW	1202	6/10/02	12:00	11.6	747.1	902	120.7%	73.6	81.4	734.9	633.6	6.7
LGNW	1202	6/10/02	13:00	11.6	746.9	900	120.5%	67.5	75.3	735.1	632.8	6.7
LGNW	1202	6/10/02	14:00	11.7	746.3	897	120.2%	65.4	71.5	735.2	633.0	6.6
LGNW	1202	6/10/02	15:00	11.6	745.9	900	120.7%	73.9	80	735.4	633.0	6.7
LGNW	1202	6/10/02	16:00	11.6	746.0	885	118.6%	56.1	62.2	735.7	632.4	6.0

Table 19. FMS data for Wells Dam, May 29, 2002

Station	Station #	DATE	HR	Temp at Sensor (degC)	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG (%Sat)	Spill (kcfs)	Total Flow (kcfs)	Forebay Elevation (ft)	Tailwater Elevation (ft)	Calculated Compensation Depth
WEL	2407	5/29/02	8:58	11.2	740	803	108.5%	10	110.7	778.8	711.9	2.7
WEL	2407	5/29/02	9:58	11.2	740	803	108.5%	10	143.9	778.5	714.3	2.7
WEL	2407	5/29/02	10:58	11.1	740	800	108.1%	10	174.1	778.7	716.4	2.6
WEL	2407	5/29/02	11:58	11.1	740	800	108.1%	10	164.4	779.2	715.7	2.6
WEL	2407	5/29/02	12:58	11.1	740	797	107.7%	10	165.2	779.3	715.6	2.5
WEL	2407	5/29/02	13:58	11.0	740	797	107.7%	10	163.7	779.7	715.6	2.5
WEL	2407	5/29/02	14:58	11.1	740	799	108.0%	10	160.9	780	715.5	2.6
WEL	2407	5/29/02	15:58	11.0	739	799	108.1%	10	160.9	780.3	715.5	2.6
WELW	2400	5/29/02	8:58	11.2	742	812	109.7%	10	110.7	778.8	711.9	3.1
WELW	2400	5/29/02	9:58	11.2	742	813	109.9%	10	143.9	778.5	714.3	3.2
WELW	2400	5/29/02	10:58	11.2	742	814	110.0%	10	174.1	778.7	716.4	3.2
WELW	2400	5/29/02	11:58	11.2	742	805	108.8%	10	164.4	779.2	715.7	2.8
WELW	2400	5/29/02	12:58	11.1	742	814	110.0%	10	165.2	779.3	715.6	3.2
WELW	2400	5/29/02	13:58	11.1	742	813	109.9%	10	163.7	779.7	715.6	3.2
WELW	2400	5/29/02	14:58	11.1	742	812	109.7%	10	160.9	780	715.5	3.1
WELW	2400	5/29/02	15:58	11.1	741	813	110.0%	10	160.9	780.3	715.5	3.2

Table 20. FMS data for Wells Dam, July 2, 2002

Station	Station #	DATE	HR	Temp at Sensor (degC)	Barometric Pressure (mmHg)	Total Gas Pressure (mmHg)	TDG (%Sat)	Spill (kcfs)	Total Flow (kcfs)	Forebay Elevation (ft)	Tailwater Elevation (ft)	Calculated Compensation Depth
WEL	2407	7/2/02	9:58	13.7	745	874	117.3%	163.7	257.1	779.6	722.0	5.6
WEL	2407	7/2/02	10:58	13.7	745	873	117.2%	152.5	257.7	779.6	721.3	5.6
WEL	2407	7/2/02	11:58	13.7	745	870	116.8%	138.7	258.2	779.4	721.2	5.4
WEL	2407	7/2/02	12:58	13.7	744	868	116.7%	118.1	244.9	779.6	720.6	5.4
WEL	2407	7/2/02	13:58	13.7	743	867	116.7%	113.1	244.8	779.4	720.6	5.4
WEL	2407	7/2/02	14:58	13.8	743	868	116.8%	113.5	237	779.5	720.0	5.4
WELW	2400	7/2/02	9:58	13.7	747	1016	136.4%	163.7	257.1	779.6	722.0	11.8
WELW	2400	7/2/02	10:58	13.7	747	1011	135.7%	152.5	257.7	779.6	721.3	11.6
WELW	2400	7/2/02	11:58	13.7	747	1003	134.6%	138.7	258.2	779.4	721.2	11.2
WELW	2400	7/2/02	12:58	13.8	746	989	132.9%	118.1	244.9	779.6	720.6	10.7
WELW	2400	7/2/02	13:58	13.8	745	977	131.5%	113.1	244.8	779.4	720.6	10.2
WELW	2400	7/2/02	14:58	13.8	745	973	131.0%	113.5	237	779.5	720.0	10.0

Table 21. Spill Gate Settings During Monitoring Surveys Lower Granite Dam

		Amount of spill by gate in kcfs								
Date	Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	Total
14-May	1000-1500	7.2	0.0	1.9	0.0	1.9	1.9	1.9	1.9	16.9
10-Jun	1000	6.7	7.7	7.7	9.6	9.6	7.7	5.8	5.8	60.7
	1100	6.7	9.6	9.6	11.5	11.5	9.6	7.7	7.7	73.9
	1200	6.7	9.6	9.6	11.5	11.5	9.6	7.7	7.7	73.9
	1210	6.7	7.7	7.7	9.6	9.6	9.6	7.7	5.8	64.5
	1300	6.7	7.7	7.7	9.6	9.6	9.6	7.7	5.8	64.5
	1355	6.7	9.6	9.6	11.6	11.6	9.6	7.7	7.7	74.2
	1400	6.7	9.6	9.6	11.6	11.6	9.6	7.7	7.7	74.2
	1500	6.7	9.6	9.6	11.6	11.6	9.6	7.7	7.7	74.2
	1512	6.8	7.8	7.8	7.8	7.8	7.8	5.8	5.8	57.4

Wells Dam

		Amount of spill by gate in kcfs											
Date	Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	Total
29-May	11:00		2.0		2.0		2.0		2.0		2.0		10.0
	12:00		2.0		2.0		2.0		2.0		2.0		10.0
	13:00		2.0		2.0		2.0		2.0		2.0		10.0
	14:00		2.0		2.0		2.0		2.0		2.0		10.0
	15:00		2.0		2.0		2.0		2.0		2.0		10.0
2-Jul	12:00		2.0			14.3	2.0	40.5	2.0	59.5	2.0	35.7	122.2
	13:00		2.0			14.3	2.0	40.5	2.0	40.5	2.0	35.7	103.2
	14:00		2.0		2.0	14.3	2.0	40.5	2.0	40.5	2.0	35.7	105.2
	15:00		2.0		2.0	14.3	2.0	40.5	2.0	40.5	2.0	35.7	105.2