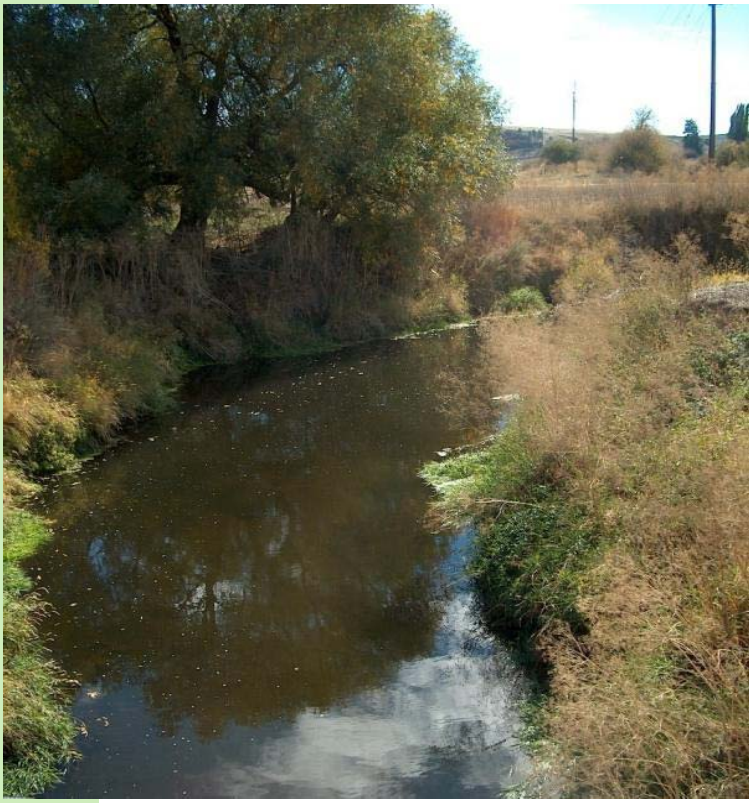

Streamflow Summary for the Palouse and South Fork Palouse Rivers and Selected Tributaries, 2006-08

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Cover photo: South Fork Palouse River at Albion, Washington.

Streamflow Summary for the Palouse and South Fork Palouse Rivers and Selected Tributaries, 2006-08

by

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Table of Contents

List of Figures and Tables

Page

Figures

Table

.

Abstract

From May 2006 to June 2008, the Washington State Department of Ecology (Ecology) conducted a streamflow assessment on the Palouse River and its major tributaries.

This monitoring was conducted in support of temperature, dissolved oxygen, pH, and fecal coliform total maximum daily load (TMDL) studies developed by Ecology. The purpose of each of these TMDLs is to ensure the impaired waterbodies will attain water quality standards. Ecology initiated these TMDL studies because of numerous federal Clean Water Act 303(d) listings of streams in the Palouse River basin.

Continuous stage-height recorders were installed at five sites in the South Fork Palouse River basin in the first study year, and at five sites in the mainstem Palouse River basin in the second study year. Three additional sites were monitored using discrete streamflow measurements and stage observations in the first study year. Discharge-rating curves relating stage height to flow volume were developed based on the discrete flow measurements taken at each of the 13 sites.

Error assessments were conducted for each station for both the period of record and the low-flow period (July-September). Overall, potential error of streamflow data collected from the 13 sites monitored for this study ranged from ±12% to ±120%.

Introduction

From May 2006 to June 2008, the Environmental Assessment (EA) Program of the Washington State Department of Ecology (Ecology) conducted a streamflow assessment on the Palouse River and its major tributaries.

This monitoring was conducted in support of temperature, dissolved oxygen, pH, and fecal coliform total maximum daily load (TMDL) studies developed by the EA Program. The purpose of each of these TMDLs is to ensure the impaired waterbodies will attain water quality standards (Bilhimer et al., 2006; Carroll, 2007; Kardouni et al., 2007; Mathieu and Carroll, 2006; Mathieu et al., 2007). Ecology initiated these TMDL studies because of numerous federal Clean Water Act 303(d) listings of streams in the Palouse River basin.

Sampling Sites

The Palouse River flows from its headwaters near Princeton, Idaho 144 miles to its confluence with the Snake River at Lyons Ferry, Washington. Land use in the Palouse River basin is primarily dryland agriculture and rangeland, with scattered small rural city populations.

The South Fork (S.F.) Palouse River flows from its headwaters east of Moscow, Idaho 47.2 miles to its confluence with the Palouse River in Colfax, Washington. Land use in the S.F. Palouse basin is primarily dryland agriculture with most of the population centered within the cities of Pullman, Washington and Moscow, Idaho.

This streamflow assessment was broken into two study years. The first year focused on the S.F. Palouse River and its tributaries, and ran from May 2006 to May 2007. The second year focused on the North Fork and mainstem Palouse River, and ran from May 2007 to May 2008.

South Fork Palouse Sites (Year One)

In the first year of the study, Ecology established continuous stage-height recorders and developed discharge-rating curves at five sites in the S.F. Palouse River basin (Figure 1):

- S.F. Palouse River at Colfax (Site 1): This gage was located at river mile 1.2, upstream of the City of Colfax's flood control channel.
- S.F. Palouse River at Parvin (Site 2): This gage was located at river mile 8.9, at the Parvin Road crossing.
- S.F. Palouse River at Albion (Site 3): This gage was located at river mile 14.6, near the Albion Post Office.
- Paradise Creek at mouth (Site 4): This gage was located 0.1 miles upstream of the confluence with the S.F. Palouse River, downstream of Bishop Road in Pullman.
- Paradise Creek at Idaho border (Site 5): This gage was located at river mile 6.5, along the Moscow-Pullman Highway at the Washington-Idaho border.

Discharge-rating curves were established and instantaneous stage-height readings were taken at three additional sites (Figure 1):

- S.F. Palouse River below Sunshine Creek (Site 6): This gage was located at river mile 23.8 at Professional Mall Boulevard in Pullman.
- Dry Creek at Pullman (Site 7): This gage was located just upstream of the confluence with the S.F. Palouse River, next to the Pullman public library.
- Missouri Flat Creek at Pullman (Site 8): This gage was located 100 yards upstream of the confluence with the S.F. Palouse River, at NW State Street.

Mainstem Palouse Sites (Year Two)

In the second year of the study, Ecology established continuous stage-height recorders and developed discharge-rating curves at four sites on the mainstem Palouse River, and one site on the S.F. Palouse River (Figure 1):

- Palouse River above Rebel Flat Creek (Site 9): This gage was located at river mile 49.4, in the community of Winona.
- Palouse River at Shields Road (Site 10): This gage was located at river mile 77.8, at Shields Road north of the town of Diamond.
- Palouse River above the South Fork (Site 11): This gage was located at river mile 89.8, at the Highway 195-Highway 26 junction in the town of Colfax.
- Palouse River at Elberton (Site 12): This gage was located at river mile 104.0, at Oral Smith Road in the community of Elberton.
- S.F. Palouse River below Colfax (Site 13): This gage was located about 200 yards upstream of the confluence with the mainstem Palouse River at river mile 0.02, in the town of Colfax.

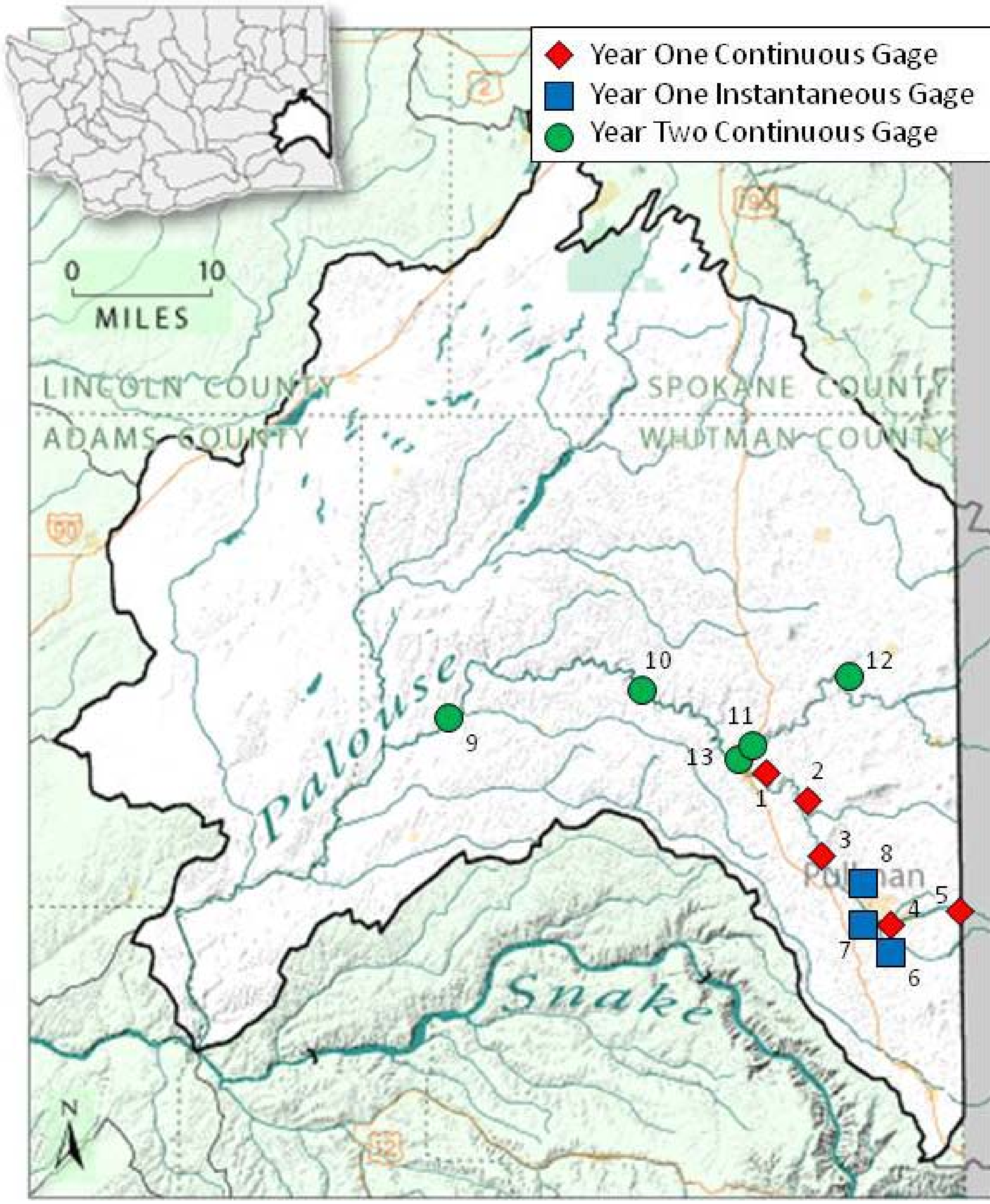

Figure 1: Map of Palouse River basin study sites.

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Methods

Each of the continuous gaging stations was equipped with a submersible pressure transducer and datalogger that recorded water surface elevation (stage height) and water temperature at 15-minute intervals throughout the 2006-08 study period.

The mainstem Palouse River often freezes during the winter months. Since submersible pressure transducers can suffer irreparable damage if encased in ice, a gas bubbler system was installed at Palouse River at Shields Road (Site 10) during year two of the study. This system has the pressure transducer housed inside the datalogger and a plastic tube extending into the channel. The pressure transducers at the remaining gages were removed during the winter months, and their hydrographs were estimated based on the following stations: USGS Station 13351000-Palouse River at Hooper for Site 9, and USGS Station 1334500-Palouse River at Potlatch for Sites 11, 12, and 13. The pressure transducers were reinstalled once the risk of channel ice had subsided.

At each of the 13 sites monitored for this study, Ecology took 11 to 15 streamflow measurements to establish a discharge-rating curve, which models the relationship between stage and streamflow. These rating curves were then used to calculate the average daily flow for each site.

Streamflow Measurements

Ecology took flow measurements at the 13 sites using one of three methods: mechanical current meter, acoustic Doppler current profiler (ADCP), or acoustic Doppler velocimeter (ADV).

Flow measurements using mechanical current meters were made following the USGS mid-section method (Rantz et al., 1982a, 1982b). Ecology has made minor modifications to the USGS method to accommodate its measurement equipment (Butkus, 2005; Holt, 2009; Shedd, 2009). The flow measurement cross-sections were established by driving re-bar into opposing banks such that the cross-sections were perpendicular to the streamflow at each site. This allowed field staff to return to the same cross-section at different stage heights, and added to the reliability of the measured flow data. In general, the cross-sections were divided so that no more than 10% of the total flow passed through any single cell. The width of the individual cells varied in keeping with the 10% flow criteria (Shedd, 2009).

Ecology took velocity measurements at 60% of the stream depth when the total stream depth was less than 1.5 feet, and at 20% and 80% of the stream depth when the depth was greater than 1.5 feet. The instream velocity measurements were taken using a standard USGS top-set wading rod fitted for Swoffer-type optical sensors and propellers. Flow was calculated using the USGS mid-section method with a specialized flow calculation software program developed by Ecology (Butkus, 2005; Shedd, 2009).

High-flow measurements were often taken by lowering the current meter from a bridge over the river. In this method, a sensor, propeller, and a 25, 50, or 75 pound weight are suspended in the channel from a crane. This rigging creates some physical constraints in that the propeller can be suspended no closer than 0.6 ft. from the river bed. As a result, 80% depth measurements can only be made at depths of 2.5 ft. or greater (Holt, 2010).

Many of the flow measurements taken for this study were made using an ADCP mounted on a durable plastic trimaran vessel. ADCPs use sonar to measure the Doppler shift in acoustic frequency that occurs when sound waves reflect off particles in the water column. The ADCP sends a signal into the water column once per second to determine a continuous profile of depth and velocity across the river channel. Four to eight measurements are made by towing or walking the ADCP vessel across the chosen transect, which must be between one and 15 feet deep and have moderate velocities (less than six feet per second). The results of these transects are then averaged (Shedd et al., 2008).

The continuous profiling capability of ADCPs make them an extremely accurate instrument for measuring flow, since water column velocities and cross-sectional areas are measured more thoroughly than can be done using mechanical current meters. ADCP measurements were used for this study whenever stream conditions permitted.

By year two of the study, Ecology had acquired a SonTek FlowTracker ADV, which was employed for some of the mainstem measurements. The ADV is a side-looking sonar sensor that is mounted on a top-set wading rod, similar to a mechanical current meter (Burks, 2009). Velocity measurements are taken at fixed points along a cross-section, and flow is calculated using the mid-section method (Shedd, 2009).

Stage-Height Records

Ecology installed a submersible pressure transducer to continuously monitor stage height at each of the 10 continuous monitoring sites. A primary gage index (PGI) was also installed at each of the 13 sites for the study. The PGI is a readable device, such as a staff gage, wire weight gage, or reference point on an over-passing bridge. The stage heights observed from the PGI are used to develop the rating curve and to calibrate the datalogger at sites where continuous data are collected (Shedd, 2008). The dataloggers at each of the continuous monitoring sites were calibrated to the PGI at the time of installation and were subsequently recalibrated as necessary (Fisher and Holt, 2010; Myers, 2009).

Pressure transducers are inherently prone to drift, with the degree varying from instrument to instrument. Drift is essentially a migration of the instrument from its original calibration, and it materializes as a difference between observed and logged stage-height values (Freeman et al., 2004). This instrument drift results in erroneous stage-height values that, when applied to the discharge-rating curve for a station, produce erroneous flow values. These erroneous stage-height values are typically corrected by applying time-weighted adjustments to the continuous data set, which pivot on the stage-height values observed on the PGI by field staff.

The adjusted stage-height values are then applied to the flow-rating curve for the site, yielding a more accurate record of flow. The time-weighted adjustments are based on the assumption that instrument drift occurs gradually and evenly over time, which under conditions such as sedimentation and biofouling, is generally true (Freeman et al., 2004).

Error Assessments

Ecology calculated error estimates for each site for the two primary sources of error: pressure-transducer drift and the discharge-rating curve. The error estimates were calculated for the period of record for each site and for the low-flow season (July-September) separately.

Error introduced by pressure-transducer drift was quantified using the following calculation:

$$\frac{1}{n}\sum_{1}^{n}\left(\frac{\left|Q_{rec}-Q_{obs}\right|}{Q_{obs}}\right)$$

where:

Q_{rec} is the corresponding streamflow for the recorded stage values.
Q_{obs} is the corresponding streamflow for the observed stage-height values.

Error in the discharge-rating curve is quantified using the following calculation:

$$\frac{1}{n}\sum_{1}^{n}\left(\frac{\left|Q_{pred}-Q_{adj}\right|}{Q_{pred}}\right)$$

where:

Q_{pred} is the streamflow predicted by the rating curve.
Q_{adj} is the measured streamflow plus or minus the maximum potential error, based on the professional quality rating of each streamflow measurement.

Error due to pressure-transducer drift and error inherent in the discharge-rating curve are mutually exclusive sources of error and are thus treated as additive. Table 1 shows the error assessment results for each site.

Table 1: Error assessment results for Palouse River TMDL stream-gaging sites.

Site	Name	Error Estimates		
		Rating	Data	Total
1	S.F. Palouse R. at Colfax	18%	22%	40%
2	S.F. Palouse R. at Parvin	17%	8%	25%
3	S.F. Palouse R. at Albion	17%	3%	20%
4	Paradise Cr. at mouth	24%	N/A	24%
5	Paradise Cr. at Idaho border	12%	108%	120%
6	S.F. Palouse R. below Sunshine Creek	18%	6%	24%
7	Dry Cr. at Pullman	106%	N/A	106%
8	Missouri Flat Cr. at Pullman	41%	N/A	41%
9	Palouse R. above Rebel Flat Creek	13%	6%	19%
10	Palouse R. at Shields Road	10%	2%	12%
11	Palouse R. above the South Fork	10%	7%	17%
12	Palouse R. at Elberton	16%	23%	39%
13	S.F. Palouse R. below Colfax	17%	7%	24%

High-Flow Modeling

High-flow conditions and the timing of high-flow events often preclude direct measurement of peak flows at any given station. Wherever feasible, these high flows are modeled using a slope-conveyance model. The slope-conveyance method of high-flow modeling is based on Manning's velocity equation:

$$V = \frac{1.49}{n}\left(\frac{A}{P}\right)^{2/3} S^{1/2}$$

where:

V is average velocity across a given river cross-section in ft/sec.
n is Manning's roughness coefficient.
A is the area of a given river cross-section in ft^2.
P is the wetted perimeter of a given river cross-section in ft.
S is the energy slope of a given river segment.

Existing high-flow measurements, in conjunction with cross-sectional and longitudinal surveys, are used to determine Manning's roughness coefficient (n) and energy slope (S) for those measurements. These results can then be extrapolated to determine flow at stages above the measured range for a station. The extrapolated results are then calibrated to measured flow using linear regression.

Modeled high flows are considered estimates of actual flow. For each model, potential error is calculated as the average difference between measured flow and calibrated modeled flow.

Quality Assurance

Ecology took quality assurance measures during this study to address (1) error inherent in the instream flow measurements at each site, and (2) error in stage-height records produced by the datalogger at the continuous monitoring sites.

Streamflow Measurements

Because the largest potential source of error in a flow measurement is in the velocity measurement, site selection and equipment calibration are of high importance. In this study, the measured cross-sections were qualitatively rated from excellent to poor, based on physical conditions encountered during each measurement.

- An *excellent* cross-section, which lies in a straight channel segment with laminar flow and fairly fine-grained substrate, assumes an error of up to 2%.
- A *good* cross-section, which generally lies in a straight channel segment with predominantly laminar flow and courser-grained substrate, assumes an error of up to 5%.
- A *fair* cross-section, which may contain sections of angular flow, turbulence, or near-bank eddies, assumes an error of up to 8%.
- A *poor* cross-section, which lies in proximity to bends in the stream channel with predominantly turbulent flow and cobble or boulder substrate, assumes an error of over 8%.

Depending on the selected cross-section, a minimum of the assigned error is assumed and carried forward to the final flow calculation and rating curve development.

An additional source of error in velocity measurements made with mechanical current meters is the calibration of the Swoffer instruments. The ideal calibration setting of a Swoffer propeller is 186, which means that for every 186 revolutions of the propeller, 10 lineal feet of water has passed the measurement point. The Swoffer meters tend to be temperature sensitive, and the calibration setting of a meter can change over the course of a flow measurement. The calibration settings for Swoffer meters used during this project were checked before and after each flow measurement, with values ranging from 181 to 189. A calibration value of 181 overestimates the flow measurement by 2.5%. Similarly, a calibration value of 189 underestimates the flow measurement by 1.5%.

After a discharge-rating curve was established for each site, flow measurements were tracked by comparing the measured flow values to the flow values predicted by the rating curve at the same stage. The combination of propeller variations, turbulent flow conditions at high flows, and rampant aquatic weed growth at most of the sites contributed to the measured and predicted flow differences for individual flow measurements ranging from 0% to 115%. This range of differences between measured and predicted flow demonstrates the ability of the rating curves to predict flow at each site.

Stage-Height Records

Based on manufacturer specifications, the theoretical precision of the pressure transducers is less than or equal to 0.02% of the full-scale output. For the transducers used by Ecology, this precision is considered linear from 0 to 15 pounds per square inch (psi), or 0 to 34.6 feet of water (Fletcher, 1994).

During the study period, the accuracy of pressure transducer at each site was addressed by using PGI versus pressure-transducer regressions. The correlation coefficient (r) values for the regression of raw pressure-transducer readings against the final data set, which had been adjusted to the discrete observed stage-height values, had values ranging from 0.559 to 1.0. This correlation provides an indication of the severity of pressure-transducer drift (discussed above in the *Methods* section) at each site.

Results

Year One Study Sites

Site 1: S.F. Palouse River at Colfax

The average daily streamflow for Site 1 ranged from 3.3 cubic feet per second (cfs) in early August 2006 to 1,020 cfs in early January 2007. Peak flow during the study was 1,890 cfs during a large rain-on-snow event in early January 2007 (Figure 2). Daily flow averages are presented in Appendix A, Table A-1. The measured range of flow for this site encompassed only 10% of the range of flow encountered, with flow measurements ranging from 3.6 to 202 cfs (Figure 3). However, flows exceeded the measured range only 8% of the time during the study. 1% of flows were less than the lowest measured flow, and 7% of flows were higher than the highest measured flow (Figure 4). The flow measurements taken at this site are listed in Appendix B, Table B-1.

Within the measured range of flows, the fit of the rating curve was fair. Fifteen of the 16 flow measurements taken at Site 1 were used to develop the rating curve. Six of these measurements were within 5% of the flow predicted by the rating curve, and four were within 10%. The other five measurements were within 20% of the flow predicted by the rating curve. One measurement was excluded from the rating curve development. This measurement, taken in early September 2006, had a poor propeller calibration, and the flow was much lower than predicted by the rating curve. Measurements taken before and after this one fit the rating curve, so it was determined that this measurement was erroneous. Flows greater than 202 cfs were modeled using a slope-conveyance model. The potential error for the modeled flows for this station is ±16%.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data showed a correlation coefficient (r) of 0.999 and a standard error of 4.6 cfs (8% of the mean flow for the study). This regression indicates minor and consistent pressure-transducer drift at this site (Figure 5).

Overall, the potential error for flow data for this site is calculated to be ±40%. Of this, 22% of the potential error is from the continuous stage data, and 18% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±72%. Of this, 54% of the potential error is from the continuous stage data, and 18% is from the rating curve. The large potential error in the continuous data, despite the minor pressure-transducer drift, is due to the high sensitivity of the rating curve. Particularly at low flows, a very small change in stage produces a large change in flow. Therefore, even small adjustments to the stage-height data result in large changes in flow.

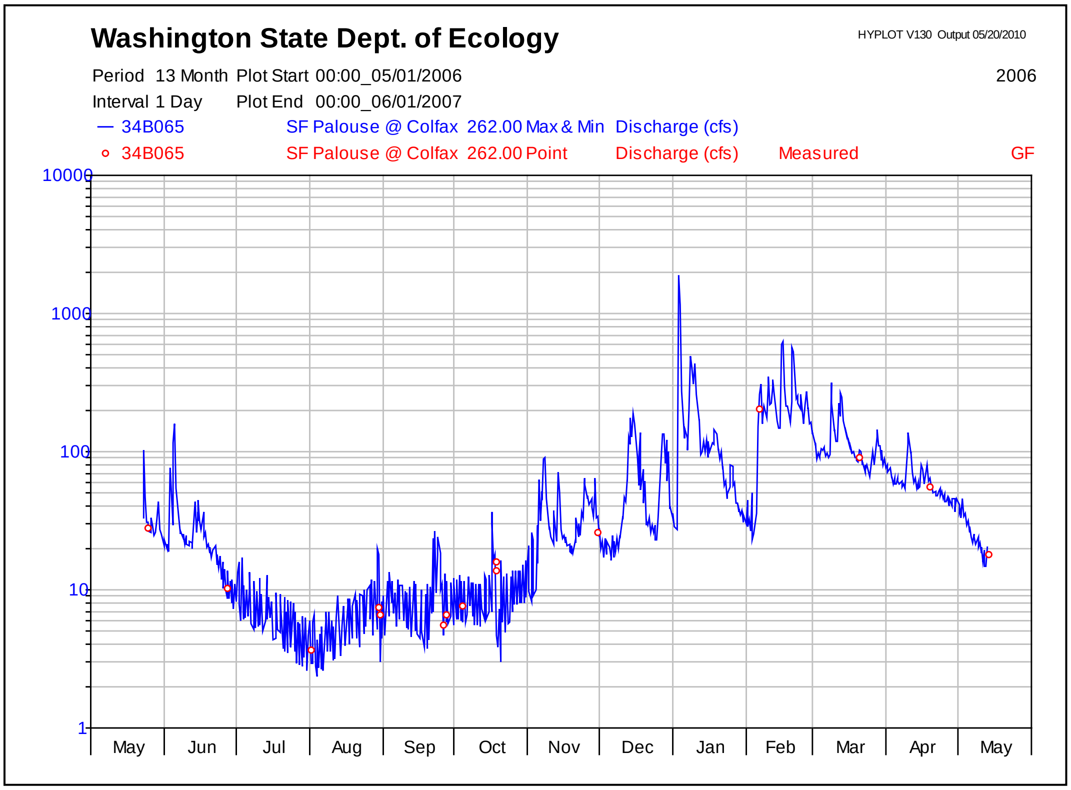

Figure 2: Streamflow hydrograph for Site 1.

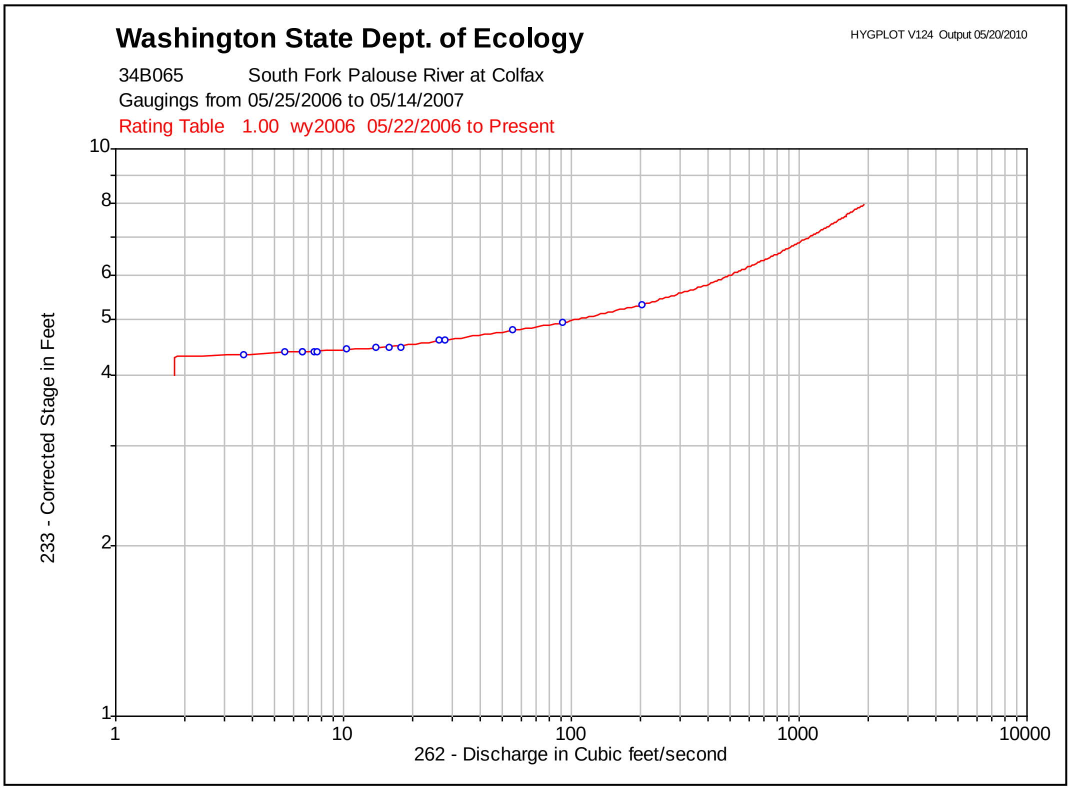

Figure 3: Discharge-rating curve for Site 1.

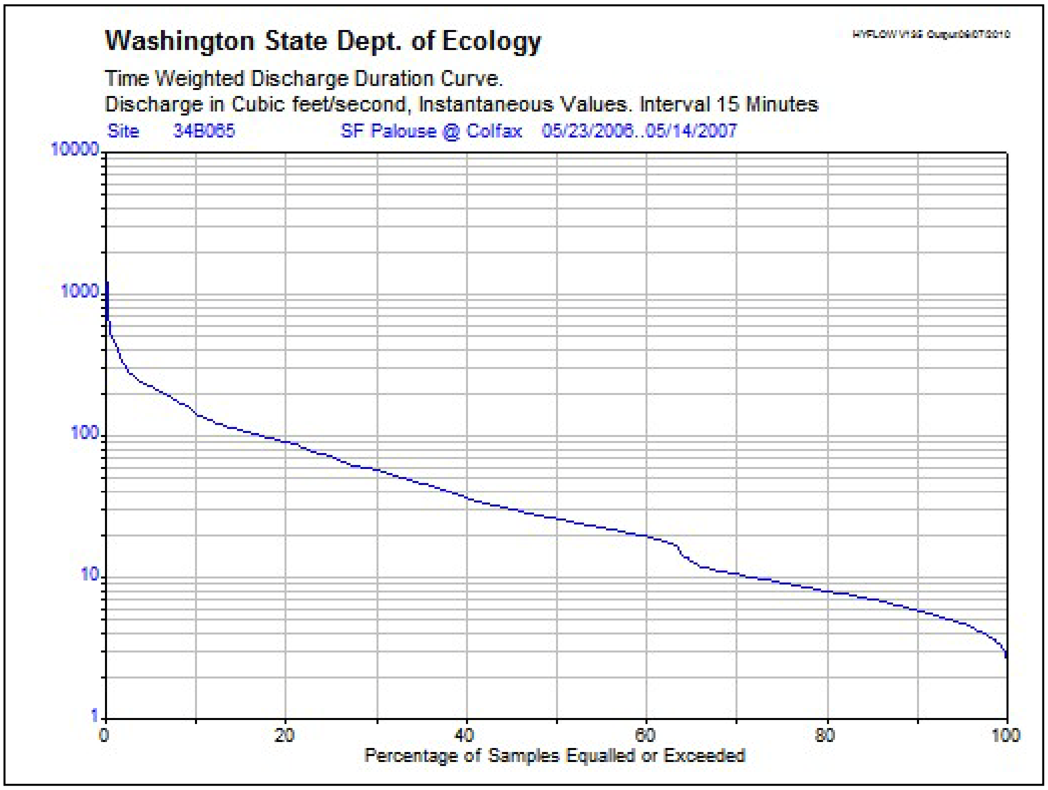

Figure 4: Streamflow exceedance graph for Site 1.

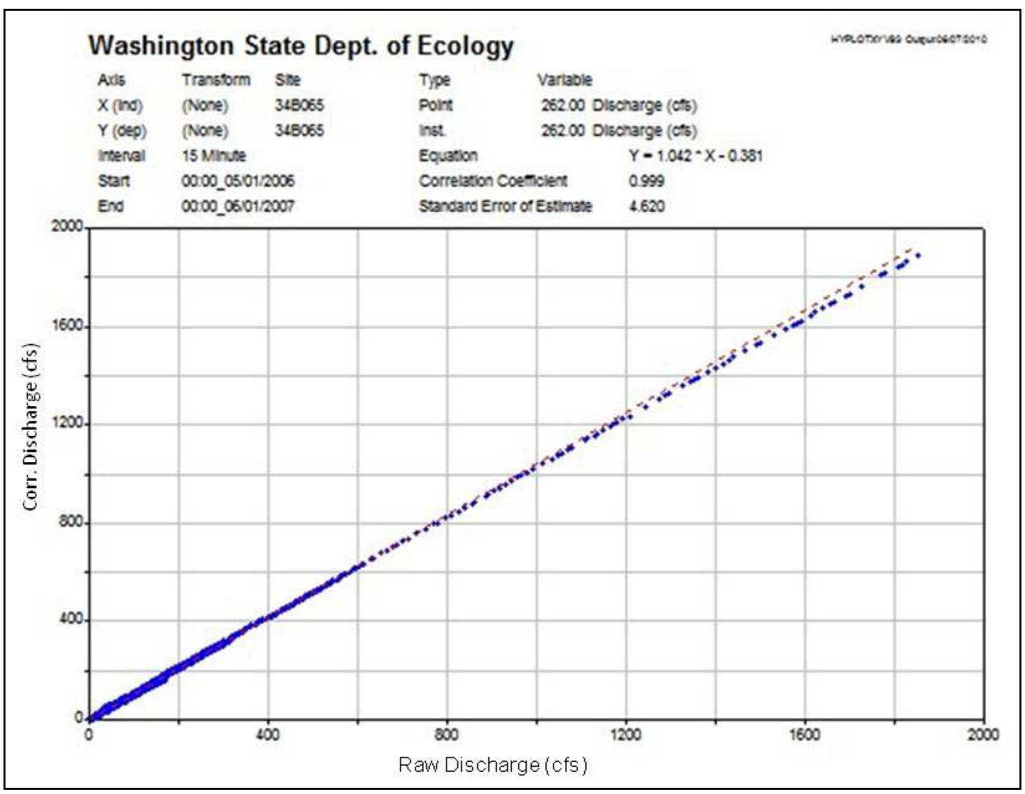

Figure 5: Linear regression of pre- versus post-adjusted streamflow data for Site 1. *Deviations from the regression line indicate pressure-transducer drift.*

Site 2: S.F. Palouse River at Parvin

The average daily streamflow for Site 2 ranged from less than 3.3 cfs in mid-August 2006 to 1,060 cfs in early January 2007. Peak flow during the study was estimated at 1,580 cfs during a large rain-on-snow event in early January 2007 (Figure 6). Daily flow averages are presented in Appendix A, Table A-2. The measured range of flow for this site encompassed only 11% of the range of flow encountered, with flow measurements ranging from 5.7 to 180 cfs (Figure 7). Those flows that exceeded the measured range occurred 24% of the time. 17% of flows were less than the lowest measured flow, and 7% were higher than the highest measured flow (Figure 8). The flow measurements taken at this station are listed in Appendix B, Table B-2.

Within the measured range of flows, the fit of the rating curve was fair. Seventeen of the 19 flow measurements taken at this site were used to develop the rating curve. Of these, nine were within 5% of the flow predicted by the rating curve, and seven were within 10%. Two measurements were excluded from rating curve development. These measurements were taken on September 6, 2006 and November 28, 2006 respectively. The September 6 measurement had numerous surface velocity measurements, likely resulting in an overestimate of average velocity for the measurement. The November 28 measurement had poor Swoffer propeller calibration results, and velocities were likely underestimated. Flows greater than 180 cfs were modeled using a slope-conveyance model. The modeled flows very closely approximated measured flows at this site, requiring no calibration. The modeled flows are thus considered as accurate as the measured flows for this site.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data showed a correlation coefficient (r) of 1.0 and a standard error of 1.2 cfs (2% of the mean flow for the study). This regression indicates minor and consistent pressure-transducer drift at this site (Figure 9).

Overall, the potential error for flow data for this site is calculated to be ±24%. Of this, 8% of the potential error is from the continuous stage data, and 16% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±37%. Of this, 20% of the potential error is from the continuous stage data, and 17% is from the rating curve.

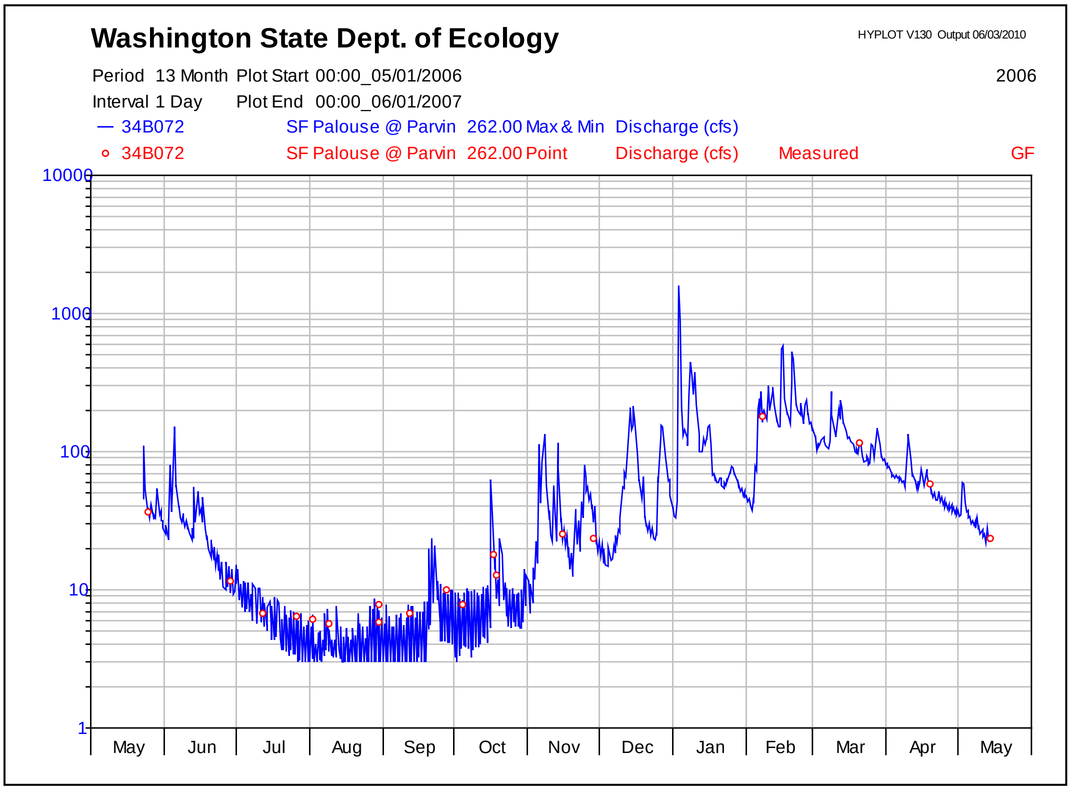

Figure 6: Streamflow hydrograph for Site 2.

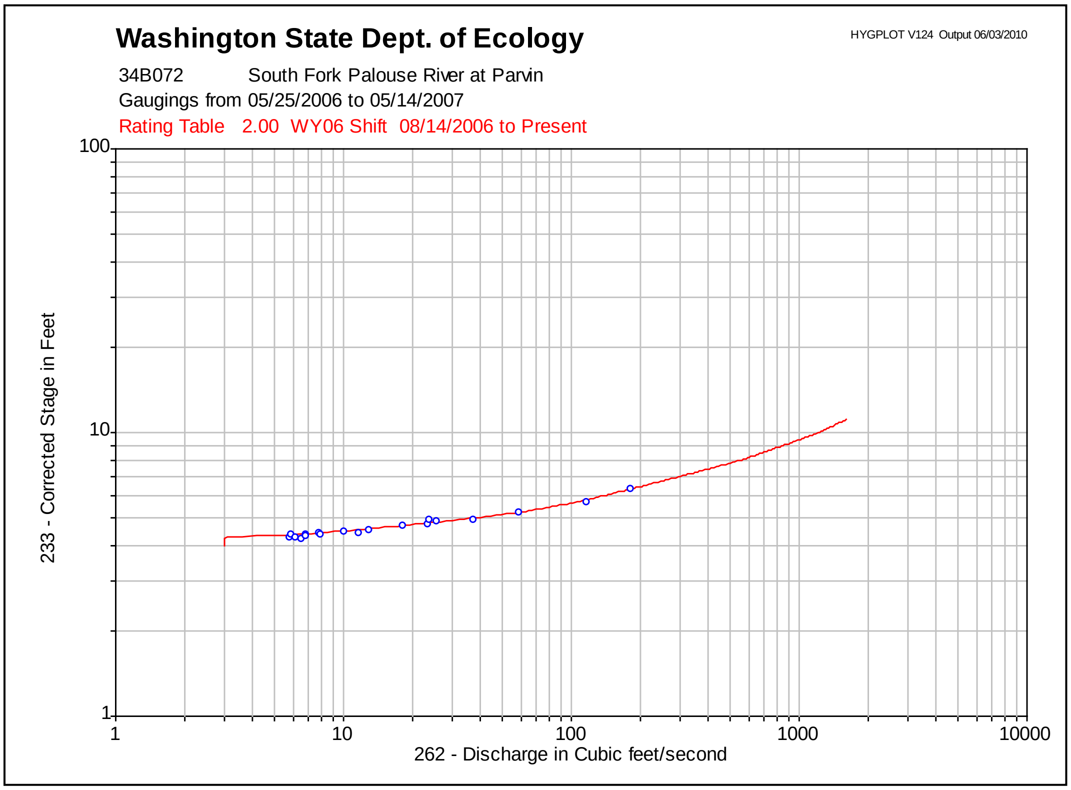

Figure 7: Discharge-rating curve for Site 2.

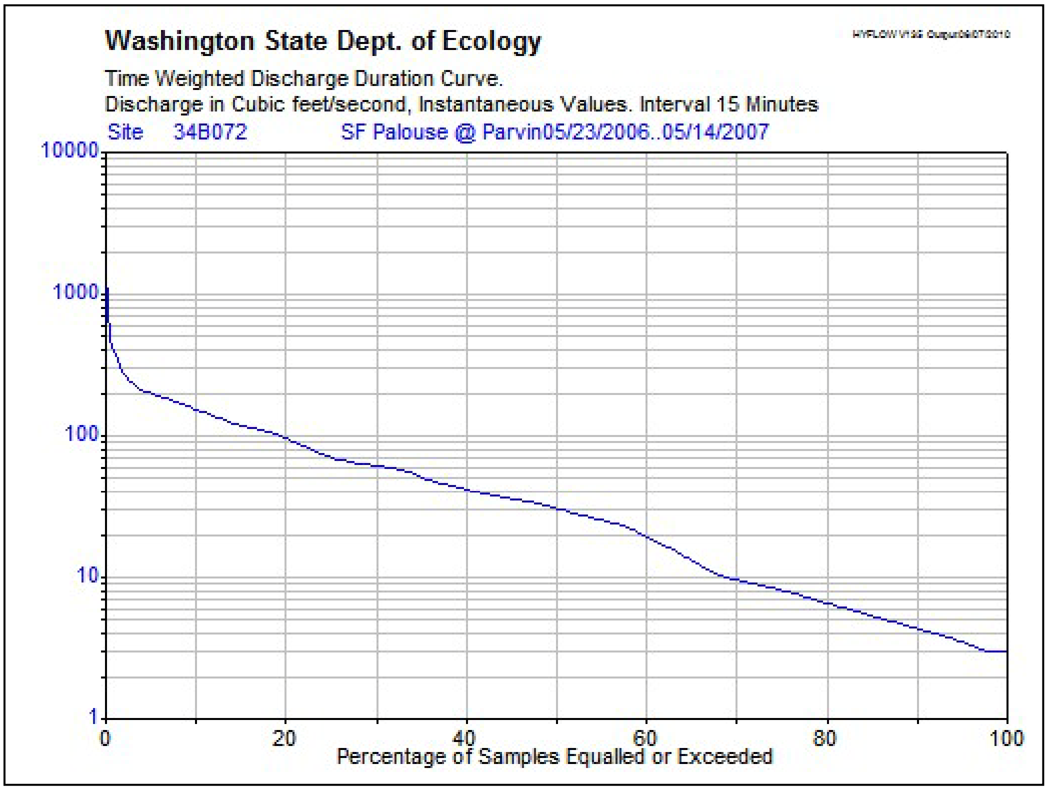

Figure 8: Streamflow exceedance graph for Site 2.

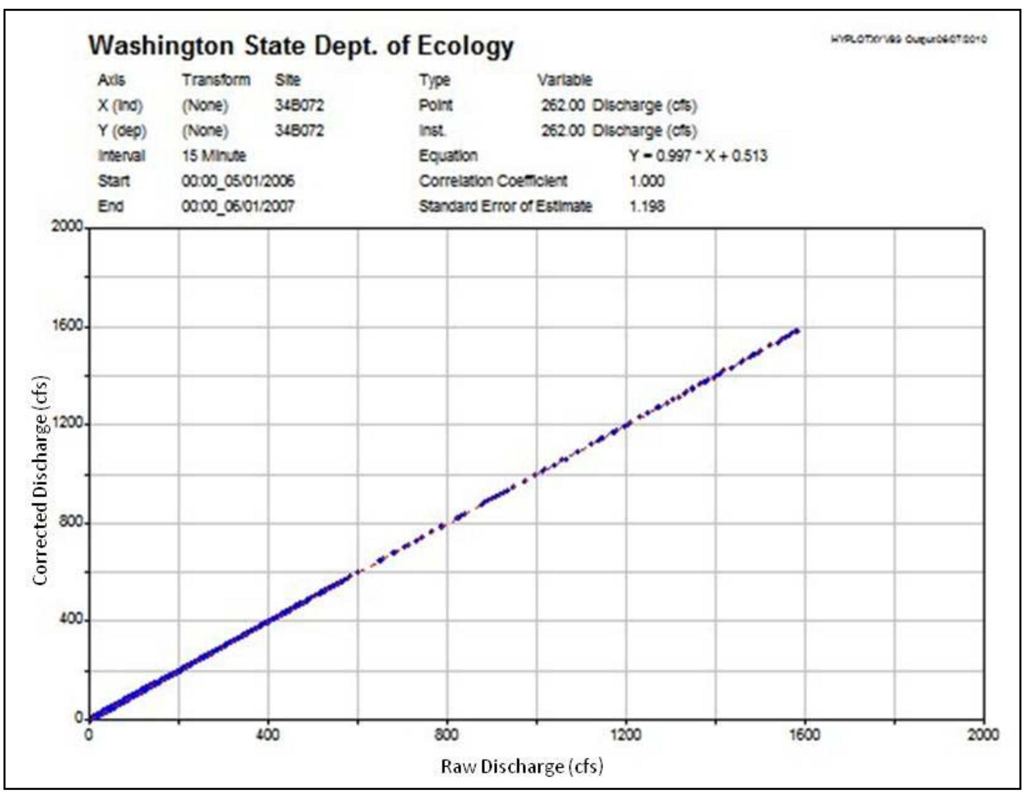

Figure 9: Linear regression of pre- versus post-adjusted streamflow data for Site 2. *Deviations from the regression line indicate pressure-transducer drift.*

Site 3: S.F. Palouse River at Albion

The average daily streamflow for Site 3 ranged from 3.4 cfs in early August 2006 to 842 cfs in early January 2007. Peak flow during the study was 1,260 cfs during a large rain-on-snow event in early January 2007 (Figure 10). Daily flow averages are presented in Appendix A, Table A-3. The measured range of flow for this site encompassed only 11% of the range of flow encountered, with flow measurements ranging from 3.3 to 141 cfs (Figure 11). However, those flows that exceeded the measured range occurred only 7% of the time. 2% of flows were lower than the lowest measured flow, and 5% were higher than the highest measured flow (Figure 12). The flow measurements taken at this station are listed in Appendix B, Table B-3.

Within the measured range of flows, the fit of the rating curve was fair. All 17 flow measurements taken at this site were used to develop the rating curve. Of these, seven were within 5% of the flow predicted by the rating curve, and four were within 10%. Flows greater than 141 cfs were modeled using a slope-conveyance model. The potential error for the modeled flows for this station is ±17%.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data showed a correlation coefficient (r) of 1.0 and a standard error of 0.9 cfs (2% of the mean flow for the study). This regression indicates minor and consistent pressure-transducer drift at this site (Figure 13).

Overall, the potential error for flow data for this site is calculated to be ±20%. Of this, 3% of the potential error is from the continuous stage data, and 17% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±18%. Of this, 4% of the potential error is from the continuous stage data, and 14% is from the rating curve.

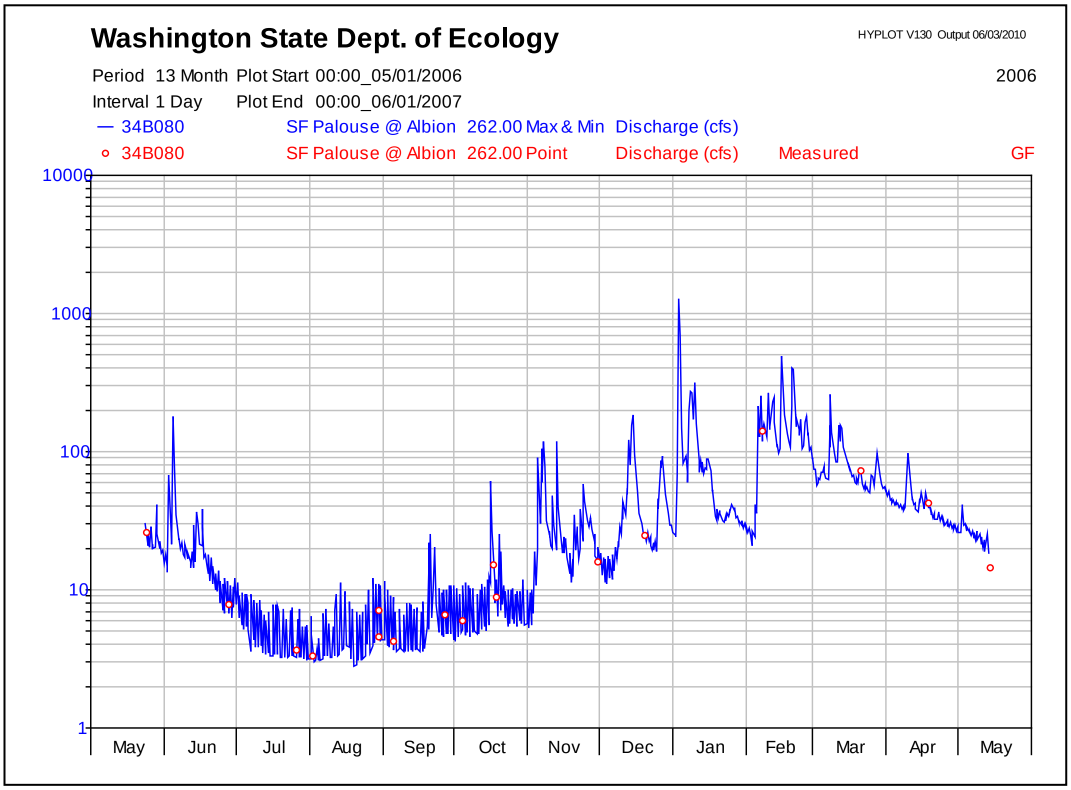

Figure 10: Streamflow hydrograph for Site 3.

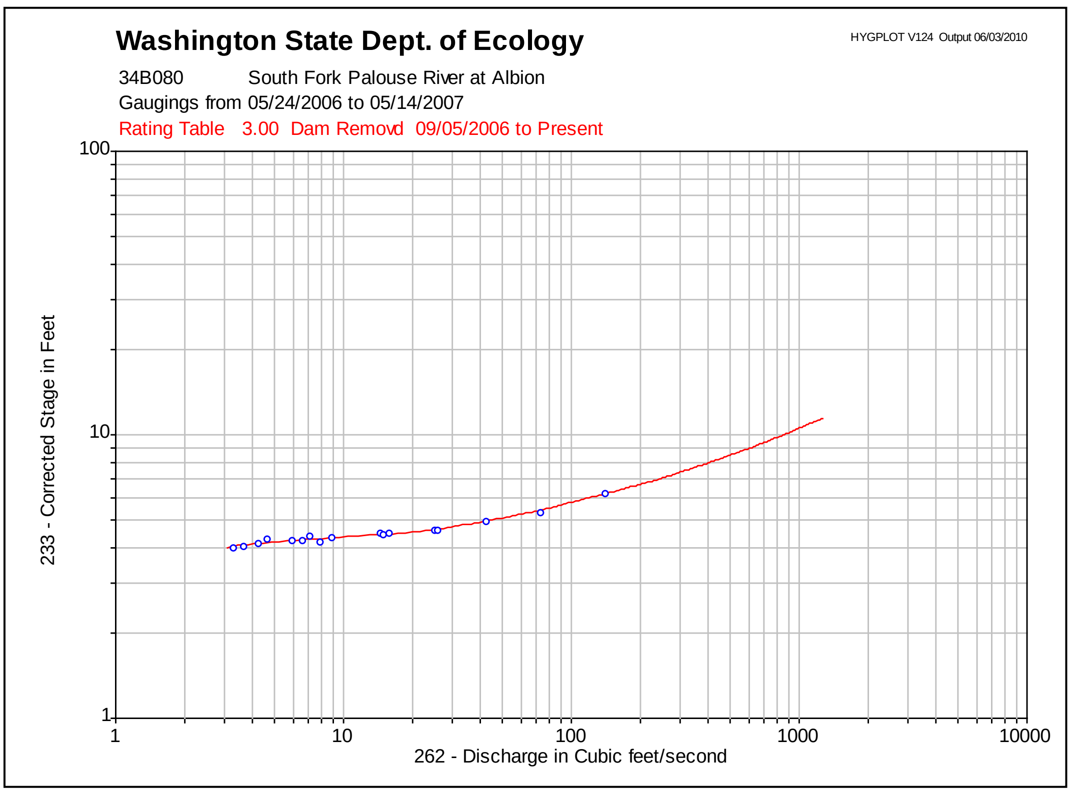

Figure 11: Discharge-rating curve for Site 3.

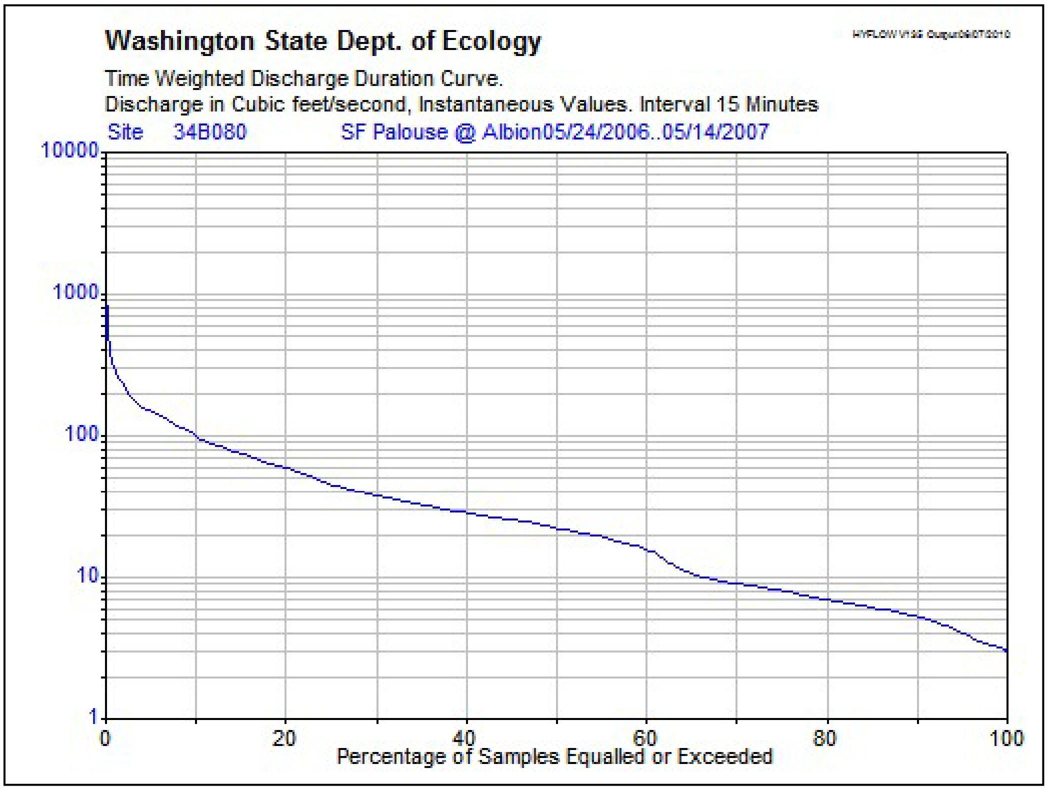

Figure 12: Streamflow exceedance graph for Site 3.

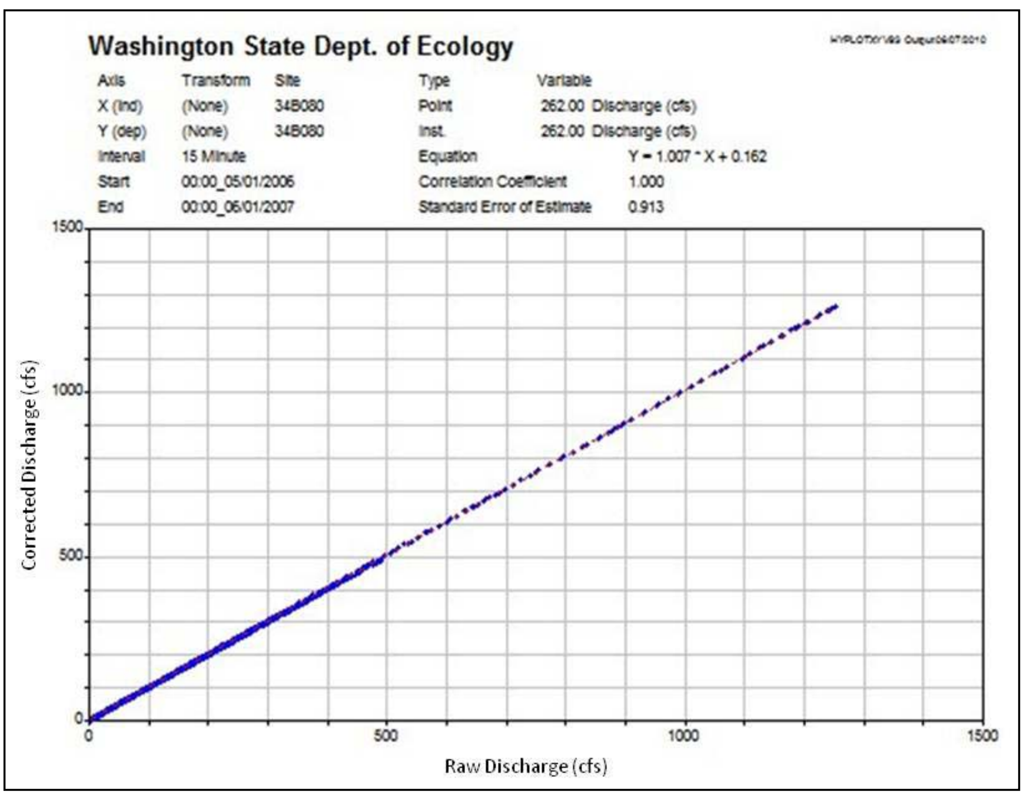

Figure 13: Linear regression of pre- versus post-adjusted streamflow data for Site 3. *Deviations from the regression line indicate pressure-transducer drift.*

Site 4: Paradise Creek at mouth

The average daily streamflow for Site 4 ranged from an estimated 1 cfs in early January 2007 to an estimated 104 cfs in early March 2007. Peak flow during the study was an estimated 254 cfs during a large storm event in early March 2007 (Figure 14). Daily flow averages are presented in Appendix A, Table A-4. The measured range of flow for this site encompassed less than 25% of the range of flow encountered, with flow measurements ranging from 1.3 to 60.9 cfs (Figure 15). Those flows that exceeded the measured range occurred only 6% of the time. 5% of flows were less than the lowest measured flow, and 1% were higher than the highest measured flow (Figure 16). The flow measurements taken at this station are listed in Appendix B, Table B-4.

Within the measured range of flows, the fit of the rating curve was good. Thirteen of the 15 flow measurements taken at this site were used to develop the rating curve. Of these, ten were within 5% of the flow predicted by the rating curve, and the other three were within 10%. Two measurements were excluded from rating curve development. These measurements were taken on June 28, 2006 and August 29, 2006 respectively.

The June 28 measurement had good quality control results, but was divided into too few vertical cells, resulting in a coarse, and likely over-estimated measurement of flow. Non-Freshwater Monitoring Unit (FMU) staff took the November 28 measurement, and the stage reading for the measurement was taken some time after the measurement itself. This measurement had a much higher flow than predicted by the rating curve; however, a measurement taken earlier that day by FMU staff matches the flow predicted by the rating curve. Flows greater than 60.9 cfs were modeled using a slope-conveyance model. The potential error for the modeled flows for this station is ±33%.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data showed a correlation coefficient (r) of 0.559 and a standard error of 13.3 cfs (117% of the mean flow for the study). This regression indicates extreme and erratic pressure-transducer drift at this site (Figure 17). Much of the continuous data record at this site had to be flagged as estimates or modeled based on Site 5 due to repeated instrument failures at Site 4 during the study.

Overall, the potential error for flow data for this site is calculated to be ±120%. Of this, 108% of the potential error is from the continuous stage data, and 12% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±33%. Of this, 21% of the potential error is from the continuous stage data, and 12% is from the rating curve.

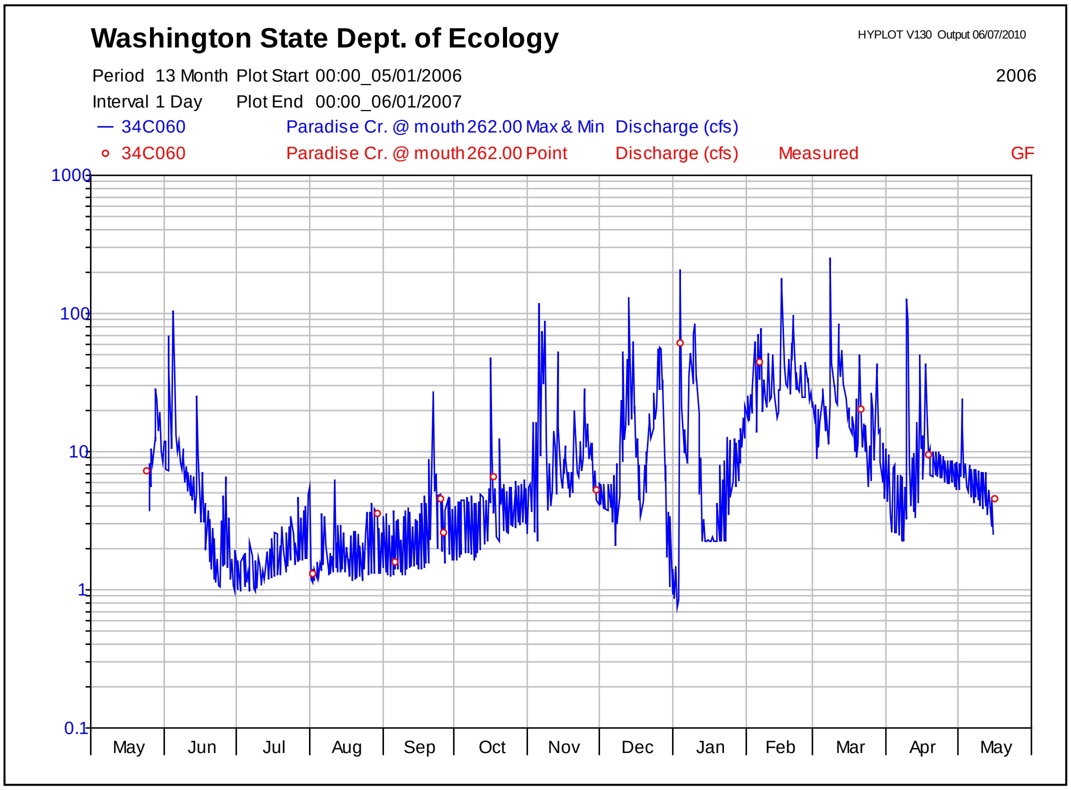

Figure 14: Streamflow hydrograph for Site 4.

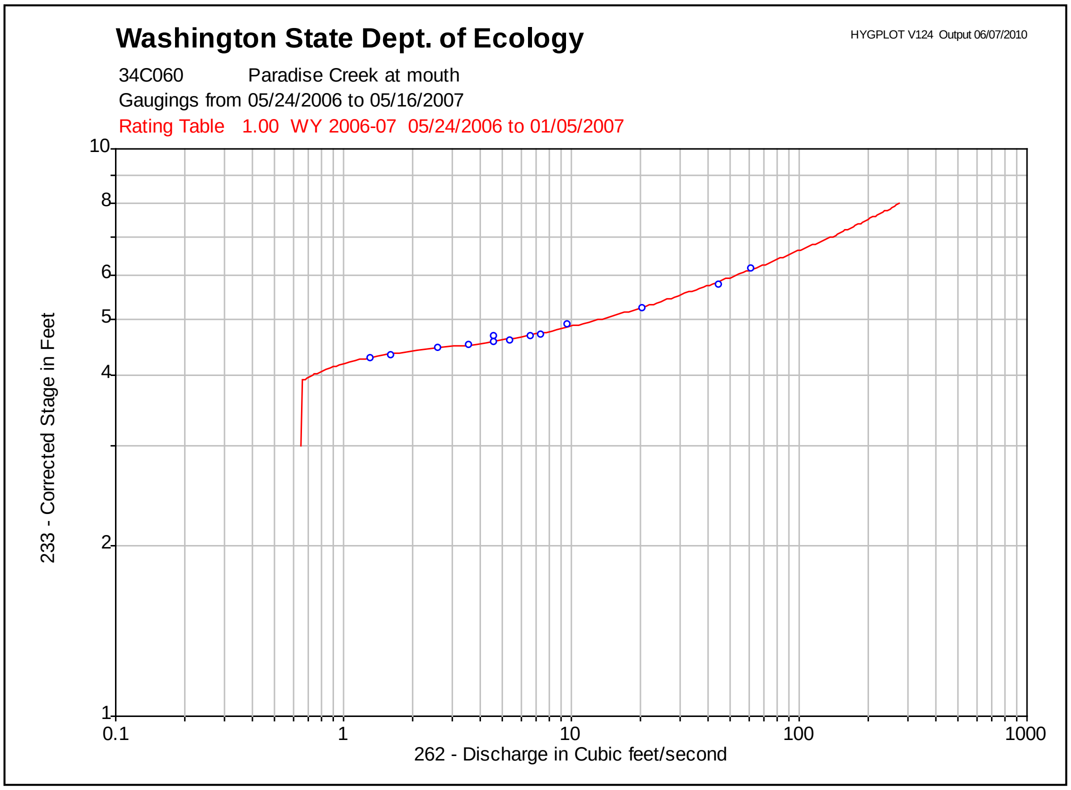

Figure 15: Discharge-rating curve for Site 4.

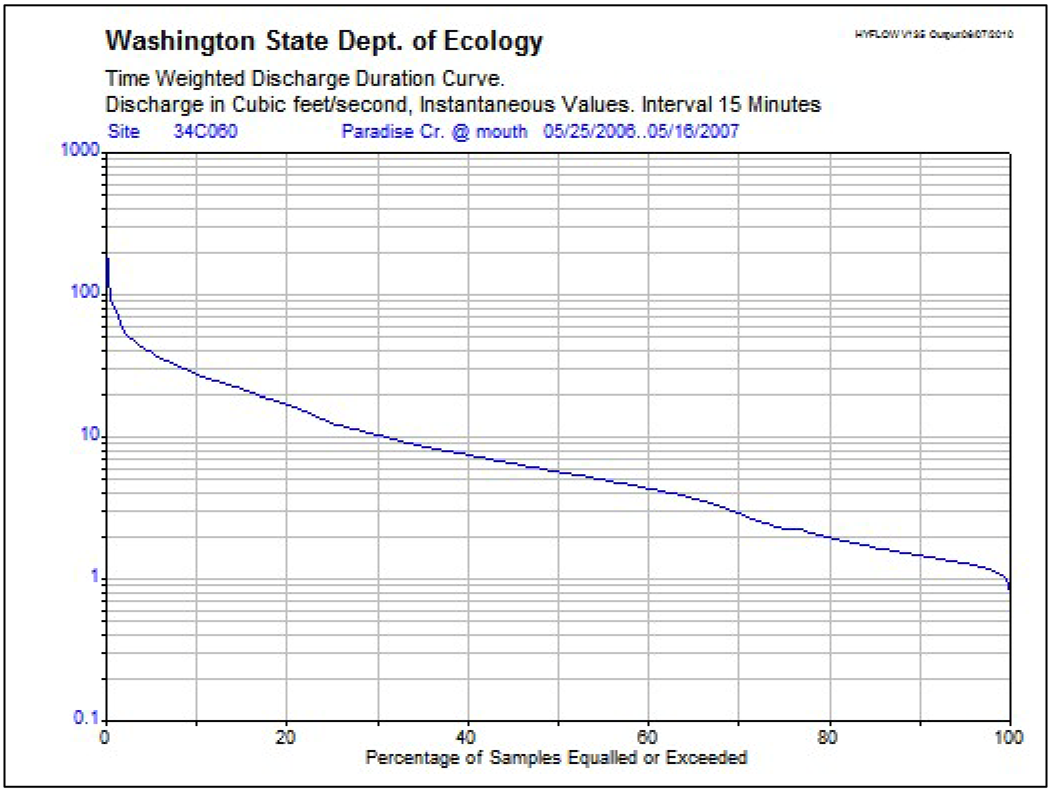

Figure 16: Streamflow exceedance graph for Site 4.

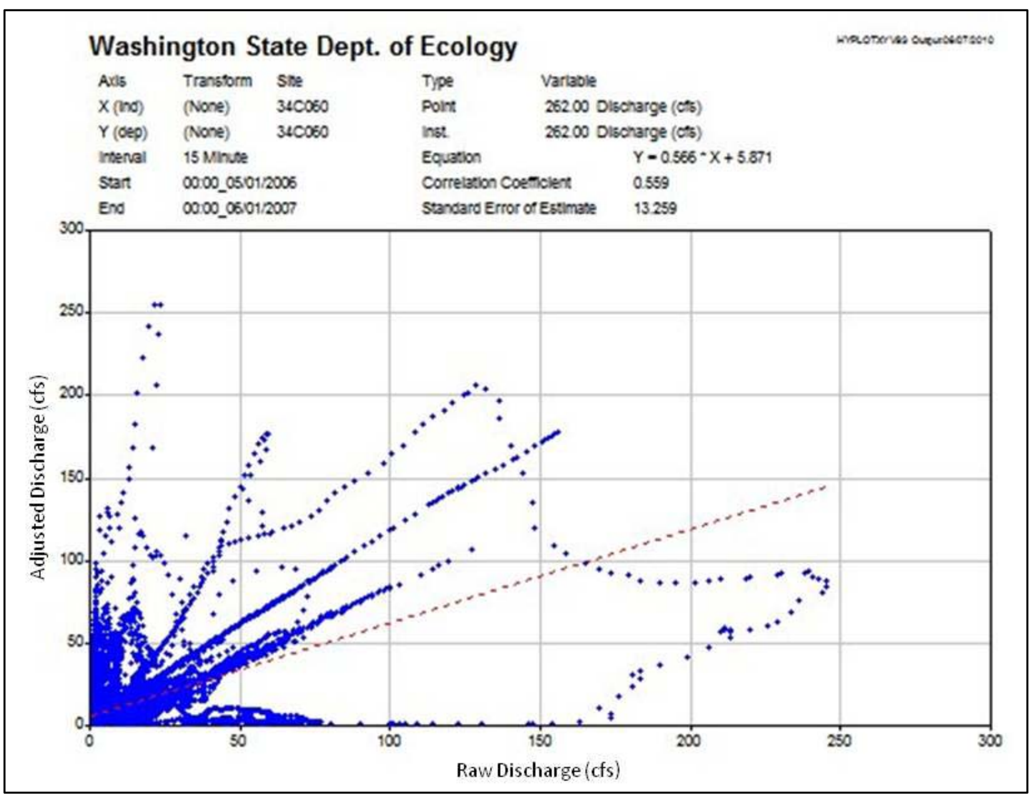

Figure 17: Linear regression of pre- versus post-adjusted streamflow data for Site 4. *Deviations from the regression line indicate pressure-transducer drift.*

Site 5: Paradise Creek at Idaho Border

The average daily streamflow for Site 4 ranged from an estimated 0.3 cfs in early July 2006 to 63.8 cfs in early January 2007. Peak flow during the study was 70.0 cfs during a large rain-on-snow event in early January 2007 (Figure 18). Daily flow averages are presented in Appendix A, Table A-5. The measured range of flow for this site encompassed only 43% of the range of flow encountered, with flow measurements ranging from 0.6 to 30.8 cfs (Figure 19). Those flows that exceeded the measured range occurred only 8% of the time. 5% of flows were less than the lowest measured flow, and 3% were higher than the highest measured flow (Figure 20). The flow measurements taken at this station are listed in Appendix B, Table B-5.

Within the measured range of flows, the fit of the rating curve was fair. All 17 flow measurements taken at this site were used to develop the rating curve. Eight of the measurements were within 5% of the flow predicted by the rating curve, and four were within 10%. The other five measurements were within 20% of the flow predicted by the rating curve. The stage-discharge relationship at this site was very volatile, changing three times over the course of the study. Flows greater than 30.8 cfs were modeled using a slope-conveyance model. The potential error for the modeled flows for this station is ±17%.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data showed a correlation coefficient (r) of 0.999 and a standard error of 0.5 cfs (7% of the mean flow for the study). This regression indicates moderate and somewhat variable pressure-transducer drift at this site (Figure 21).

Overall, the potential error for flow data for this site is calculated to be ±24%. Of this, 6% of the potential error is from the continuous stage data, and 18% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±33%. Of this, 10% of the potential error is from the continuous stage data, and 23% is from the rating curve.

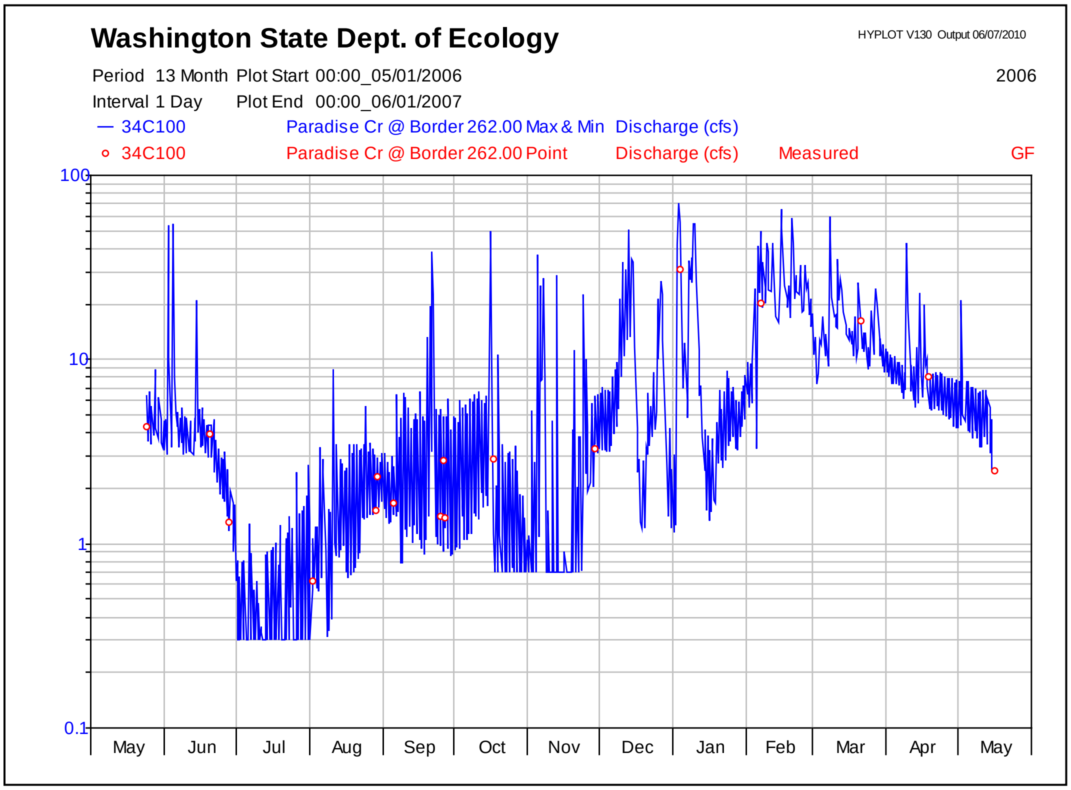

Figure 18: Streamflow hydrograph for Site 5.

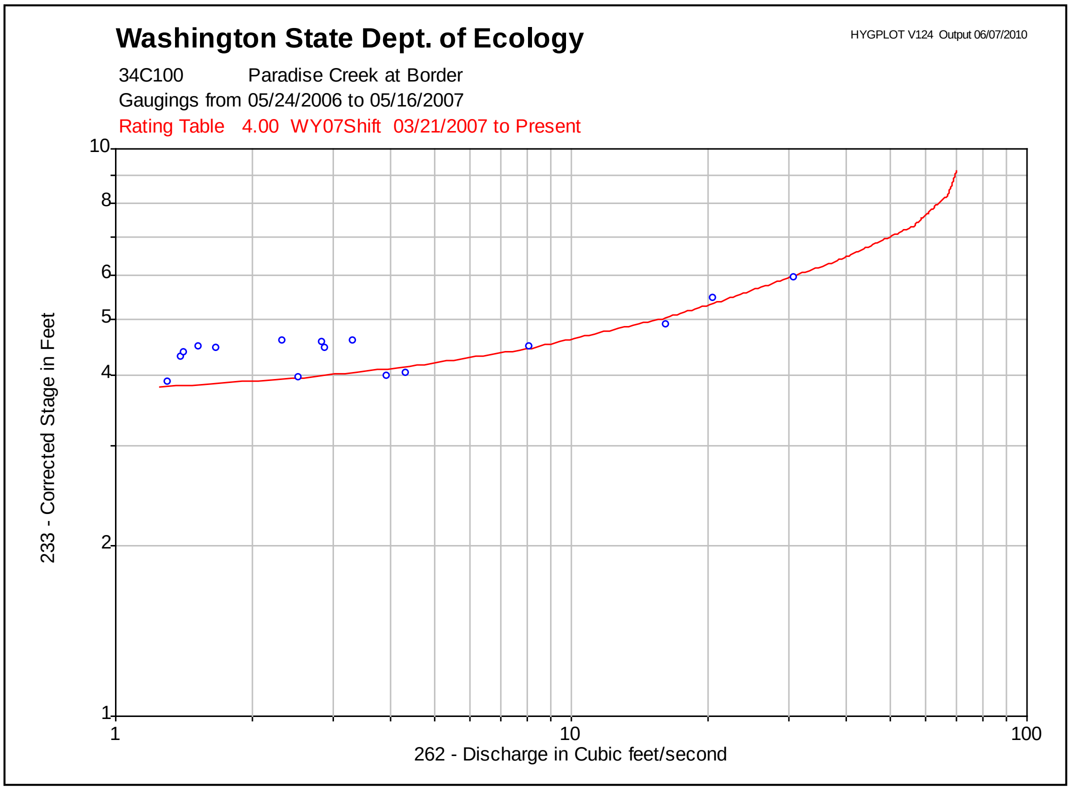

Figure 19: Discharge-rating curve for Site 5.

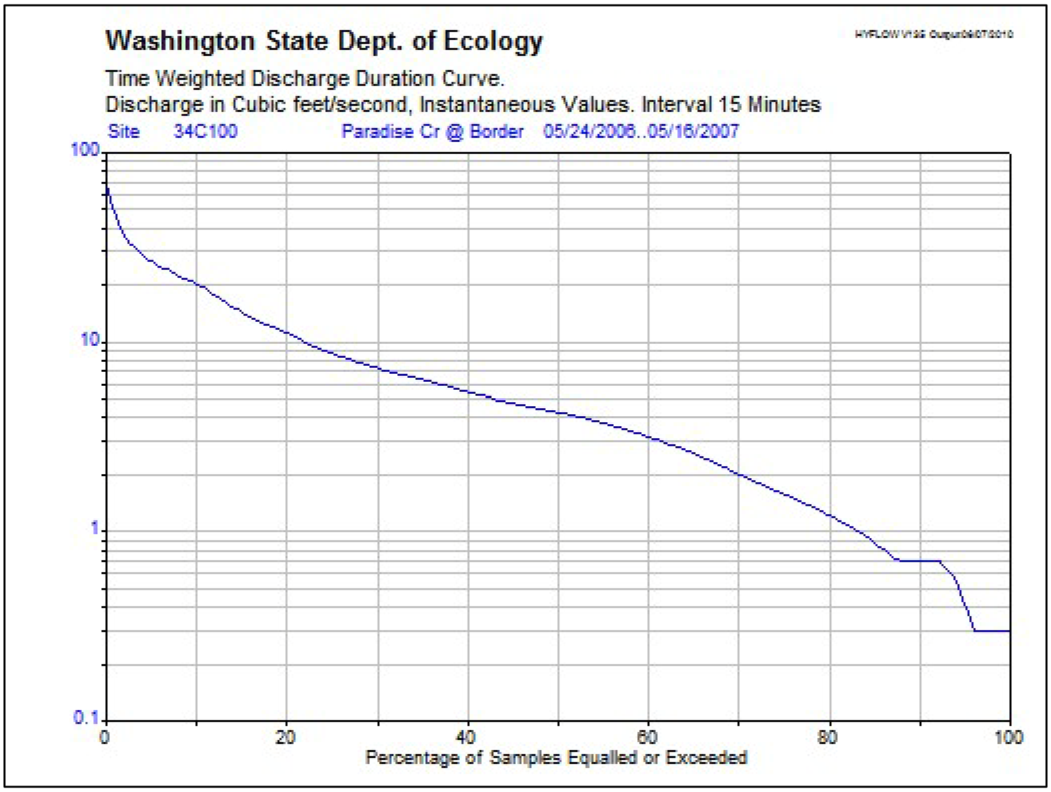

Figure 20: Streamflow exceedance graph for Site 5.

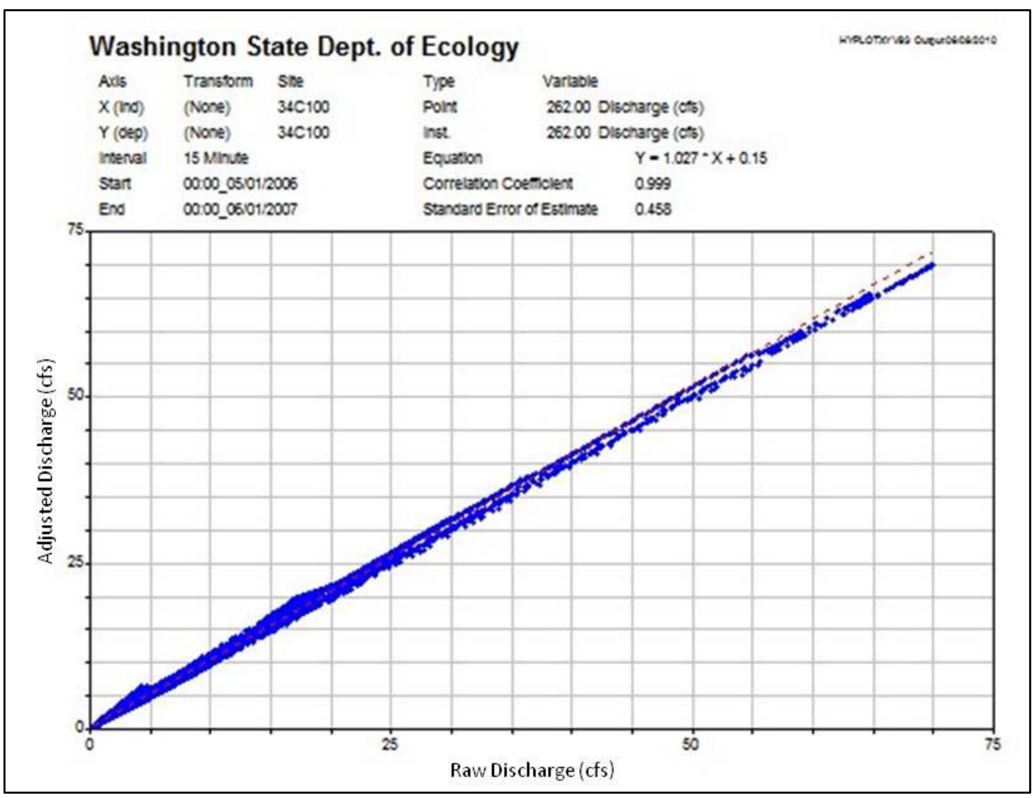

Figure 21: Linear regression of pre- versus post-adjusted streamflow data for Site 5. *Deviations from the regression line indicate pressure-transducer drift.*

Site 6: S.F. Palouse River below Sunshine Creek

Continuous data were not collected at Site 6. Instead, discrete streamflow measurements were taken to develop a rating curve that could be used to derive flow from any given stage height for the site (Figure 22). Flow measured at this site ranged from 0.07 to 76.9 cfs (Figure 23). None of the discrete stage readings fell outside this measured range.

Within the measured range of flows, the fit of the rating curve was poor. All 22 flow measurements taken at Site 6 were used to develop the rating curve. Ten of these measurements were within 5% of the flow predicted by the rating curve, three were within 10%, and seven were within 20%. The other two flow measurements were within 30% of the flow predicted by the rating curve. The flow measurements and discrete stage readings taken at this site are listed in Appendix B, Table B-6.

Staff-gage readings taken during flow measurements were quality checked using depth to water surface, or "tape-down" readings. A regression of staff-gage versus tape-down readings for Site 6 has a correlation coefficient (r) of 0.998 and a standard error of 0.04 ft (Figure 24). This indicates no substantial errors in the readings, which can generally be considered reliable to within the standard error.

Overall, the potential error for flow data for this site is estimated to be ±24%. Since there is no continuous stage record at this site, the rating curve is the sole source of error. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±32%.

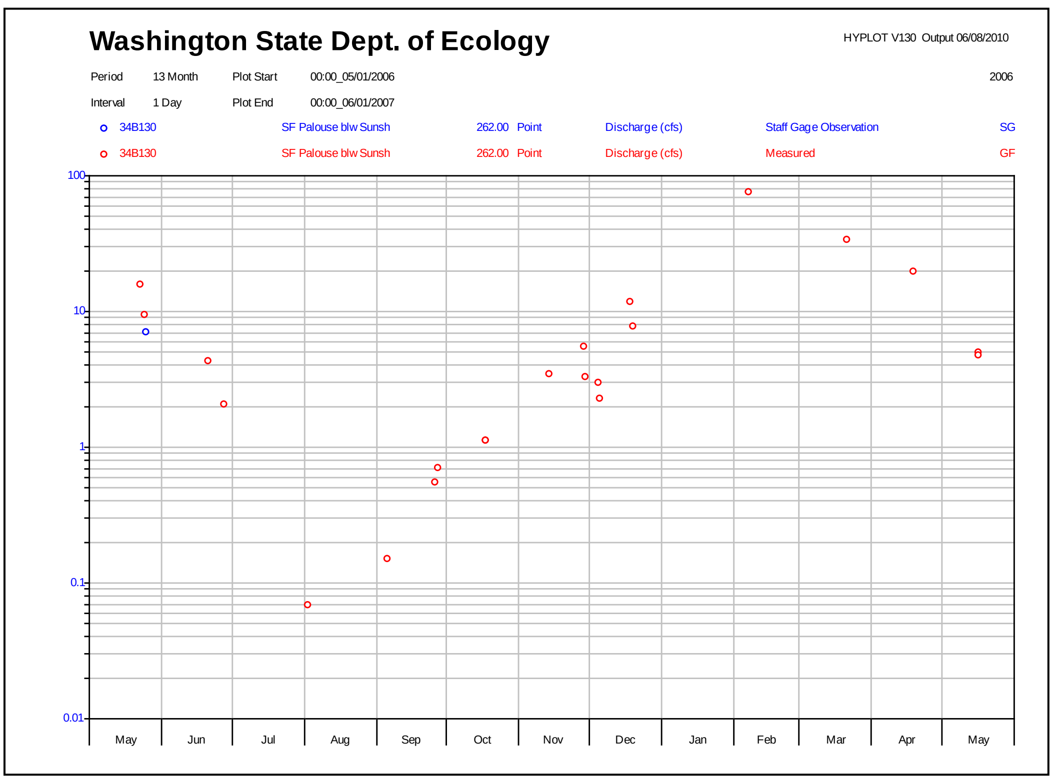

Figure 22: Streamflow hydrograph for Site 6.

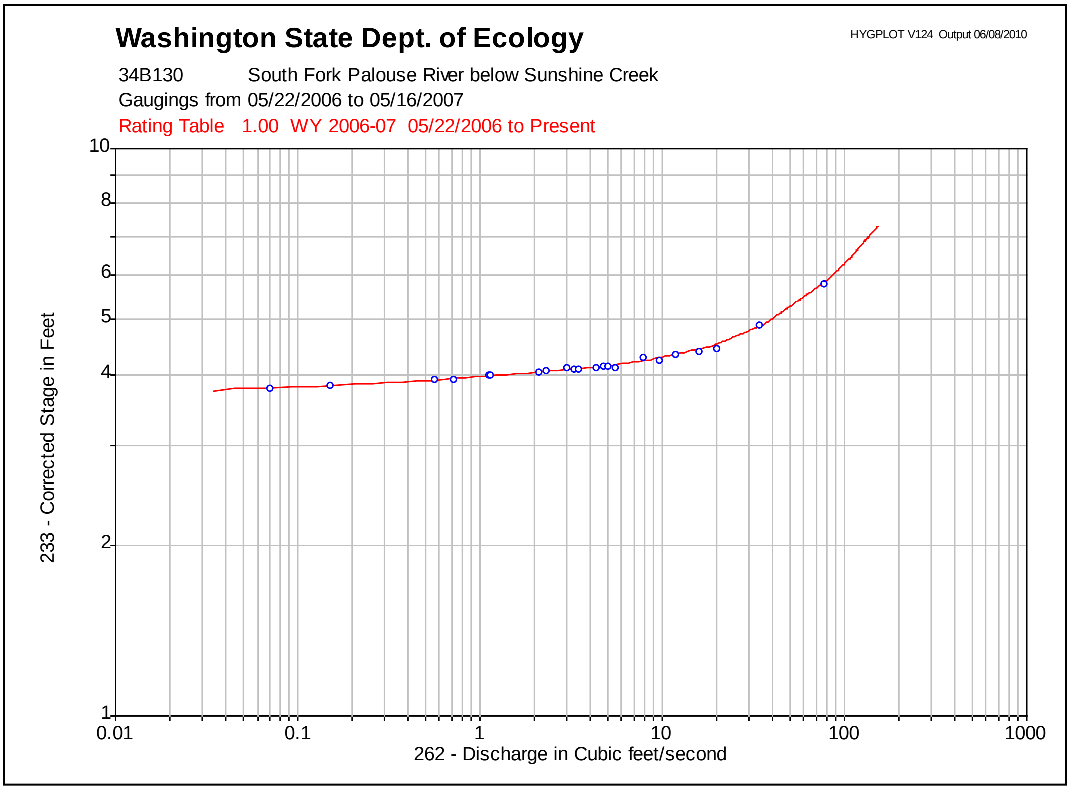

Figure 23: Discharge-rating curve for Site 6.

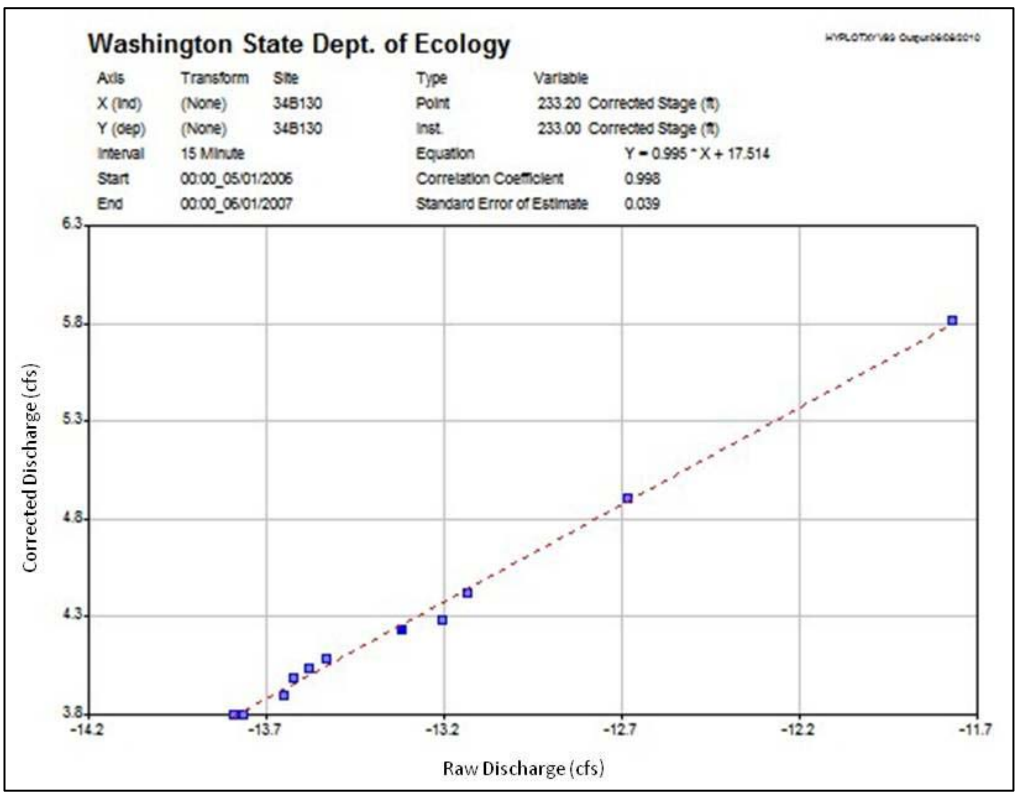

Figure 24: Regression of staff-gage versus tape-down readings for Site 6.
Deviations from the regression line indicate error in the readings.

Site 7: Dry Creek at Pullman

Continuous data were not collected at Site 7. Instead, discrete streamflow measurements were taken to develop a rating curve that could be used to derive flow from any given stage height for the site (Figure 25). Flow encountered at this site ranged from 0.02 to 7.9 cfs. The measured flow, ranging from 0.05 cfs to 2.6 cfs, covers only 32% of the range of flow encountered (Figure 26). Three of the discrete stage readings fell outside this measured range.

Within the measured range of flows, the fit of the rating curve was poor. Fourteen of the 22 flow measurements taken at Site 7 were used to develop the rating curve. Ten of these measurements were within 5% of the flow predicted by the rating curve. The other four ranged from 25% to 55%. Non-FMU staff took several of the measurements. Many of these measurements exhibited a very high degree of variability and were determined not to be accurate enough to use for rating curve development. The stage-height readings for these measurements were instead applied to the rating curve to calculate flow for these times. High-flow modeling was not conducted for this site. The measured flows exhibited too much variability to produce an accurate slope-conveyance model. The flow measurements and discrete stage readings taken at this site are listed in Appendix B, Table B-7.

Staff-gage readings taken during flow measurements were quality checked using depth to water surface, or tape-down readings. A regression of staff-gage versus tape-down readings for Site 7 has a correlation coefficient (r) of 0.982 and a standard error of 0.03 ft (Figure 27). There was one obvious outlier revealed by the regression, which was attributed to an erroneous tape-down reading.

Overall, the potential error for flow data for this site is estimated to be ±42%. Since there is no continuous stage record at this site, the rating curve is the sole source of error. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±53%.

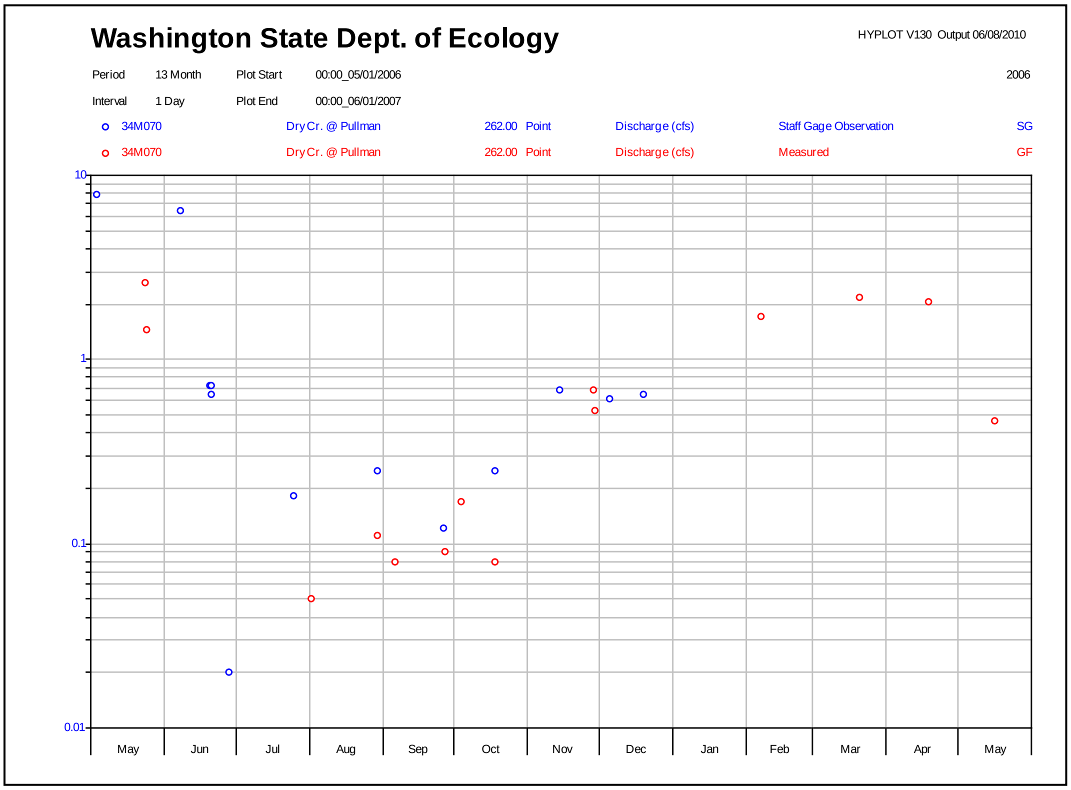

Figure 25: Streamflow hydrograph for Site 7.

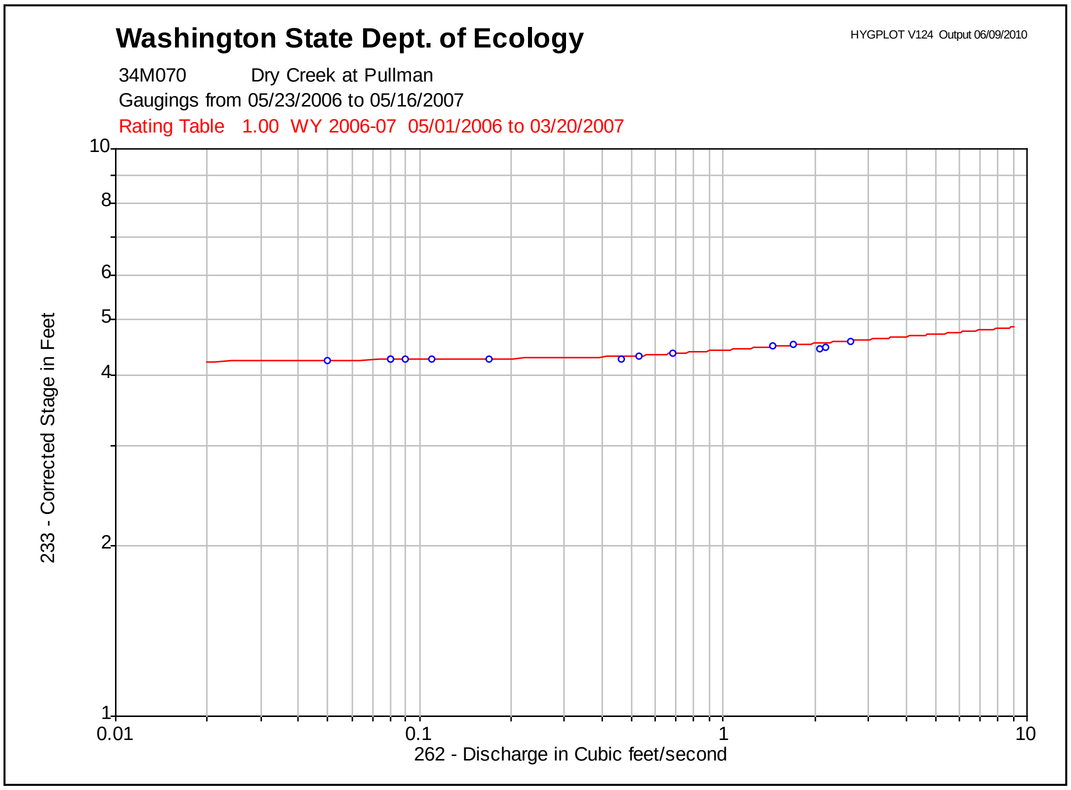

Figure 26: Discharge-rating curve for Site 7.

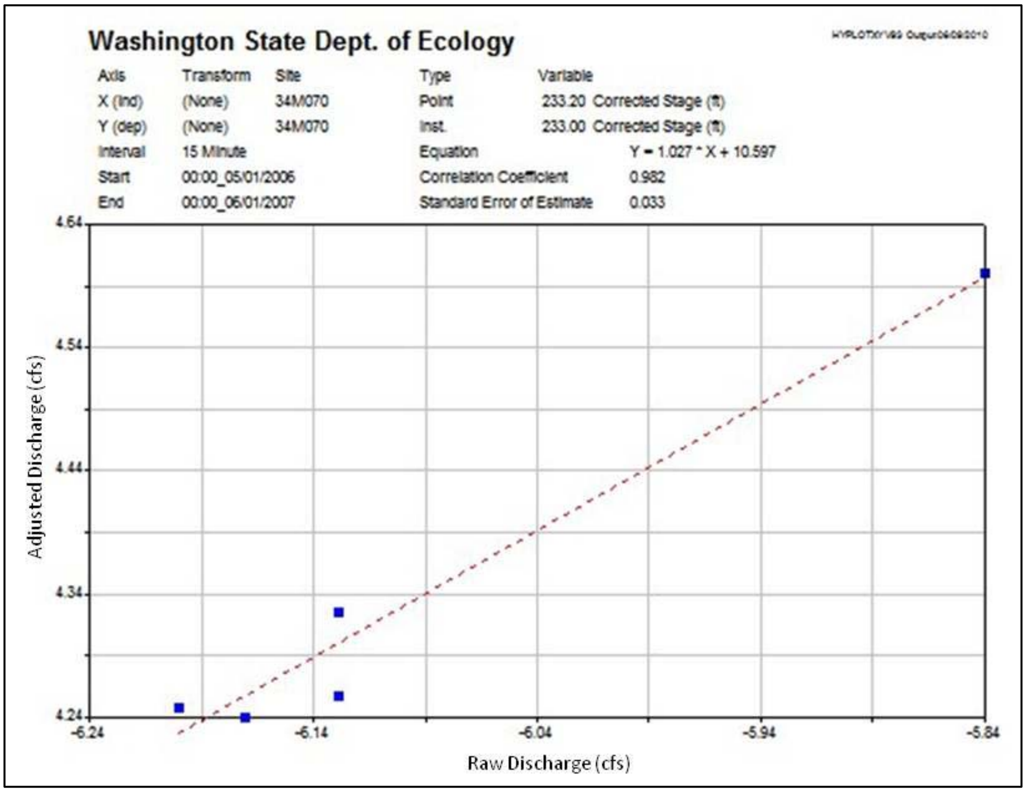

Figure 27: Regression of staff-gage versus tape-down readings for Site 7.
Deviations from the regression line indicate error in the readings.

Site 8: Missouri Flat Creek at Pullman

Continuous data were not collected at Site 8. Instead, discrete streamflow measurements were taken to develop a rating curve that could be used to derive flow from any given stage height for the site (Figure 28). Flow measured at this site ranged from 0.2 to 18.5 cfs (Figure 29). None of the discrete stage readings fell outside this measured range.

Within the measured range of flows, the fit of the rating curve was poor. All 12 flow measurements taken at Site 8 were used to develop the rating curve. Nine of these measurements were within 5% of the flow predicted by the rating curve. The other three, which were all below 0.5 cfs, ranged from 47% to 115%. Due to this high variability encountered at the lowest flows, flows less than 0.6 cfs are considered estimates. The flow measurements and discrete stage readings taken at this site are listed in Appendix B, Table B-8.

It was not possible to install a staff gage at this site; only tape-down readings were used. Therefore no quality control checks were performed on the stage-height readings taken at this site.

Overall, the potential error for flow data for this site is estimated to be ±41%. Since there is no continuous stage record at this site, the rating curve is the sole source of error. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±100%.

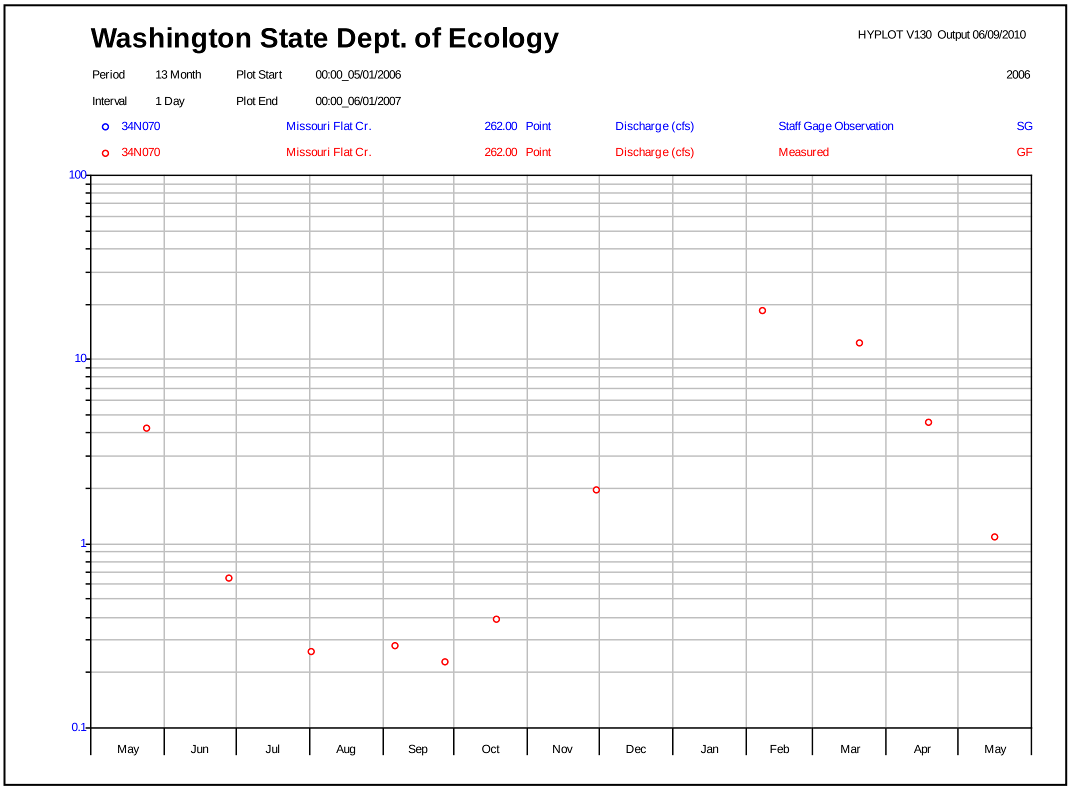

Figure 28: Streamflow hydrograph for Site 8.

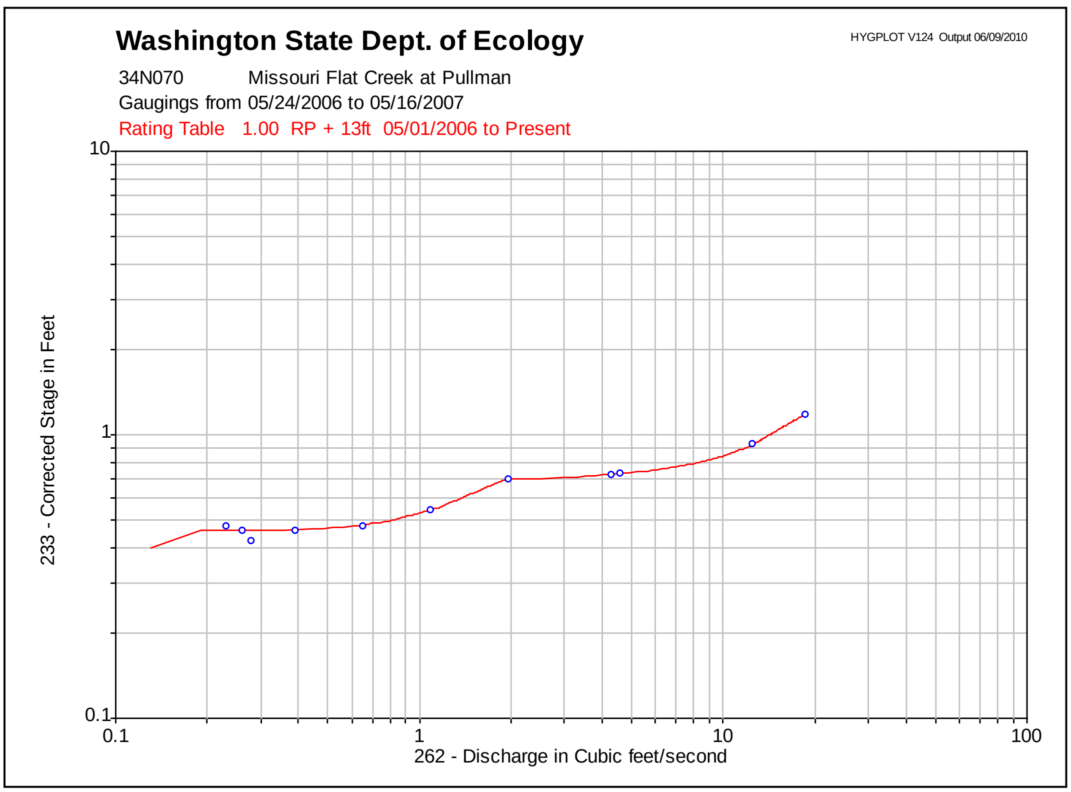

Figure 29: Discharge-rating curve for Site 8.

Year Two Study Sites

Site 9: Palouse River above Rebel Flat Creek

The average daily streamflow for Site 9 ranged from 1.6 cfs in mid-August 2007 to 1,920 cfs in mid-April 2008. Peak flow during the study was 2,190 cfs. This occurred in mid-April as a result of spring run-off (Figure 30). Daily flow averages are presented in Appendix A, Table A-6. The measured range of flow for this site encompassed only 26% of the range of flow encountered, with flow measurements ranging from 5.8 to 909 cfs (Figure 31). However, those flows that exceeded the measured range occurred only 20% of the time. 6% of flows were lower than the lowest measured flow, and 14% were higher than the highest measured flow (Figure 32). The flow measurements taken at this station are listed in Appendix B, Table B-9.

Within the measured range of flows, the fit of the rating curve was good. All 11 flow measurements taken at this site were used to develop the rating curve. Of these, five were within 5% of the flow predicted by the rating curve. The remaining six measurements ranged from 5 to 12% of the flow predicted by the rating. Flows greater than 909 cfs were modeled using a slope-conveyance model. The potential error for the modeled flows for this station is ±13%.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data for the May 2007 to November 2007 period showed a correlation coefficient (r) of 0.996 and a standard error of 3.0 cfs (7% of the mean flow for the same period). This regression indicates moderate and somewhat variable pressure-transducer drift at this site (Figure 33). The pressure transducer was removed in early November 2007 to protect it from ice damage. It was reinstalled in mid-February 2008. Much of the data from this point forward was either qualified as an estimate or removed, and the data gap was filled using correlated data from USGS station 13351000, Palouse River at Hooper.

Overall, the potential error for flow data for this site is calculated to be ±19%. Of this, 6% is from the continuous stage data, and 13% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±21%. Of this, 6% of the potential error is from the continuous stage data, and 15% is from the rating curve.

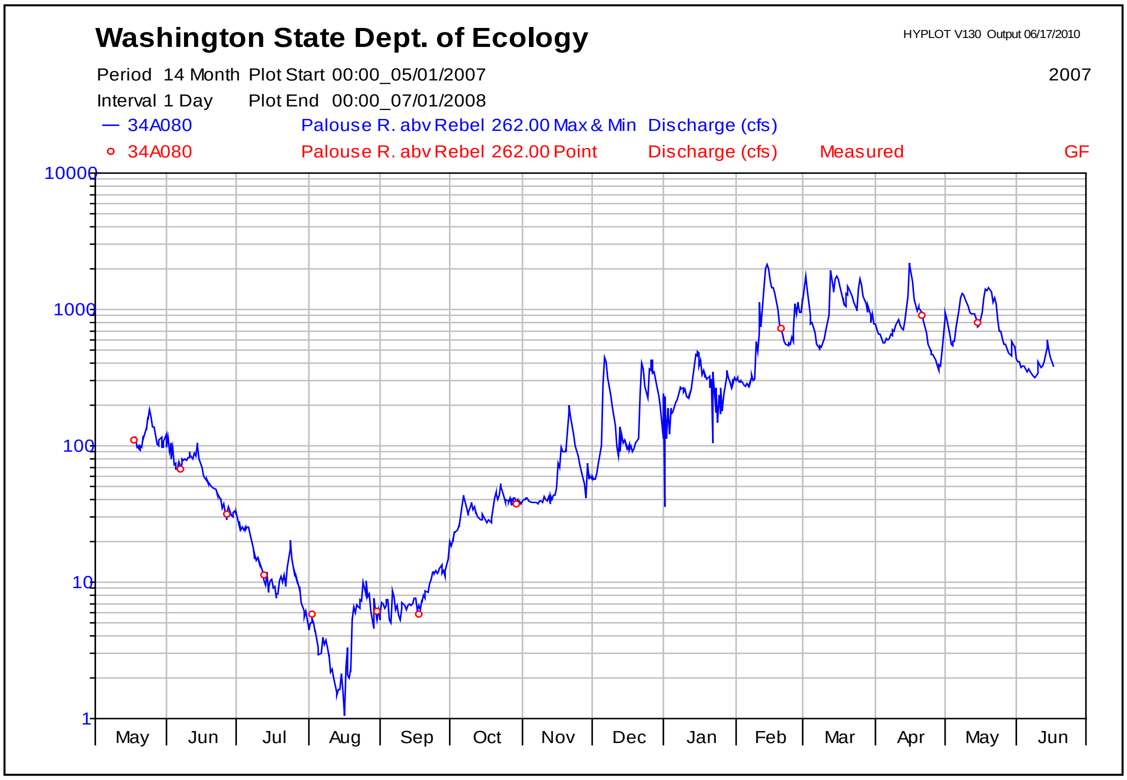

Figure 30: Streamflow hydrograph for Site 9.

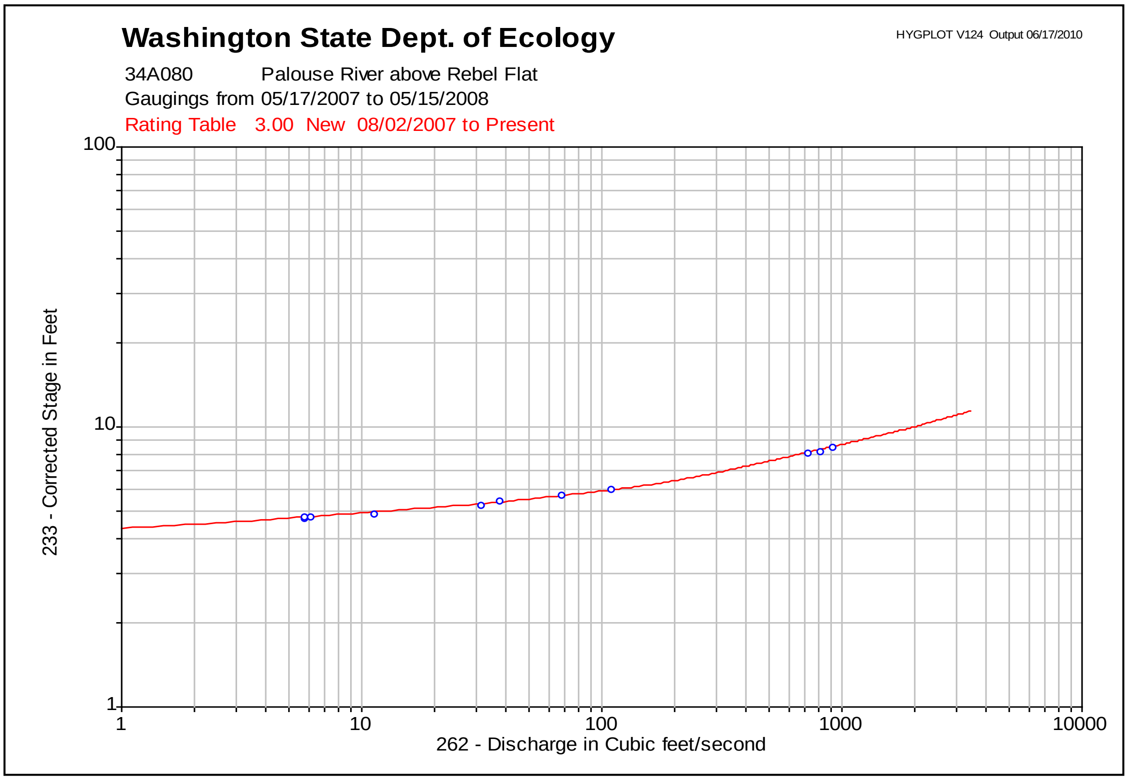

Figure 31: Discharge-rating curve for Site 9.

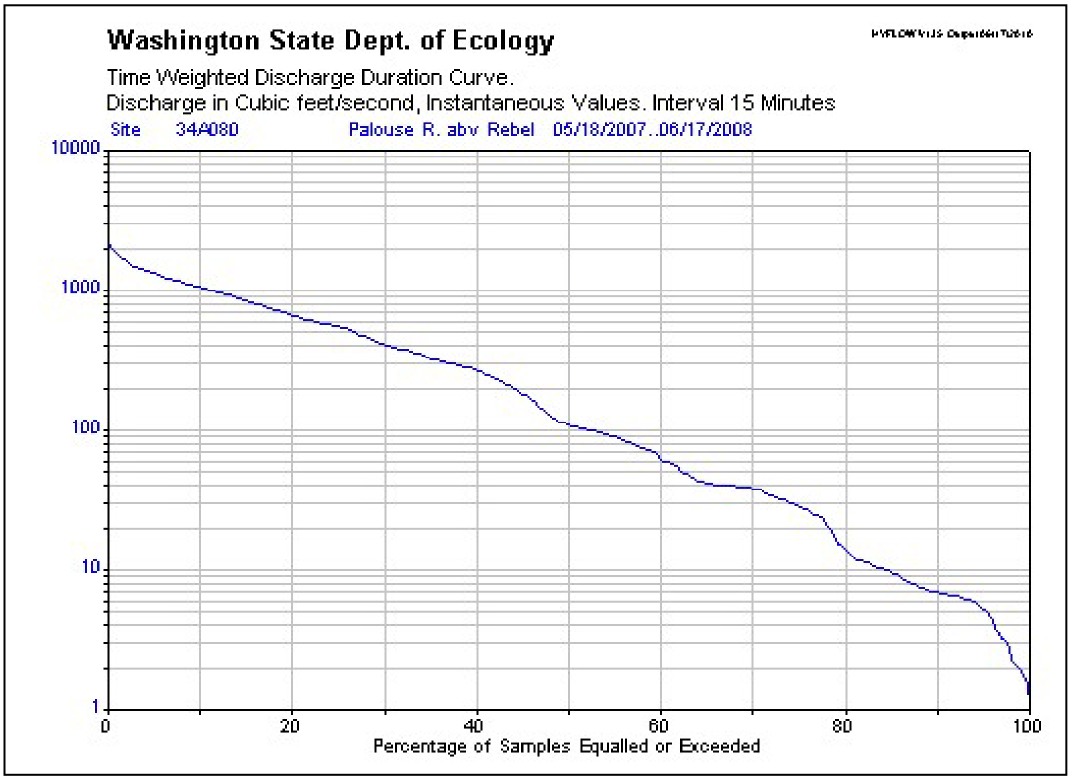

Figure 32: Streamflow exceedance graph for Site 9.

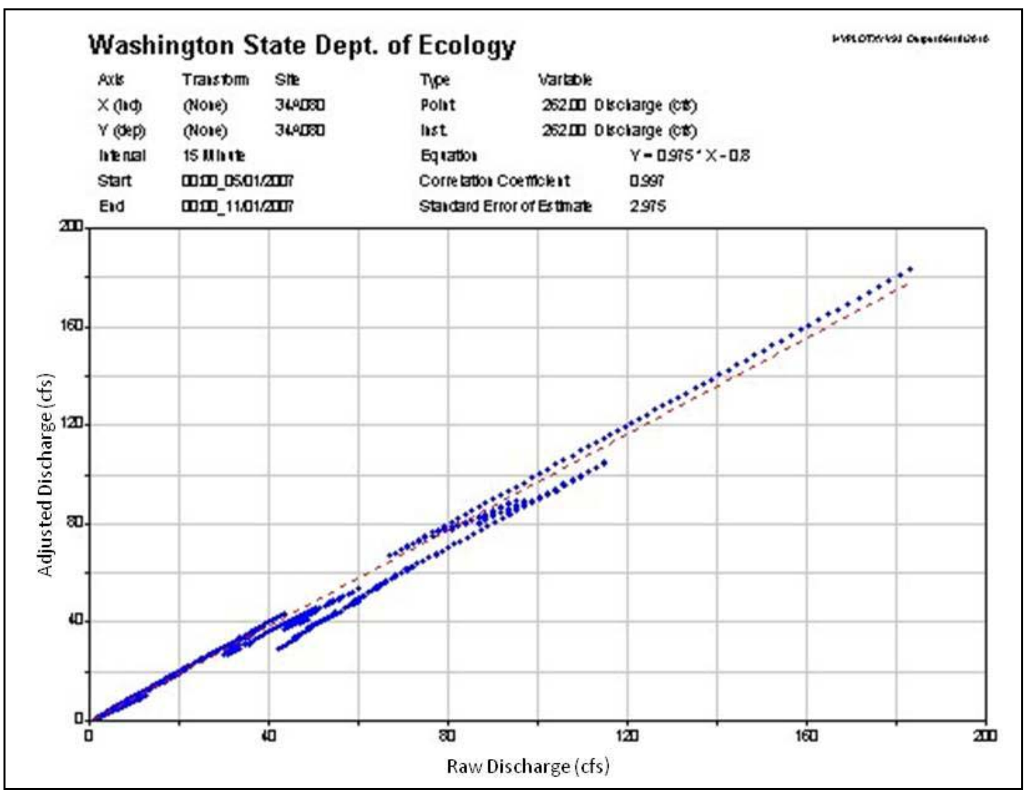

Figure 33: Linear regression of pre- versus post-adjusted streamflow data for Site 9. *Deviations from the regression line indicate pressure-transducer drift.*

Site 10: Palouse River at Shields Road

The average daily streamflow for Site 10 ranged from 3.2 cfs in mid-August 2007 to 2,120 cfs in early March 2008. Peak flow during the study was 2,280 cfs. This occurred in early March as a result of spring run-off (Figure 34). Daily flow averages are presented in Appendix A, Table A-7. The measured range of flow for this site encompassed 62% of the range of flow encountered, with flow measurements ranging from 6.7 to 1,486 cfs (Figure 35). However, those flows that exceeded the measured range occurred 6% of the time. 3% of flows were lower than the lowest measured flow, and 3% were higher than the highest measured flow (Figure 36). The flow measurements taken at this station are listed in Appendix B, Table B-10.

Within the measured range of flows, the fit of the rating curve was poor. Eleven of the 13 measurements taken were used to develop the rating curves. The June 6, 2007 measurement was discarded due to extremely large velocity variability. The February 20, 2008 measurement was discarded due to extremely difficult flow-measurement conditions at the site. Six of the measurements were within 5% of the flow predicted by the rating curve, and three were within 10%. The other two measurements were within 22% of the predicted flow. The stage-discharge relationship at this site was very volatile, changing three times over the course of the study. Flows greater than 1,486 cfs were modeled using a slope-conveyance model. The potential error for the modeled flows for this station is ±8%.

Time-weighted adjustments were performed on the continuous data to correct for logger drift. A linear regression of pre- versus post-adjusted continuous flow data for the May 2007 to mid-July 2008 period showed a correlation coefficient (r) of 0.996 and a standard error of 37 cfs (10% of the mean flow for the same period). This regression indicates moderate and somewhat variable logger drift at this site (Figure 37).

Overall, the potential error for flow data for this site is calculated to be ±12%. Of this, 2% of the potential error is from the continuous stage data, and 10% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±12%. Of this, 1% of the potential error is from the continuous stage data, and 11% is from the rating curve.

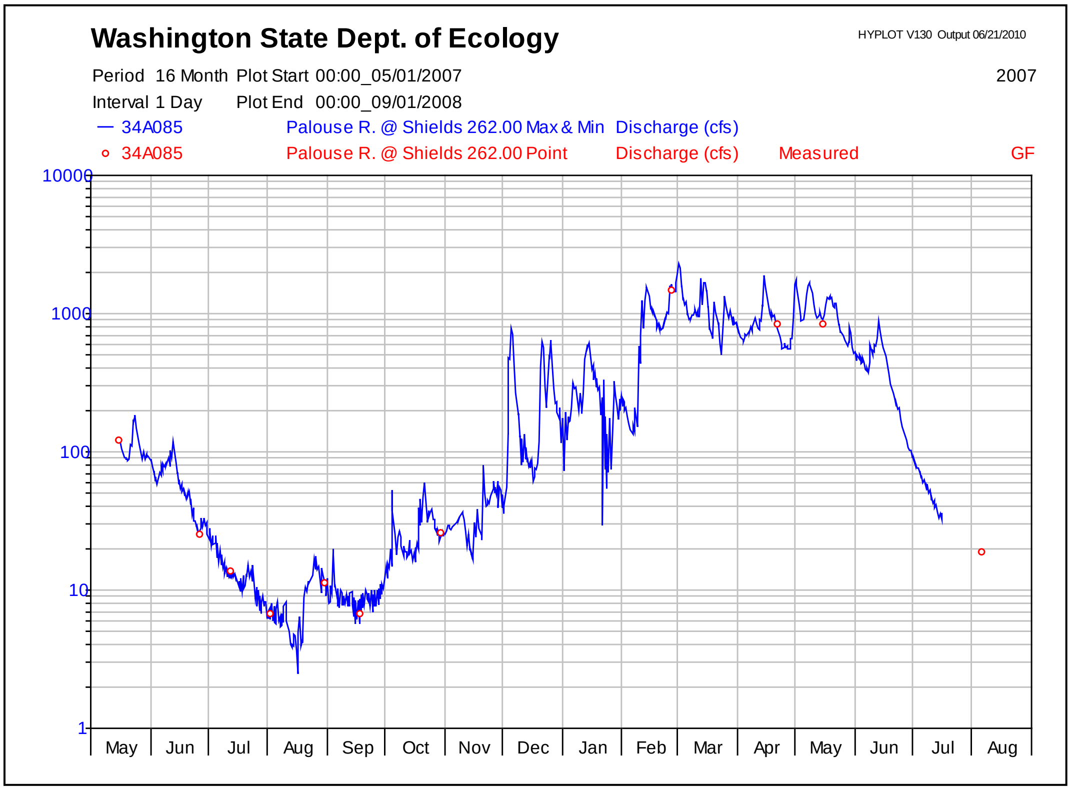

Figure 34: Streamflow hydrograph for Site 10.

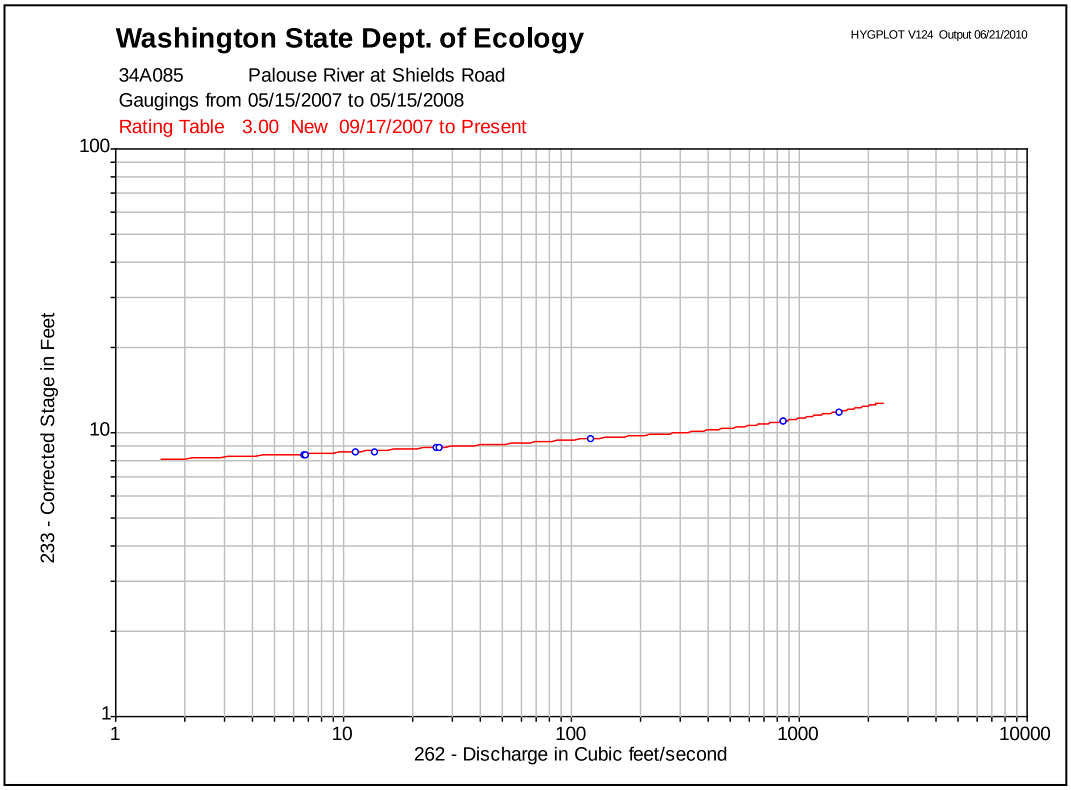

Figure 35: Discharge-rating curve for Site 10.

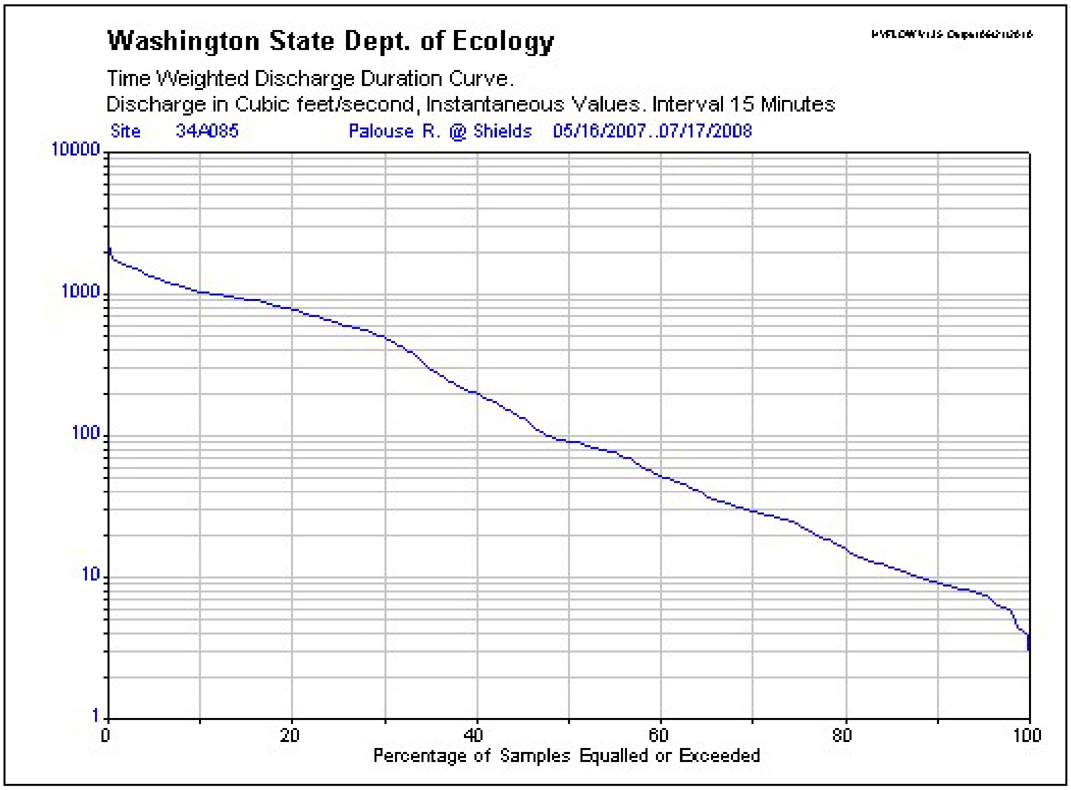

Figure 36: Streamflow exceedance graph for Site 10.

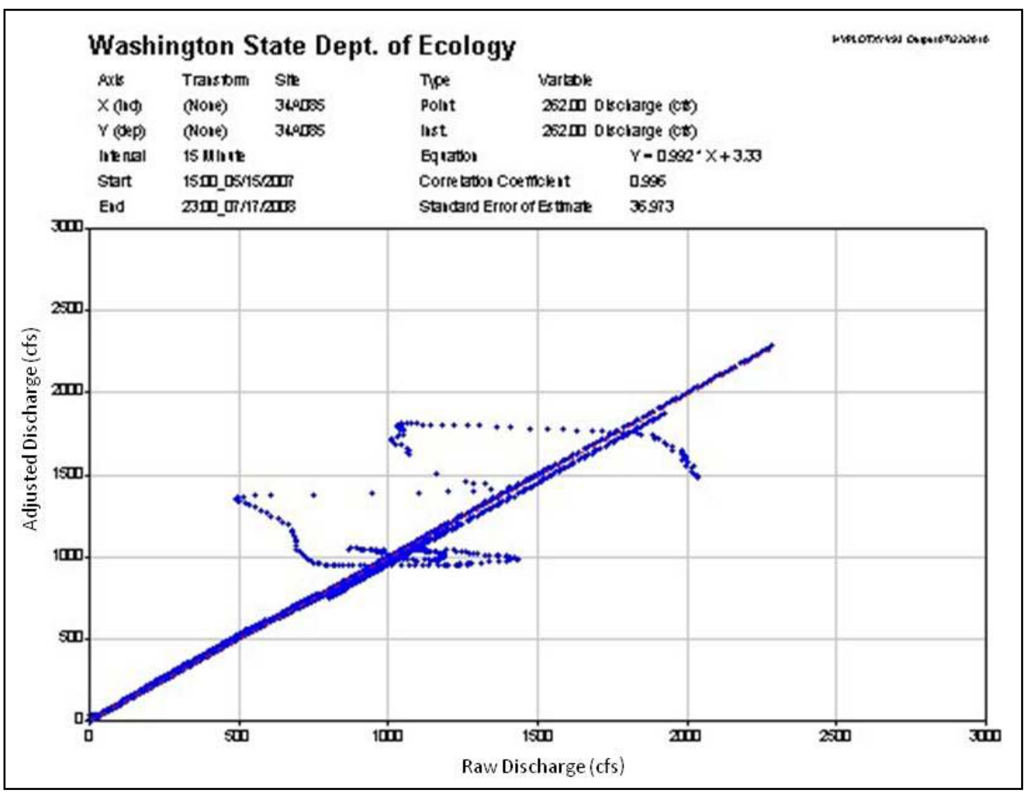

Figure 37: Linear regression of pre- versus post-adjusted streamflow data for Site 10. *Deviations from the regression line indicate logger drift.*

Site 11: Palouse River above S.F. Palouse River

The average daily streamflow for Site 11 ranged from 0.30 cfs in mid-August 2007 to 2,180 cfs in early March 2008. Peak flow during the study was 2,340 cfs. This occurred in early March as a result of spring run-off (Figure 38). Daily flow averages are presented in Appendix A, Table A-8. The measured range of flow for this site encompassed 33% of the range of flow encountered, with flow measurements ranging from 1.4 to 777 cfs (Figure 39). However, those flows that exceeded the measured range occurred 16% of the time. 5% of flows were lower than the lowest measured flow, and 11% were higher than the highest measured flow (Figure 40). The flow measurements taken at this station are listed in Appendix B, Table B-11.

Within the measured range of flows, the fit of the rating curve was good. All but one of the 15 flow measurements were used to develop the rating curve. Of these 14 measurements used, six were within 5% of the flow predicted by the rating curve. The remaining seven measurements ranged from 5 to 11% of the flow predicted by the rating. The August 30, 2007 measurement was discarded due to a high potential error in flow from significantly high velocity variation. Flows greater than 777 cfs were modeled using a slope-conveyance model. This model produced results that were dramatically different from measured flows, requiring a large calibration factor. The potential error for the modeled flows for this station is ±71%.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data for the period of record showed a correlation coefficient (r) of 0.999 and a standard error of 18.4 cfs (7% of the mean flow for the same period). This regression indicates minimal pressure-transducer drift at this site (Figure 41). The pressure transducer was removed in early November 2007 to protect it from ice damage. It was reinstalled in mid-February 2008. During this period, data from USGS station 13345000, Palouse River at Potlatch, were used to estimate continuous flow for this site.

Overall, the potential error for flow data for this site is calculated to be ±17%. Of this, 7% of the potential error is from the continuous stage data, and 10% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±21%. Of this, 11% of the potential error is from the continuous stage data, and 10% is from the rating curve.

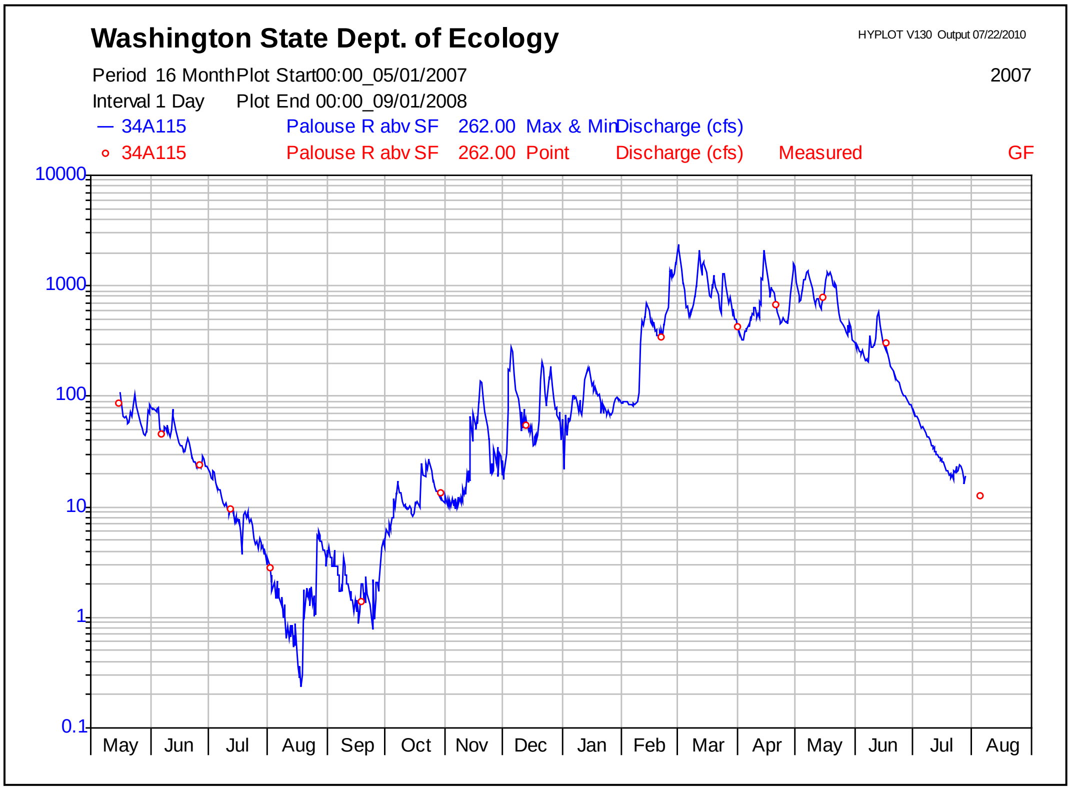

Figure 38: Streamflow hydrograph for Site 11.

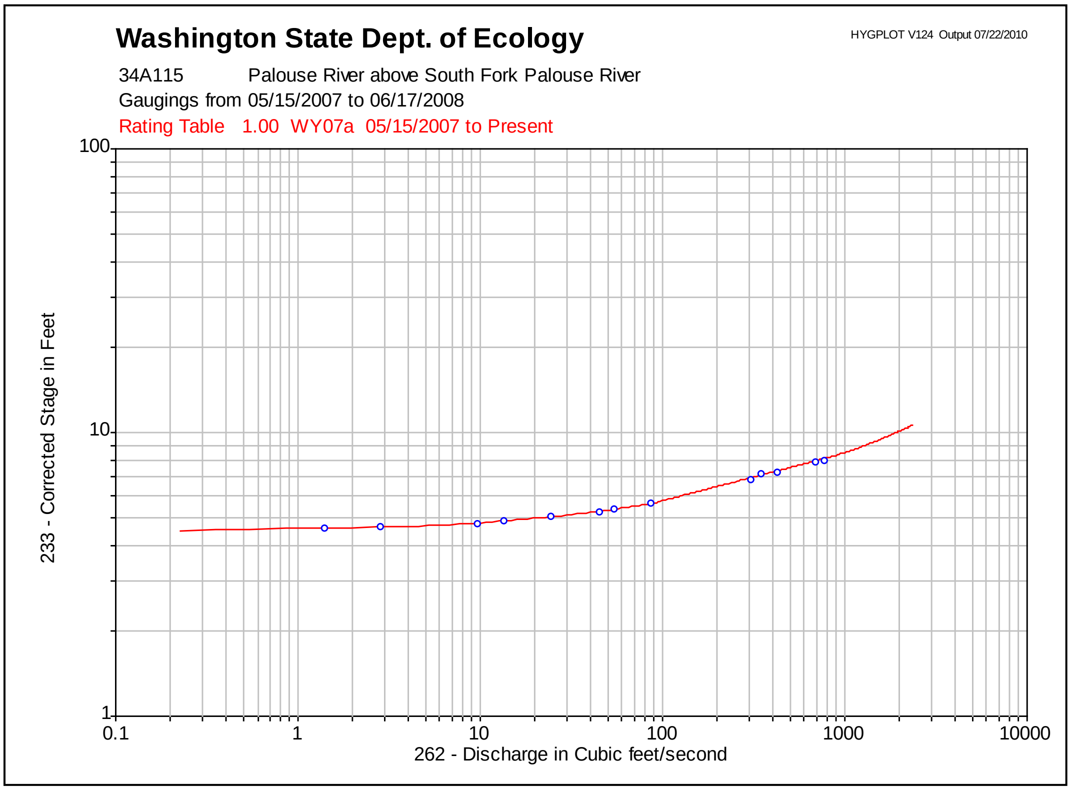

Figure 39: Discharge-rating curve for Site 11.

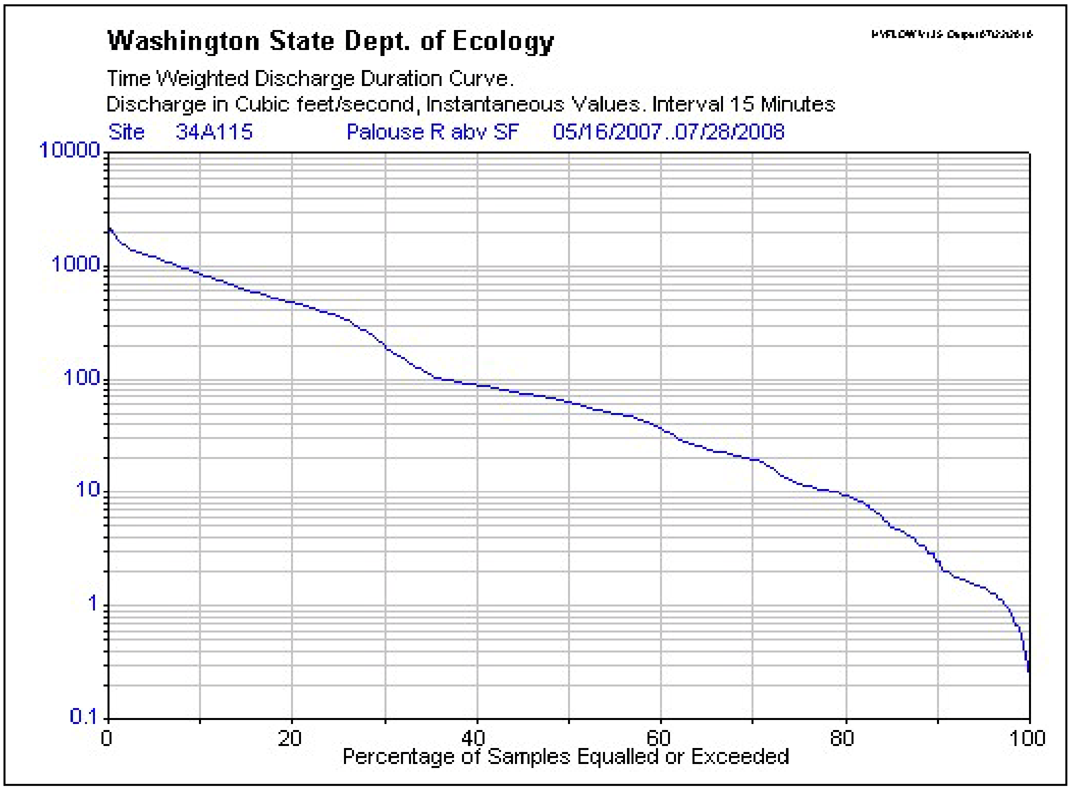

Figure 40: Streamflow exceedance graph for Site 11.

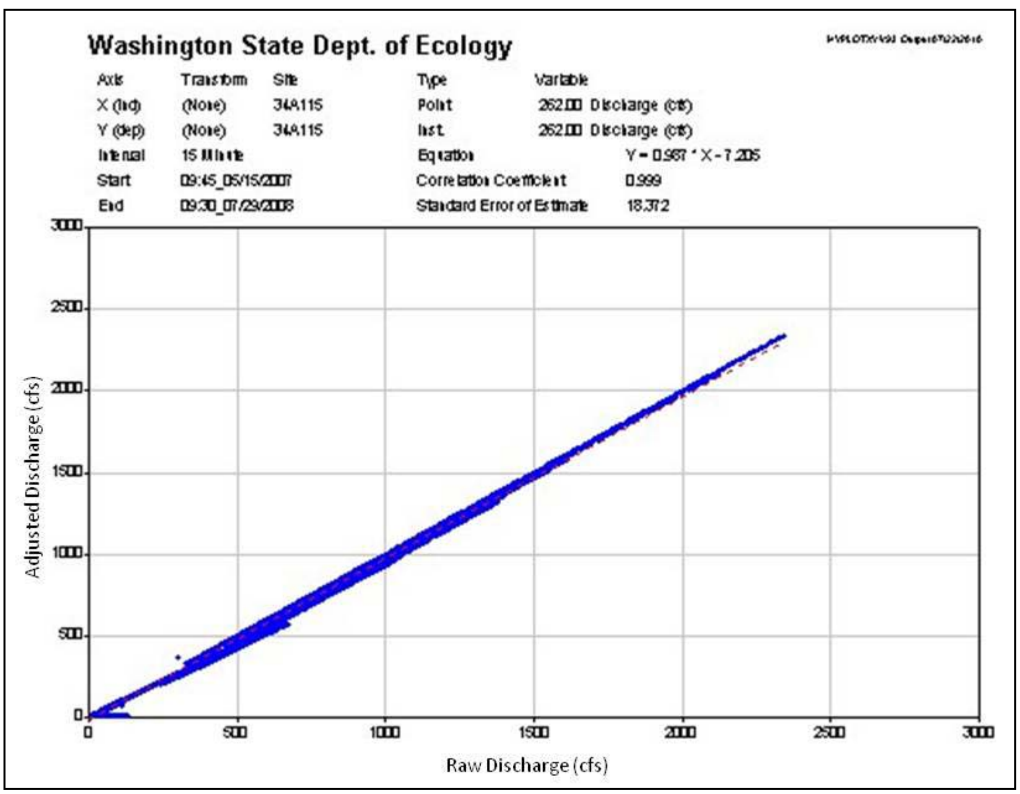

Figure 41: Linear regression of pre- versus post-adjusted streamflow data for Site 11. *Deviations from the regression line indicate pressure-transducer drift.*

Site 12: Palouse River at Elberton

The average daily streamflow for Site 12 ranged from 2.1 cfs in mid-August 2007 and then again in mid-September 2007 to 1,940 cfs in mid-April 2008. Peak flow during the study was 2,190 cfs. This occurred in mid-April as a result of spring run-off (Figure 42). Daily flow averages are presented in Appendix A, Table A-9. The measured range of flow for this site encompassed 34% of the range of flow encountered, with flow measurements ranging from 2.36 to 752 cfs (Figure 43). However, those flows that exceeded the measured range occurred only 16% of the time. 3% of flows were lower than the lowest measured flow, and 13% were higher than the highest measured flow (Figure 44). The flow measurements taken at this site are listed in Appendix B, Table B-12.

Within the measured range of flows, the fit of the rating curve was fair. Eleven of the 12 flow measurements taken at this site were used to develop the rating curve. Of these, three were within 5% of the flow predicted by the rating curve, six were within 10%, and two were between 10% and 15%. Flows greater than 752 cfs were modeled using a slope-conveyance model. This model produced results that were dramatically different from measured flows, requiring a large calibration factor. The potential error for the modeled flows for this station is ±51%.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data for the period of record showed a correlation coefficient (r) of 0.999 and a standard error of 15.7 cfs (6% of the mean flow for the same period). This regression indicates minimal pressure-transducer drift at this site (Figure 45). The pressure transducer was removed in early November 2007 to protect it from ice damage. It was reinstalled in mid-February 2008. During this period, data from USGS station 13345000, Palouse River at Potlatch, were used to estimate continuous flow for this site.

Overall, the potential error for flow data for this site is calculated to be ±39%. Of this, 23% of the potential error is from the continuous stage data, and 16% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±27%. Of this, 12% of the potential error is from the continuous stage data, and 15% is from the rating curve.

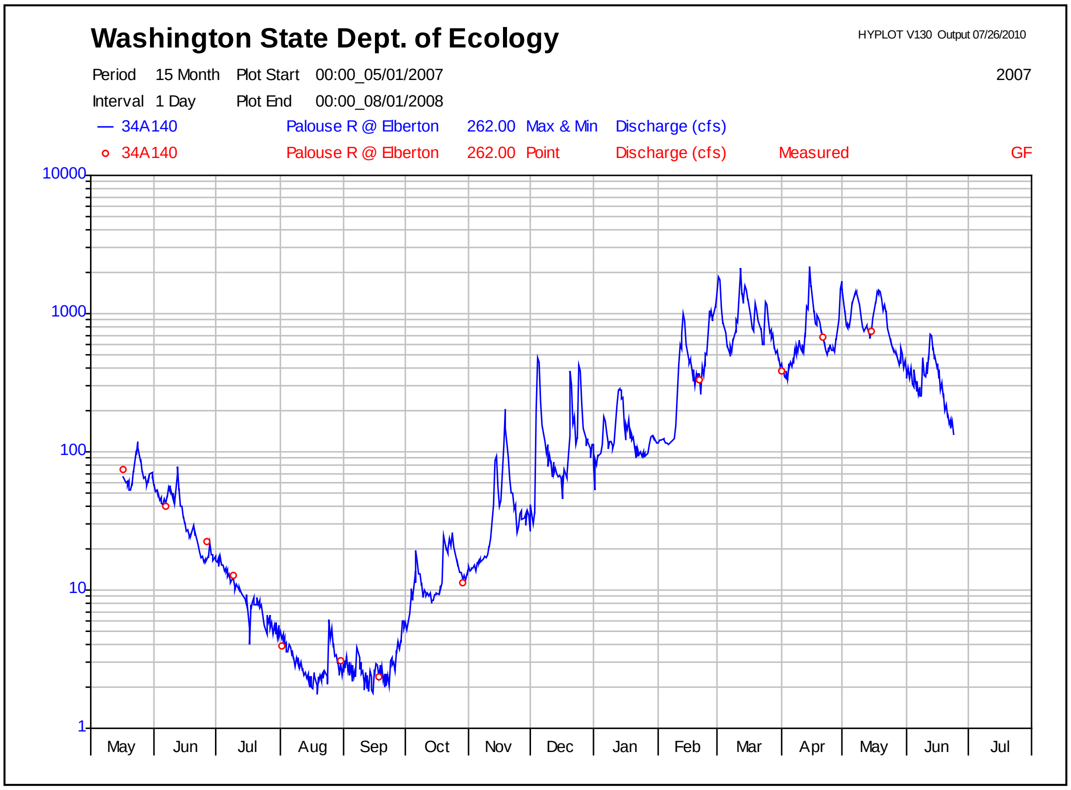

Figure 42: Streamflow hydrograph for Site 12.

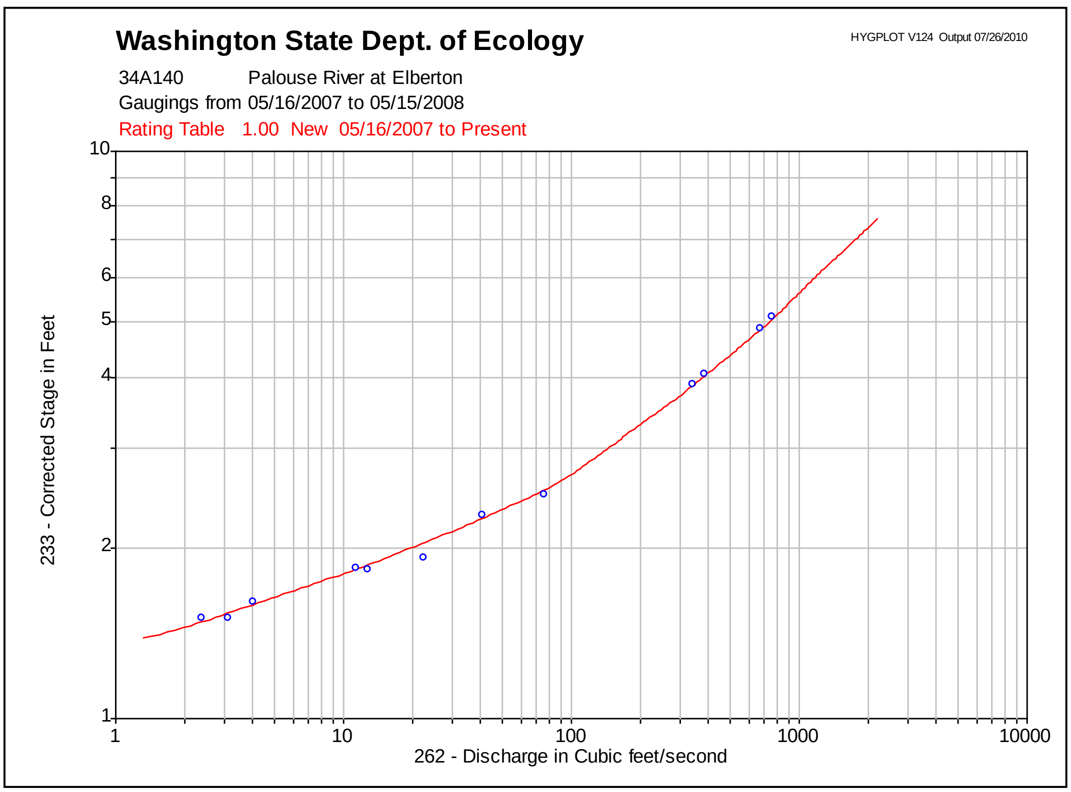

Figure 43: Discharge-rating curve for Site 12.

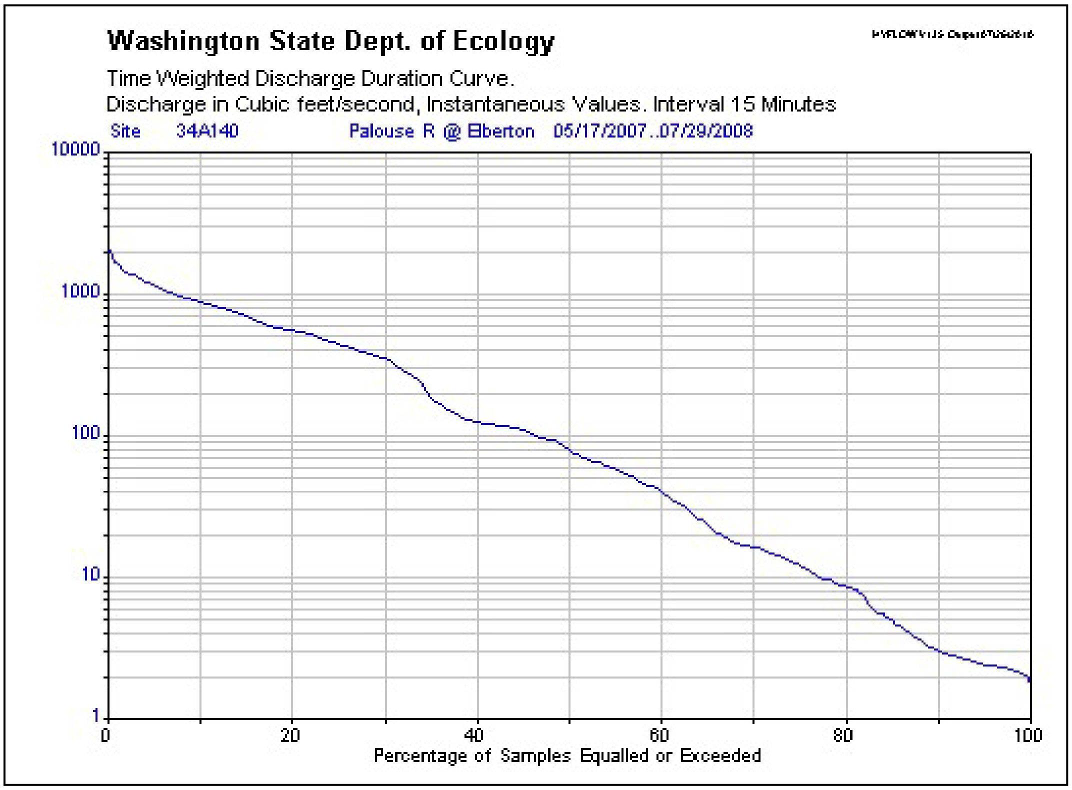

Figure 44: Streamflow exceedance graph for Site 12.

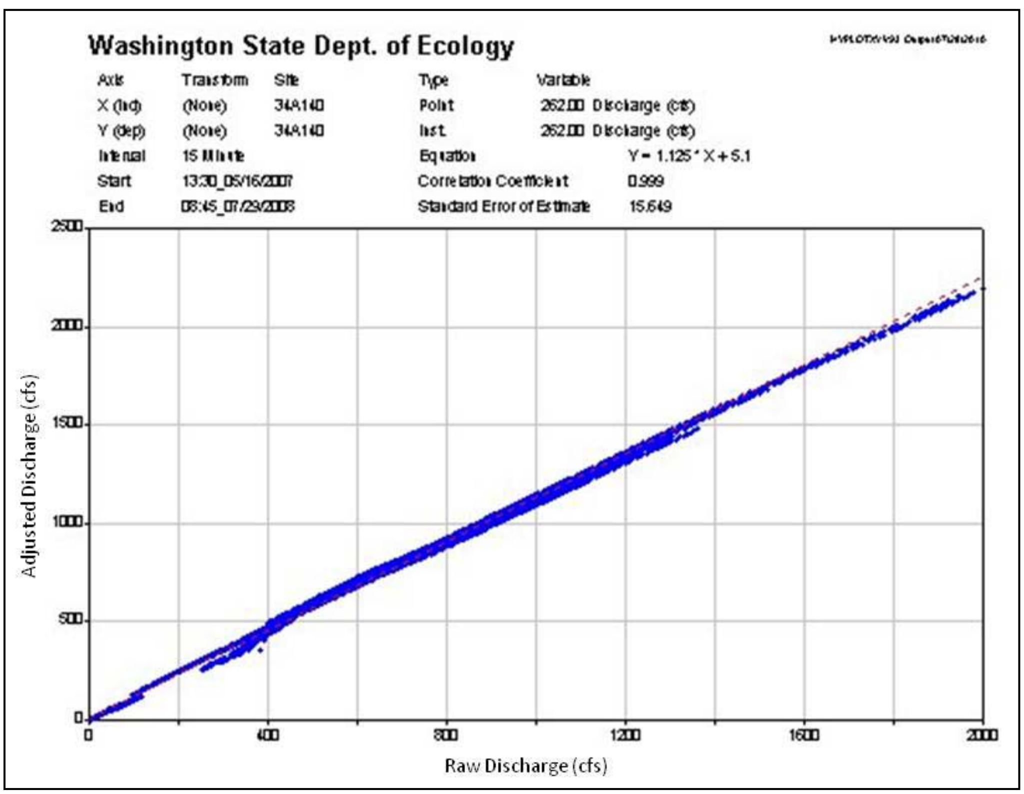

Figure 45: Linear regression of pre- versus post-adjusted streamflow data for Site 12. *Deviations from the regression line indicate pressure-transducer drift.*

Site 13: S.F. Palouse River below Colfax

Data from mid-February 2008 to the end of the data record were collected but were not used in calculating any of the statistics cited for Site 13. During this period, the stage readings were falsely elevated due to a backwater effect from the mainstem Palouse River.

The average daily streamflow for Site 13 from mid-May 2007, when the station was installed, through mid-February 2008 ranged from 3.0 cfs in mid-August 2007 to 439 cfs in mid-February 2008.

Peak flow during this period was 507 cfs. This occurred in mid-February 2008 as a result of winter storm events (Figure 46). Daily flow averages are presented in Appendix A, Table A-10. The measured range of flow for this site encompassed 52% of the range of flow encountered, with flow measurements ranging from 2.55 to 263 cfs (Figure 47). However, those flows that exceeded the measured range occurred 2% of the time. 1% of flows were lower than the lowest measured flow, and 1% were higher than the highest measured flow (Figure 48). Flows greater than 263 cfs were modeled using a slope-conveyance model. The potential error for the modeled flows for this station is ±13%. The flow measurements taken at this station are listed in Appendix B, Table B-13.

Time-weighted adjustments were performed on the continuous data to correct for pressure-transducer drift. A linear regression of pre- versus post-adjusted continuous flow data for the period of record showed a correlation coefficient (r) of 0.992 and a standard error of 0.70 cfs (2.5% of the mean flow for the same period) (Figure 49). The pressure transducer was removed in early November 2007 to protect it from ice damage. It was reinstalled in mid-February 2008. During this period, data from USGS station 13345000, Palouse River at Potlatch, were used to estimate continuous flow for this site.

Overall, the potential error for flow data for this site is calculated to be ±26%. Of this, 9% of the potential error is from the continuous stage data, and 17% is from the rating curve. During the low-flow period (July through September), the potential error for flow data for this site is calculated to be ±31%. Of this, 12% of the potential error is from the continuous stage data, and 19% is from the rating curve.

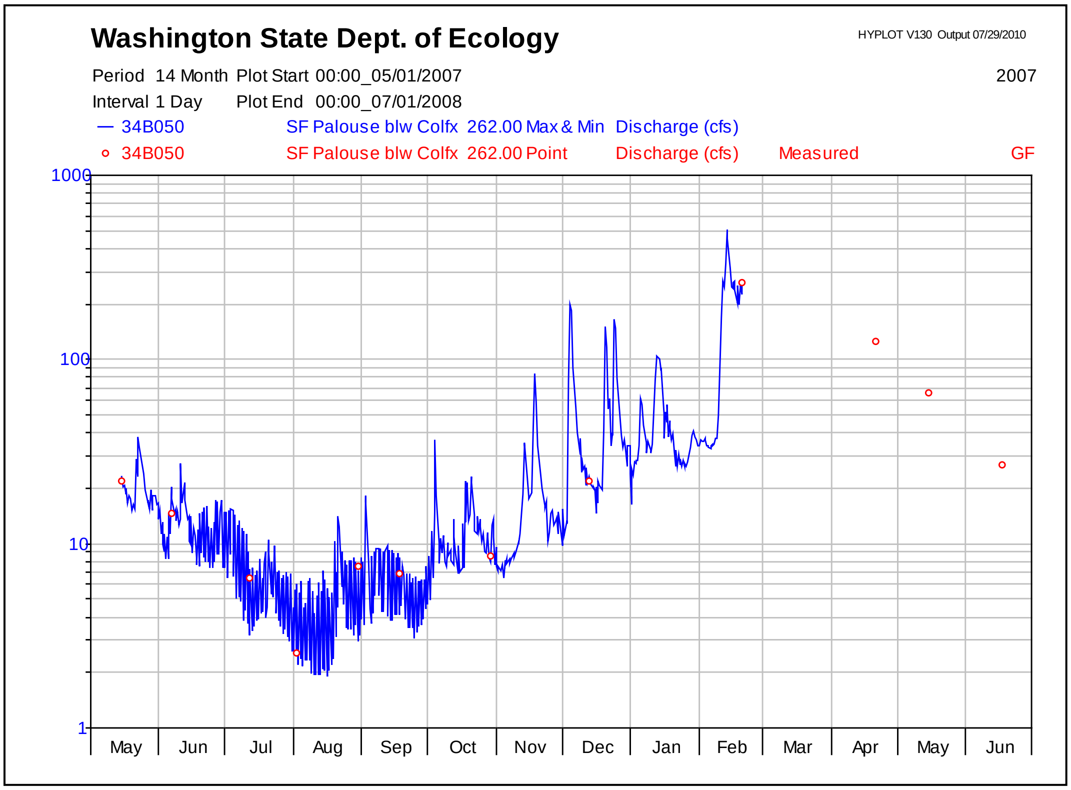

Figure 46: Streamflow hydrograph for Site 13.

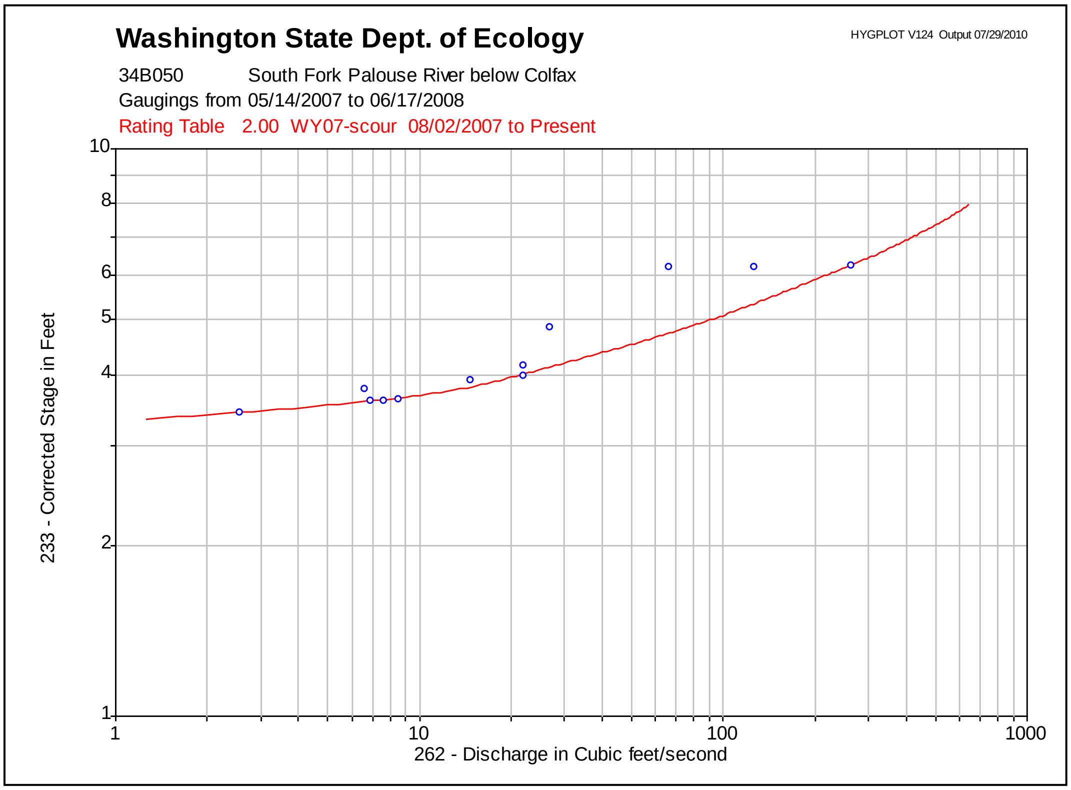

Figure 47: Discharge-rating curve for Site 13.

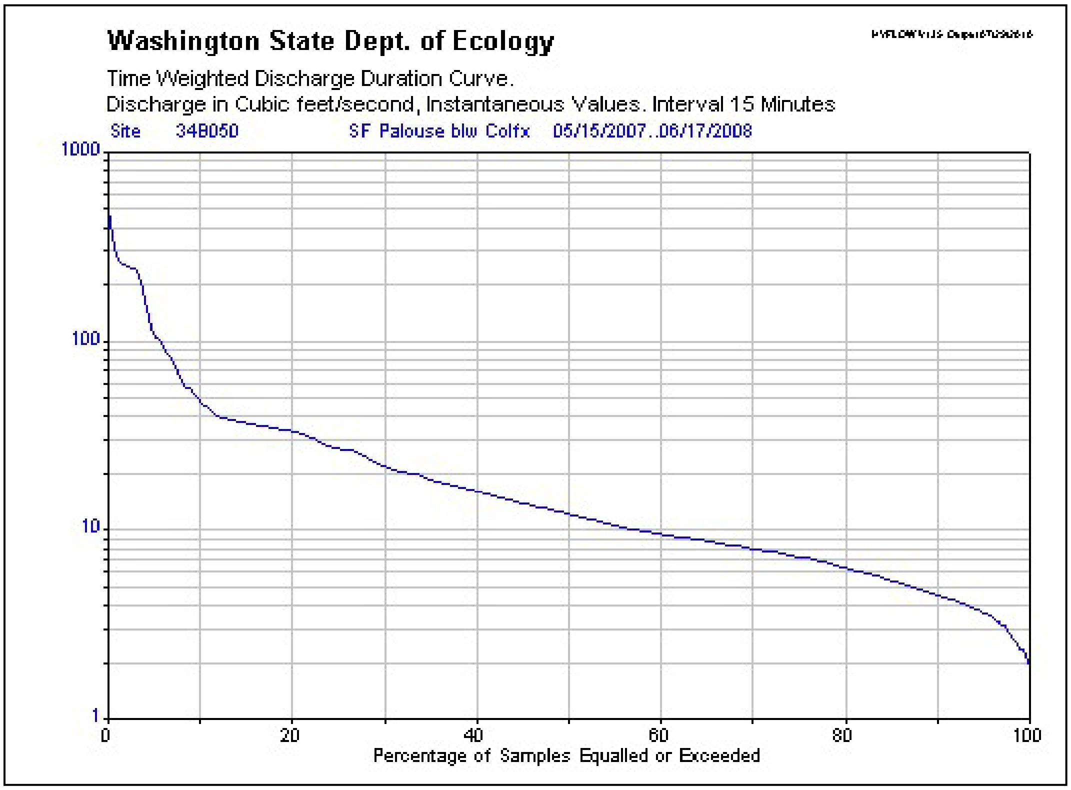

Figure 48: Streamflow exceedance curve for Site 13.

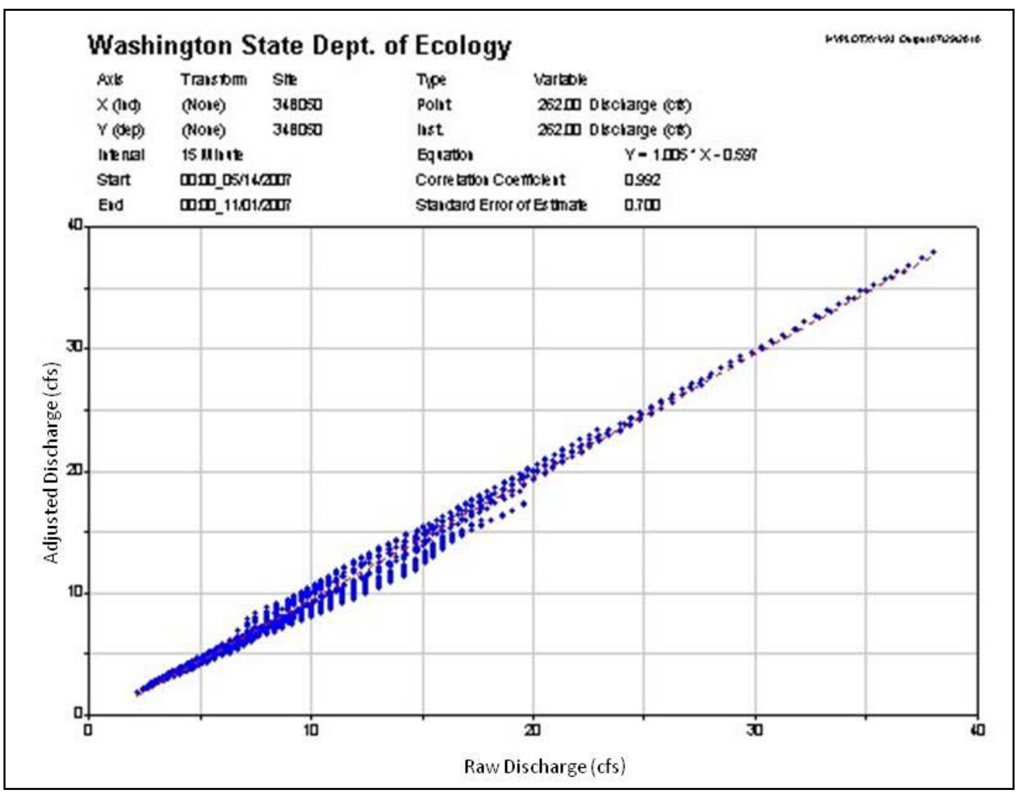

Figure 49: Linear regression of pre- versus post-adjusted streamflow data for Site 13. *Deviations from the regression line indicate pressure-transducer drift.*

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Appendices

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Appendix A. Average Daily Streamflow for Continuous Monitoring Stations

Table A-1: Site 1, S.F. Palouse River at Colfax.

Day	May 2006	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2007	Feb	Mar	Apr	May
1	[]	21.1	10J	4.0J	6.5J	8.5J	11.8J	23.1	33.1	33.4	124	74.7	38.6
2	[]	20.6	9.5J	4.1J	8.0J	8.5J	10.8J	19.9	29.6	28.9	101	70.4	34.8
3	[]	42.6	8.0J	4.3J	10.8*	9.1J	11.6J	20	1020M	32	93.4	62.9	39.4
4	[]	40.9	7.7J	3.3J	9.8*	8.9J	15.1J	19.7	559M	27.5	99.6	60.5	32.4
5	[]	87.9	8.0J	3.6J	8.7*	9.5J	25.4J	18.7	175A	74.6	106	60.9	28.4
6	[]	41.4	8.2J	3.8J	7.0*	9.6J	39.6	18.7	135	215A	97.8	59.8	25.8
7	[]	28	7.7J	3.7J	8.2J	10.5J	64.9	19.9	115	229A	93.7	58.2	23.8
8	[]	25.2	7.4J	5.1J	8.6J	8.9J	66.1	21.2	409M	199A	223A	55.7	22.4
9	[]	23.3	7.5J	4.9J	8.0J	8.8J	36	23.1	348M	207A	168A	75.4	22
10	[]	22.7	7.1J	4.8J	7.8J	8.4J	26.3	28.5	362M	283A	128	114	20.6
11	[]	21.9	7.4J	4.4J	7.4J	8.0J	25	39.7	207A	240A	157A	83.9	19.1
12	[]	20.8	7.2J	4.9J	6.5J	9.4J	26.8	48.6	119	310A	218A	66.2	18
13	[]	27.1	7.5J	5.8J	7.9*	9.2J	32	86.4	108	208A	201A	59.5	17.5
14	[]	29.5	7.6J	4.8J	8.9*	9.3J	37.7	139	114	159	149	56.7	[]
15	[]	36.5	7.5J	5.8J	7.5*	9.5J	25.6	162	109	276M	123	67	[]
16	[]	29.3	6.5J	6.0J	7.3*	13.1J	23	122	111	458M	110	64.9	[]
17	[]	28.1	6.6J	6.7J	7.9*	21.6	22.4	71.4	110	242A	102	63.7	[]
18	[]	22.3	6.9J	6.4J	6.6*	12.2J	20.5J	88.8	126	200A	94	68.5	[]
19	[]	20.3	6.6J	6.0J	7.1*	5.4J	19.5J	56.6	120	178A	89	58.6	[]
20	[]	18.9	5.8J	6.8J	7.6*	7.6J	20.5J	42.9	99.1	481M	91.7	52.7	[]
21	[]	18.5	4.9J	5.8J	12.1*	9.3J	27.9J	30.5	88.4	361M	91.6	50.6	[]
22	[]	18	5.6J	6.4J	13.4*	7.5J	26.1J	30.5	68.5	239A	78	50.4	[]
23	62.4	16.7	5.3J	6.8J	17.1*	8.2J	28.4J	27.8	54.2	218A	76.5	51.7	[]
24	36.6	15	5.3J	7.1J	21.4*	9.2J	40.1J	25.8	51.4	209A	73.9	48.7	[]
25	28.8	12.8J	5.1J	7.6J	12.8*	10.0J	49.8J	25.8	67.6	183A	79.1	45.9	[]
26	28.5	11.5J	4.9J	8.5J	7.8*	11.5J	45.1J	58.7	67.2	239A	91.6	44.5	[]
27	26.8	11.1J	4.5J	9.1J	9.4J	11.2J	41.7J	123	49.3	188	96.6	43.7	[]
28	28.3	10.3J	4.4J	8.3J	8.7J	11.1J	40.8J	110	39.9	150	126	43.1	[]
29	32.4	10.1J	4.7J	10J	8.9J	11.4J	47.5J	87.6	36.2		95.8	41.9	[]
30	26.2	9.5J	4.1J	6.6J	9.0J	12.2J	30.9	68.5	33.8		85.2	41	[]
31	23		3.7J	5.6J		12.0J		36.7	32		80.9		[]
Mean	32.5	24.7J	6.6J	5.8J	9.3*	10J	31.3J	54.7	161M	210M	114A	59.8	26.4
Median	28.5	21.5J	6.9J	5.8J	8.1*	9.3J	27.3J	36.7	109M	208M	97.8A	59	23.8
Max.Daily Mean	62.4	87.9J	10J	10J	21.4*	21.6J	66.1J	162	1020M	481M	223A	114	39.4
Min.Daily Mean	23	9.5J	3.7J	3.3J	6.5*	5.4J	10.8J	18.7	29.6M	27.5M	73.9A	41	17.5
Inst.Max	102	160J	17.3J	19.6J	26.7*	36.2J	90.6J	189	1890M	624M	317A	136	45.8
Inst.Min	20.9	7.3J	2.6J	2.4J	3.7*	3.0J	8.1J	16.3	27.6M	23.2M	66.5A	36.6	14.7

All recorded data are continuous and reliable except where the following tags are used:
* - Data estimated based on other stations
A - Above rating, reliable extrapolation
J - Estimated data
M - Data based on modeled streamflow
[ ] - Data not recorded

Table A-2: Site 2, S.F. Palouse River at Parvin.

Day	May 2006	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2007	Feb	Mar	Apr	May
1	[]	27.2	12.4	4.2U	4.5B	6.5B	9.7B	19.5	36.1	45.8	134	78.4	36.2
2	[]	25.9	10.9	4.9U	4.9U	6.3U	9.4B	17.8	34.6	43.5	114	73.2	41.1
3	[]	53	9.6	3.5U	4.2U	6.5B	11.5	16.9	1060Q	40.6	110	67.5	48.1
4	[]	56	9.1	3.8U	3.8U	6.6B	16.5	17.3	453M	50.4	118	65.8	39.5
5	[]	81.7	9.2	3.9U	3.9U	6.9B	50.9	17.9	153M	112M	123	65.4	35.2
6	[]	47.1	9.2	3.7U	4.7U	7.2B	64.1	18.4	136	204M	114	63.7	32.3
7	[]	36.6	7.8B	4.9U	4.6U	7.1B	111	20.9	133M	207M	110	61.3	30.9
8	[]	33.3	8.2B	5.4U	5.1U	6.8B	85.5	23.6	371M	187M	213M	58.7	30.3
9	[]	30.8	7.8B	4.3U	4.4U	7.1B	41.3	28	295M	202M	158	84	30.5
10	[]	29.1	7.7B	3.8U	4.5U	7.2B	29.4	39.2	301M	241M	135	110	27.5
11	[]	27.1	7.9B	3.8U	5.2U	7.2B	33.1	63.2	172M	220M	163M	74.5	25.6
12	[]	25.2	7.2B	4.7U	5.3U	7.4B	27.6	77.4	111	266M	197M	64.4	23.9
13	[]	33.8	6.7B	3.3U	5.5U	8.1B	51.3	132M	113	184M	179M	59	24.8
14	[]	37.1	6.5B	3.8U	4.6U	7.8B	44.6	165M	118	159	150	56.7	[]
15	[]	43.1	6.5B	3.5U	5.0U	7.9B	27.6	184M	136	290M	131	67.3	[]
16	[]	35	6.1B	4.0U	5.1B	23.0B	23.8	129	141	376M	123	61.3	[]
17	[]	33.8	6.4B	3.6U	4.7U	23.8	21.3	73.2	83.8	205M	116	64.9	[]
18	[]	25.1	6.6B	3.3U	5.5U	12.4	16.7	53.2	65.6	182	107	64.3	[]
19	[]	22.7	6.3B	3.8U	6.0B	10.1B	14.6	48.2	61.8	180M	102	54.8	[]
20	[]	20.6	4.9B	3.7U	11.0B	13.9	21.2	31.3	62.1	436M	107	49.2	[]
21	[]	18.3	5.5B	4.4U	12.0B	12	26.1	28	61	284M	102	46.9	[]
22	[]	16.7	5.1B	4.3U	14.7	9.1B	23.5	26.9	58	207M	88.8	46.7	[]
23	70.9	16.2	4.8B	4.2U	15.7	8.5B	30.5	24.9	60.1	196M	89	46.8	[]
24	43.8	14.2	5.2B	3.8U	9.3B	8.2B	51.7	24.6	65	185M	84	43.8	[]
25	35.7	13.1	5.1B	4.3U	7.7B	8.6B	57.8	35.7	73.5	179M	95.2	41.5	[]
26	36.3	13.1	4.8B	5.2U	7.6B	8.3B	49.2	85	73.3	207M	99.6	40.1	[]
27	33.9	13.2	4.3B	4.5U	7.9B	8.0B	43.4	150	65	175	115	39.4	[]
28	38.4	12.1	5.0B	5.4U	7.4B	8.0B	35.2	119	58.8	153	131	38.5	[]
29	39.7	11.9	4.3U	5.6U	7.7B	8.4B	30.2	73.3	54.1		98.8	37.7	[]
30	34.3	12.3	3.9U	5.1U	7.4B	10.7B	21.6	55.2	50.9		88.9	37.1	[]
31	30.3		4.1U	4.7U		10.6		43.1	48.2		83.2		[]
Mean	40.4	28.8	6.7U	4.2U	6.7U	9.4U	36.0B	59.4M	152Q	194M	122M	58.8	32.7
Median	36.3	26.5	6.5U	4.2U	5.2U	8.0U	29.8B	39.2M	73.5Q	192M	114M	60.1	30.9
Max.Daily Mean	70.9	81.7	12.4U	5.6U	15.7U	23.8U	111B	184M	1060Q	436M	213M	110	48.1
Min.Daily Mean	30.3	11.9	3.9U	3.3U	3.8U	6.3U	9.4B	16.9M	34.6Q	40.6M	83.2M	37.1	23.9
Inst.Max	109	152	15.1U	8.7U	23.8U	62.2U	135B	214M	1580Q	583M	276M	134	59.6
Inst.Min	28.2	9.3	3.0U	3.0U	3.0U	3.0U	6.7B	14.8M	32.9Q	37.3M	79.9M	34.7	22.1

All recorded data are continuous and reliable except where the following tags are used:
B - Below rating, reliable extrapolation
M - Data based on modeled streamflow
Q - Questionable estimate
U - Unknown flow, less than value shown
[ ] - Data not recorded

Table A-3: Site 3, S.F. Palouse River at Albion.

Day	May 2006	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2007	Feb	Mar	Apr	May
1	[]	16.6	9.1B	4.3B	8.2B	7.3	7.6	16.6	25.3	27.2	81.8	50	27.3
2	[]	19.1B	7.9B	3.6B	6.6B	7.6	7.8	15	25.7	26.1	65.1	47.1	31.2
3	[]	35.9	7.5B	3.4B	6.7B	7.7	12.1	13.9	842M	24.4	62.2	44	32.4
4	[]	56.6M	7.1B	3.7B	6.6B	8.3	13.5	14.2	327M	29.4	67.9	42.9	28.5
5	[]	45	7.3B	3.7B	6.4B	8.1	46.5	14.2	97.7M	69.4M	74.5	42	26.7
6	[]	27.3	6.7B	4.4B	5.5B	8.2	56.2	14.8	83.7	163M	68.1	41.4	25.5
7	[]	21.1	6.5B	5.5	6.1B	7.7	82.9	17.3	93.1M	166M	69.1M	39.8	25
8	[]	19.4	6.4B	5.3	5.8B	7.8	49.1	19.6	249M	147M	188M	38.6	24.8
9	[]	18.6	5.9B	4.5B	5.4B	7.7	28	23.1	205M	162M	111	61.5	24.9
10	[]	18.2	6.4B	4.4B	5.6B	7.8	23.6	30.6	240M	192M	88.8	72.8	23.3
11	[]	17.2	6	4.8	6.1B	8	28.3	36.6	117M	172M	116M	48.7	22.1
12	[]	16.2	5.4	5.6B	6.4B	8.5	22.7	45.8	81.2	218M	140M	42.5	20.7
13	[]	18.6	5.3	5.9B	6.1B	8.5	47.5	88.2	77.5	132M	124	39.5	21.1
14	[]	25.2	5.4	7.0B	5.8B	8.4	28.5	102M	72.5	106	97.2	39.2	[]
15	[]	24.4	5.3	6.6B	6.1B	8.7	21.1	116M	82.1	229M	81.4	45	[]
16	[]	24.3	5.5B	6.8B	5.4B	28.3	21.1	73.5	82.6	299M	74.8	40.5	[]
17	[]	20.6	6.0B	6.5B	5.7B	17.1	19.3	42.5	60	152M	68.5	44.4	[]
18	[]	16.6	6	5.8B	6.3B	9.7	15.8	31.7	43.2	125	62.2	41.9	[]
19	[]	15.1B	4.7	4.8B	7.5	11.7	13.3	27.5	34.1	129M	60.6	36.8	[]
20	[]	13.6B	5	4.2B	10.1	12.3	22.1	24.6	34.8	347M	65.3	34.7	[]
21	[]	12.7B	5.3	5.2B	13.4	9.2	23	23.7	33.1	222M	62.5	33.5	[]
22	[]	11.6B	4.8	4.9B	16.5	8.2	19.2	22.3	32.6	156M	55.6	33.9	[]
23	[]	11.4B	5.1	5.0B	10.7	8.1	26.2	20.7	33.7	144M	55.4	33.3	[]
24	24.6	9.6B	5.3	5.5B	7.7	8	39.1	21	36.2	128M	52.2	31.9	[]
25	21.9	9.2B	5.3	7.2B	7.7	8.4	35.9	31	39	124M	59.2	30.6	[]
26	22.6	9.7B	4.9B	6.8B	7.7	7.7	29.5	58	38.7	151M	60.8	29.9	[]
27	20.5	9.5B	5.2B	7.6B	7.8	7.9	28.9	83.9	35.3	120	76.6	29.5	[]
28	26.3	8.9B	4.7B	8.3B	8.3	7.8	25.1	66.8	32.1	98	81.5	28.9	[]
29	22.4	8.8B	4.1B	8.3B	8.3	8	20.4	40.9	30.5		60.7	28.4	[]
30	20.4	9.1B	3.9B	8.0B	7.8	8.7	18	31.4	29.3		55.8	28	[]
31	17.9		4.0B	7.9B		8.2		27.9	28.3		52.6		[]
Mean	22.1	19.0M	5.7B	5.7B	7.5B	9.3	27.7	38.5M	105M	145M	78.7M	40	25.6
Median	22.1	16.9M	5.4B	5.5B	6.6B	8.2	23.3	27.9M	43.2M	146M	68.1M	39.7	25
Max.Daily Mean	26.3	56.6M	9.1B	8.3B	16.5B	28.3	82.9	116M	842M	347M	188M	72.8	32.4
Min.Daily Mean	17.9	8.8M	3.9B	3.4B	5.4B	7.3	7.6	13.9M	25.3M	24.4M	52.2M	28	20.7
Inst.Max	41.5	180M	11.2B	12.3B	25.6B	60.6	120	186M	1260M	490M	259M	98.4	41.5
Inst.Min	15.7	6.3M	3.1B	2.8B	3.5B	4.2	5.3	10.9M	23.9M	21.1M	50.4M	26.7	18.5

All recorded data are continuous and reliable except where the following tags are used:
B - Below rating, reliable extrapolation
M - Data based on modeled streamflow
[ ] - Data not recorded

Table A-4: Site 4, Paradise Creek near mouth.

Day	May 2006	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2007	Feb	Mar	Apr	May
1	[]	9.5Q	1.3Q	2.2Q	2.1	2.6	4.5	5.2Q	1.1*	21.2*	19.5Q	7.0*	6.9
2	[]	18.8Q	1.2Q	1.2Q	2.1	2.8	4.9*	4.9Q	1*	22.2*	15.1*	6.1*	10.7
3	[]	17.2Q	1.2Q	1.3B	1.8B	2.9	6.6*	5.0Q	59.4M	23.5*	15.2*	5.0*	9.1
4	[]	32.2Q	1.3Q	1.4B	1.6B	3.2	6.4*	5.0Q	60.7Q	27.5*	20.3*	4.7*	7.2
5	[]	20.0Q	1.5Q	1.4B	2.2B	3.4	35.5M	5.1Q	13.9Q	28.1Q	23.7*	4.8*	6.6
6	[]	11.7Q	1.2Q	2.5	2	3.5	32.3M	5.0Q	11.6Q	48.7Q	17.7*	4.5*	6.2
7	[]	10Q	1.4Q	2.6	2.2	3.2	49.6M	4.9*	12.7Q	32.4Q	15.8*	4.0U	6.3B
8	[]	9.3Q	1.4Q	1.7	1.7	3.3	32.4M	6.2*	44.3Q	26.9Q	104M	3.8U	6.1
9	[]	7.9Q	1.2Q	1.5	2.0B	2.9	7.3Q	7.5*	39.5Q	32.5Q	34.3*	29.8M	6.1
10	[]	6.9Q	1.3Q	1.5	2.2B	3.2	5.5Q	13.5*	52.7Q	30.8Q	25.8*	19.1M	5.8B
11	[]	5.7Q	1.3Q	2.6	2.3	3.3	7.7Q	21.6*	24.3Q	33.2Q	49.5M	6.7*	5.8B
12	[]	5.5Q	1.2Q	1.7	2.4	3.8	7.2Q	22.9*	9.3*	39.4Q	44.8*	6.5*	5.6B
13	[]	5.4Q	1.3Q	2.2	1.9	3.7	20.0Q	42.7M	4.6U	21.4Q	37.3*	7.0*	5.0B
14	[]	11.7Q	1.4Q	1.9	2.2	3.5	9.3Q	21.6*	2.3U	24.4Q	26.6*	8.4*	4.2B
15	[]	6.7Q	1.6Q	1.9	2.1	4	7.2Q	33.7*	2.3U	83.0Q	20.4*	17.8*	3.5B
16	[]	5.3Q	1.6Q	1.6	2.3	13.6	8.6Q	14.9*	2.3U	71.2Q	17.9*	10.1*	[]
17	[]	4.4Q	1.8Q	1.4B	2.5	6.1	7.2Q	7.3*	2.3U	34.8*	15.5*	20.2*	[]
18	[]	3.4Q	1.8Q	1.7B	2.6	4	5.8Q	5.8*	2.3U	33.2*	12.7*	12.9*	[]
19	[]	2.6Q	1.6Q	1.6B	3.1	4	5.9Q	6.1*	2.8U	33.6*	14.0*	8.6	[]
20	[]	2.1Q	1.8Q	1.8B	4.6	7	10.8Q	6.9*	4.0U	74.9Q	21.0*	8.2	[]
21	[]	1.7Q	1.7Q	1.6B	6.8	4.2	8.7Q	10.7*	3.9U	41.5Q	15.1*	8	[]
22	[]	1.5Q	1.9Q	1.6B	11.9	4.2	8.0Q	16.1*	5.0U	31.4Q	11.7*	7.9	[]
23	[]	1.3Q	2.0Q	1.6B	4.6	4.2	9.4Q	16.8*	6.6U	33.6Q	11.7*	8	[]
24	[]	1.7Q	2.3Q	1.8	3.4	4.4	17.4Q	21.4*	7.9*	28.9Q	8.3*	7.8	[]
25	5.9Q	2.8Q	2.1Q	2.2	3.6	4.5	14.4Q	28.6*	8.6*	30.3Q	13.9*	7.5	[]
26	8.1Q	3.8Q	1.8Q	2.1B	3.1	4.4	11.5Q	42.1*	9.9*	35.8Q	12.4*	7.5	[]
27	10.2Q	3.0Q	2.5Q	2.3	2.9	4.5	10.0Q	38.9*	9.2*	27.5Q	29.1*	7.4	[]
28	20.4Q	1.6Q	2.1Q	2.3	3.3	4.5	7.4Q	16.2*	9.1*	23.1Q	22.8*	7.1	[]
29	17.6Q	1.3Q	2.3Q	2.3	3.2	4.6	5.8Q	4.1*	11.7*		11.1*	6.9	[]
30	13.7Q	1.4Q	2.5Q	2	2.6	4.9	5.2Q	2.0*	14.3*		9.1*	7	[]
31	10Q		2.8Q	1.7		4.3		1.5*	16.3*		7.7*		[]
Mean	12.3Q	7.2Q	1.7Q	1.9Q	3.0B	4.3	12.4Q	14.3Q	14.7Q	35.5Q	22.7Q	9.0U	6.3B
Median	10.2Q	5.3Q	1.6Q	1.7Q	2.4B	4	7.9Q	7.5Q	9.1Q	31.9Q	17.7Q	7.4U	6.1B
Max.Daily Mean	20.4Q	32.2Q	2.8Q	2.6Q	11.9B	13.6	49.6Q	42.7Q	60.7Q	83.0Q	104Q	29.8U	10.7B
Min.Daily Mean	5.9Q	1.3Q	1.2Q	1.2Q	1.6B	2.6	4.5Q	1.5Q	1Q	21.2Q	7.7Q	3.8U	3.5B
Inst.Max	28.9Q	106Q	4.9Q	6.2Q	27.1B	47.6	118Q	132Q	206Q	178Q	254Q	127U	24.0B
Inst.Min	3.7Q	1Q	1Q	1.1Q	1.2B	1.6	2.2Q	0.9Q	0.7Q	13.7Q	4.6Q	2.3U	2.5B

All recorded data are continuous and reliable except where the following tags are used:
* - Data estimated based on other stations
B - Below rating, reliable extrapolation
M - Data based on modeled streamflow
Q - Questionable estimate
U - Unknown flow, less than value shown
[ ] - Data not recorded

Table A-5: Site 5, Paradise Creek at Idaho Border.

Day	May 2006	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2007	Feb	Mar	Apr	May
1	[]	3.8B	0.5U	0.6U	2.2*	2.4J	0.7U	5.0J	1.9J	8.0J	13.1J	9.8	6.1
2	[]	12.1M	0.4U	0.8B	2.0*	2.7J	1.3U	5.2J	3.2M	7.7J	10.1J	9.2	9.7
3	[]	5.3J	0.4U	0.9	1.7*	3.2J	1U	5.2J	63.8M	7.8J	10.5J	8.7	6.7
4	[]	16.7M	0.5U	0.9B	2.0*	3.4J	3.0U	5.2J	30.7M	8.5J	13.6J	8.6	6.1
5	[]	6.5J	0.3U	1.7J	1.9*	3.4J	10.2M	5.4J	10.8J	18.3M	14.2J	8.7	5.8
6	[]	4.7J	0.5U	2.0J	3.1*	3.2J	14.5J	6.0J	7.7J	32.8M	12.0J	8.4	5.6
7	[]	4.3B	0.4U	1.5	2.2J	3.2J	16.6J	6.6J	12.5M	26.0M	16.4M	7.9	5.7
8	[]	4.5J	0.3U	0.8B	2.4J	3.4J	1.6U	7.4J	31.7M	27.0M	34.0M	7.5	5.5
9	[]	4.1B	0.3U	0.8B	2.8J	3.7J	0.8U	10.6J	34.4M	32.8M	19.4J	19.8M	5.3
10	[]	4.0B	0.3U	1.9J	2.8J	3.9J	0.7U	15.9M	37.4M	27.7M	16.1J	11	5.4
11	[]	3.6B	0.3U	2.0J	2.8J	4.5J	1.0U	14.1J	19.4J	33.6M	26.2M	8	5.3
12	[]	3.9B	0.3U	2.0J	2.1J	4.2J	0.7U	20.0J	8.6J	33.3M	24.1J	7.6	5.3
13	[]	4.2B	0.4U	1.6J	2.3J	3.8J	4.7U	26.2M	5.2J	20.9J	20.7J	7.4	4.9
14	[]	8.5J	0.4U	1.8	2.7J	3.9J	0.7U	19.8M	3.4J	18.6J	17.0J	9.2	4
15	[]	4.7J	0.5U	1.4	2.6J	5.9M	0.7U	17.8M	2.7J	45.4M	14.7J	10.4	3.7
16	[]	4.4J	0.5U	1.2	2.9J	16.8M	0.7U	7.1J	2.4J	34.0M	13.8J	8	[]
17	[]	4.1B	0.6U	1.7J	2.5J	2.3J	0.7U	3.3J	2.4J	23.1	12.9J	11.9	[]
18	[]	3.8B	0.4U	1.6J	2.7J	1.1U	0.7U	2.2J	2.6J	21.3J	12.0J	8.4	[]
19	[]	3.7B	0.5U	1.9J	4.9J	3.9U	0.9U	2.0J	3.4J	29.6M	12.3J	7	[]
20	[]	3.6U	0.5U	1.8J	5.4J	1.8J	2.8U	2.2J	4.3J	52.4M	16.4J	6.9	[]
21	[]	3.2U	0.6U	1.8J	16.5M	1.6U	0.9U	4.7J	4.0J	28.4M	13.0J	6.8	[]
22	[]	3.2U	0.7U	1.6J	7.6J	1.6U	1.3U	4.8J	4.7J	24.8	11.8	7	[]
23	[]	2.6U	0.7U	2.0J	3.0J	1.7U	1.4J	5.8J	5.7J	27.5M	11.8	7	[]
24	4.9J	2.3U	0.7B	2.4*	3.1J	1.9J	10.3J	5.6J	5.7J	21.3J	10.2	6.8	[]
25	4.9J	2.2U	0.5U	2.1*	3.3J	1.7J	4.9J	12.2J	5.6J	24.8M	13.8	6.5	[]
26	4.5J	2.2U	0.8U	2.3*	2.8J	1.6U	3.2J	22.2J	5.7J	26.3M	11.7	6.7	[]
27	4.7J	1.7U	0.5U	2.2*	3.2J	1.3U	3.9J	19.5J	4.8J	20.6J	20.8	6.3	[]
28	5.4J	1.4U	0.6U	2.4*	3.2J	1.0U	3.7J	7.0J	4.7J	16.9J	15.6	6.3	[]
29	4.7J	1.2U	0.6U	2.2*	2.5J	1.1U	4.9J	3.4J	5.4J		11.5	6.1	[]
30	4.2B	1.0U	0.7U	2.1*	2.3J	0.8U	5.0J	2.6J	6.1J		10.7	6.2	[]
31	4.1B		1.2U	2.3*		0.8U		1.9J	6.5J		10		[]
Mean	4.7J	4.4U	0.5U	1.7U	3.4M	3.1U	3.4U	8.9M	11.2M	25.0M	15.2M	8.3M	5.7
Median	4.7J	3.8U	0.5U	1.8U	2.8M	2.7U	1.3U	5.8M	5.6M	25.4M	13.6M	7.8M	5.5
Max.Daily Mean	5.4J	16.7U	1.2U	2.4U	16.5M	16.8U	16.6U	26.2M	63.8M	52.4M	34.0M	19.8M	9.7
Min.Daily Mean	4.1J	1.0U	0.3U	0.6U	1.7M	0.8U	0.7U	1.9M	1.9M	7.7M	10.0M	6.1M	3.7
Inst.Max	8.9J	54.8U	2.7U	8.8U	38.1M	49.7U	37.4U	50.3M	70.0M	65.5M	59.7M	42.7M	20.9
Inst.Min	3.4J	0.6U	0.3U	0.3U	0.8M	0.7U	0.7U	1.2M	1.1M	3.3M	7.4M	4.3M	2.5

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* - Data estimated based on other stations
B - Below rating, reliable extrapolation
J - Estimated data
M - Data based on modeled streamflow
U - Unknown flow, less than value shown
[ ] - Data not recorded

Table A-6: Site 9, Palouse River above Rebel Flat Creek.

Day	May 2007	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2008	Feb	Mar	Apr	May	Jun
1	[]	101	29.3J	4.7B	6.6	19.6	40.0*	57.7*	150*	306*	1410M	743*	921M	419*
2	[]	90.7	26.1J	5.3B	6.8	21.2	40.4*	58.7*	143*	302*	1620M	674*	754*	391*
3	[]	81.8	24.7J	4.6B	7.1	23.5	40.1*	71.4*	148*	294*	1080M	628*	603*	384*
4	[]	70.9	24.7J	3.9B	6.7B	25.1	38.5*	81.1*	177*	284*	816*	583*	562*	378*
5	[]	71	25.0J	3.1B	6.1B	27.8	38.2*	206*	195*	281*	732*	576*	641*	355*
6	[]	73	25.0J	3.4B	8.4	41.7	38.1*	388*	212*	281*	599*	606*	853M	356*
7	[]	75.9	20.1J	3.7B	6.9	37.7	38.3*	365*	234*	290*	526*	635*	1110M	334*
8	[]	78.7	16.1J	3.6B	6.0B	32.5	38.6*	273*	263*	307*	529*	676*	1270M	321*
9	[]	79.7	15.2J	3.1B	5.9B	35.1	39.0*	210*	258*	431*	571*	710*	1240M	316*
10	[]	85.7	14.7J	2.4U	6.7	35.7	40.3*	163*	243*	575*	664*	822*	1120M	399*
11	[]	83.4	13.2J	2.1U	6.5	33.7	40.1*	118*	229*	854M	824*	807*	1000M	378*
12	[]	85.8	11.1J	1.8U	6.6	31.2	40.2*	105*	242*	1040M	1500M	739*	939M	406*
13	[]	93.1	10.4J	1.6U	6.9	29.6	41.5*	111*	321*	1670M	1660M	773*	933M	451*
14	[]	89.1	9.4J	1.9U	6.8	29	42.4*	110*	429*	2060M	1470M	1050M	865M	562*
15	[]	73.6	10J	2.0U	7.3	30.6	45.3*	104*	469*	1820M	1710M	1920M	759*	475*
16	[]	63.6	9.7J	1.4U	6.9	27.7	68.5*	99.3*	409*	1520M	1570M	1910M	848M	416*
17	[]	57.8	8.7B	2.7U	6.4	28	79.8*	96.5*	359*	1390M	1330M	1360M	1080M	[]
18	108	54.7	7.9B	2.1U	6.7	27.9	92.6*	93.6*	336*	1160M	1130M	1070M	1320M	[]
19	97.4	51.3	9.6B	3.1U	7.6	34.5	92.7*	98.3*	321*	885M	1150M	1020M	1420M	[]
20	97.2	49.2	10.4B	6.1J	8	44.4	122*	107*	314*	703*	1410M	991M	1390M	[]
21	107	48	10.6B	6.3	9.1	41.9	186*	146*	198*	620*	1330M	891M	1210M	[]
22	123	46.7J	10.8B	6.6	10.1	49.8	140*	352*	243*	561*	1200M	743*	1160M	[]
23	146	42.5J	14.3	7.2	11.1	45.2	112*	310*	204*	549*	1050M	613*	961M	[]
24	169	38.2J	18.2	9.1	11.7	40.1	91.2*	242*	175*	575*	1050M	518*	753*	[]
25	155	35.1J	12.4	9	11.8	40.5	76.7*	261*	195*	627*	1550M	481*	646*	[]
26	132	30.3J	11.1	9	12.5	39.9	65.6*	388*	203*	952M	1370M	442*	579*	[]
27	112	34.6J	9.9B	7.3	12.4	40.1	56.9*	372*	274*	1040M	1150M	397*	538*	[]
28	106	32.0J	8.1B	5.5J	11.6	40.9	54.9*	300*	336*	1020M	1030M	372*	497*	[]
29	107	31.3J	6.6B	6.8J	12.7	40.2	63.7*	250*	302*	1070M	975M	423*	480*	[]
30	102	32.9J	6.0B	5.7B	17.1	39.7	60.1*	221*	285*		862M	656*	567*	[]
31	106		5.5B	5.8B		38.4		185*	298*		825M		481*	[]
Mean	119	62.7J	14.0J	4.5U	8.6B	34.6	65.5*	192*	263*	809M	1120M	794M	887M	396*
Median	107	67.2J	11.1J	3.9U	7.0B	35.1	50.1*	163*	243*	627M	1130M	693M	865M	388*
Max. Daily Mean	169	101J	29.3J	9.1U	17.1B	49.8	186*	388*	469*	2060M	1710M	1920M	1420M	562*
Min. Daily Mean	97.2	30.3J	5.5J	1.4U	5.9B	19.6	38.1*	57.7*	143*	281M	526M	372M	480M	316*
Inst.Max	183	116J	32.5J	10.3U	19.8B	53.5	198*	440*	497*	2120M	1940M	2190M	1450M	602*
Inst.Min	93.4	28.5J	4.5J	1.0U	5.1B	18.7	37.5*	57.0*	36.1*	272M	509M	355M	438M	313*

All recorded data are continuous and reliable except where the following tags are used:
* - Data estimated based on other stations
B - Below rating, reliable extrapolation
J - Estimated data
M - Data based on modeled streamflow
U - Unknown flow, less than value shown
[ ] - Data not recorded

Table A-7: Site 10, Palouse River at Shields Road.

Day	May 2007	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2008	Feb	Mar	Apr	May	Jun	Jul
1	[]	81.2	25.9	6.6*	10B	13.2	26.2*	43.7	117	227*	2120M	759	1720M	496	89
2	[]	73.2	24.2	6.9*	9.8B	14.1	27.6*	47.1	151	209*	1840M	708	1360M	489	84.1
3	[]	65.9	23.1	6.8	13.2	16.8	28.5*	101	139	188*	1380M	661	1040*	479	78.5
4	[]	61.7	23.4	6.5	13.2	27.1	28.1*	396	172	167*	1240	646	911*	448	73.2
5	[]	65.9	20.6	6.3	9.9	31.4	28.9*	670	182	155*	1100	692	972*	460	68.7
6	[]	72	18.5	6.9	8.8B	21.9	30.0*	570	240	146*	954	717	1220*	412	63.5
7	[]	76.9	17	6	8.5B	21.1	31.6*	337	300	150*	917	749	1510M	391	59.8
8	[]	80	15.9	6.1	8.6	25.5	33.2*	220	272	167*	935	776	1640M	392	57
9	[]	80.4	14.4	6.5	8.5	22.1	35.2*	150	222	354*	1020	873	1520M	560	53.6
10	[]	84.2	13.2	6.8*	8.4	19.7	34.6*	97.7	225	565*	1030*	882	1280*	518	49.4
11	[]	86.4	13.2	5.4*	8.3	19.2	29.2*	99.4	213	916*	992*	807	1070*	570	44.9
12	[]	99.3	12.8	4.5*	8.4	18	24.8*	108	361	1060*	1490M	817	946*	640	42.4
13	[]	98.3	12.9	4.0*	8.8	20.1	22.0*	92.9	542	1410M	1420M	980	986*	808	38.8
14	[]	75.6	12.6	4.4*	7.7B	19	19.0*	82.6	590	1420M	1490M	1410M	979*	699	35.1
15	[]	64	12	4.5*	7.3B	17.5	17.7*	81	550	1170	1590M	1760M	923*	609	34
16	110	58.8	11.3	3.2U	7.4B	17.8	27.6*	72.4	418	1050	1300*	1340M	1050	532	33.7
17	101	54.8	10.6	5.4*	7.5B	20.2	29.4*	71.2	373	1030	932*	1060	1210	453	[]
18	92.8	51.2	10.8	4.1*	7.9B	27.4	31.3*	78	343	913	721*	972	1310	388	[]
19	90.7	48.6	11.4	5.6*	8.3	38.6	26.5*	94.2	305	826	936*	978	1300	336	[]
20	87.8	49.3	12.1	9.9*	8.6	37.1	37.2*	213	268*	796	1130*	917	1210	286	[]
21	99.8	47.6	13.3	10.5*	9.1	51.5	68.3*	550	107*	785	939*	829	1140	253	[]
22	131	40.8	13.6	11.1*	8.7	38.3	44.8*	414	162*	821	769*	734*	1060	228	[]
23	176	35.2	12.5	12.3*	8.6	35	42.8*	241	98.9*	899	555*	638*	886	212	[]
24	171	30.6	13.2	15.3*	8.3	35.2	44.9*	322	73.6*	994	793*	572*	778	189	[]
25	131	28.6	10.3	15.4*	8.6	36.1	49.8*	540	89.9*	1240M	1230*	581*	713	161	[]
26	106	27.6	9.5	15.8*	8.8	30.8	54.6*	515	95.8*	1500M	1070	583*	672	142	[]
27	94.2	30	8.8	13.5*	9	27.4	52.2	349	187*	1540M	986	569*	628	126	[]
28	93.2	31	8	11.0*	9.9	26.1	46.7	249	292*	1530M	989	588*	597	115	[]
29	91.3	31.5	8.6*	13.3*	10.2	24.3*	49.1	202	227*	1730M	874	760*	737	104	[]
30	93.5	27.4	8.1*	11.8*	11.3	25.4*	47.2	192	200*		898	1270M	639	95.4	[]
31	90.4		7.5*	10.5		25.4*		147	218*		834		542		[]
Mean	110	58.6	13.8*	8.3U	9.1B	25.9*	35.6*	237	249*	826M	1110M	854M	1050M	386	56.6
Median	97	60.3	12.8*	6.8U	8.6B	25.4*	31.4*	192	222*	899M	992M	768M	1040M	402	55.3
Max. Daily Mean	176	99.3	25.9*	15.8U	13.2B	51.5*	68.3*	670	590*	1730M	2120M	1760M	1720M	808	89
Min. Daily Mean	87.8	27.4	7.5*	3.2U	7.3B	13.2*	17.7*	43.7	73.6*	146M	555M	569M	542M	95.4	33.7
Inst.Max	184	117	27.7*	17.6U	19.8B	60.0*	79.8*	775	611*	1940M	2280M	1870M	1780M	876	92.8
Inst.Min	85.9	25.3	6.3*	2.5U	5.7B	12.3*	16.8*	36	29.6*	136M	510M	552M	517M	91.1	32.6

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* - Data estimated based on other stations
B - Below rating, reliable extrapolation
J - Estimated data
M - Data based on modeled streamflow
U - Unknown flow, less than value shown
[ ] - Data not recorded

Table A-8: Site 11, Palouse River above S.F. Palouse River.

Day	May 2007	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2008	Feb	Mar	Apr	May	Jun	Jul
1	[]	79.1	21	3.2J	3.9	6	11.8*	22.0*	40.3*	88.0*	2180M	398*	1260M	286	74.5
2	[]	77.2	20	2.7J	4.1	6	11.0*	24.3*	52.8*	89.2*	1760M	363	917M	287	69.3
3	[]	76.1	19.7	2.0J	3.3	6.5	10.9*	57.9*	50.1*	89.7*	1180M	337	756M	268	64.6
4	[]	74.4	18.5	1.8J	3.3	7.2	11.0*	151*	60.6*	87.4*	987M	348	801M	244	59.8
5	[]	68.4	16	1.6J	3.1	9.3	10.7*	240*	64.7*	83.8*	748M	394	1000M	252	54.9
6	[]	45.5	14.7	1.7J	2.5	11.7	10.7*	205*	83.6*	82.8*	582	423	1230M	220	51.7
7	[]	46.5	13.6	1.5J	2	16.1	11.2*	134*	98.9*	84.8*	556	470	1340M	212	49
8	[]	51	11.7	1.3J	1.8	14.6	11.1*	104*	92.9*	87.6*	607	509	1250M	241	45.7
9	[]	49.9	10.6	1.1J	2.5	12.4	11.5*	82.4*	79.9*	96.0*	749M	588	1060M	320	42.5
10	[]	49.9	10.3	0.8U	2.7	10.7	12.9*	58.8*	81.3*	174*	929M	589	840M	288	38.4
11	[]	45.7	9.4	0.7U	2.2	10.2	14.1*	60.2*	77.7*	415*	1400M	536	707	304	35.2
12	[]	67.5	9.1	0.7U	1.8	9.9	16.9*	64.7*	115*	465*	1910M	602	734	393	33.1
13	[]	56.6	9.2	0.7U	1.5	9.7	18.9*	57.1*	160*	616*	1340M	921M	707	510	30.6J
14	[]	45.4	8.8	0.6U	1.4B	9.1	51.3*	51.3*	175*	640*	1580M	1610M	630	403	28.4J
15	[]	40.2	7.7	0.7U	1.3B	8.5	45.2*	50.4*	164*	516*	1480M	1930M	739M	336	27.6J
16	94.7	37.6	7.2	0.4U	1.3B	9.6	60.7*	44.0*	131*	457*	1200M	1340M	975M	284	26.4J
17	72.6	34.5	7	0.3U	1.1B	10.7	54.9*	40.3*	120*	460*	910M	972M	1200M	260	24.2J
18	64.5	32.8	4.8	0.3U	1.6B	10.5*	67.8*	42.6*	114*	405*	817M	882M	1280M	233	22.0J
19	63.1	34.2	7.2	0.6U	1.8	15.2*	110*	49.9*	106*	370*	1130M	881M	1240M	203	20.5J
20	58.4	39	8.6	1.5B	1.5B	22.0*	113*	89.3*	96.5*	366*	1080M	770M	1090M	178	19.2J
21	62.5	35.4	8.3	1.7	1.7B	19.6*	83.6*	179*	79.4*	384*	902M	639	1020M	160	18.5J
22	74	30	8.2	1.6	1.4B	23.1*	62.0*	137*	74.1*	409	701M	530	852M	147	19.2J
23	95.3	26.6	7.5	1.5B	1.2B	23.8*	46.9*	92.4*	72.8*	493	592	466	618	138	22.1J
24	91.9	24.5	6.3	1.4B	1.4B	24.0*	31.2*	109*	71.0*	583	1040M	485	513	126	21.8J
25	71.8	23.3	5.1	1.3B	1.1B	19.0*	21.4*	160*	69.7*	962M	1110M	490	460	114	23.0J
26	59.6	23	4.7	3.6B	1.9	16.5*	27.3*	150*	69.2*	1310M	911M	479	426	105	22.3J
27	54.8	24.2	4.6	5.7	1.8	14.3*	27.3*	107*	78.8*	1330M	774M	502	390	98.7	19.6J
28	47.7	28.1	4.6	5.1	3	13.2*	23.6*	84.6*	90.3*	1370M	721M	665M	372	92.9	17.6J
29	46.9	24.6	4.2	4.5	4.5	12.5*	25.4*	69.7*	96.8*	1670M	577*	1070M	425	88.2	[]
30	57.6	22.5	3.7	4	4.6	12.0J	24.2*	66.5*	92.3*	[]	550*	1520M	366	81.9	[]
31	74.2	[]	3.4J	3.3	[]	11.4J	[]	51.6*	89.0*	[]	466*	[]	313	[]	[]
Mean	68.1	43.8	9.5J	1.9U	2.2B	13.1*	34.6*	91.5*	91.9*	489M	1020M	724M	823M	229	35.1J
Median	63.8	39.6	8.3J	1.5U	1.8B	11.7*	23.9*	69.7*	83.6*	409M	911M	562M	801M	237	28.0J
Max. Daily Mean	95.3	79.1	21.0J	5.7U	4.6B	24.0*	113*	240*	175*	1670M	2180M	1930M	1340M	510	74.5J
Min. Daily Mean	46.9	22.5	3.4J	0.3U	1.1B	6.0*	10.7*	22.0*	40.3*	82.8M	466M	337M	313M	81.9	17.6J
Inst.Max	109	80.4	21.8J	6.0U	5.2B	27.2*	136*	279*	182*	2000M	2340M	2100M	1480M	574	76.5J
Inst.Min	44.4	21.8	3.0J	0.2U	0.8B	4.9*	9.6*	17.5*	21.6*	81.6M	421M	326M	304M	76.5	16.1J

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* - Data estimated based on other stations
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J - Estimated data
M - Data based on modeled streamflow
U - Unknown flow, less than value shown
[ ] - Data not recorded

Table A-9: Site 12, Palouse River at Elberton.

Day	May 2007	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2008	Feb	Mar	Apr	May	Jun	Jul
1	[]	54.3	16.3	4.6	2.9	5.5	14.5*	35.8*	74.1*	118*	1700M	402	1250M	376	?
2	[]	49.9	16	4.5	3	5.4	14.3*	33.2*	89.5*	121*	1410M	378	921M	374	?
3	[]	46.9	16.4	4.2	2.8	7.9	14.6*	88.2*	94.9*	122*	942M	356	810M	348	?
4	[]	44.1	14.7J	3.9	2.6	9.4	14.9*	400*	101*	119*	797M	380	872M	326	?
5	[]	44.2J	13.8J	3.8	2.5	11.3	15.7*	333*	158*	115*	637J	421	1070M	322	?
6	[]	44.7J	13.5J	3.5	2.5	15.7	16.1*	186*	158*	115*	546J	448	1300M	279J	?
7	[]	51.5J	12.4J	3.4	3.2	14.2	16.5*	134*	127*	117*	542J	502	1400M	271J	?
8	[]	54.5J	11.6J	3.1	3	12	17.2*	110*	112*	122*	597J	534	1280M	361J	?
9	[]	49.4	11.4J	3.1	2.7	10.3J	17.9*	93.4*	114*	136*	717M	591	1060M	411	?
10	[]	46	10.6	3	2.4	9.5J	19.5*	86.0*	110*	252*	857M	588	867M	388	?
11	[]	50.5	10.3	2.8	2.2J	9.4J	21.1*	76.9*	151*	541*	1350M	564	767M	422	?
12	[]	67.4	10.2	2.6	2.2J	9.4J	33.1*	75.8*	257*	596*	1860M	646	803M	547	?
13	[]	46.1	9.4	2.4	2.2J	8.8J	50.6*	71.7*	284*	889M	1260M	958M	759M	613	?
14	[]	36.9	9	2.4	2.1J	8.3J	75.3*	67.1*	255*	739M	1490M	1720M	698	518	?
15	[]	32.1	8.7	2.2B	2.2J	8.9J	45.4*	66.4*	208*	507*	1380M	1940M	828M	443	?
16	[]	28.2	7.4	2.2B	2.6J	9.4J	41.0*	58.3*	142*	447*	1110M	1270M	1050M	387	?
17	62.8	25.6	5.4	2.3B	2.7J	9.7J	77.2*	68.0*	154*	429*	865M	935M	1310M	329J	?
18	59	25	7.7	2.2J	2.6J	10.6J	167*	67.3*	135*	368*	771M	904M	1420M	276J	?
19	57	26.3	8.3	2.1J	2.5	15.4J	113*	101*	128*	344*	1050M	893M	1360M	229J	?
20	55.6	27.4	8.3	2.3J	2.3	21.7	77.3*	307*	123*	349*	968M	795M	1140M	198J	?
21	62	23.3	8.4	2.3J	2.2B	19.4	56.0*	225*	102*	317*	836M	682J	1100M	174J	?
22	80.7	20.3	8.2	2.4J	2.2B	22.5	45.4*	140*	97.8*	330	681M	585J	902M	160J	?
23	109	18.3	7	2.5J	2.4B	23	39.7*	121*	97.1*	415	616J	538J	708M	151J	?
24	96	16.8	6.2	3.0J	3.1	23.1	31.3*	280*	95.7*	472	1010M	562J	608	?	?
25	78.5	16.3	5.8	5.3J	2.8	18.4	33.7*	282*	94.8*	738M	1010M	561J	559	?	?
26	68.2	16.3	6.3	4.5J	3.3	16	34.7*	173*	94.9*	977M	806M	553J	524	?	?
27	62.4	19.5	5.9	3.7J	4	13.9	33.1*	134*	105*	960M	700M	592J	488	?	?
28	59.6	19.6	5.5	3.1J	4.1	12.8	32.8*	119*	119*	1020M	630	764M	463	?	?
29	65.6	17.2	5.2	2.8J	4.6	12.1	35.4*	113*	130*	1260M	542	1190M	512	?	?
30	68.9	16.9	5.1	2.7J	5.6	12.6	30.6*	103*	123*		497	1610M	448	?	
31	61.3		4.9	2.7J		13.5		95.2*	119*		445		404	[]	
Mean	69.8	34.5J	9.4J	3.1J	2.9J	12.9J	41.2*	137*	134*	449M	923M	762M	893M	344J	
Median	62.8	30.2J	8.4J	2.8J	2.6J	12.0J	33.1*	103*	119*	368M	836M	590M	867M	348J	
Max. Daily Mean	109	67.4J	16.4J	5.3J	5.6J	23.1J	167*	400*	284*	1260M	1860M	1940M	1420M	613J	
Min. Daily Mean	55.6	16.3J	4.9J	2.1J	2.1J	5.4J	14.3*	33.2*	74.1*	115M	445M	356M	404M	151J	
Inst.Max	119	78.2J	17.5J	6.1J	6.0J	26.0J	202*	483*	286*	1410M	2160M	2190M	1500M	710J	
Inst.Min	52.5	15.8J	4.1J	1.8J	1.8J	5.1J	13.9*	27.3*	53.5*	114M	411M	333M	372M	135J	

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B - Below rating, reliable extrapolation
J - Estimated Data
M - Data based on modeled streamflow
U - Unknown flow, less than value shown
? - Unreliable Estimate, data will not be reported
[ ] - Data Not Recorded

Table A-10: Site 13, S.F. Palouse River below Colfax.

Day	May 2007	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2008	Feb	Mar	Apr	May	Jun	Jul
1	[]	13.6	11.3	3.8U	6.3	6.4	8.1*	13.4*	21.8*	35.0*	X	X	X	X	X
2	[]	11.4	11.4	3.8U	10	7.1	7.2*	12.1*	26.1*	35.9*	X	X	X	X	X
3	[]	10	11.6	3.5B	11	8.4	7.3*	31.3*	27.6*	36.4*	X	X	X	X	X
4	[]	9.2	11	4.0B	6.9	21.5	7.4*	163*	29.6*	35.2*	X	X	X	X	X
5	[]	10.6	10	3.3B	6.8	12.8	7.8*	132*	52.6*	33.6*	X	X	X	X	X
6	[]	15.8	8.6B	3.4B	7.2	9.4	8.0*	69.3*	52.6*	33.5*	X	X	X	X	X
7	[]	15.2	8.9B	3.7B	7.7	9.9	8.1*	46.3*	39.7*	34.4*	X	X	X	X	X
8	[]	14.6	8.2B	3.9B	7.9	9.4	8.5*	35.7*	33.6*	36.1*	X	X	X	X	X
9	[]	13.9	7.0B	3.4B	7.8	8.9~	8.9*	29.4*	34.3*	41.6*	X	X	X	X	X
10	[]	15.1	6.5B	3.0B	7.3	9.3	9.6*	26.7*	32.5*	91.5*	X	X	X	X	X
11	[]	20.9	5.5B	3.2B	7.4	8.7	10.3*	23.8*	49.2*	230*	X	X	X	X	X
12	[]	19.3	4.5U	3.6B	8.2	10	15.5*	23.2*	93.4*	271*	X	X	X	X	X
13	[]	15.8	4.7U	3.4B	7	9.8	21.4*	21.7*	104*	439M	X	X	X	X	X
14	[]	12.6	5.0U	4.4B	6.6	8.4	29.2*	20.4*	92.7*	376M	X	X	X	X	X
15	22.3	11.2	5.3U	4.4B	6.4	8.2	19.5*	20.2*	72.6*	269*	X	X	X	X	[]
16	20.2	10.2	5.4U	3.9B	6.4	9	17.8*	18.0*	45.3*	250*	X	X	X	X	[]
17	18.8	9.3	4.8U	3.9B	6.7	11	29.4*	20.5*	50.2*	254*	X	X	X	X	[]
18	17.2	9.4	5.7U	4.0B	6.6	17.4	67.8*	20.3*	42.4*	232*	X	X	X	X	[]
19	16.8	10.4	5.6U	4.8B	5.9	16.1	42.7*	30.7*	39.4*	231*	X	X	X	X	[]
20	15.8	11.1	6.7U	5	5.7	19.7	28.3*	115*	37.3*	247*	X	X	X	X	[]
21	19.7	11.1	7.3U	8.9	5.8	16.5	21.8*	81.3*	29.5*	X	X	X	X	X	[]
22	28.7	11.0J	6.5U	8.9	5.4	13.1	18.3*	46.0*	27.9*	X	X	X	X	X	[]
23	31.6	9.8J	7.5U	7.1	5	12.7	16.3*	37.9*	27.6*	X	X	X	X	X	[]
24	26.9	9.7J	5.5U	6.6	5.1	12.4	12.8*	104*	27.2*	X	X	X	X	X	[]
25	21.9	10.1J	5.5U	6	5	11.6	13.7*	105*	26.9*	X	X	X	X	X	[]
26	18.3	12.1	5.1U	6.1	4.9	10.3	13.9*	59.5*	26.9*	X	X	X	X	X	[]
27	16.4	12.7J	4.6U	6	5.1	10.1	13.0*	43.1*	30.3*	X	X	X	X	X	[]
28	16.4	11.7J	4.9U	6	4.9	9.8	12.7*	36.7*	35.6*	X	X	X	X	X	[]
29	17	10.6J	4.5U	6.3	5.5	9.6	13.7*	34.1*	39.6*	X	X	X	X	X	[]
30	17.3	10.6	4.5U	5.7	5.9	12.3	11.4*	30.5*	37.1*	X	X	X	X	X	[]
31	15.7		3.5U	5.8		9.1		28.0*	35.3*	X	X		X		[]
Mean	20.1	12.3J	6.7U	4.8U	6.6	11.3~	17.0*	47.7*	42.6*	161M					
Median	18.3	11.2J	5.6U	4.0U	6.5	9.9~	13.3*	31.3*	35.6*	161M					
Max. Daily Mean	31.6	20.9J	11.6U	8.9U	11	21.5~	67.8*	163*	104*	439M					
Min. Daily Mean	15.7~	9.2J	3.5U	3.0U	4.9	6.4~	7.2*	12.1*	21.8*	33.5M					
Inst.Max	38	27.1J	15.5U	14.2U	18.4	36.4~	84.2*	200*	104*	507M					
Inst.Min	13.6	7.4J	2.6U	1.9U	3.1	4.7~	6.5*	10*	16.4*	33.1M					

All recorded data are continuous and reliable except where the following tags are used:
* - Data estimated based on other stations
B - Below rating, reliable extrapolation
J - Estimated data
M - Data based on modeled streamflow
U - Unknown flow, less than value shown
? - Unreliable estimate, data will not be reported
[ ] - Data not recorded
X - Data rejected

Appendix B. Discrete Streamflow Measurements

Table B-1: Site 1, S.F. Palouse River at Colfax.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
05/25/2006	915	4.60	27.9	75.73	0.37	ADCP	Poor	3.3%
06/27/2006	1450	4.45	10.4	3.22	3.20	Wading	Fair	-17.2%
08/01/2006	1505	4.35	3.6	1.71	2.11	Wading	Fair	-9.4%
08/30/2006	1010	4.40	7.4	2.33	3.18	Wading	Non-FMU	-5.1%
08/30/2006	1450	4.38	6.6	2.35	2.80	Wading	Non-FMU	12.1%
09/05/2006	1215	4.40	5.0	2.17	2.29	Wading	Discarded	N/A
09/26/2006	1355	4.38	5.5	2.17	2.54	Wading	Fair	-5.8%
09/27/2006	1405	4.38	6.6	1.87	3.54	Wading	Non-FMU	13.1%
10/04/2006	1345	4.39	7.7	2.18	3.54	Wading	Non-FMU	13.4%
10/18/2006	1345	4.48	15.9	3.62	4.39	Wading	Non-FMU	-1.3%
10/18/2006	1620	4.46	13.9	3.59	3.85	Wading	Fair	1.9%
11/30/2006	1134	4.61	26.1	7.53	3.46	Wading	Poor	-9.5%
02/06/2007	1440	5.31	203	132.3	1.48	ADCP	Good	0.3%
03/20/2007	1305	4.96	90.8	38.46	2.36	Wading	Good	-5.0%
04/19/2007	815	4.82	55.3	99.29	0.56	ADCP	Poor	-9.2%
05/14/2007	730	4.48	17.9	73.63	0.23	ADCP	Poor	11.7%

Table B-2: Site 2, S.F. Palouse River at Parvin.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
05/25/2006	735	4.92	36.9	19.75	1.86	Wading	Fair	-3.1%
06/28/2006	1230	4.43	11.6	13.67	0.85	Wading	Fair	-1.2%
07/12/2006	1220	4.32	6.8	11.43	0.60	Wading	Non-FMU	-9.0%
07/26/2006	1200	4.26	6.5	12.42	0.52	Wading	Non-FMU	11.5%
08/02/2006	1230	4.27	6.1	11.97	0.51	Wading	Poor	0.3%
08/09/2006	1130	4.30	5.7	11.42	0.05	Wading	Non-FMU	12.4%
08/30/2006	807	4.38	5.9	11.80	0.50	Wading	Non-FMU	-4.8%
08/30/2006	1300	4.41	7.8	13.26	0.59	Wading	Non-FMU	6.9%
09/06/2006	1036	4.38	8.5	12.57	0.67	Wading	Discarded	N/A
09/12/2006	1140	4.40	6.8	13.40	0.51	Wading	Non-FMU	1.0%
09/27/2006	1100	4.48	10.0	13.57	0.73	Wading	Fair	7.0%
10/04/2006	1300	4.45	7.8	13.00	0.60	Wading	Non-FMU	-8.6%
10/17/2006	1420	4.73	18.0	16.68	1.08	Wading	Poor	-7.0%
10/18/2006	1200	4.56	12.9	14.91	0.86	Wading	Non-FMU	7.4%
11/15/2006	1210	4.86	25.5	18.72	1.36	Wading	Non-FMU	-5.4%
11/28/2006	1416	4.92	23.8	19.70	1.20	Wading	Good	-23.9%
02/07/2007	1400	6.33	181	71.61	2.47	ADCP	Good	-0.9%
03/20/2007	1435	5.74	117	37.95	3.08	Bridge	Fair	4.4%
04/19/2007	705	5.23	58.7	24.00	2.42	ADCP	Fair	0.1%
05/14/2007	930	4.79	23.3	31.00	0.75	ADCP	Poor	4.4%

Table B-3: Site 3, S.F. Palouse River at Albion.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
05/24/2006	1450	4.60	25.9	31.04	0.83	Wading	Fair	12.6%
06/28/2006	1105	4.19	7.9	19.41	0.40	Wading	Fair	10.3%
07/26/2006	1130	4.06	3.7	16.03	0.23	Wading	Non-FMU	-1.0%
08/02/2006	1130	4.00	3.3	14.92	0.22	Wading	Fair	0.2%
08/30/2006	1000	4.41	7.1	27.04	0.26	Wading	Non-FMU	-2.8%
08/30/2006	1415	4.30	4.6	24.54	0.19	Wading	Non-FMU	1.0%
09/05/2006	1619	4.14	4.2	18.62	0.22	Wading	Fair	10.2%
09/27/2006	950	4.24	6.6	22.48	0.29	Wading	Fair	6.4%
10/04/2006	1145	4.25	5.9	21.64	0.27	Wading	Non-FMU	-8.4%
10/17/2006	1225	4.43	15.0	28.32	0.53	Wading	Good	10.3%
10/18/2006	1400	4.33	8.9	25.67	0.35	Wading	Non-FMU	0.6%
11/30/2006	850	4.48	16.0	30.32	0.52	Wading	Good	-5.5%
12/20/2006	1010	4.59	25.0	33.74	0.74	Wading	Non-FMU	6.6%
02/07/2007	1240	6.20	141	84.98	1.60	ADCP	Good	-0.2%
03/21/2007	1040	5.31	73.0	61.00	1.20	Wading	Good	12.3%
04/18/2007	1540	4.94	42.1	42.00	1.00	ADCP	Good	2.7%
05/14/2007	1115	4.51	14.4	31.00	0.47	ADCP	Good	-22.1%

Table B-4: Site 4, Paradise Creek near mouth.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
05/24/2006	1640	4.73	7.3	5.89	1.24	Wading	Good	1.4%
06/28/2006	630	4.40	3.7	4.37	0.84	Wading	Discarded	N/A
08/02/2006	805	4.29	1.3	2.93	0.44	Wading	Fair	-0.1%
08/29/2006	1010	4.51	3.6	6.42	0.55	Wading	Non-FMU	0.4%
08/29/2006	1555	4.36	2.8	6.10	0.46	Wading	Discarded	N/A
09/06/2006	726	4.35	1.6	3.00	0.53	Wading	Poor	0.7%
09/25/2006	1110	4.58	4.6	7.75	0.59	Wading	Non-FMU	-2.2%
09/26/2006	1725	4.46	2.6	3.78	0.68	Wading	Fair	-1.1%
10/17/2006	1020	4.69	6.6	5.63	1.17	Wading	Fair	3.0%
11/29/2006	1444	4.61	5.3	5.27	1.01	Wading	Good	4.2%
01/04/2007	750	6.18	60.9	20.55	2.96	Wading	Fair	-6.8%
02/06/2007	1655	5.78	44.3	14.21	2.95	ADCP	Good	7.6%
03/21/2007	735	5.24	20.5	10.28	1.99	Wading	Good	4.8%
04/18/2007	1100	4.92	9.6	6.00	1.57	ADCP	Poor	0.0%
05/16/2007	800	4.69	4.5	5.36	0.85	Wading	Good	6.4%

Table B-5: Site 5, Paradise Creek at Border.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
05/24/2006	745	4.04	4.3	2.74	1.57	Wading	Fair	1.3%
06/20/2006	920	3.98	3.9	3.10	1.27	Wading	Non-FMU	0.4%
06/28/2006	810	3.90	1.3	1.08	1.20	Wading	Fair	0.1%
08/02/2006	900	4.26	0.6	4.64	0.13	Wading	Poor	-2.5%
08/29/2006	1330	4.60	2.3	6.58	0.35	Wading	Non-FMU	-4.4%
08/29/2006	805	4.49	1.5	5.32	0.29	Wading	Non-FMU	-8.7%
09/05/2006	1417	4.48	1.7	7.71	0.21	Wading	Fair	3.2%
09/25/2006	930	4.40	1.4	2.66	0.53	Wading	Non-FMU	-16.8%
09/26/2006	1555	4.57	2.8	8.92	0.31	Wading	Fair	-12.7%
09/27/2006	725	4.32	1.4	5.57	0.24	Wading	Fair	14.0%
10/17/2006	655	4.48	2.9	7.87	0.36	Wading	Good	17.8%
11/29/2006	843	4.61	3.3	9.07	0.36	Wading	Fair	-8.8%
01/04/2007	1005	5.96	30.8	32.23	0.95	Wading	Fair	1.7%
02/07/2007	855	5.46	20.4	22.50	0.84	ADCP	Good	-0.5%
03/21/2007	910	4.93	16.1	12.44	1.29	Wading	Good	12.8%
04/18/2007	1330	4.50	8.1	7.00	1.14	ADCP	Poor	-5.6%
05/16/2007	610	3.97	2.5	1.45	1.73	Wading	Poor	-7.4%

Table B-6: Site 6, S.F. Palouse River below Sunshine Creek.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
05/22/2006	1650	4.40	15.9	16.20	0.98	Wading	Poor	12.3%
05/24/2006	900	4.24	9.6	13.63	0.70	Wading	Fair	14.8%
05/25/2006	625	4.21	7.2			Rating		
06/20/2006	1235	4.12	4.4	8.37	0.52	Wading	Non-FMU	3.1%
06/27/2006	1710	4.04	2.1	9.11	0.23	Wading	Fair	0.5%
08/02/2006	1010	3.79	0.1	0.20	0.36	Wading	Poor	3.7%
09/05/2006	700	3.82	0.2	0.25	0.60	Wading	Poor	8.4%
09/25/2006	1445	3.91	0.6	10.65	0.05	Wading	Non-FMU	-0.4%
09/27/2006	635	3.92	0.7	0.79	0.90	Wading	Fair	10.4%
10/17/2006	1600	3.98	1.1	10.93	0.10	Wading	Non-FMU	-2.8%
10/17/2006	820	3.98	1.1	1.45	0.77	Wading	Poor	-3.7%
11/13/2006	1530	4.08	3.5	12.88	0.27	Wading	Non-FMU	14.8%
11/28/2006	955	4.12	5.5	13.44	0.41	Wading	Non-FMU	30.5%
11/29/2006	1044	4.08	3.3	5.33	0.61	Wading	Fair	8.2%
12/04/2006	1615	4.10	3.0	10.88	0.28	Wading	Non-FMU	-18.1%
12/05/2006	1235	4.07	2.3	10.94	0.21	Wading	Non-FMU	-16.6%
12/18/2006	1625	4.35	11.9	13.77	0.86	Wading	Non-FMU	-1.4%
12/19/2006	900	4.28	7.9	12.76	0.62	Wading	Non-FMU	-17.9%
02/07/2007	730	5.79	76.9	46.70	1.23	ADCP	Fair	1.0%
03/21/2007	642	4.90	34.1	30.24	1.13	Wading	Fair	-5.7%
04/18/2007	1250	4.43	19.9	12.00	1.61	ADCP	Poor	27.7%
05/16/2007	1550	4.14	4.8	11.72	0.41	Wading	Fair	-0.5%
05/16/2007	1540	4.14	5.0	12.14	0.41	Wading	Fair	4.0%

Table B-7: Site 7, Dry Creek at Pullman.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
5/3/2006	11:50	4.82	7.9			Rating		
5/23/2006	1515	4.59	2.62	4.15	0.63	Wading	Fair	0.0
5/24/2006	1310	4.49	1.45	0.45	1.45	Wading	Non-FMU	-4.2
6/7/2006	12:50	4.77	6.4			Rating		
6/20/2006	16:35	4.35	0.6			Rating		
6/20/2006	10:10	4.37	0.7			Rating		
6/20/2006	11:05	4.37	0.7			Rating		
6/28/2006	9:55	4.21	0.02			Rating		
7/25/2006	15:30	4.27	0.2			Rating		
8/1/2006	1705	4.24	0.05	0.04	1.19	Wading	Poor	1.5
8/29/2006	1035	4.27	0.11	1.98	0.06	Wading	Non-FMU	-39.3
8/29/2006	16:00	4.28	0.2			Rating		
9/6/2006	858	4.25	0.08	0.07	1.23	Wading	Poor	2.7
9/26/2006	14:30	4.26	0.1			Rating		
9/27/2006	835	4.26	0.09	0.05	1.81	Wading	Poor	-25.5
10/3/2006	1550	4.26	0.17	2.01	0.09	Wading	Non-FMU	40.8
10/18/2006	920	4.27	0.08	0.07	1.24	Wading	Poor	-55.9
10/18/2006	10:50	4.28	0.2			Rating		
11/14/2006	12:20	4.36	0.7			Rating		
11/28/2006	1520	4.36	0.68	2.42	0.28	Wading	Non-FMU	-0.7
11/29/2006	1250	4.32	0.53	1.05	0.51	Wading	Fair	-0.1
12/5/2006	14:30	4.34	0.6			Rating		
12/19/2006	14:00	4.35	0.6			Rating		
2/7/2007	1005	4.51	1.7	5.00	0.35	ADCP	Poor	0.5
3/20/2007	1745	4.47	2.2	0.60	3.61	Wading	Poor	0.9
4/18/2007	1440	4.43	2.1	0.51	4.04	Wading	Poor	1.6
5/16/2007	1510	4.27	0.46	0.18	2.56	Wading	Poor	1.9

Table B-8: Site 8, Missouri Flat Creek at Pullman.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
5/3/2006	11:15	1.06	15.6			Rating		
5/24/2006	620	0.73	4.3	4.74	0.89	Wading	Poor	1.2
6/7/2006	12:20	0.97	13.5			Rating		
6/28/2006	1015	0.48	0.65	2.10	0.31	Wading	Poor	0.7
8/1/2006	1630	0.46	0.26	0.75	0.35	Wading	Poor	-1.7
9/6/2006	824	0.43	0.28	0.96	0.29	Wading	Fair	115.4
9/27/2006	905	0.48	0.23	0.93	0.25	Wading	Fair	-64.4
10/18/2006	1555	0.46	0.39	1.08	0.36	Wading	Poor	47.5
11/29/2006	1337	0.70	2.0	4.45	0.43	Wading	Good	-0.8
2/7/2007	1100	1.18	18.5	23.56	0.79	Wading	Good	0.7
3/20/2007	1700	0.93	12.4	11.40	1.09	Wading	Fair	-2.1
4/18/2007	1507	0.73	4.6	6.00	0.74	ADCP	Poor	0.7
5/16/2007	1425	0.55	1.1	5.92	0.18	Wading	Poor	-1.2

Table B-9: Site 9, Palouse River above Rebel Flat Creek.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
5/17/2007	1022	5.97	109	88.30	1.24	ADCP	Good	-1.8%
6/6/2007	900	5.73	68.1	73.41	0.93	Wading	Fair	-5.8%
6/26/2007	946	5.25	31.6	62.73	0.54	ADCP	Fair	5.0%
7/12/2007	1135	4.89	11.2	47.00	0.24	ADCP	Poor	-0.9%
8/2/2007	1319	4.74	5.8	12.42	0.46	Wading	Fair	9.3%
8/30/2007	910	4.75	6.1	13.83	0.44	Wading	Fair	11.1%
9/17/2007	1349	4.79	5.8	16.01	0.36	Wading	Fair	-7.6%
10/29/2007	1430	5.41	37.3	62.30	0.60	ADCP	Good	-5.1%
2/20/2008	1320	8.07	726	290.00	2.50	ADCP	Good	4.2%
4/21/2008	1330	8.46	909	335.00	2.71	ADCP	Good	2.0%
5/15/2008	1302	8.16	809	302.00	2.68	ADCP	Fair	9.6%

Table B-10: Site 10, Palouse River at Shields Road.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
5/15/2007	1315	9.54	122	187.40	0.65	ADCP	Good	-0.1%
6/6/2007	1110	9.28	40.7	136.61	0.30	Wading	Discarded	-42.4%
6/26/2007	1115	8.91	25.4	97.10	0.26	ADCP	Poor	-21.6%
7/12/2007	1344	8.56	13.6	18.73	0.73	Wading	Fair	6.4%
8/2/2007	1150	8.37	6.7	15.22	0.44	Wading	Good	-9.5%
8/30/2007	1045	8.52	11.2	20.37	0.55	Wading	Good	20.6%
9/17/2007	1107	8.41	6.8	16.23	0.42	Wading	Good	4.6%
10/29/2007	1355	8.88	26.1	22.86	1.14	ADV	Good	2.8%
2/20/2008	1030	10.88	600	332.00	1.81	ADCP	Discarded	23.1%
2/26/2008	1300	11.88	1486	448.00	3.32	ADCP	Poor	-0.2%
4/21/2008	1210	10.95	846	348.00	2.40	ADCP	Fair	2.4%
5/15/2008	1156	11.00	849	352.00	2.41	ADCP	Good	1.2%
8/6/2008	719	8.78	18.9	99.01	0.19	Wading	Fair	7.3%

Table B-11: Site 11, Palouse River above S.F. Palouse River.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
5/15/2007	1000	5.64	85.8	133.00	0.65	ADCP	Fair	-3.5%
6/6/2007	1308	5.27	45.4	33.14	1.37	Wading	Fair	2.3%
6/26/2007	1227	5.04	24.2	38.50	0.63	ADCP	Fair	3.9%
7/12/2007	1000	4.79	9.6	16.37	0.58	Wading	Fair	0.6%
8/2/2007	1004	4.64	2.8	11.37	0.25	Wading	Fair	-3.1%
8/30/2007	1329	4.65	4.1	12.05	0.34	Wading	Discarded	18.2%
9/18/2007	1154	4.60	1.4	10.91	0.13	Wading	Fair	-2.8%
10/29/2007	1218	4.86	13.4	18.67	0.72	ADV	Fair	6.3%
12/13/2007	1108	5.36	54.5	27.92	1.95	ADV	Good	0.6%
2/21/2008	912	7.16	348	230.00	1.51	ADCP	Fair	-5.9%
4/1/2008	1000	7.26	423	257.28	1.64	ADCP	Good	5.2%
4/21/2008	913	7.87	686	311.00	2.20	ADCP	Good	5.4%
5/15/2008	933	8.00	777	328.00	2.37	ADCP	Good	8.4%
6/17/2008	909	6.82	307	209.75	1.47	ADV	Good	10.8%
8/5/2008	1336	4.85	12.4	17.03	0.73	ADV	Fair	6.9%

Table B-12: Site 12, Palouse River at Elberton.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
5/16/2007	1216	2.49	74.9	64.80	1.16	ADCP	Fair	5.9
6/6/2007	1558	2.29	40.3	46.25	0.87	Wading	Fair	-9.3
6/26/2007	1443	1.93	22.3	63.00	0.38	ADCP	Fair	40.9
7/9/2007	1040	1.84	12.7	60.00	0.21	ADCP	Poor	8.6
8/2/2007	757	1.61	4.0	6.51	0.61	Wading	Fair	-9.8
8/30/2007	1453	1.51	3.1	4.83	0.64	Wading	Fair	12.0
9/18/2007	1335	1.51	2.4	4.02	0.59	Wading	Fair	14.5
10/29/2007	952	1.85	11.2	9.17	1.22	ADV	Good	-8.4
2/21/2008	1240	3.885	336	99.20	3.39	ADCP	Good	-5.1
4/1/2008	825	4.07	384	125.00	3.15	ADCP	Good	-4.1
4/21/2008	729	4.89	671	151.00	4.46	ADCP	Fair	-3.9
5/15/2008	754	5.12	752	167.00	4.51	ADCP	Good	-4.6

Table B-13: Site 13, S.F. Palouse River below Colfax.

Date	Time	Stage (ft)	Flow (cfs)	Area (ft^2)	Velocity (ft/sec)	Method	Quality	% Deviation
5/14/2007	1615	4.16	22.0	36.00	0.61	ADCP	Fair	-7.0
6/6/2007	1434	3.93	14.7	32.67	0.45	Wading	Fair	-8.0
7/12/2007	830	3.78	6.5	27.81	0.24	Wading	Poor	-3.9
8/2/2007	913	3.43	2.6	3.88	0.66	Wading	Fair	-1.1
8/30/2007	1158	3.60	7.6	7.54	1.01	Wading	Fair	7.0
9/18/2007	917	3.61	6.9	22.12	0.31	Wading	Good	-8.7
10/29/2007	1107	3.63	8.5	21.91	0.39	ADV	Good	4.3
12/13/2007	950	4.00	21.8	34.83	0.63	ADV	Good	0.5
2/20/2008	1644	6.24	263	128.00	2.06	ADCP	Good	0.4
4/21/2008	1041	6.20	126	121.00	1.04	ADCP	Good	not used*
5/15/2008	1034	6.20	66.2	120.00	0.55	ADCP	Good	not used*
6/17/2008	1000	4.87	26.8	66.33	0.40	ADV	Good	not used*

* Stage influenced by backwater from mainstem Palouse River.

Appendix C. Glossary, Acronyms, and Abbreviations

Glossary

303(d) list: Section 303(d) of the federal Clean Water Act requires Washington State to periodically prepare a list of all surface waters in the state for which designated uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years.

Clean Water Act: A federal act passed in 1972 that contains provisions to restore and maintain the quality of the nation's waters. Section 303(d) of the Clean Water Act establishes the TMDL program.

Discharge: The rate of streamflow at a given instant in terms of volume per unit of time, typically cubic feet per second.

Discharge-rating curve: A mathematical model relating water surface elevation, or stage, to discharge at a given point on a river or stream. Stage and discharge typically form a logarithmic relationship.

Load allocation: The portion of a receiving waters' loading capacity attributed to one or more of its existing or future sources of nonpoint pollution or to natural background sources.

Loading capacity: The greatest amount of a substance that a waterbody can receive and still meet water quality standards.

Stage height: Water surface elevation.

Total maximum daily load (TMDL): A distribution of a substance in a waterbody designed to protect it from exceeding water quality standards. A TMDL is equal to the sum of all of the following: (1) individual wasteload allocations for point sources, (2) the load allocations for nonpoint sources, (3) the contribution of natural sources, and (4) a margin of safety to allow for uncertainty in the wasteload determination. A reserve for future growth is also generally provided.

Wasteload allocation: The portion of a receiving water's loading capacity allocated to existing or future point sources of pollution. Wasteload allocations constitute one type of water quality-based effluent limitation.

Acronyms and Abbreviations

ADCP	Acoustic Doppler current profiler
ADV	Acoustic Doppler velocimeter
cfs	Cubic feet per second
Ecology	Washington State Department of Ecology
FMU	Freshwater Monitoring Unit

ft	Feet
Inst.	Instantaneous
PGI	Primary gage index
S.F.	South Fork
SOP	Standard operating procedures
TMDL	(See Glossary above)
USGS	U.S. Geological Survey