

WATER QUALITY STATUS REPORT

S.F. PALOUSE RIVER/PARADISE CREEK

Water Year 1980

Department of Health & Welfare
Division of Environment
Boise, Idaho

August 1981

Report No. WQ-46

TABLE OF CONTENTS

	Page
LIST OF TABLES & FIGURES	ii
INTRODUCTION	1
MATERIALS AND METHODS	2
Survey Design	2
Parameters	4
Methods	5
RESULTS	6
Stream Flow	6
Suspended Sediment and Turbidity	11
Nutrients	18
Phosphorus	18
Nitrogen	19
Bacteria	20
Other Water Quality Parameters	22
Water Quality Rating	24
SUMMARY	25
APPENDICES	
Appendix A - Station List	27
Appendix B - Data Printout for all Stations	31
Appendix C - Linear Regression of Suspended Sediment and Total Phosphorus	51
Appendix D - Fertilizer Value of Nutrients	52

LIST OF TABLES AND FIGURES

	Page
Table 1	Water Quality Data for S.F. Palouse R. 12
Table 2	Water Quality Data for Paradise Creek 13
Table 3	Suspended Sediment and Total Phosphorus Loading 15
Table 4	Bacteria Counts for S.F. Palouse R. and Paradise Creek 21
Figure 1	Location of Water Quality Monitoring Stations 3
Figure 2	Hydrograph for S.F. Palouse R., 1980 7
Figure 3	Hydrograph for S.F. Palouse R., 1979 8
Figure 4	Hydrograph for Paradise Creek, 1980 9
Figure 5	Hydrograph for Paradise Creek, 1979 10
Figure 6	Suspended Sediment Loading for S.F. Palouse River 16
Figure 7	Suspended Sediment Loading for Paradise Creek 17

S.F. PALOUSE RIVER AND PARADISE CREEK

INTRODUCTION

The Idaho Agricultural Pollution Abatement Plan (1979) identified priority stream segments in which runoff from farmlands was impacting water quality. The S.F. Palouse River and Paradise Creek watersheds in Latah County were identified as having severe pollution due to erosion on dryland farming ground. The Latah Soil Conservation District was awarded a 208 grant to develop a water pollution abatement plan for the two streams based on implementation of best management practices. To provide water quality information on the two watersheds, the IDHW-DOE began a water quality survey in 1979.

The specific objectives of the survey were to: 1) measure the ambient water quality of the streams over one year, and 2) to identify critical sub-basins within the watershed which are major sources of sediment. The ambient monitoring provides data on the streams for comparison to water quality standards and for comparison to other stream segments. The tributary monitoring provides information on sub-basins which may help the Soil Conservation District identify critical erosion areas which need treatment.

Paradise Creek and S.F. Palouse River are located in the Palouse Mountain Range north and east of the City of Moscow. The streams originate in coniferous forests and then flow through the rolling hills of the Palouse

Prairie. The major land use is dryland farming with the primary crops being wheat, peas and lentils. Paradise Creek flows directly through the City of Moscow and therefore may also be influenced by urban storm runoff, as well as the city sewage treatment plant. The topography in the Palouse County consists of steep rolling hills with deep silt loam soils. To conserve moisture, crop rotations traditionally include summer fallow which leaves soil exposed and creates the potential for erosion. This practice, combined with the naturally erosive soils on steep slopes, has caused water quality problems during periods of runoff. Erosion rates are quite high - up to 100 tons/acre - which has led to large amounts of sediment being transported down the S.F. Palouse River.

Paradise Creek empties into the South Fork at Pullman, Washington. The South Fork joins the Palouse River at Colfax, Washington, approximately 30 river miles from the state line. The Palouse River empties into the Snake River in the backwaters of Lower Monumental Dam in Washington.

MATERIALS AND METHODS

Survey Design

Four ambient stations were monitored on the S.F. Palouse River and Paradise Creek (Figure 1) from November 1979 to July 1980, and one additional sample during high flow in February 1981. Seven to eight samples were taken to represent the following periods in the water year:

- 1) Fall base flow (November)

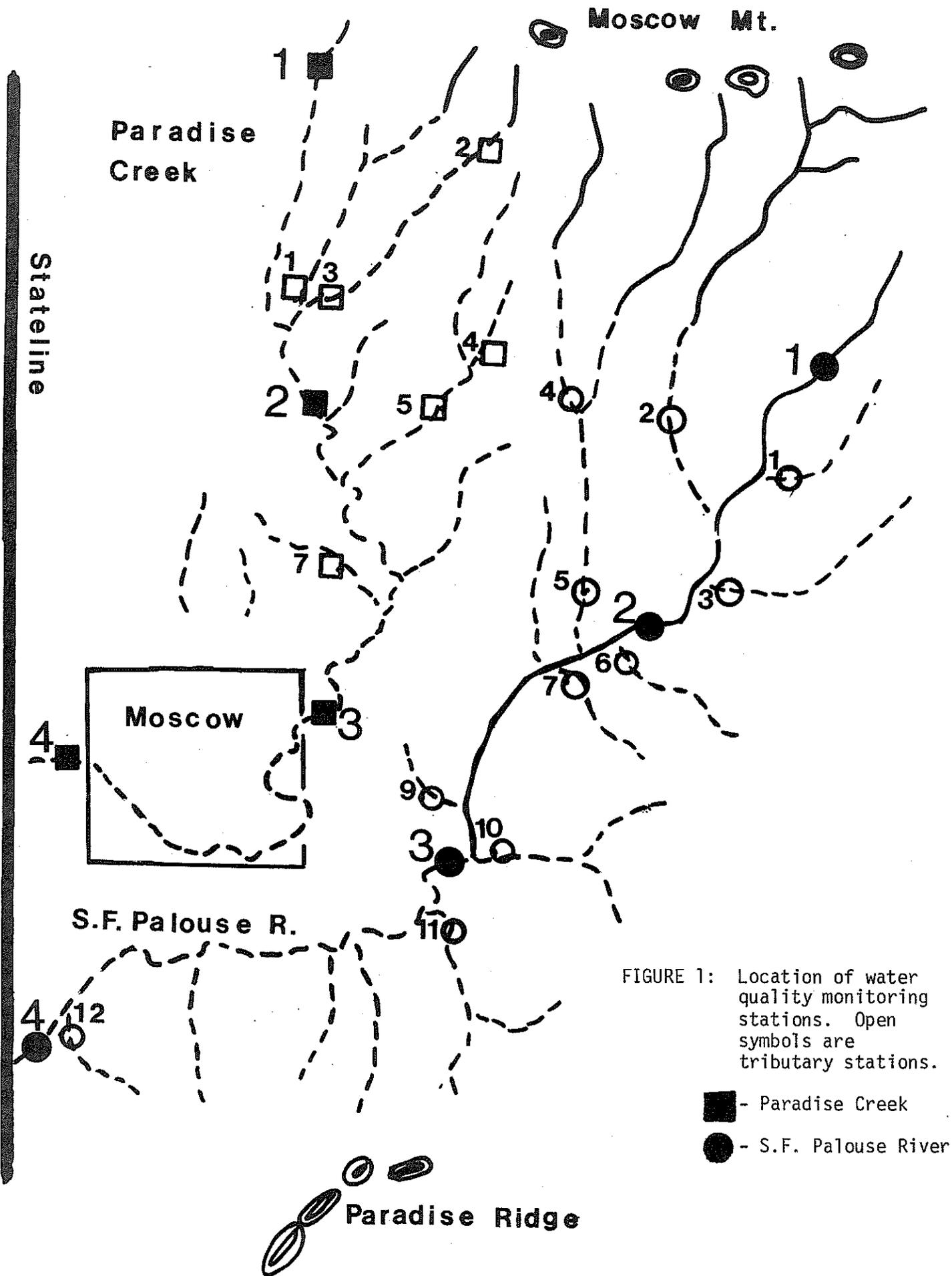


FIGURE 1: Location of water quality monitoring stations. Open symbols are tributary stations.

- - Paradise Creek
- - S.F. Palouse River

- 2) Winter base flow (January)
- 3) Peak flows (February, March, April)
- 4) Summer base flows (July)

Attempts at sampling peak flows were not successful due to the short duration of the peak. Field crews were not able to get to the streams in time to monitor water quality. However, two high flows were sampled, March 1980 and February 1981, which will serve as an example of sediment concentrations during high water. Sample periods between January and April 1980 were preceded by storms which produced between 0.35 to 0.55 inches of precipitation. However, only in March were flows still high when the sample was taken.

In addition to ambient stations, ten tributary stations were sampled in S.F. Palouse watershed and seven in Paradise Creek. Samples were taken at these stations two to three times in the spring. Most of these tributaries are intermittent and samples were taken during runoff.

Parameters

At ambient stations field parameters, bacteria, nutrients, and solids were measured each sampling run. Common ions and total metals were sampled quarterly. At tributary stations only turbidity and suspended sediment were sampled. Parameters sampled and station locations are listed in Appendix A.

Methods

Field parameters (temperature, dissolved oxygen, pH and flow) were measured according to the IDHW-DOE Technical Procedures Manual. All other parameters were analyzed according to EPA, Methods for Chemical Analysis of Water and Wastes. Discharge was measured with a Marsh-McBirney flow meter.

RESULTS

Stream Flow

The S.F. Palouse River and Paradise Creek in Idaho are intermittent headwater streams of the Palouse River. Their flow characteristics are therefore erratic in nature and change quickly in response to storms or snow melt. Erosion and sediment production are directly tied to the pattern of precipitation and runoff which varies widely from year to year.

Flow characteristics of these streams are shown in the hydrographs Figure 2 through Figure 5. Figures 2 and 3 show weekly mean discharge for the gaging station on the S.F. Palouse River at Pullman. This gage is below the confluence with Paradise Creek and other small drainages so flow will be higher than the segment sampled. Samples were collected during water year 1980 (September 1979 to October 1980) when precipitation and runoff were below average. The peak flow for the year occurred on February 18 at a daily average of 600 cfs. Water year 1979 (Figure 3) by contrast shows much higher flows during the winter and spring with a peak flow of 1770 cfs on February 13. Paradise Creek hydrographs, Figures 4 and 5, show similar patterns.

Although there is a wide variation from year to year in occurrence of peak flows and magnitude of flow, a general pattern of runoff can be observed. During the summer the streams are barely flowing. The

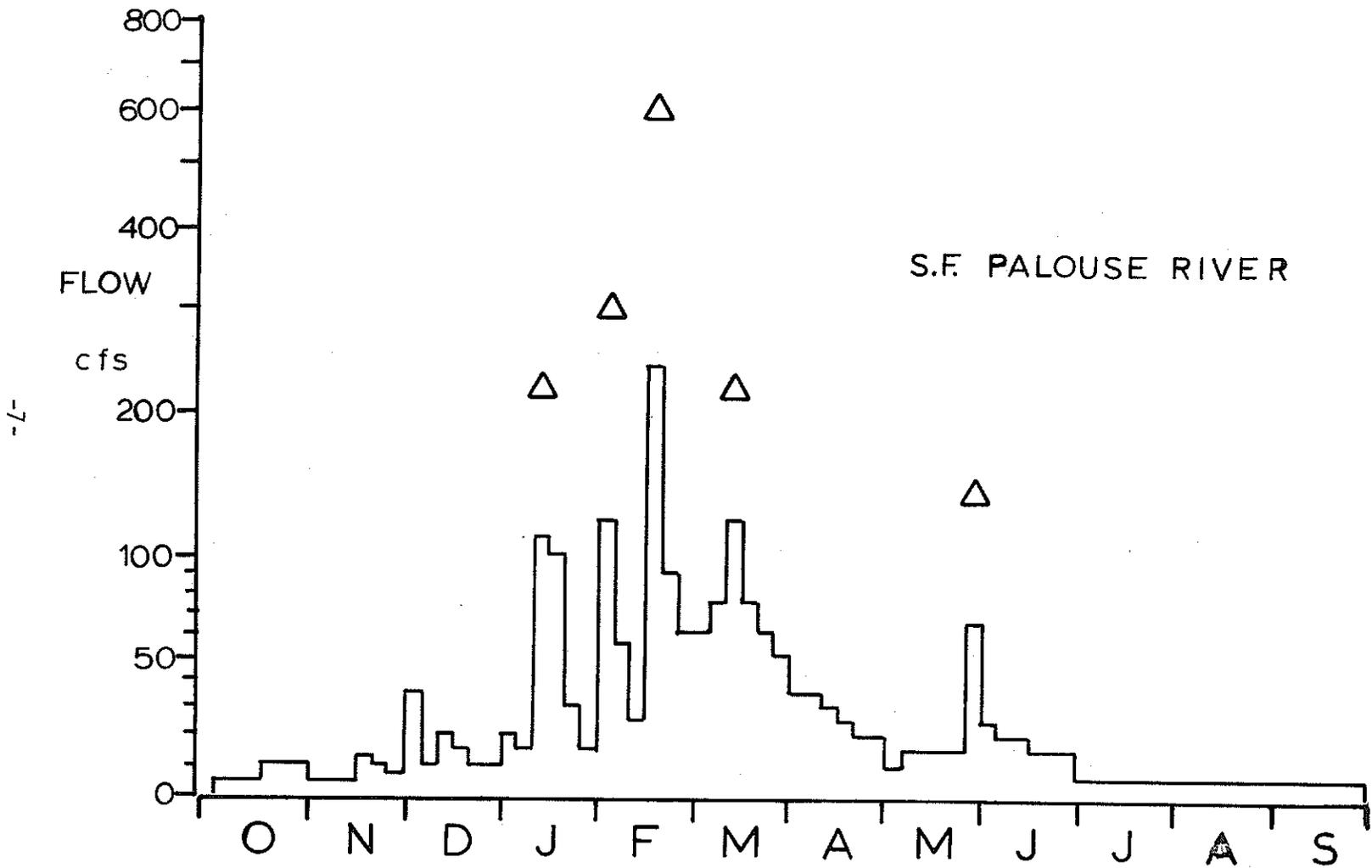


FIGURE 2: Discharge of S.F. Palouse River at Pullman, WA. for water year 1980, October 1979 through September 1980. USGS provisional records. Δ - indicates peak flows.

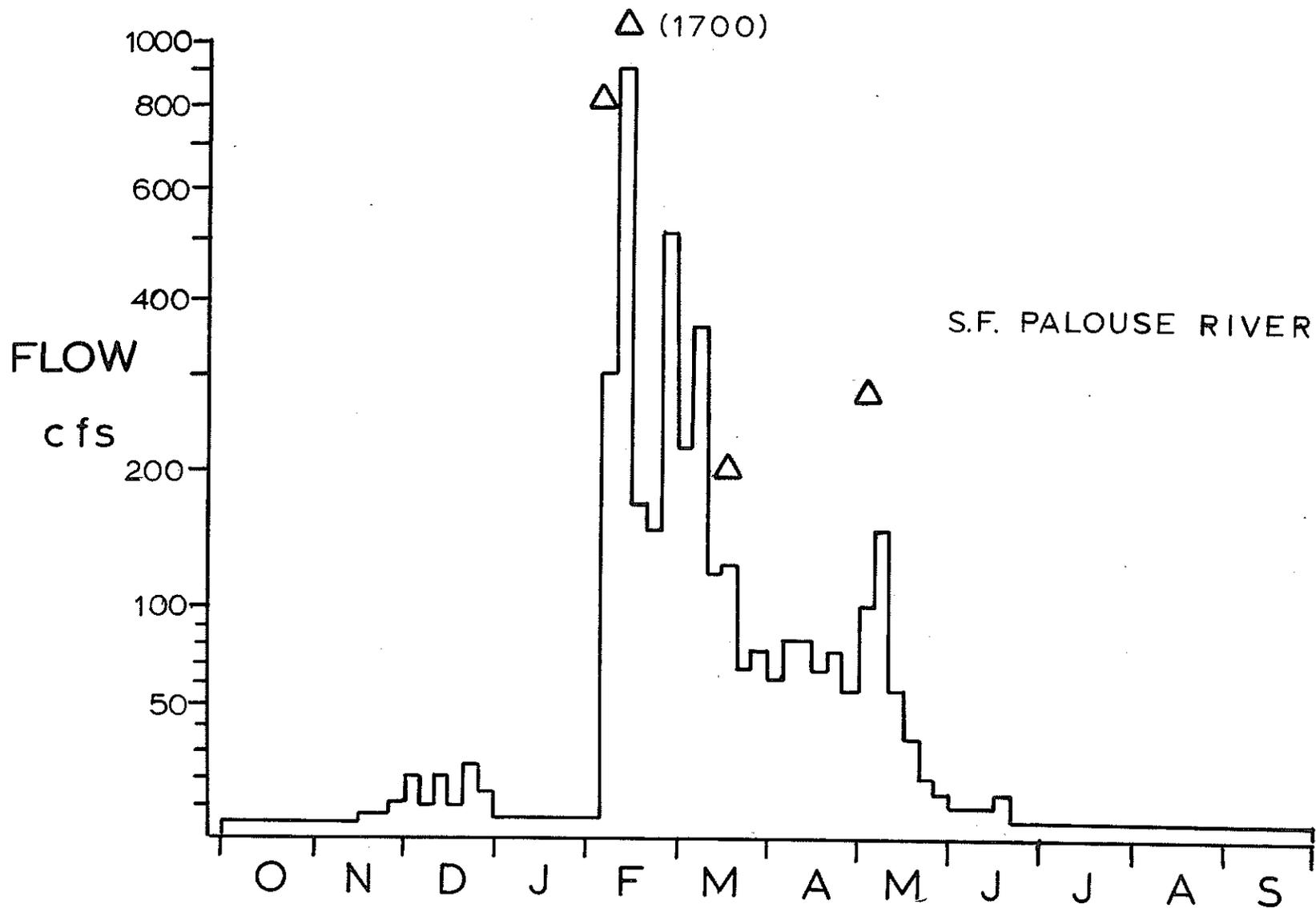


FIGURE 3: Discharge of S.F. Palouse River at Pullman, WA. for water year 1979, October 1978 through September 1979. △ - indicates peak flow.

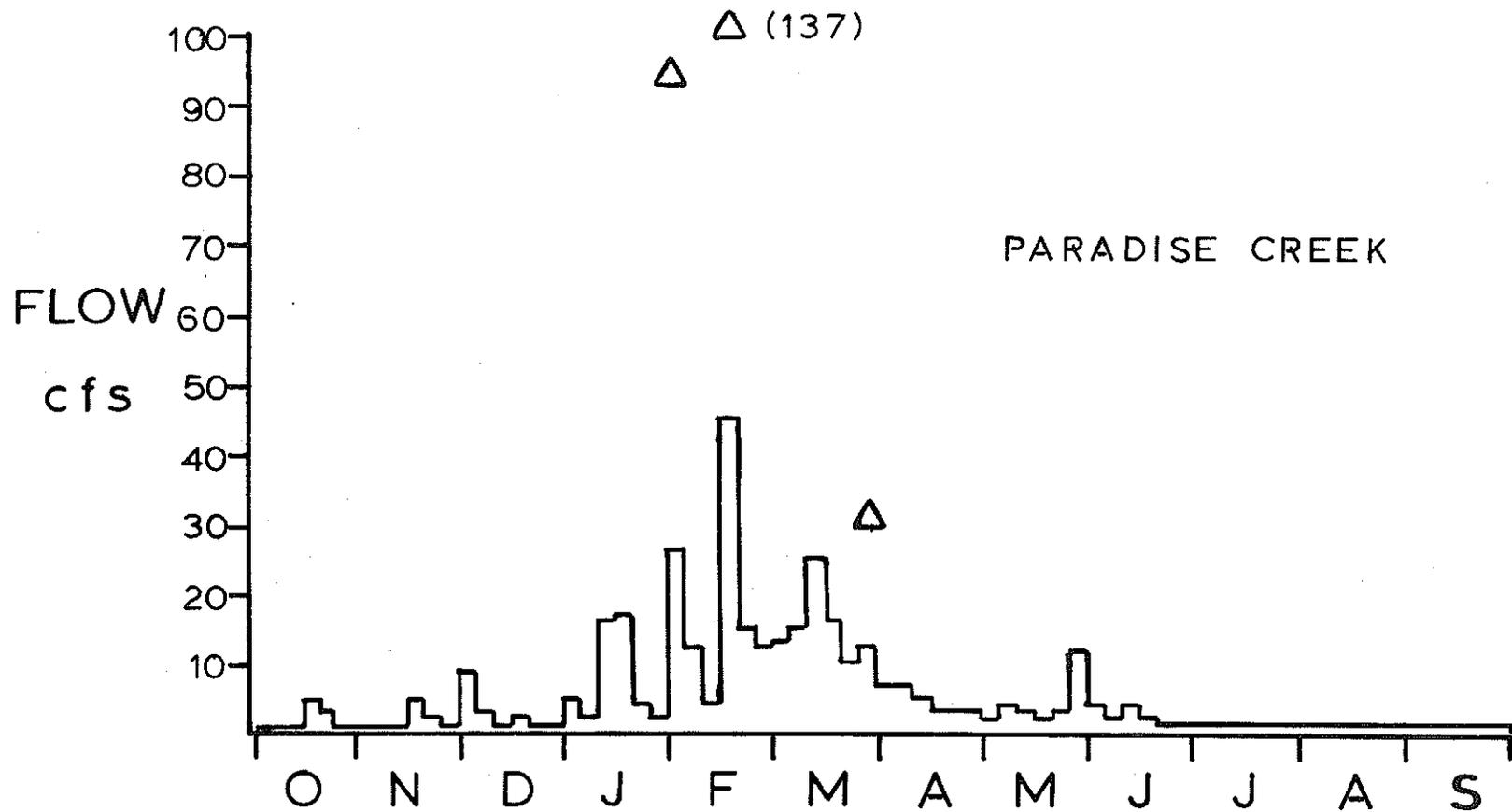


FIGURE 4: Discharge of Paradise Creek at University of Idaho for water year 1980, from October 1979 through September 1980. USGS provisional records.
△ - indicates peak flow.

-10-

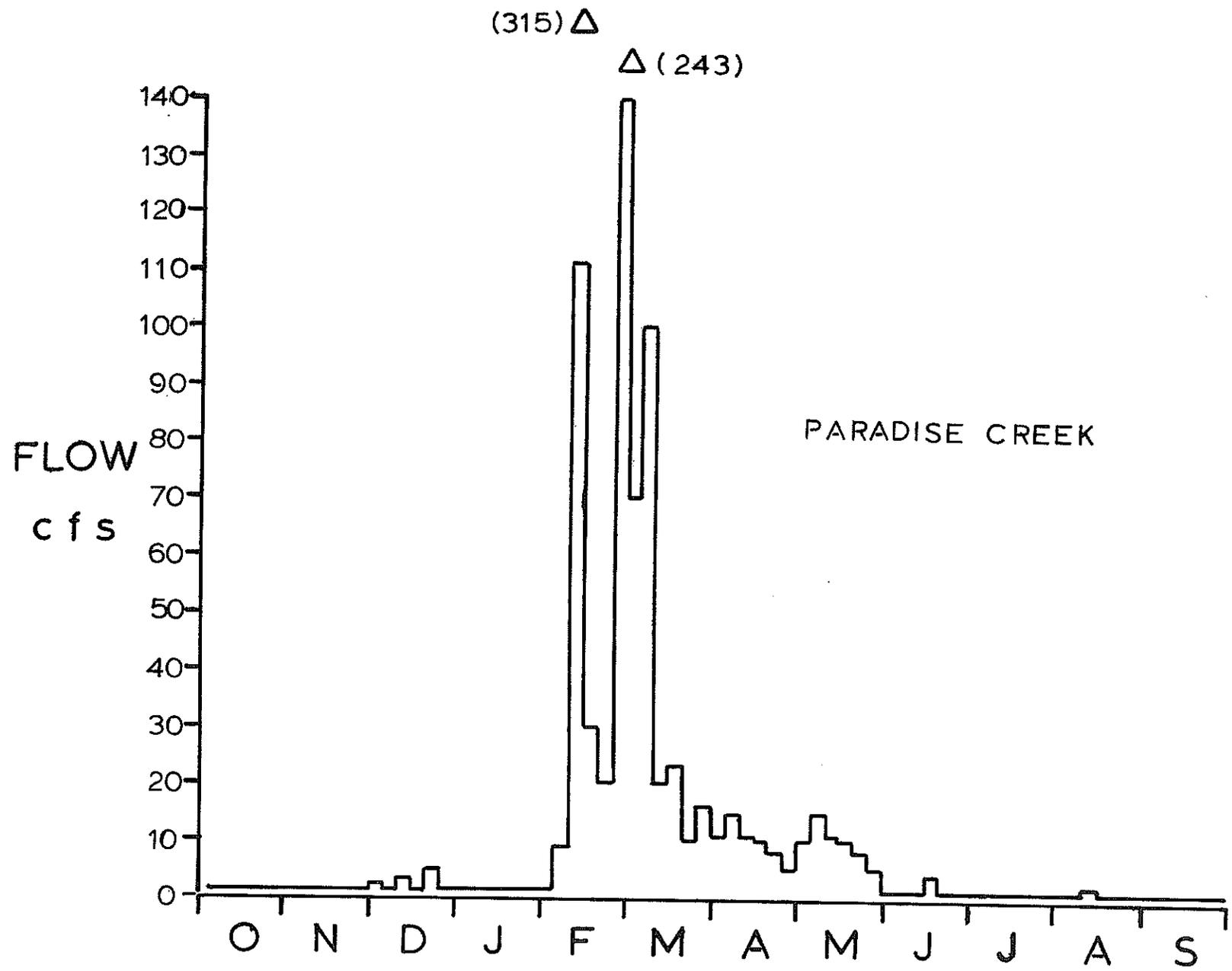


FIGURE 5: Discharge of Paradise Creek at University of Idaho for water year 1980, October 1979 through September 1980. Δ - indicates peak flow.

S.F. Palouse River has a base flow of approximately 5 cfs and Paradise Creek of 0.5 cfs. These low flows continue through the fall until autumn rains boost the discharge somewhat. Most of the precipitation occurs during the winter as rains or snow. The snow builds up until a warm wind and rain, usually in February, creates a sudden temperature increase which results in a major runoff event. It is during this runoff when the major erosion and sediment production occur. Discharge generally remains above base flow through June due to continuing snow melt and spring rains.

Suspended Sediment and Turbidity

Most of the sediment transport to the creeks occurs in a short period during peak flow. In the Palouse and Paradise Creek watersheds, a runoff event often lasts only a short period - 12 to 24 hours - so it is difficult to collect a sample when suspended sediment is high.

Tables 1 and 2 show selected parameters on main stem stations on the S.F. Palouse and Paradise Creek. From inspection of the data, it can be noted that suspended sediment concentrations are high on March 14, 1980 and February 14, 1981 when flows are high. On all other sampling runs suspended sediment is much lower.

Data from March 14 will be used to illustrate sediment transport during a high flow situation. Table 3 and Figures 6 and 7 show the sediment load in tons/day on this date. Sediment concentration and loading

TABLE 1
 Water Quality Data for Main Stem Stations on the S.F. Palouse River,
 Nov. 1979 through Feb. 1981
 Units are mg/l except for turbidity-NTU, fecal coliform bacteria-number/100 ml, and flow-cfs

STATIONS Parameters	SAMPLING PERIODS							
	NOV	JAN	MAR	APR 10	APR 30	MAY	JULY	FEB (81)
NEAR HEADWATERS								
Suspended sediment		8	26	3	3		-----	433
Turbidity		25	28	18	10		-----	-----
Total phosphorus		0.15	0.25	0.14	0.12		0.06	0.58
Ortho-phosphate		0.06	0.30	0.35	0.08		0.03	0.29
Nitrate		0.31	0.45	0.12	0.07		0.07	1.79
Fecal coliform		30	-----	19	34		10	-----
Dissolved solids		102	83	95	79		-----	103
Flow		0.1	5	0.2	1		0.5	2
BELOW ROBINSON LAKE								
Suspended sediment	5	75	1670	33	28		8	2590
Turbidity	10	68	160	29	5.2		8.2	-----
Total phosphorus	0.14	0.34	1.11	0.19	0.12		0.09	1.76
Ortho-phosphate	0.06	0.30	0.35	0.08	0.03		0.08	0.31
Nitrate	0.01	21.1	7.11	1.31	0.15		0.02	5.7
Fecal coliform	8	300	-----	5	70		50	-----
Dissolved solids	101	178	88	96	61		65	164
Flow	0	0	30	5	3		1	-----
AT HIGHWAY 8								
Suspended sediment	8	99	1520	18	10		12	1629
Turbidity	20	67	215	21	7.3		9.2	-----
Total phosphorus	0.19	0.41	1.39	0.18	0.16		0.13	1.44
Ortho-phosphate	0.10	0.31	0.46	0.10	0.06		0.06	0.31
Nitrate	0.08	18.7	3.90	3.10	0.41		1.10	5.67
Fecal coliform	12	1000	-----	96	110		180	-----
Dissolved solids	127	186	97	113	77		105	197
Flow	2	0	50	8	4		1	63
NEAR STATELINE								
Suspended sediment	0	318	3115	52	17	33	6	1857
Turbidity	6.6	158	218	50	8.6	3.3	3.0	540
Total phosphorus	0.16	0.58	1.95	0.27	0.20	0.25	0.12	1.28
Ortho-phosphate	0.08	0.44	0.38	0.15	0.08	0.09	0.09	0.31
Nitrate	1.02	16.1	6.6	4.1	2.5	1.43	0.47	5.06
Fecal coliform	385	900	-----	65	220	305	995	-----
Dissolved solids	201	176	97	168	124	150	130	111
Flow	4	53	100	15	7		1	239

TABLE 2
 Water Quality Data for Main Stem Stations on Paradise Creek,
 Nov. 1979 through Feb. 81
 Units are mg/l except for turbidity-NTU, fecal coliform bacteria-number/100 ml, and flow-cfs

STATIONS Parameters	SAMPLING PERIODS									
	NOV	JAN	FEB	MAR	APR 10	APR 30	MAY	JULY	FEB (81)	
NEAR HEADWATERS										
Suspended sediment		16	312	413	30	24		138	1452	
Turbidity (NTU)		53	96	110	32	16		17	-----	
Total phosphorus		0.23	0.33	0.56	0.33	0.18		0.43	0.83	
Ortho-phosphate		0.20	0.26	0.32	0.10	0.08		0.09	0.30	
Nitrate		0.17	0.29	0.02	0.02	0.02		0.04	0.08	
Fecal coliform		20	40	-----	2	4		87	-----	
Dissolved solids		132	169	103	125	99		97	214	
Flow (cfs)		0.1	1.0	4.0	0.1	0.05		0.1	-----	
BELOW IDLER'S REST										
Suspended sediment		15	166	1420	28	8		0	870	
Turbidity (NTU)		75	90	250	25	10		11	-----	
Total phosphorus		0.34	0.37	1.42	0.19	-----		0.10	1.04	
Ortho-phosphate		0.32	0.29	0.52	0.05	0.06		0.06	0.45	
Nitrate		17.8	10.9	6.6	2.6	0.92		0.05	6.4	
Fecal coliform		80	40	-----	0	110		750	-----	
Dissolved solids		216	200	84	115	104		102	279	
Flow (cfs)		-----	-----	20	2	2		0.3	41	
AT MOSCOW										
Suspended solids		33	284	2110	7	12		18	2371	
Turbidity (NTU)		87	135	2.5	17	7.3		15	-----	
Total phosphorus		0.38	0.53	1.78	0.16	-----		0.20	1.67	
Ortho-phosphate		0.39	0.45	0.67	0.10	0.01		0.03	0.44	
Nitrate		20.5	10.9	7.4	3.5	0.95		0.07	6.6	
Fecal coliform		160	140	-----	10	210		680	-----	
Dissolved solids		240	249	85	148	113		97	290	
Flow (cfs)		-----	27	40	4	1		-----	-----	
AT USGS GAGE										
Suspended sediment		2	48	483	1400	8	8	1663	17	2290
Turbidity (NTU)		3.7	87	180	215	14	1.9	79	11	660
Total phosphorus		0.69	0.47	0.73	1.16	0.20	0.22	0.94	0.54	1.71
Ortho-phosphate		0.57	0.42	0.63	0.66	0.09	0.08	0.40	0.39	0.35
Nitrate		3.7	17.0	11.5	4.7	5.0	0.8	2.5	3.4	6.0
Fecal coliform		170	290	200	-----	164	630	1800	-----	-----
Dissolved solids		425	239	273	107	178	185	293	310	542
Flow (cfs)		1.0	20	27	68	5	3	12	1	220

increase from the headwaters to the Washington-Idaho border. Differences in the size of the two watersheds are shown in the total sediment load transported. Paradise Creek reached a high of 260 tons/day near Stateline while S.F. Palouse reached a high of 1180 tons/day. This is a large amount of sediment, although it must be realized that, compared to other periods on the hydrograph, the March 14 runoff was not a particularly high flow.

There is no accepted water quality standard for suspended sediment which can be compared to the data. However, EPA and the Water Quality Bureau use a maximum criteria of 25-80 mg/l as a guide for the concentration of sediment harmful to aquatic life. During any measured high flow suspended sediment exceeds this criteria in these two streams and in most of the tributaries (see Appendix B for tributary data). In general any stream measured that was within the Palouse farming boundary had high suspended sediment during high flow.

Turbidity is a measure of clarity and relates to the visual aesthetic quality of the water. Turbidity is related to suspended sediment; the higher the sediment load the murkier the water appears. An accepted maximum criteria for turbidity is 25 NTU. It can be noted from Tables 1 and 2 that turbidity generally exceeds this standard during any high flow period.

TABLE 3
Suspended Sediment and Total Phosphorus
Loading for S.F. Palouse River and Paradise Creek

March 14, 1980					
Station	Flow	Suspended Sediment mg/l	Sediment Loading tons/day	Total Phosphorus mg/l	Phosphorus Loading lbs/day
<u>S.F. Palouse</u>					
near headwaters	5	26	0.4	0.25	7
below Robinson Lake	30	1670	135	1.11	220
at Highway 8	50	1520	205	1.39	375
near Stateline	100	3115	841	1.95	1051
<u>Paradise Creek</u>					
near headwaters	4	413	4.5	0.56	12
below Idler's Rest	20	1420	78	1.42	153
at Moscow	40	2110	228	1.78	384
at USGS Gage	68	1400	257	1.16	425
February 18, 1981					
<u>S.F. Palouse</u>					
near Stateline	239	1857	1198	1.28	1649
<u>Paradise Creek</u>					
at USGS Gage	220	2290	1360	1.71	2028

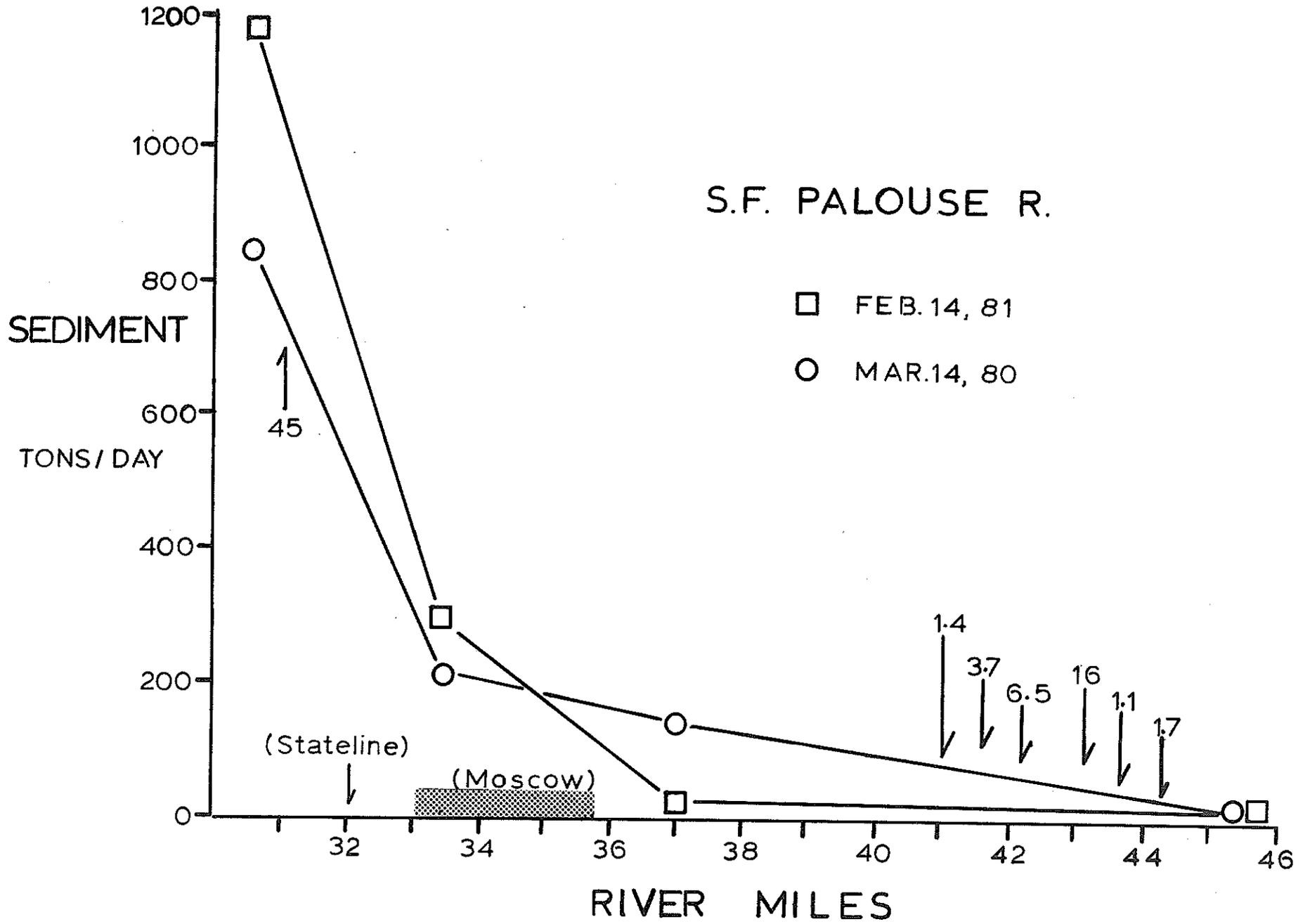


FIGURE 6: Suspended sediment loading for S.F. Palouse River at Stateline. Arrows indicate loading for tributaries on March 14, 1980.

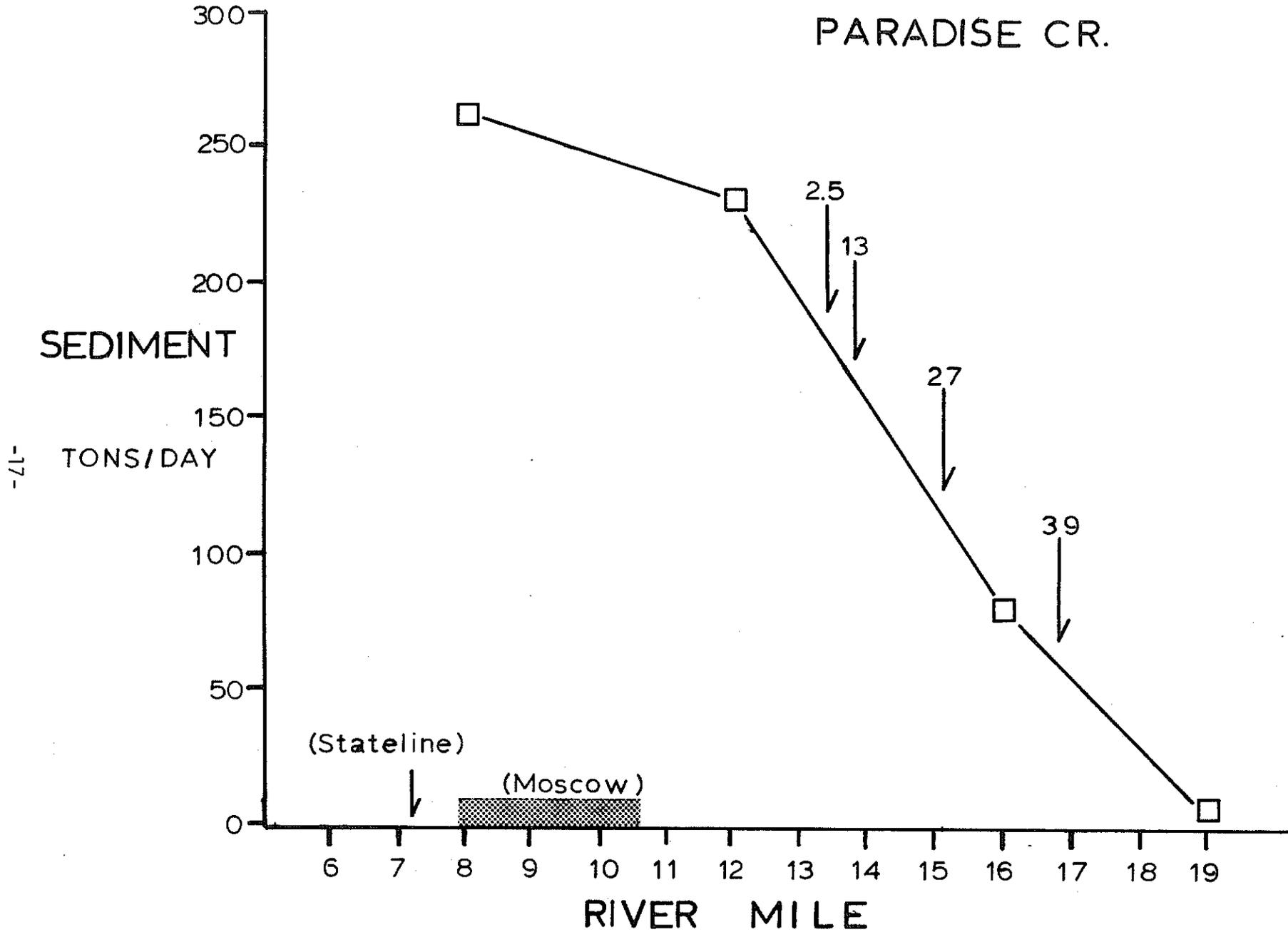


FIGURE 7: Suspended sediment loading for Paradise Creek near University of Idaho on March 14, 1980. Arrows indicate loading for tributaries. 39 tons/day is for Idlers Rest Cr., 27 tons/day is for tributary at West Twin Road.

Nutrients

The major nutrients of concern in water are forms of nitrogen and phosphorus. These nutrients in high concentrations cause excessive nuisance algal or aquatic plant growth. If excessive, the algal or plant growth will interfere with recreational use, will be offensive to sight and smell, may clog pipes and ditches, and may reduce night-time dissolved oxygen to harmful levels.

Phosphorus

Total phosphorus measures the phosphorus dissolved in the water plus the phosphorus contained in soil particles suspended in the water column. Ortho-phosphate measures only the dissolved phosphorus. Comparing the two forms indicates how much of the phosphorus is washed into streams with the sediment.

Total phosphorus increased in the two streams whenever flow and suspended sediment increased (Tables 1 and 2). For example, at S.F. Palouse at Stateline total phosphorus was 0.16 mg/l during low flows in November and increased to 1.95 mg/l during high flows in March.

Similar increases occurred in Paradise Creek. The association between total phosphorus and suspended sediment in Paradise Creek is illustrated by the linear regression between the two parameters (Appendix C). The calculated correlation coefficient was 0.93; a coefficient of ± 1 indicates a perfect correlation.

During high flow, a tremendous amount of phosphorus is lost with the sediment when soil is washed into the stream. Table 3 shows the phosphorus concentration and loading during the runoff event in March. At a flow of 100 cfs, 1,051 pounds/day of phosphorus was transported out of the S.F. Palouse watershed. For Paradise Creek on the same day, 425 pounds/day of phosphorus washed down the stream.

Following a storm which caused high erosion on February 14, 1981, 2,028 pounds of elemental phosphorus per day was transported out of the Paradise Creek watershed. This is equivalent to approximately ten tons of commercial fertilizer (Formulation 9-30-0). The value of phosphate according to a fertilizer dealer is approximately \$0.40/lb, so the value of the phosphate lost during this one storm is approximately \$2,400. (See Appendix D for estimate of total fertilizer lost during the year.)

Nitrogen

Nitrates are not associated with soil particles but are carried dissolved in the water column. The concentrations of nitrate are extremely high in the Palouse and Paradise Creek watershed (Tables 1 and 2). The accepted criteria for stimulation of excessive plant growth is 0.3 mg/l. Concentrations of nitrate in S.F. Palouse and Paradise Creek reached maximum levels of 15-20 mg/l. For comparison average nitrate concentrations for treated domestic sewage is within the range of 6-8 mg/l.

The concentrations of nitrate peak in the winter time and decrease throughout the summer. This appears to be related to application of fertilizer and soil moisture saturation. Winter wheat is planted in the fall and is usually fertilized with ammonia. During any warm spells, ammonia is rapidly converted to nitrate in the soil. Nitrates percolate readily with water in the soil profile and enter streams with the groundwater. A significant percent of the applied ammonia's fertilizer value is lost to this process.

BACTERIA

Fecal coliform and fecal streptococcus bacteria are found in the intestinal tract of warm-blooded animals and are therefore used as indicators of fecal contamination. According to Idaho Water Quality Standards and Wastewater Treatment Requirements, the S.F. Palouse R. and Paradise Creek are protected for secondary contact recreation, which includes activities like wading and floating. The standards for fecal coliform bacteria require that a geometric mean is not to exceed 200 bacteria per 100 ml.

Table 4 shows the geometric mean for fecal coliform bacteria at main stem stations. Stations near the headwaters in Moscow Mountain have fairly low bacteria concentrations. The stations near Moscow and at Stateline exceed the 200 bacteria per 100 ml standard.

Table 4: Fecal Coliform and Fecal Streptococcus
Bacteria, Geometric Means at S.F. Palouse
and Paradise Creek, November 1979-February 1981

<u>Stations</u>	<u>N</u>	<u>Fecal Coliform</u>	<u>Fecal Streptococcus</u>
<u>S.F. Palouse River</u>			
-near headwaters	4	23	39
-below Robinson Lake	5	87	2855
-at Highway 8	5	280	2041
-near Stateline	6	478	3676
<u>Paradise Creek</u>			
-near headwaters	5	31	29
-below Idler's Rest	5	196	127
-at Moscow	5	240	107
-at USGS	6	542	330

The high fecal streptococcus counts at the S.F. Palouse R. stations indicate the bacteria are probably due to livestock. However, in Paradise Creek the lower fecal streptococcus concentrations indicate that the bacteria may more likely originate from human sewage or from both livestock and human sewage.

OTHER WATER QUALITY PARAMETERS

pH

All pH measurements were within the Idaho Water Quality Standard range of 6.5-9.0. At the S.F. Palouse River station near Stateline pH was within the range 6.5-7.5; and at Paradise Creek pH was within the range 6.5-7.6.

Dissolved Solids

Mineral content in the two drainages indicate the water is moderately hard. Dissolved solids are within safe limits for all protected uses. Average dissolved solids content at S.F. Palouse River near Stateline was 144 mg/l, and was 251 mg/l at Paradise Creek. Dissolved solids generally are highest during the fall and winter as groundwater makes up most of the flow in the streams (see Tables 1 and 2).

Dissolved Oxygen

All dissolved oxygen measurements were above the minimum concentration of 6.0 mg/l except for one sample. This indicates that there are probably no dissolved oxygen problems in the S.F. Palouse River and Paradise Creek.

WATER QUALITY RATING

A Water Quality Index is used to summarize all the various parameters and allows for easy comparison to other streams. EPA Region X has developed a Water Quality Index which reduces the data to one number. This index is an aggregation of a standard set of parameters and associated criteria which provides a means for comparing water quality status with respect to fishable/swimmable water quality goals.

The WQI spans a scale from zero to 100, with zero meaning no evidence of pollution to 100 indicating severe pollution. The overall average WQI for S.F. Palouse River at Stateline is 86. The overall average for Paradise Creek at the Gage is 99.1. For comparison, Water Quality Indices for other nearby rivers are shown below:

<u>STATION</u>	<u>WQI</u>
S.F. Palouse River	86
Paradise Creek	99
S.F. Palouse River at Pullman	96
Palouse River at Potlatch	36
Clearwater River above Lewiston	35
St. Joe River, St. Maries	12

SUMMARY

- 1) The concentration of sediment and associated pollutants depend on the timing and magnitude of runoff. Typically erosion and sediment production are highest during the late winter when warm chinook winds cause a sudden thaw. The S.F. Palouse R. and Paradise Creek are headwater streams which have flashy flow characteristics. The streams have little or no discharge during the summer and fall and then experience peak flows of short duration during the winter and spring.
- 2) During high flows, suspended sediment was measured in the 1,000-3,000 mg/l range. During one storm on March 14, 1980, 260 tons of suspended sediment were transported per day in Paradise Creek, and 1,180 tons/day was measured in S.F. Palouse River.
- 3) Phosphorus is associated with soil particles and increased when flow and suspended sediment increased. During high flows, total phosphorus was in the range of 1.5 to 2.0 mg/l in the S.F. Palouse River and Paradise Creek. For comparison, total phosphorus was in the 0.1-0.3 mg/l range during low flows.

Organic nitrogen increased with increasing sediment concentrations during high flows. However, the major nitrogen form was nitrate, which was highest in the winter during low flows. The concentration of nitrates in January were approximately 15-20 mg/l. These high concentrations of nitrate are probably due to application of ammonia

in the fall. The ammonia is oxidized to nitrate during warm temperatures, readily percolates through the soil and enters the streams with groundwater.

- 4) Fecal coliform bacteria, which are indicators of contamination from warm-blooded animals, were low in number near headwaters, but increased as the streams flowed through the Palouse hills. Fecal coliform counts for the S.F. Palouse and Paradise Creek exceeded water quality standards for secondary contact recreation at the stateline most of the year.
- 5) Other parameters--pH, dissolved oxygen, and dissolved solids--were within water quality standards or criteria and are not considered a problem.
- 6) The overall water quality rating, as indicated by the Water Quality Index, is very poor due to suspended sediment, phosphorus, nitrogen, turbidity and bacteria. The Water Quality Index for S.F. Palouse River was 86, and was 99 for Paradise Creek. The Water Quality Index spans a scale from 0 to 100 with zero indicating high water quality and 100 indicating severe pollution.
- 7) During high flows, every station that was within the Palouse farming ground experienced high suspended sediment concentration and associated pollutants. With respect to water quality, most areas within the Palouse that were measured would be considered critical.

APPENDIX A

**Survey Stations
and Parameter List**

SF - South Fork, Palouse River
 TS - Tributary to South Fork

SURVEY STATIONS

P - Paradise Creek
 T - Tributary to Paradise Creek

Station #	Description	Latitude/Longitude	River Mile	Elevation	STORET #
-----------	-------------	--------------------	------------	-----------	----------

AMBIENT STATIONS

South Fork, Palouse River

SF-1	S.F. Palouse at Headwaters	46°46'45"/116°53'25"	59.5/89.6/44.3	2920'	2020199
SF-2	S.F. Palouse below Robinson Lake	46°45'00"/116°55'05"	59.5/89.6/41.3	2640'	2020200
SF-3	S.F. Palouse at Highway 8	46°43'15"/116°56'55"	59.5/89.6/38.3	2590'	2020201
SF-4	S.F. Palouse at John Brown Bridge (West of Stateline)	46°41'00"/116°04'10"	59.5/89.6/29.8	2480'	2020068

Paradise Creek

P-1	Paradise Creek near Headwaters	46°48'40"/116°58'25"	59.5/89.6/23.6/18.9	2900'	2020203
P-2	Paradise Creek below Idler's Rest	46°46'25"/116°58'25"	59.5/89.6/23.6/15.9	2660'	2020204
P-3	Paradise Cr. at Eisenhower St. Br., Moscow	46°44'20"/116°58'20"	59.5/89.6/23.6/12	2600'	2020205
P-4	Paradise Cr. at USGS Gage	46°43'55"/117°01'25"	59.5/89.6/23.6/7.6	2540'	2020206

INTENSIVE STATIONS

South Fork, Palouse River

TS-1	Tributary 1 mi. North of Robinson Lk.	46°46'00"/116°53'55"	59.5/89.6/43.1/0.1	2760'	2020210
TS-2	Crumarine Cr. at USGS Gage	46°42'40"/116°54'55"	59.5/89.6/42.5/1.3	2800'	2020211
TS-3	East Tributary to Robinson Lake	46°45'15"/116°54'25"	59.5/89.6/42.0/0.2	2700'	2020212
TS-4	Howard Cr. at Mouth	46°46'20"/116°55'50"	59.5/89.6/40.5/2.5/.1	2700'	2020213
TS-5	Gnat Cr. at USGS Gage	46°45'15"/116°55'40"	59.5/89.6/40.5/0.6	2650'	2020214
TS-6	Tributary South of Robinson Lake, 1	46°44'40"/116°55'15"	59.5/89.6/40.9/0.2	2650'	2020215
TS-7	Tributary South of Robinson Lake, 2	46°44'40"/116°55'15"	59.5/89.6/40.2/0.4	2640'	2020216
TS-8	Tributary West of Gnat Creek	46°44'45"/116°56'15"	59.5/89.6/40.1/0.3	2640'	2020217
TS-9	Tributary 1 mi. North of Highway 8	46°43'50"/116°57'25"	59.5/89.6/38.8/0.4	2620'	2020218
TS-10	Tributary near Golf Course	46°43'25"/116°56'35"	59.5/89.6/38.4/0.2	2600'	2020219
TS-11	Tributary below Tomer Butte	46°42'45"/116°57'05"	59.5/89.6/37.5/0.5	2600'	2020220
TS-12	Tributary west of Stateline	46°41'05"/117°03'25"	59.5/89.6/30.45/0.1	2500'	2020221

Paradise Creek

T-1	Tributary to Idler's Rest Cr.	46°47'10"/116°58'35"	59.5/89.6/23.6/16.8/0.2/0.2	2680'	2020225
T-2	Idler's Rest Cr. at Headwaters	46°48'15"/116°56'45"	59.5/89.6/23.6/16.8/2.2	2880'	2020226
T-3	Idler's Rest Cr. at Mouth	46°47'00"/116°58'40"	59.5/89.6/23.6/16.8/0.1	2670'	2020227
T-4	Upper Tributary at West Twin Rd.	46°46'45"/116°56'50"	59.5/89.6/23.6/15.1/1.5/0.1	2720'	2020228
T-5	Tributary at West Twin Rd.	46°46'25"/116°57'10"	59.5/89.6/23.6/15.1/1.1	2690'	2020229
T-6	Tributary at East Twin Rd.	46°45'20"/116°57'20"	59.5/89.6/23.6/13.8/0.2	2640'	2020230
T-7	Tributary Northeast of Moscow	46°45'20"/116°58'05"	59.5/89.6/23.6/13.4/0.4	2650'	2020231

WATER QUALITY PARAMETERS

This list for ambient stations only, see intensive sampling.

Flow

(A)	flow, instantaneous	00061	A = All sampling runs Q = Quarterly, sampling run 1, 2, 4, 7
-----	---------------------	-------	--

Temperature

(A)	temperature Deg-c	00010
-----	-------------------	-------

Oxygen

(A)	dissolved oxygen mg/l	00299/00300
(A)	dissolved oxygen % saturation	00301

pH

(A)	field	00400
(A)	lab	00403

Bacteria

(A)	fecal coliform	31616
(A)	total coliform	31501
(A)	fecal streptococci	31679

Trophic

(A)	COD	00335/00340
(A)	t. ammonia as N	00610
(A)	t. NO ₂ + NO ₃ as N	00630
(A)	t. Kjeldahl nitrogen	00625
(A)	t. phosphorus as P	00665
(A)	orthophosphate as P	70507

Aesthetic

(A)	turbidity ftu	00076
-----	---------------	-------

Solids

(A)	dissolved solids	70300
(A)	suspended sediment	80154
(A)	specific conductance umhos/cm	00095
(Q)	hardness (as CaCO ₃)	00900
(Q)	t. alkalinity (as CaCO ₃)	00410
(Q)	bicarbonate alkalinity (as CaCO ₃)	00425
(Q)	carbonate alkalinity (as CaCO ₃)	00430
(Q)	calcium	00916
(Q)	magnesium	00927
(Q)	sodium	00929
(Q)	potassium	00937
(Q)	chloride	00940
(Q)	fluoride	00950
(Q)	sulphate (as SO ₄)	00945
(Q)	silica (as SiO ₂)	00956

Radioactivity SF-4, P-4 only

(Q)	total alpha pc/l	01501
(Q)	total beta pc/l	03501

Inorganic Toxicity

(Q)	arsenic, total	1002
(Q)	boron, total	1022
(Q)	cadmium, total	1027
(Q)	chromium, total	1034
(Q)	copper, total	1042
(Q)	iron, total	1045
(Q)	lead, total	1051
(Q)	manganese, total	1055
(Q)	mercury, total	71900
(Q)	zinc, total	1092

APPENDIX B

Printout of Data
for Ambient and Intensive
Survey Stations

STORET RETRIEVAL DATE 81/07/20

2020199

46 46 45.0 116 53 25.0 2

S F PALOUSE AT HEADWATERS

16057 IDAHO LATAH

PACIFIC NORTHWEST 130800

MIDDLE AND LOWER SNAKE RIVER

211DSURV

800405 DEPTH 0

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 00290 0680

MILES 0324.30 0059.50 089.60 045.50

INITIAL DATE				01/01/01	80/01/15	80/03/14	80/04/10	80/04/30	80/07/08	80/11/01	81/02/14
INITIAL TIME-DEPTH-BOTTOM				1230	1230	1340	1250	1240			1515
00010	WATER	TEMP	CENT								
00011	WATER	TEMP	FAHN	2.0-		4.0	7.0	14.0			
00042	ALTITUDE	FEET	AB MSL	2920							
00061	STREAM	FLOW,	INST-CFS	0.10	5.00	0.20 J	1.00 J	0.50 J	0.00	1.85	
00076	TURB	TRHDIMTR	HACH FTU	25.0	28.0	18.0	10.0				
00094	CNDUCTVY	FIELD	MICROMHO					7			
00095	CNDUCTVY	AT 25C	MICROMHO	63	47	51	53	66			
00116	INTNSVE	SURVEY	IDENT	801602	801602	801602	801602	801602	801602	801602	
00300	DO		MG/L	12.3		12.7	11.4	9.4			
00301	DO	SATUR	PERCENT			107.8	103.9	100.5			
00335	COD	LOWLEVEL	MG/L	19.0	47.0	6.4	20.0				
00400	PH		SU	7.60		7.30	6.90	7.50			
00403	LAB	PH	SU	7.40	6.60	7.00	7.40				
00410	T ALK	CACO3	MG/L	23			21	26			
00425	HCO3 ALK	CACO3	MG/L	23			21	26			
00430	CO3 ALK	CACO3	MG/L	1 K			1 K	1 K			
00610	NH3+NH4-	N TOTAL	MG/L	0.0750	0.0200	0.0040	0.0120	0.0210		0.0540	
00619	UN-IONZO	NH3-NH3	MG/L	0.000		0.00	0.00	0.000			
00625	TOT KJEL	N	MG/L	0.100	1.000	0.400	0.600	0.100 K		1.600	
00630	NO2&NO3	N-TOTAL	MG/L	0.31	0.45	0.12	0.07	0.07		1.79	
00665	PHOS-TOT		MG/L P	0.150	0.250	0.140	0.120	0.060		0.580	
00900	TOT HARD	CACO3	MG/L	18			16	20			
00916	CALCIUM	CA-TOT	MG/L	4.0			4.0	4.8			
00927	MGNSIUM	MG,TOT	MG/L	1.3			1.3	1.5			
00929	SODIUM	NA,TOT	MG/L	5.00			4.70	5.60			
00937	PTSSIUM	K,TOT	MG/L	1.60			1.30	1.80			
00940	CHLORIDE	CL	MG/L	2			1	1			
00945	SULFATE	SO4-TOT	MG/L	8			10 K				
00951	FLUORIDE	F,TOTAL	MG/L	0.14			0.09				
00956	SILICA	TOTAL	MG/L	32.0			37.0				
31501	TOT COLI	MFIMENDO	/100ML	990		20	330	120			
31616	FEC COLI	MFM-FCBR	/100ML	30		19	34	10			
31679	FECSTREP	MF M-ENT	/100ML	130		1	6	21			
70300	RESIDUE	DISS-180	C MG/L	102	83	95	79			103	
70507	PHOS-T	ORTHO	MG/L P	0.104	0.091	0.070	0.048	0.072		0.104	
80154	SUSP SED	CONC	MG/L	8	26	3	3			433	

-32-

STORET RETRIEVAL DATE 81/07/20
 2020200
 46 45 00.0 116 55 05.0 2
 S F PALOUSE BELOW ROBINSON LAKE
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

800405 DEPTH 0
 /TYPA/AMRNT/STREAM
 INDEX 1310001 002740 00290 0680
 MILES 0324.30 0059.50 089.60 042.50

INITIAL DATE	01/01/01	79/11/01	90/01/15	80/03/14	80/04/10	80/04/30	80/07/08	81/02/14
INITIAL TIME-DEPTH-BOTTOM		1120	1245	1345	1500	1315	1315	1525
00010 WATER TEMP CENT		4.0	1.0-		6.5	10.0	17.5	
00011 WATER TEMP FAHN		39.2	30.2		43.7	50.0	63.5	
00042 ALTITUDE FEET AB MSL	2640							
00061 STREAM FLOW, INST-CFS		0.10 J	0.10 J	30.00	5.30	3.20	1.00	0.00
00076 TURB TRIDMTR HACH FTU		10.0	68.0	160.0	29.0	5.2	8.2	
00095 CONDUCTVY AT 25C MICROMHO		76	184	124	76	52	68	
00116 INTNSVE SURVEY IDENT		801602	801602	801602	801602	801602	801602	801602
00300 DO MG/L		10.6	12.8		12.5	11.4	9.3	
00301 DO SATUR PERCENT		89.1			112.8	111.0	107.8	
00335 COD LOWLEVEL MG/L			31.0	44.0	16.0	17.0		
00400 PH SU		6.90	7.50		7.40	7.10	7.10	
00403 LAB PH SU		7.40	7.30	6.80	7.60	7.50	7.60	
00410 T ALK CACO3 MG/L		39	20			22	28	
00425 HCO3 ALK CACO3 MG/L		39	20			22	28	
00430 CO3 ALK CACO3 MG/L		1 K	1 K			1 K	1 K	
00610 NH3+NH4- N TOTAL MG/L		0.0460	0.1910	0.0980	0.0230	0.0110	0.0300	0.1740
00619 UN-IONZD NH3-NH3 MG/L		0.00	0.001		0.00	0.00	0.000	
00625 TOT KJEL N MG/L		0.400	1.300	2.800	0.700	0.700	1.000	7.100
00630 NO2&NO3 N-TOTAL MG/L		0.01	21.10	7.11	1.31	0.15	0.02	5.70
00665 PHOS-TOT MG/L P		0.140	0.340	1.110	0.190	0.120	0.090	1.760
00900 TOT HARD CACO3 MG/L		32	60			18	24	
00916 CALCIUM CA-TOT MG/L		8.0	15.2			5.0	5.6	
00927 MGNSIUM MG, TOT MG/L		2.5	4.6			1.3	1.6	
00929 SODIUM NA, TOT MG/L		4.90	6.60			4.10	5.20	
00937 PISSIUM K, TOT MG/L		2.50	4.30			1.30	1.30	
00940 CHLORIDE CL MG/L		2 K	3			1	1	
00945 SULFATE SO4-TOT MG/L		8	13			10 K	10 K	
00951 FLUORIDE F, TOTAL MG/L		0.18	0.11			0.07	0.19	
00956 SILICA TOTAL MG/L		31.0	24.5			29.0	31.5	
01002 ARSENIC AS, TOT UG/L		10 K						
01022 BORON B, TOT UG/L		100						
01027 CADMIUM CD, TOT UG/L		1 K						
01034 CHROMIUM CR, TOT UG/L		50 K						
01042 COPPER CU, TOT UG/L		10						
01045 IRON FE, TOT UG/L		1400						
01051 LEAD PB, TOT UG/L		50 K						
01055 MANGNESE MN UG/L		130.0						
01092 ZINC ZN, TOT UG/L		1						
31501 TOT COLI MFIMENDO /100ML		340	11000		150	850	1240	
31616 FEC COLI MFM-FCBR /100ML		8	300		5	70	50	
31679 FECSTREP MF M-ENT /100ML		110	14000		56	44	65	
70300 RESIDUE DISS-180 C MG/L		101	178	88	96	61	65	164
70507 PHOS-T URTHO MG/L P		0.064	0.302	0.346	0.077	0.027	0.077	0.286
71900 MERCURY HG, TOTAL UG/L		0.5						
80154 SUSP SED CONC MG/L		5	75	1670	33	28	8	2590

-33-

STORET PETRIEVAL DATE 81/07/20

2020201
46 42 15.0 116 56 55.0 2
S F PALOUSE AT HWY 8
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IOSURV

800405 DEPTH 0
/TYPA/AMBNT/STREAM
INDEX 1310001 002740 00290 0680
MILES 0324.30 0059.50 089.60 039.50

			01/01/01	79/11/01	80/01/15	80/03/14	80/04/10	80/04/30	80/07/08	81/02/14
00010	WATER	TEMP	1040	1300	1440	1200	1350	1345	1535	
00011	WATER	TEMP	4.0	2.0		5.5	11.0	22.5		
00042	ALTITUDE	FEET	2590							
00061	STREAM	FLOW	2.06	0.10	J 50.00	8.40	4.20	1.30	63.00	
00076	TURB	TRBIDMTR	20.0	67.0	215.0	21.0	7.3	9.2		
00095	CONDUCTVY	AT 25C	114	193	136	120	90	151		
00116	INTNSVE	SURVEY	801602	801602	801602	801602	801602	801602	801602	801602
00300	DO	MG/L	10.8	12.6		12.3	11.2	8.7		
00301	DO	SATUR	90.6			108.1	110.9	109.9		
00335	COD	LDNLEVEL		11.0	50.0	35.2	10.0			
00400	PH	SU	7.10	7.60		7.00	7.00	7.30		
00403	LAB	PH	7.80	7.50	7.40	7.50	7.70	7.85		
00410	T ALK	CACO3	58	22	26	35	60			
00425	HCO3 ALK	CACO3	58	22	26	35	60			
00430	CO3 ALK	CACO3	1 K	1 K	1 K	1 K	1 K	1 K		
00610	NH3+NH4-	N TOTAL	0.0660	0.1860	0.0920	0.0870	0.0310	0.0540	0.2080	
00619	UN-IONZD	NH3-NH3	0.000	0.001		0.000	0.000	0.001		
00625	TOT KJEL	N	0.560	1.700	8.200	0.800	0.900	0.600	5.500	
00630	NO2&NO3	N-TOTAL	0.08	18.70	3.93	3.10	0.41	1.10	5.67	
00665	PHOS-TOT	MG/L P	0.190	0.410	1.390	0.180	0.160	0.130	1.440	
00900	TOT HARD	CACO3	48	64	48	28	54			
00916	CALCIUM	CA-TOT	12.0	16.0	11.2	9.0	16.0			
00927	MAGNESIUM	MG, TOT	3.8	5.0	3.8	2.4	4.1			
00929	SODIUM	NA, TOT	7.50	6.50	5.30	5.60	9.00			
00937	POTASSIUM	K, TOT	2.50	5.60	4.30	1.70	1.80			
00940	CHLORIDE	CL	4	2	2	1	3			
00945	SULFATE	SO4-TOT	12	14		10 K	10 K			
00951	FLUORIDE	F, TOTAL	0.16	0.15	0.15		0.08	0.22		
00956	SILICA	TOTAL	30.0	22.5	22.8	29.0	31.0			
01002	ARSENIC	AS, TOT	10 K							
01022	BURON	B, TOT	140							
01027	CADMIUM	CD, TOT	1 K							
01034	CHROMIUM	CR, TOT	50 K							
01042	COPPER	CU, TOT	10 K							
01045	IRON	FE, TOT	2010							
01051	LEAD	PB, TOT	50 K							
01055	MANGNESE	MN	270.0							
01092	ZINC	ZN, TOT	1 K							
31501	TOT COLI	MFIMENDO	170	9500		520	3500	250		
31616	FEC COLI	MFIM-FCHR	12	1000		96	110	180		
31679	FECSTREP	MF M-ENT	51	9900		66	77	115		
70300	RESIDUE	DISS-180	127	186	97	113	77	105	197	
70507	PHOS-T	GRTHD	0.101	0.313	0.461	0.095	0.062	0.061	0.309	
71900	MERCURY	HG, TOTAL	0.6							
80154	SUSP SED	CDNC	8	99	1520	18	10	12	1629	

2020068
 46 42 10.0 117 02 20.0 5
 S.FK. PALOUSE R AT STATELINE
 16057 IDAHO
 PACIFIC NORTHWEST
 LOWER SNAKE RIVER BASIN
 21IDSURV 02111204
 760810 DEPTH 0

/TYPA/AMBNT/STREAM
 INDEX 1310001 002740 00290 0680
 MILES 0324.30 0059.50 089.60 030.20

INITIAL DATE	01/01/01	75/09/12	76/04/20	79/11/01	80/01/15	80/03/14	80/04/10	80/04/30
00010 WATER TEMP CENT		16.9	7.5	0900	1300	1615	0915	1330
00011 WATER TEMP FAHN		62.4	45.5	5.0	1.0	3.0	5.5	12.0
00042 ALTITUDE FEET AB MSL	2480							
00061 STREAM FLOW, INST-CFS		0.30	140.00	4.00	53.00	100.00	15.00	7.00
00076 TURB TRBDMTR HACH FTU		5.5	180.0	6.6	158.0	218.0	50.0	8.6
00095 CNDUCTVY AT 25C MICROMHO		330	118	286	215	143	202	187
00116 INTNSVE SURVEY IDENT		801602	801602	801602	801602	801602	801602	801602
00300 DO MG/L		4.5	10.8	10.1	12.8	11.1	12.2	11.2
00301 DO SATUR PERCENT		50.8	99.3	86.3		90.0	8.0	113.5
00335 COD LOWLEVEL MG/L					43.0	56.0	25.6	20.0
00400 PH SU		7.20	7.40	6.70	7.50	6.50	7.30	7.00
00403 LAB PH SU		7.50	6.70	7.80	7.60	7.20	7.80	7.90
00410 T ALK CACO3 MG/L		140	44	118	33	39	71	71
00425 HCO3 ALK CACO3 MG/L				118	33	39	71	71
00430 CO3 ALK CACO3 MG/L				1 K	1 K	1 K	1 K	1 K
00500 RESIDUE TOTAL MG/L		244	618					
00530 RESIDUE TOT NFLT MG/L			403.00					
00610 NH3+NH4-N TOTAL MG/L		1.8245	0.1475	0.1280	0.1960	0.1900	0.2270	0.0380
00615 NO2-N TOTAL MG/L		0.0429	0.0295					
00619 UN-IONZD NH3-NH3 MG/L		0.011	0.001	0.00	0.001	0.00	0.001	0.000
00620 NO3-N TOTAL MG/L		0.6998	2.6862					
00625 TOT KJEL N MG/L		1.800	2.900	0.600	2.100	13.200	1.300	1.100
00630 NO2&NO3 N-TOTAL MG/L				1.02	16.10	6.59	4.10	2.51
00650 T PO4 MG/L		2.40	1.58					
00665 PHOS-TOT MG/L P		0.850	0.540	0.160	0.580	1.950	0.270	0.200
00900 TOT HARD CACO3 MG/L			48	108	73	59		68
00916 CALCIUM CA-TOT MG/L				27.2	17.2	14.4		19.0
00927 MGNSIUM MG,TOT MG/L				8.4	5.6	14.8		5.5
00929 SODIUM NA,TOT MG/L		26.60	5.20	16.40	9.10	7.30		10.40
00937 PTSSIUM K,TOT MG/L		3.90	2.90	3.80	6.20	6.60		2.40
00940 CHLORIDE CL MG/L		24	4	8	4	3		4
00945 SULFATE SO4-TOT MG/L				12	19			12
00951 FLUORIDE F,TOTAL MG/L				0.29	0.35	0.21		0.17
00956 SILICA TOTAL MG/L				36.0	24.3	23.9		29.0
01002 ARSENIC AS,TOT UG/L				10 K	10 K	23		10 K
01022 BORON B,TOT UG/L				115 K	60	35		290
01027 CADMIUM CD,TOT UG/L				1 K	1 K	1 K		1 K
01034 CHROMIUM CR,TOT UG/L				50 K	50 K	50 K		50 K
01042 COPPER CU,TOT UG/L				10 K	10 K	25		10 K
01045 IRON FE,TOT UG/L		190	3470	495	1820	41900		850
01051 LEAD PB,TOT UG/L				50 K	50 K	65		50 K
01055 MANGNESE MN UG/L		790.0	350.0	130.0	470.0	1440.0		110.0
01092 ZINC ZN,TOT UG/L				2 K	11	41		7
01501 ALPHA TOTAL PC/L				2.00	6.00	63.30		2.00
03501 BETA TOTAL PC/L				4.00	15.00	74.10		2.00

(SAMPLE CONTINUED ON NEXT PAGE)

-35-

2020068
 46 42 10.0 117 02 20.0 5
 S.FK. PALOUSE R AT STATELINE
 16057 IDAHO
 PACIFIC NORTHWEST
 LOWER SNAKE RIVER BASIN
 211DSURV 02111204
 760810 DEPTH 0

/TYPA/AMBNT/STREAM
 INDEX 1310001 002740 00290 0680
 MILES 0324.30 0059.50 089.60 030.20
 (SAMPLE CONTINUED FROM PREVIOUS PAGE)

INITIAL DATE	01/01/01	75/09/12	76/04/20	79/11/01	80/01/15	80/03/14	80/04/10	80/04/30
INITIAL TIME-DEPTH-BOTTOM					0900	1300	1615	0915 1330
31501 TOT COLI MFIMENDO /100ML		1600 L		540	7000		170	14500
31616 FEC CULI MFM-FCBR /100ML		80 L		385	900		65	220
31679 FECSTREP MF M-ENT /100ML				125	21500		46	120
39045 2,4,5-TP WTR SMPL UG/L					0.050 K			0.013
39360 DDD WHL SMPL UG/L					0.010 K			
39365 DDE WHL SMPL UG/L					0.024			
39370 DDT WHL SMPL UG/L					0.056			
39730 2,4-D WHL SMPL UG/L					0.100 K			
740 2,4,5-T WHL SMPL UG/L					0.050 K			
9782 LINDANE WHL SMPL UG/L								0.004
70300 RESIDUE DISS-180 C MG/L				201	176	97	168	124
70507 PHOS-T ORTHO MG/L P	0.440	0.251		0.077	0.438	0.375	0.145	0.083
71900 MERCURY HG,TOTAL UG/L				0.6	0.5 K	0.5 K		0.5 K
80154 SUSP SED CONC MG/L				2 K	318	3115	52	17
82052 BANVEL TOTAL UG/L				1 K	1 K		1 K	1 K

INITIAL DATE	80/05/22	80/07/08	81/02/14
INITIAL TIME-DEPTH-BOTTOM	1600	1430	1600
00010 WATER TEMP CENT		24.0	
00011 WATER TEMP FAHN		75.2	
00061 STREAM FLOW, INST-CFS		1.00	239.40
00076 TURB TRBIDMTR HACH FTU	3.3	3.0	540.0
00095 CNDUCTVY AT 25C MICROMHO	244	203	110
00116 INTNSVE SURVEY IDENT	801602	801602	801602
00300 DO MG/L		8.7	
00301 DO SATUR PERCENT		112.0	
00335 COD LOWLEVEL MG/L	22.0		49.4
00400 PH SU		7.40	
00403 LAB PH SU	8.20	8.10	6.50
00410 T ALK CACO3 MG/L	95	84	19
00425 HCO3 ALK CACO3 MG/L	95	84	19
00430 CO3 ALK CACO3 MG/L	1 K	1 K	1 K
00610 NH3+NH4- N TOTAL MG/L	0.0670	0.0620	0.2150
00619 UN-IONZD NH3-NH3 MG/L		0.001	
00625 TOT KJEL N MG/L	0.870	0.300	4.900
00630 NO2&NO3 N-TOTAL MG/L	1.43	0.47	5.06
00665 PHOS-TOT MG/L P	0.250	0.120	1.280
00900 TOT HARD CACO3 MG/L	94	79	34
00916 CALCIUM CA-TOT MG/L	26.4	18.8	10.4
00927 MAGNSIUM MG,TOT MG/L	7.3	6.3	11.2
00929 SODIUM NA,TOT MG/L	14.40	12.50	5.10
00937 POTASSIUM K,TOT MG/L	2.20	1.90	7.20
00940 CHLORIDE CL MG/L	8	8	3
00945 SULFATE SO4-TOT MG/L	13	10 K	33
00951 FLUORIDE F,TOTAL MG/L	0.26	0.24	0.14

(SAMPLE CONTINUED ON NEXT PAGE)

-36-

STOREY RETRIEVAL DATE 81/07/20

2020068

46 42 10.0 117 02 20.0 5

S.FK. PALOUSE R AT STATELINE

16057 IDAHO

PACIFIC NORTHWEST

LOWER SNAKE RIVER BASIN

21IDSURV 02111204

760810 DEPTH 0

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 00290 0680

MILES 0324.30 0059.50 089.60 030.20

(SAMPLE CONTINUED FROM PREVIOUS PAGE)

INITIAL DATE				80/05/22	80/07/08	81/02/14
INITIAL TIME-DEPTH-BOTTOM				1600	1430	1600
00956	SILICA	TOTAL	MG/L	24.5	24.8	16.5
01002	ARSENIC	AS,TOT	UG/L		10 K	10
01022	BORON	B,TOT	UG/L		115	30
01027	CADMIUM	CD,TOT	UG/L		1 K	3
01034	CHROMIUM	CR,TOT	UG/L		50 K	50 K
01042	COPPER	CU,TOT	UG/L		10 K	50
01045	IRON	FE,TOT	UG/L		305	56250
01051	LEAD	PB,TOT	UG/L		50 K	50 K
01055	MANGNESE	MN	UG/L		50.0	1620.0
01092	ZINC	ZN,TOT	UG/L		6	153
01501	ALPHA	TOTAL	PC/L		2.00	35.20
03501	BETA	TOTAL	PC/L		4.00	62.20
31501	TOT COLI	MFIMENDO	/100ML	400	1365	
31616	FEC COLI	MFM-FCBR	/100ML	305	995	
31679	FECSTREP	MF M-ENT	/100ML	86 K	179	
39045	2,4,5-TP	WTR SMPL	UG/L		0.050 K	
70300	RESIDUE	DISS-180	C MG/L	150	130	111
70507	PHOS-T	ORTHO	MG/L P	0.092	0.090	0.314
71900	MERCURY	HG,TOTAL	UG/L		0.5 K	0.5 K
80154	SUSP SED	CONC	MG/L	33	6	1857
82052	BANVEL	TOTAL	UG/L		1 K	

37

STORET RETRIEVAL DATE 81/07/20

2020210

46 46 00.0 116 53 55.0 2

TRIBUTARY 1 MI NORTH OF ROBINSON LAKE

16057 IDAHO LATAH

PACIFIC NORTHWEST 130800

MIDDLE AND LOWER SNAKE RIVER

21IDSURV

800405 DEPTH 0

/TYP/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0960

MILES 0324.30 0059.50 089.60 044.30 000.10

INITIAL DATE 01/01/01 80/03/14 80/04/10

INITIAL TIME-DEPTH-BOTTOM 1320 1420

00042	ALTITUDE	FEET	AB MSL	2760		
00061	STREAM	FLOW,	INST-CFS		1.00 J	0.10 J
00076	TURB	TRBIDMTR	HACH FTU		70.0	16.0
00116	INTNSVE	SURVEY	IDENT		801602	801602
70300	RESIDUE	DISS-180	C MG/L		103	110
80154	SUSP SED	CONC	MG/L		619	13

STORET RETRIEVAL DATE 81/07/20

2020211

46 42 40.0 116 54 55.0 2

CRUMARINE CR AT USGS GAGE

16057 IDAHO LATAH

PACIFIC NORTHWEST 130800

MIDDLE AND LOWER SNAKE RIVER

21IDSURV

800405 DEPTH 0

/TYP/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0950

MILES 0324.30 0059.50 089.60 043.70 001.30

INITIAL DATE 01/01/01 80/03/14 80/04/10

INITIAL TIME-DEPTH-BOTTOM 1250 1350

00042	ALTITUDE	FEET	AB MSL	2800		
00061	STREAM	FLOW,	INST-CFS		2.50	1.70
00076	TURB	TRBIDMTR	HACH FTU		24.5	7.0
00116	INTNSVE	SURVEY	IDENT		801602	801602
70300	RESIDUE	DISS-180	C MG/L		80	69
80154	SUSP SED	CONC	MG/L		133	12

STORET RETRIEVAL DATE 81/07/20

2020212

46 45 15.0 116 54 25.0 2

EAST TRIBUTARY TO ROBINSON LAKE

16057 IDAHO LATAH

PACIFIC NORTHWEST 130800

MIDDLE AND LOWER SNAKE RIVER

21IDSURV

800405 DEPTH 0

/TYP/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0940

MILES 0324.30 0059.50 089.60 043.20 000.20

INITIAL DATE 01/01/01 80/03/14 80/04/10

INITIAL TIME-DEPTH-BOTTOM 1330 1430

00042	ALTITUDE	FEET	AB MSL	2700		
00061	STREAM	FLOW,	INST-CFS		5.00 J	0.10 J
00076	TURB	TRBIDMTR	HACH FTU		160.0	23.0
00116	INTNSVE	SURVEY	IDENT		801602	801602
70300	RESIDUE	DISS-180	C MG/L		107	124
80154	SUSP SED	CONC	MG/L		1168	26

STORET RETRIEVAL DATE 81/07/20
2020213
46 46 20.0 116 55 50.0 2
HOWARD CR AT MOUTH
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800405 DEPTH 0
/TYPA/AMBNT/STREAM
INDEX 1310001 002740 00290 0680 0910 0030
MILES 0324.30 0059.50 089.60 041.70 000.60 002.50
INITIAL DATE 01/01/01 80/03/14 80/04/10
INITIAL TIME-DEPTH-BOTTOM 1305 1400
00042 ALTITUDE FEET AB MSL 2700
00061 STREAM FLOW, INST-CFS 5.00 J 1.30
00076 TURB TRSIDMTR HACH FTU 32.0 16.5
00116 INTNSVE SURVEY IDENT 801602 801602
70300 RESIDUE DISS-180 C MG/L 105 84
80154 SUSP SED CONC MG/L 60 43

STORET RETRIEVAL DATE 81/07/20
2020214
46 45 15.0 116 55 40.0 2
GNAT CR AT USGS GAGE
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800405 DEPTH 0
/TYPA/AMBNT/STREAM
INDEX 1310001 002740 00290 0680 0910
MILES 0324.30 0059.50 089.60 041.70 000.60
INITIAL DATE 01/01/01 80/03/14 80/04/10
INITIAL TIME-DEPTH-BOTTOM 1415 1435
00042 ALTITUDE FEET AB MSL 2650
00061 STREAM FLOW, INST-CFS 10.00 J 3.00
00076 TURB TRSIDMTR HACH FTU 88.0 22.0
00116 INTNSVE SURVEY IDENT 801602 801602
70300 RESIDUE DISS-180 C MG/L 130 100
80154 SUSP SED CONC MG/L 138 22

STORET RETRIEVAL DATE 81/07/20
2020215
46 44 40.0 116 55 15.0 2
TRIBUTARY SOUTH OF ROBINSON LAKE, 1
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800322 DEPTH 0
/TYPA/AMBNT/STREAM
INDEX 1310001 002740 00290 0680 0920
MILES 0324.30 0059.50 089.60 042.10 000.20
INITIAL DATE 01/01/01 80/03/14 80/04/10
INITIAL TIME-DEPTH-BOTTOM 1400 1515
00042 ALTITUDE FEET AB MSL 2650
00061 STREAM FLOW, INST-CFS 3.00 J 0.80 J
00076 TURB TRSIDMTR HACH FTU 80.0 9.0
00116 INTNSVE SURVEY IDENT 801602 801602
70300 RESIDUE DISS-180 C MG/L 112 117
80154 SUSP SED CONC MG/L 794 15

-39-

STORET RETRIEVAL DATE 81/07/20
2020217
46 44 45.0 116 56 15.0 2
TRIBUTARY WEST OF GNAT CREEK
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800322 DEPTH 0
/TYPA/AMBNT/STREAM
INDEX 1310001 002740 00290 0680 0890
MILES 0324.30 0059.50 089.60 041.30 000.30
INITIAL DATE 01/01/01 80/03/14
INITIAL TIME-DEPTH-BOTTOM 1405
00042 ALTITUDE FEET AB MSL 2640
00061 STREAM FLOW, INST-CFS 0.10 J
00076 TURB TRBIDMTR HACH FTU 110.0
00116 INTNSVE SURVEY IDENT 801602
70300 RESIDUE DISS-180 C MG/L 194
80154 SUSP SED CONC MG/L 307

STORET RETRIEVAL DATE 81/07/20
2020219
46 43 25.0 116 56 35.0 2
TRIBUTARY NEAR GOLF COURSE
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800322 DEPTH 0
/TYPA/AMBNT/STREAM
INDEX 1310001 002740 00290 0680 0820
MILES 0324.30 0059.50 089.60 039.60 000.20
INITIAL DATE 01/01/01 80/03/14 80/04/10
INITIAL TIME-DEPTH-BOTTOM 1500 1215
00042 ALTITUDE FEET AB MSL 2600
00061 STREAM FLOW, INST-CFS 2.00 J 0.80 J
00076 TURB TRBIDMTR HACH FTU 25.0 12.0
00116 INTNSVE SURVEY IDENT 801602 801602
70300 RESIDUE DISS-180 C MG/L 127 161
80154 SUSP SED CONC MG/L 263 36

STORET RETRIEVAL DATE 81/07/20
2020220
46 42 45.0 116 57 05.0 2
TRIBUTARY BELOW TOWER BUTTE
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800322 DEPTH 0
/TYPA/AMBNT/STREAM
INDEX 1310001 002740 00290 0680 0800
MILES 0324.30 0059.50 089.60 037.70 000.50
INITIAL DATE 01/01/01 80/03/14 80/04/10
INITIAL TIME-DEPTH-BOTTOM 1505 1130
00042 ALTITUDE FEET AB MSL 2600
00061 STREAM FLOW, INST-CFS 5.00 J 0.10 J
00076 TURB TRBIDMTR HACH FTU 115.0 22.0
00116 INTNSVE SURVEY IDENT 801602 801602
70300 RESIDUE DISS-180 C MG/L 146 165
80154 SUSP SED CONC MG/L 927 26

-40-

STORET RETRIEVAL DATE 81/07/20

2020221

46 41 05.0 117 03 25.0 2

TRIBUTARY WEST OF STATELINE

16057 IDAHO LATAH

PACIFIC NORTHWEST 130800

MIDDLE AND LOWER SNAKE RIVER

211DSURV

800322 DEPTH 0

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0520

MILES 0324.30 0059.50 089.60 031.10 000.10

INITIAL DATE 01/01/01 80/03/14 80/04/10

INITIAL TIME-DEPTH-BOTTOM 1545 1020

00042	ALTITUDE	FEET	AB MSL	2500		
00061	STREAM	FLOW	INST-CFS	10.00	J	2.60
00076	TURB	TRBIDMTR	HACH FTU	180.0		25.0
00116	INTNSVE	SURVEY	IDENT	801602		801602
70300	RESIDUE	DISS-180	C	145		186
80154	SUSP SED	CONC	MG/L	1699		39

STORET RETRIEVAL DATE 81/07/20

2020203

46 48 40.0 116 58 25.0 2

PARADISE CREEK NEAR HEADWATERS

16057 IDAHO

LATAH

PACIFIC NORTHWEST

130800

MIDDLE AND LOWER SNAKE RIVER

21IDSURV

800405 DEPTH 0

/TYP/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0290

MILES 0324.30 0059.50 089.60 023.50 018.90

INITIAL DATE			01/01/01	80/01/15	80/02/20	80/03/14	80/04/08	80/04/30	80/07/08	81/02/14
INITIAL TIME-DEPTH-BOTTOM				0940	0930	0945	1015	0945	1005	1500
00010	WATER	TEMP	CENT	1.0	3.0		0.0	8.0	14.0	
00011	WATER	TEMP	FAHN	30.2	37.4		32.0	46.4	57.2	
00042	ALTITUDE	FEET	AB MSL	2900						
00061	STREAM	FLOW	INST-CFS	0.10 J	1.00	4.00	0.10 J	0.05 J	0.10 J	0.23
00076	TURB	TURBIDMTR	HACH FTU	53.0	96.0	110.0	32.0	16.0	17.0	
00095	CONDUCTVY	AT 25C	MICROMHO	70	56	57	69	74	101	
00116	INTNSVE	SURVEY	IDENT	801602	801602	801602	801602	801602	801602	801602
00300	DO		MG/L	11.8	11.6			11.1	9.3	
00301	DO	SATUR	PERCENT		95.5			103.7	99.4	
00335	CGD	LOWLEVEL	MG/L	22.0	40.3	9.0	23.0	17.0		
00400	PH		SU	7.50	7.10			6.50	7.10	
00403	LAB	PH	SU	7.40	7.10	7.60	7.00	7.70	7.50	
00410	T ALK	CAC03	MG/L	28		23		32	44	
00425	HCO3 ALK	CAC03	MG/L	28		23		32	44	
00430	CO3 ALK	CAC03	MG/L	1 K		1 K		1 K	1 K	
00610	NH3+NH4-	N TOTAL	MG/L	0.1000	0.2570	0.0250	0.0100	0.0100	0.0700	0.0390
00619	UN-IOMZD	NH3-NH3	MG/L	0.000	0.000			0.0	0.000	
00625	TIT KJEL	N	MG/L	0.400	0.780	1.600	0.600	0.700	0.700	4.100
00630	NO2&NO3	N-TOTAL	MG/L	0.17	0.29	0.02	0.02	0.00 K	0.04	0.08
00665	PHOS-TOT		MG/L P	0.230	0.330	0.560	0.330	0.180	0.430	0.830
00900	TOT HARD	CAC03	MG/L	20		26		26	36	
00916	CALCIUM	CA-TOT	MG/L	5.6		8.0		7.0	8.0	
00927	MGNESIUM	MG,TOT	MG/L	1.7		1.8		1.9	2.5	
00929	SODIUM	NA,TOT	MG/L	5.50		4.50		5.90	7.30	
00937	POTASSIUM	K,TOT	MG/L	1.10		1.20		1.30	1.90	
00940	CHLORIDE	CL	MG/L	2		1		1	2	
00945	SULFATE	SO4-TOT	MG/L	9				11	10 K	
00951	FLUORIDE	F,TOTAL	MG/L	0.20		0.20		0.15	0.24	
00956	SILICA	TOTAL	MG/L	28.8		31.5		38.0	40.0	
31501	TOT COLI	MFIMENDU	/100ML	1700	2300		340	120	220	
31616	FEC COLI	MF-MFCBR	/100ML	20	40		2	4	87	
31679	FECSTREP	MF-M-ENT	/100ML	10	22		1 K	21	90	
70300	RESIDUE	DISS-180	C MG/L	132	169	103	125	99	97	214
70507	PHOS-T	GRIND	MG/L P	0.203	0.264	0.316	0.101	0.084	0.093	0.300
80154	SUSP SED	CONC	MG/L	16	312	413	30	24	138	1452

2020204
 46 46 25.0 116 58 25.0 2
 PARADISE CREEK BELOW IDLER'S REST
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

800405 DEPTH 0
 /TYP/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0290
 MILES 0324.30 0059.50 089.60 023.50 015.90

INITIAL DATE			01/01/01	80/01/15	80/02/20	80/03/14	80/04/08	80/04/30	80/07/08	81/02/14
INITIAL TIME-DEPTH-BOTTOM										
00010	WATER	TEMP	1010	1100	1025	1215	1005	1030	1430	
00011	WATER	TEMP	1.0-	6.0			8.0	18.0		
00042	ALTITUDE	FEET	2660				46.4	64.4		
00061	STREAM	FLOW	0.27 J		20.00	2.20	2.00	0.27 J	41.08	
00076	TURB	TRBIDMTR	75.0	90.0	250.0	25.0	10.0	11.0		
00095	CNDUCTVY	AT 25C	181	158	109	108	121	147		
00116	INTNSVE	SURVEY	801602	801602	801602	801602	801602	801602	801602	801602
00300	DO	MG/L	10.8	12.0			11.1	8.1		
00301	DO	SATUR		105.7			102.7	93.9		
00335	COD	LOWLEVEL	45.0	59.1	47.0	26.0	7.0			
00400	PH	SU	8.00	7.00		6.70	6.70	7.10		
00403	LAB	PH		7.00	7.10	7.70	7.90	8.00		
00410	T ALK	CACO3	15		24		48	67		
00425	HCO3 ALK	CACO3	15		24		48	67		
00430	CO3 ALK	CACO3	1	K	1	K	1	K	1	K
00610	NH3+NH4-	N TOTAL	0.0800	0.2890	0.1020	0.2540	0.0510	0.0580	0.0820	
00619	UN-IONZD	NH3-NH3	0.001	0.000			0.00	0.000		
00625	TOT KJEL	N	1.700	2.040	10.200	1.200	1.200	1.100	5.100	
00630	NO2&NO3	N-TOTAL	17.80	10.90	6.57	2.60	0.92	0.05	6.38	
00665	PHOS-TOT	MG/L P	0.340	0.370	1.420	0.190		0.100	1.040	
00900	TOT HARD	CACO3	66		48		46	56		
00916	CALCIUM	CA-TOT	15.2		12.0		12.0	15.2		
00927	MGNESIUM	MG,TOT	5.0		3.6		3.4	4.3		
00929	SODIUM	NA,TOT	6.30		4.50		7.30	8.40		
00937	PTSIUM	K,TOT	4.90		3.20		1.90	1.50		
00940	CHLORIDE	CL	2		1		1	1		
00945	SULFATE	SO4-TOT	12				10	K	10	K
00951	FLUORIDE	F,TOTAL	0.13		0.18		0.11	0.23		
00956	SILICA	TOTAL	23.8		22.8		33.0	27.3		
31501	TOT COLI	MFIMENDO	/100ML	7200	68		720	4700	740	
31616	FEC COLI	MFm-FCHR	/100ML	80	40		2	K	110	750
31679	FECSTREP	MF M-ENT	/100ML	300	94		4	61	178	
70300	RESIDUE	DISS-180	C	MG/L	216	200	84	115	104	279
70507	PHOS-T	ORTHO	MG/L P	0.322	0.294	0.519	0.053	0.061	0.063	0.453
80154	SUSP SED	CONC	MG/L	15	166	1420	28	8	2	K
									870	

2020205
 46 44 20.0 116 58 20.0 2
 PARADISE CR AT EISENHOWER ST BR, MOSCOW
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

			800405 DEPTH 0							
/TYPA/AMBNT/STREAM										
INDEX 1310001 002740 00290 0680 0290										
MILES 0324.30 0059.50 089.60 023.50 012.00										
INITIAL DATE			01/01/01	80/01/15	80/02/20	80/03/14	80/04/08	80/04/30	80/07/08	81/02/14
00010	WATER	TEMP	1030	1300	1145	1400	1045	1055	1400	
00011	WATER	TEMP	1.0-	5.5			10.5	21.0		
00042	ALTITUDE	FEET	30.2	41.9			50.9	69.8		
00061	STREAM	FLOW,	2600							
00076	TURB	TRBIDMTR		27.40	40.00	4.30	1.10		0.00	
00095	CNDUCTVY	AT 25C	87.0	135.0	2.5	17.0	7.3	15.0		
00116	INTNSVE	SURVEY	211	170	138	151	172	159		
00300	DD	MG/L	801602	801602	801602	801602	801602	801602	801602	
00301	DD	SATUR	12.0	11.2			12.8	7.3		
00335	COD	LOWLEVEL		98.5			126.7	89.1		
00400	PH	SU	7.80	6.80	62.0	10.0	17.0	7.4		
00403	LAR	PH	7.20	7.00		7.40	7.00	7.40		
00410	T ALK	CACO3	16		7.30	8.20	8.10	8.10		
00425	HCO3 ALK	CACO3	16		25		72	72		
00430	CO3 ALK	CACO3	1		25		72	72		
00610	NH3+NH4-	N TOTAL	1 K		1 K		1 K	1 K		
00619	UN-IONZO	NH3-NH3	0.1370	0.1310	0.1010	0.0290	0.0430	0.0750	0.1370	
00625	TOT KJEL	N	0.001	0.000			0.000	0.001		
00630	NO2&NO3	N-TOTAL	1.600	2.520	14.400	0.900	1.200	1.000	8.600	
00665	PHOS-TOT	MG/L P	20.50	10.90	7.42	3.48	0.95	0.07	6.55	
00900	TOT HARD	CACO3	0.380	0.530	1.780	0.160		0.200	1.670	
00916	CALCIUM	CA-TOT	72		56		68	58		
00927	MGNESIUM	MG,TOT	17.6		13.6		18.0	16.0		
00929	SODIUM	NA,TOT	5.8		4.2		5.3	4.3		
00937	PTSSIUM	K,TOT	6.70		5.30		9.40	10.90		
00940	CHLORIDE	CL	5.20		3.10		2.70	0.90		
00945	SULFATE	SO4-TOT	2		1		2	1		
00951	FLUORIDE	F,TOTAL	14				10 K	10 K		
00956	SILICA	TOTAL	0.13		0.18		0.11	0.27		
31501	TOT COLI	MFI-MENDO	22.3		24.0		21.0	18.5		
31616	FEC COLI	MFM-FCBR	20000	1400		760	1100	470		
31679	FECSTREP	MF M-ENT	160	140		10	210	680		
70300	RESIDUE	DISS-180	220	80		1	68	168		
70507	PHOS-T	ORTHO	240	249	85	118	113	97	290	
80154	SUSP SED	CONC	0.395	0.452	0.673	0.096	0.005	0.032	0.443	
		MG/L	33	284	2110	7	12	18	2371	

-44-

2020206
 46 43 55.0 117 01 25.0 2
 PARADISE CR AT USGS GAGE
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

800405 DEPTH 0
 /TYPA/AMBNT/STREAM
 INDEX 1310001 002/40 00290 0680 0290
 MILES 0324.30 0059.50 089.60 023.50 007.60

INITIAL DATE	01/01/01	79/11/01	80/01/15	80/02/20	80/03/14	80/04/08	80/04/30	80/05/22
00010 WATER TEMP CENT	1300	1050	1415	1205	1330	1115	1500	
00011 WATER TEMP FAHN	8.5	1.0	5.5	2.5		12.0		
00042 ALTITUDE FEET	2540							
00061 STREAM FLOW, INST-CFS	0.34 J	0.85 J	26.70	68.00	4.54	3.02	12.00	
00076 TURB TRBDIMTR HACH FTU	3.7	87.0	180.0	215.0	14.0	1.9	79.0	
00095 CNOUCTVY AT 25C MICROMHD	602	247	242	160	276	319	421	
00105 UPSTREAM REACH MILES						0.30		
00116 INTNSVE SURVEY IDENT	801602	801602	801602	801602	801602	801602	801602	801602
00300 DO MG/L	9.3	12.6	11.3	11.3		11.0		
00301 DO SATUR PERCENT	87.9		99.1	91.8		111.7		
00335 COD LOWLEVEL MG/L		62.0	72.6	50.0	30.0	30.0	41.0	
00400 PH SU	6.50	7.60	7.10	6.90	7.50	7.10		
00403 LAB PH SU	8.00	7.60	7.20	7.60	8.50	8.00	7.70	
00410 T ALK CACO3 MG/L	183	27		38		107	104	
00425 HCO3 ALK CACO3 MG/L	183	27		38		107	104	
00430 CO3 ALK CACO3 MG/L	1 K	1 K		1 K		1 K	1 K	
00610 NH3+NH4- N TOTAL MG/L	1.5130	0.2420	0.2060	0.1240	0.0830	0.0400	0.3940	
00619 UN-IONZD NH3-NH3 MG/L	0.001	0.001	0.000	0.000		0.000		
00625 TOT KJEL N MG/L	1.070	2.200	3.450	4.200	1.100	1.400	1.890	
00630 NO2&NO3 N-TOTAL MG/L	3.70	17.00	11.50	4.73	5.00	0.80	2.49	
00665 PHOS-TOT MG/L P	0.690	0.470	0.730	1.160	0.200	0.220	0.940	
00900 TOT HARD CACO3 MG/L	170	82		68		102	141	
00916 CALCIUM CA-TOT MG/L	42.4	20.0		16.0		27.0	40.0	
00927 MGNSIUM MG,TOT MG/L	14.4	6.4		10.4		8.1	9.7	
00929 SODIUM NA,TOT MG/L	79.00	10.90		8.50		25.90	28.90	
00937 PTSSIUM K,TOT MG/L	5.60	5.70		5.00		3.20	4.20	
00940 CHLORIDE CL MG/L	76	6		4		22	22	
00945 SULFATE SO4-TOT MG/L	30	18				13	80	
00951 FLUORIDE F,TOTAL MG/L	0.43	0.14		0.21		0.20	0.65	
00956 SILICA TOTAL MG/L	49.0	22.3		23.5		20.0	37.8	
01002 ARSENIC AS,TOT UG/L	10 K	10 K		24		10 K		
01022 BORON B,TOT UG/L	290			90		220		
01027 CADMIUM CD,TOT UG/L	1 K	1 K		1 K		1 K		
01034 CHROMIUM CR,TOT UG/L	50 K	50 K		50 K		50 K		
01042 COPPER CU,TOT UG/L	10 K	10 K		10		10 K		
01045 IRON FE,TOT UG/L	420	1030		23450		620		
01051 LEAD PB,TOT UG/L	50 K	50 K		60		50 K		
01055 MANGNESE MN UG/L	280.0	150.0		740.0		190.0		
01092 ZINC ZN,TOT UG/L	2	28		59		14		
01501 ALPHA TOTAL PC/L	2.40	4.20		21.80		0.30		
03501 BETA TOTAL PC/L	4.70	9.00		44.40		3.10		
31501 TOT COLI MFIMENDO /100ML	730	9100	2300		4300	22000	40 K	
31616 FEC COLI MFM-FCHR /100ML	170	290	200		164	630	1800	
31679 FECSTREP MF M-ENT /100ML	36	440	570		44	18	1000	
39045 2,4,5-TP WTR SMPL UG/L		0.100 K	0.050 K			0.023		

(SAMPLE CONTINUED ON NEXT PAGE)

2020206
 46 43 55.0 117 01 25.0 2
 PARADISE CR AT USGS GAGE
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

800405 DEPTH 0
 /TYPA/AMBNT/STREAM
 INDEX 1310001 002740 00290 0680 0290
 MILES 0324.30 0059.50 089.60 023.50 007.60
 (SAMPLE CONTINUED FROM PREVIOUS PAGE)

INITIAL DATE	01/01/01	79/11/01	80/01/15	80/02/20	80/03/14	80/04/08	80/04/30	80/05/22
INITIAL TIME-DEPTH-BOTTOM	1300		1050	1415	1205	1330	1115	1500
39730 2,4-D WHL SMPL UG/L			0.050 K	0.100 K				
39740 2,4,5-T WHL SMPL UG/L			0.050 K	0.050 K				
39782 LINDANE WHL SMPL UG/L								
70300 RESIDUE DISS-180 C MG/L		425	239	273	107	178	0.330	
70507 PHOS-T ORTHO MG/L P		0.565	0.419	0.632	0.657	0.090	185	293
71900 MERCURY HG,TOTAL UG/L		1.2	0.5 K		0.5 K		0.078	0.404
80154 SUSP SED CONC MG/L		2 K	48	483	1400		0.5 K	
82052 BANVEL TOTAL UG/L		1 K	1 K	1 K			8	1663

INITIAL DATE	80/07/08	81/02/14
INITIAL TIME-DEPTH-BOTTOM	1120	1345
00010 WATER TEMP CENT	23.5	
00011 WATER TEMP FAHN	74.3	
00061 STREAM FLOW, INST-CFS	0.85 J	273.00
00076 TURB TRBIDMTR HACH FTU	11.0	660.0
00095 CONDUCTVY AT 25C MICROMHO	456	110
00116 INTNSVE SURVEY IDENT	801602	801602
00300 DO MG/L	9.7	
00301 DO PERCENT	125.2	
00335 COD LOWLEVEL MG/L		60.8
00400 PH SU	7.40	
00403 LAB PH SU	8.25	6.80
00410 T ALK CACO3 MG/L	176	22
00425 HCO3 ALK CACO3 MG/L	176	22
00430 CO3 ALK CACO3 MG/L	1 K	1 K
00610 NH3+NH4- N TDAL MG/L	0.1530	0.2340
00619 UN-IQWZD NH3-NH3 MG/L	0.002	
00625 TOT KJEL N MG/L	0.200	8.600
00630 NO2&NO3 N-TOTAL MG/L	3.39	6.04
00665 PHOS-TOT MG/L P	0.540	1.710
00900 TOT HARD CACO3 MG/L	150	38
00916 CALCIUM CA-TOT MG/L	38.4	11.2
00927 MGNSIUM MG,TOT MG/L	12.2	14.0
00929 SODIUM NA,TOT MG/L	45.80	7.50
00937 PTSSIUM K,TOT MG/L	4.80	10.00
00940 CHLORIDE CL MG/L	26	5
00945 SULFATE SO4-TOT MG/L	24	48
00951 FLUORIDE F,TOTAL MG/L	0.59	0.22
00956 SILICA TOTAL MG/L	46.8	16.8
01002 ARSENIC AS,TOT UG/L	10 K	16
01022 BORON B,TOT UG/L	190	10 K
01027 CADMIUM CD,TOT UG/L	1 K	1 K
01034 CHROMIUM CR,TOT UG/L	50 K	60
01042 COPPER CU,TOT UG/L	10 K	80
01045 IRON FE,TOT UG/L	730	67500

(SAMPLE CONTINUED ON NEXT PAGE)

-46-

STORET RETRIEVAL DATE 81/07/20

2020206

46 43 55.0 117 01 25.0 2

PARADISE CR AT USGS GAGE

16057 IDAHO LATAH

PACIFIC NORTHWEST 130800

MIDDLE AND LOWER SNAKE RIVER

21IDSURV

800405 DEPTH 0

/TYP/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0290

MILES 0324.30 0059.50 089.60 023.50 007.60

(SAMPLE CONTINUED FROM PREVIOUS PAGE)

INITIAL DATE		80/07/08	81/02/14
INITIAL TIME-DEPTH-BOTTOM		1120	1345
01051	LEAD PB,TOT UG/L	50 K	50 K
01055	MANGNESE MN UG/L	230.0	1510.0
01092	ZINC ZN,TOT UG/L	27	246
01501	ALPHA TOTAL PC/L	2.40	34.40
03501	BETA TOTAL PC/L	5.20	67.00
31501	TOT COLI MFIMENDO /100ML	4900	
31679	FECSTREP MF M-ENT /100ML	205	
39045	2,4,5-TP WTR SMPL UG/L	0.050 K	
70300	RESIDUE DISS-180 C MG/L	310	542
70507	PHOS-T ORTHO MG/L P	0.386	0.352
71900	MERCURY HG,TOTAL UG/L	0.5 K	0.5 K
80154	SUSP SED CONC MG/L	17	2290
82052	BANVEL TOTAL UG/L	1 K	

STORET RETRIEVAL DATE 81/07/20

2020225

46 47 10.0 116 58 35.0 2
 TRIBUTARY TO IDLER'S REST CR
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

800322 DEPTH 0

/TYPA/AMBNT/STREAM

INDEX	1310001	002740	00290	0680	0290	0300	0010		
MILES	0324.30	0059.50	089.60	023.50	016.80	000.20	00.20		
INITIAL DATE				01/01/01	80/02/20	80/03/14	80/04/08		
INITIAL TIME-DEPTH-BOTTOM					1015	1000	1030		
00042 ALTITUDE	FEET	AB MSL		2680					
00061 STREAM	FLOW,	INST-CFS			5.20	8.00	0.70	J	
00076 TURB	TRIDMTR	HACH FTU			98.0	255.0	30.0		
00116 INTNSVE	SURVEY	IDENT			801602	801602	801602		
70300 RESIDUE	DISS-180	C	MG/L		216	110	138		
80154 SUSP SED	CONC	MG/L			189	1294	14		

STORET RETRIEVAL DATE 81/07/20

2020226

46 48 15.0 116 56 45.0 2
 IDLER'S REST CR AT HEADWATERS
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

800322 DEPTH 0

/TYPA/AMBNT/STREAM

INDEX	1310001	002740	00290	0680	0290	0300		
MILES	0324.30	0059.50	089.60	023.50	016.80	002.20		
INITIAL DATE				01/01/01	80/02/20	80/03/14	80/04/08	
INITIAL TIME-DEPTH-BOTTOM					1120	1035	1100	
00042 ALTITUDE	FEET	AB MSL		2880				
00061 STREAM	FLOW,	INST-CFS			1.00	2.00	1.00	
00076 TURB	TRIDMTR	HACH FTU			18.0	17.0	8.4	
00116 INTNSVE	SURVEY	IDENT			801602	801602	801602	
70300 RESIDUE	DISS-180	C	MG/L		96	56	65	
80154 SUSP SED	CONC	MG/L			13	60	2	K

STORET RETRIEVAL DATE 81/07/20

2020227

46 47 00.0 116 58 40.0 2
 IDLER'S REST CR AT MOUTH
 16057 IDAHO LATAH
 PACIFIC NORTHWEST 130800
 MIDDLE AND LOWER SNAKE RIVER
 21IDSURV

800322 DEPTH 0

/TYPA/AMBNT/STREAM

INDEX	1310001	002740	00290	0680	0290	0300		
MILES	0324.30	0059.50	089.60	023.50	016.80	000.10		
INITIAL DATE				01/01/01	80/02/20	80/03/14	80/04/08	
INITIAL TIME-DEPTH-BOTTOM					1030	1005	1045	
00042 ALTITUDE	FEET	AB MSL		2670				
00061 STREAM	FLOW,	INST-CFS			6.60	10.00	2.70	
00076 TURB	TRIDMTR	HACH FTU			67.0	235.0	20.0	
00116 INTNSVE	SURVEY	IDENT			801602	801602	801602	
70300 RESIDUE	DISS-180	C	MG/L		164	102	92	
80154 SUSP SED	CONC	MG/L			243	1445	29	

STORET RETRIEVAL DATE 81/07/20
2020228
46 46 45.0 116 56 50.0 2
UPPER TRIBUTARY AT WEST TWIN RD
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800322		DEPTH	0			
/TYPA/AMBNT/STREAM						
INDEX	1310001	002740	00290	0680	0290	0260 0020
MILES	0324.30	0059.50	089.60	023.50	015.10	001.50 00.10
INITIAL DATE			01/01/01	80/02/20	80/03/14	80/04/08
INITIAL TIME-DEPTH-BOTTOM				1200	1100	1135
00042	ALTITUDE	FEET	AB MSL	2720		
00061	STREAM	FLOW,	INST-CFS		2.00	2.00 0.10 J
00076	TURB	TRRIDMTR	HACH FTU		79.0	175.0 11.0
00116	INTNSVE	SURVEY	IDENT	801602	801602	801602
70300	RESIDUE	DISS-180	C MG/L		202	215 140
80154	SUSP SED	CONC	MG/L		256	623 28

STORET RETRIEVAL DATE 81/07/20
2020229
46 46 25.0 116 57 10.0 2
TRIBUTARY AT WEST TWIN RD
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800322		DEPTH	0			
/TYPA/AMBNT/STREAM						
INDEX	1310001	002740	00290	0680	0290	0260
MILES	0324.30	0059.50	089.60	023.50	015.10	001.10
INITIAL DATE			01/01/01	80/02/20	80/03/14	80/04/08
INITIAL TIME-DEPTH-BOTTOM				1145	1045	1130
00042	ALTITUDE	FEET	AB MSL	2690		
00061	STREAM	FLOW,	INST-CFS		4.20	5.00 0.80 J
00076	TURB	TRRIDMTR	HACH FTU		96.0	235.0 7.9
00116	INTNSVE	SURVEY	IDENT	801602	801602	801602
70300	RESIDUE	DISS-180	C MG/L		238	211 136
80154	SUSP SED	CONC	MG/L		221	2000 6

STORET RETRIEVAL DATE 81/07/20
2020230
46 45 20.0 116 57 20.0 2
TRIBUTARY AT EAST TWIN RD
16057 IDAHO LATAH
PACIFIC NORTHWEST 130800
MIDDLE AND LOWER SNAKE RIVER
21IDSURV

800322		DEPTH	0			
/TYPA/AMBNT/STREAM						
INDEX	1310001	002740	00290	0680	0290	0220
MILES	0324.30	0059.50	089.60	023.50	013.80	000.20
INITIAL DATE			01/01/01	80/02/20	80/03/14	80/04/08
INITIAL TIME-DEPTH-BOTTOM				1235	1130	1145
00042	ALTITUDE	FEET	AB MSL	2640		
00061	STREAM	FLOW,	INST-CFS		2.00	4.00 0.10 J
00076	TURB	TRRIDMTR	HACH FTU		130.0	215.0 12.0
00116	INTNSVE	SURVEY	IDENT	801602	801602	801602
70300	RESIDUE	DISS-180	C MG/L		300	187 187
80154	SUSP SED	CONC	MG/L		553	1253 8

-49-

STORET RETRIEVAL DATE 81/07/20

2020231

46 45 20.0 116 58 05.0 2

TRIBUTARY NORTHEAST OF MOSCOW

16057 IDAHO LATAH

PACIFIC NORTHWEST 130800

MIDDLE AND LOWER SNAKE RIVER

21IDSURV

800322 DEPTH 0

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 00290 0680 0290 0210

MILES 0324.30 0059.50 089.60 023.50 013.40 000.40

INITIAL DATE

01/01/01 80/02/20 80/03/14 80/04/08

INITIAL TIME-DEPTH-BOTTOM

1215 1115 1155

00042 ALTITUDE FEET AB MSL 2650

00061 STREAM FLOW, INST-CFS 1.00 2.00 0.10 J

00076 TURB TRBDMTR HACH FTU 150.0 225.0 1.2

00116 INTNSVE SURVEY IDENT 801602 801602 801602

70300 RESIDUE DISS-180 C MG/L 355 394 144

80154 SUSP SED CONC MG/L 187 461 8

APPENDIX C

Linear regression of suspended sediment and total phosphorus for Paradise Creek, main stem stations, all periods.

<u>n</u>	<u>Suspended Sediment</u>	<u>Total Phosphorus</u>	<u>n</u>	<u>Suspended Sediment</u>	<u>Total Phosphorus</u>
1	2	0.69	15	2371	1.67
2	48	0.47	16	15	0.34
3	483	0.73	17	166	0.37
4	1400	1.16	18	1420	1.42
5	8	0.20	19	28	0.19
6	8	0.22	20	870	1.04
7	1663	0.94	21	16	0.23
8	17	0.54	22	312	0.33
9	2290	1.71	23	413	0.56
10	33	0.38	24	30	0.33
11	284	0.53	25	24	0.18
12	2110	1.78	26	138	0.43
13	7	0.16	27	1452	0.83
14	18	0.20			

n = 27 Mean Phosphorus = 0.65 Mean Sediment = 578

Linear Regression Equation: T. phosphorus = 0.0006 Sediment + 0.3

Correlation coefficient = 0.93

APPENDIX D: FERTILIZER VALUE OF NUTRIENTS

Nutrients transported out of the watershed can be considered as a loss to the fertility of the soil from which they drained. The following table is an estimate of value only. However, this estimate serves as a demonstration of the monetary loss associated with nutrients which become pollutants in the receiving stream.

STATION	Phosphate Tons	Phosphate Value Dollars	Nitrogen Tons	Nitrogen Value Dollars	Total Dollars
S.F. Palouse R.	22	17,600	123	73,800	91,400
Paradise Cr.	9	7,200	46	27,600	34,800
TOTAL					\$126,200

Procedure:

1. Tons of nutrient were calculated by applying appropriate data to daily discharge.
2. T. Phosphorus was converted to tons as phosphate.
3. Ammonia, nitrate, and TKN were converted to nitrogen.
4. From fertilizer dealers the following values were obtained: \$0.40/lb for phosphate, \$0.30/lb for nitrogen.