Lower Payette River Subbasin Assessment and Total Maximum Daily Load

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Prepared For State of Idaho

by
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Table of Contents

List of Tables 1

List of Figures 1

1.0. Executive Summary 2
- 1.1. Addressing Waterbody verses Hydrological Unit Area 4
- 1.2. Public Involvement 4
- 1.3. Acknowledgment 5

2.0. Watershed/Water Quality Assessment 7
- 2.1. Watershed Description 7
  - 2.1.1. Hydrology 12
  - 2.1.2. Climate 15
  - 2.1.3. Geology 15
  - 2.1.4. Fisheries 19
  - 2.1.5. Current Land Use 20
  - 2.1.6. Land Ownership 22
  - 2.1.7. Historic Presence of Man 25
  - 2.1.8. Economic and Social Base 25
- 2.2. Beneficial Use Designation History 26
  - 2.2.1 Current Beneficial Use Status 26
- 2.3. Designated Beneficial Uses Rationale/Justification 27
  - 2.3.1. Agricultural Water Supply 27
  - 2.3.2. Domestic Water Supply 27
  - 2.3.3. Industrial Water Supply 28
  - 2.3.4. Wildlife Habitat 28
  - 2.3.5. Aesthetics 28
  - 2.3.6. Cold Water Biota 28
  - 2.3.7. Salmonid Spawning 28
  - 2.3.8. Recreational Use 29
- 2.4. Water Quality Monitoring History 29
  - 2.4.1. In-River Monitoring 29
  - 2.4.2. Point Source Monitoring Requirements 30
  - 2.4.3. Tributaries-Irrigation Return Drain Monitoring. 30
- 2.5. Data Gaps 31
  - 2.5.1. Urban-Suburban Areas 31
  - 2.5.2. Waste Water Treatment Plants 31
  - 2.5.3. Rural Areas 32
  - 2.5.4. In-River Biological Indicators (Bio-Monitoring) 32
  - 2.5.5. Ground Water Contribution 32
- 2.6. Pollutant(s) of Concern/Water Quality Impairment 34
  - 2.6.1. Nutrients 34
  - 2.6.2. Temperature 37
  - 2.6.3. Bacteria 38
- 2.7. Source Identification 40
  - 2.7.1. Point Sources 40
  - 2.7.2. Nonpoint Sources 40
  - 2.7.3. Background 41

2.7.4. Natural Contribution 41
2.8. Carriers/Linkage 42
2.8.1. Sediment 42
2.8.2. Ground Water 42
2.9. Stressors 42
2.9.1. Stream/River Bank Modification 42
2.9.2. Flow Modification 43

3.0. Pollution Control Efforts 43
3.1. Ongoing Projects 43
3.1.1. Nonpoint Sources 43
3.1.2. Point Sources 44

4.0 Bacteria Loading Analysis and Load Reduction 45
4.1. Introduction 45
4.1.1. Review of Data 45
4.1.2. Data for Bacteria Load Determination 46
4.2 Loading Calculations 46
4.2.1 Methods for Calculations: 46
4.2.2. Die off Rates/Disappearance Rates 47
4.3. Load Reductions 48
4.3.1. Load Analysis 48
4.3.2. Wasteload Allocation 49
4.3.3. Load Allocation 50
4.3.4. Margin of Safety 51
4.3.5. Wasteload Allocation, Load Allocation and Total Maximum Daily Load 51

5.0. Reasonable Assurance 53
5.1. Point Sources 53
5.2. Non-Point Sources 53
5.3. Time frame for Compliance 55

6.0. Literature Cited 56

7.0 References of Lower Payette Basin Studies 60

8.0 Glossary of Terms and Acronyms 62

Appendix A. Watershed Advisory Group Meeting Dates and Locations 64

Appendix B. Water Quality Information 1997-1999 Lower Payette River 65

Appendix C. Flow Budget, In-Flow Schematic and Out-Flow Schematic Lower Payette River, 1996 66

Appendix D. Lower Payette River Monitoring Sites 67

Appendix E. Point Source Description and Monitoring Requirements 68

Appendix F. Bacteria Load Reductions Tables 69

Appendix G. Comments to Previous Draft Documents 70

List of Tables

Table 1. Fish Species Found in the Lower Payette River During 1974 and 1997. Idaho Department of Fish & Game. 19
Table 2. Land use in acreage and percent 22
Table 3. Land Ownership in the Lower Payette River area. 22
Table 4. Designated Beneficial Uses, Status and Pollutant(s) of Concern 27
Table 5. Probable salmonid species present in the Lower Payette River. Common name, scientific name and protected spawning periods. 29
Table 6. Percent Change in Historic Flows on the Payette River USGS Gage at Highway 95 Bridge 36
Table 7. Nutrient Results from 1996-1997 in River Monitoring Effort. Total Nitrite+Nitrate (average and maximum) and Total Phosphorus (average and maximum) 36
Table 8. Geometric Means for Bacteria, Lower Payette River June, August and September 1996 and 1997 39
Table 9. Known Point Source Discharge and NPDES Number. 41
Table 10. On-going Pollution Abatement Project for Agricultural Activity. 44
Table 11. Geometric Mean Results (CFU*/100 ml) Lower Payette River Bacteria Monitoring. 1996 and 1997. 46
Table 12. Load Capacity for the Payette River at Each Station. Lower Payette River. 48
Table 13. Current Load Calculation with Withdrawals, and Current Measured Load near Confluence. 49
Table 14. Load and Wasteload Allocations with Withdrawals, and Capacity Load near Confluence. 49
Table 15. Point Sources Load Analysis. 49
Table 16. Point Sources Load Capacity at Lower Payette River's Capacity at 50 CFU/100ml. (1.76E+07 CFU/sec). 50
Table 17. Point Sources Load Capacity at Lower Payette River's Capacity at 50 CFU/100ml. (1.76E+07 CFU/sec). 50
Table 18. Final Load Analysis, TMDL, Wasteload Allocation, Load Allocation and Margin of Safety. 51
Table 19. Current Load, Load After Die-Off, and Allocated Load. 52
Table 20. State of Idaho's Regulatory Authority for Non-Point Pollution Sources. 54
Table 21. Objectives for the Implementation Plan for the Lower Payette River TMDL. 55

List of Figures

Figure 1. Lower Payette River TMDL Project Area. 6
Figure 2. Payette River Basin and Sub-Basins. 9
Figure 3. Payette River Basin, Sub-Basins and Lower Payette River TMDL Project Area. 10
Figure 4. 5th Field Hydrologic Unit Areas. 11
Figure 5. Rivers, Streams, Canals, Ditches and 303(d) Listed Segments. 14
Figure 6. Geological Formations 18
Figure 7. Landuse. 23
Figure 8. Land Ownership. 24
Figure 9. Major Roads and Highways. 33

1.0. Executive Summary

The lower Payette River is located in the southwestern portion of Idaho, Figure 1. The total basin area is approximately 2,000,000 acres, or 3240 mi^2. The area of concern for this Subbasin Assessment and Total Maximum Daily Load is the lower Payette River area (River Mile 38.5 to River Mile 0, Figure 4.). Approximately 380,000 acres of irrigated and non-irrigated lands are located in this area. One other "Water Quality Limited Segment", Bissel Creek, is located in the Lower Payette River Subbasin Assessment (SBA) and Total Maximum Daily Load Management Plan (TMDL) project area, but will not be addressed in this document.

Section 303(d) of the Federal Clean Water Act requires states to develop TMDLs for those water bodies determined not in full support of the designated beneficial uses and those water bodies are considered to be water quality limited. A TMDL documents the amount of pollutant(s) a water body can assimilate without violating state water quality standards. As defined in 40 CFR Part 130, these plans are designed to provide load allocations to both point sources (wasteload allocations), non-point sources (load allocation) and provide for a margin of safety.

The 1994 §303(d) list identified temperature, nutrients and bacteria as pollutants of concern in the lower Payette River. In accordance with IDAPA 16.01.02.053, it was determined that exceedences of Idaho Water Quality Standards and Wastewater Treatment Requirements (water quality standards) had occurred and were at levels that are impairing or could impair beneficial uses. Beneficial uses impacted or impaired included: cold water biota; salmonid spawning; and primary contact and secondary contact recreation uses.

Hydrology of the river is complex, with numerous irrigation water withdrawal and return drains dominating both flow and quality of the river. Channelization for flood control is noted throughout the river. Climate is mainly arid, with a majority of precipitation events occurring during winter months. Geological features are mostly Miocene and Pliocene lake deposits, and basalt formations. The presence of Black Canyon Dam has greatly altered the amount and type of sediment in the lower Payette River originating from the upper watershed.

Fisheries studies conducted by the Idaho Department of Fish and Game in 1997 indicates support of many of the same species present in 1974, with Mountain whitefish as the dominant cold water species. Warm water species can be found throughout the river, with non-game species being dominant.

Land use is mainly agricultural with dryland and irrigated croplands, along with upland grazing. Approximately 100,000 acres are under some form of irrigation. Irrigation water is supplied through in-river diversions, pumps, or from withdrawals from Black Canyon Reservoir. Uplands are mainly used for open grazing of cattle and sheep. Landownership is mostly private, with public lands found in the uplands and river bottom. Agriculture has dominated the land use since early settlement and remains the dominant social and economic base.

Sources of pollutants include both point sources and non-point sources. Point sources are limited mainly to municipal treatment plants and confined animal feeding operations. Non-point sources are associated with agricultural, urban, suburban and rural areas.

Nutrients have not been shown to cause impairment to the beneficial uses in this waterbody at this time. Total phosphorus and nitrogen are at concentrations that may cause nuisance aquatic vegetation growth. However, evaluation of data to determine if nutrients are impairing beneficial uses concluded they are not, under current flow conditions. While dissolved oxygen concentrations do not drop below water quality standards, , monitoring indicated that aquatic growth is causing fluctuation in dissolved oxygen levels. Accordingly, it is recommended that a "Watershed Management Plan" be developed to address nutrients. Additionally, the lower Snake River/Brownlee TMDL is scheduled to be completed in 2001. If it is determined that the lower Payette River is a significant source of nutrients to the lower Snake River, reduction targets for the lower Payette River will be addressed at that time.

Summer water temperatures in the lower Payette River are warm and exceed water quality standards for both cold water biota and salmonid spawning. However, it was determined that other factors including habitat modification and flow alteration were also significant causes of impairment of beneficial uses. Blockage and diversion structures are interfering with migration patterns of trout species to historic spawning areas. Mountain whitefish appear to be maintaining a viable age class distribution throughout the project area, indicating that salmonid spawning is existing, but is not full support due to the lack of trout species.

Although it is demonstrated that water temperatures exceed current water quality standards for cold water biota and salmonid spawning, it is believed that warm water temperature is not the only pollutant impairing beneficial uses. Other conditions that preclude the development of a TMDL for temperature include warm water temperatures that exceed water quality standards originating from Black Canyon Reservoir (40 CFR 131.10(g)(3) (4)(5)).

Because of these conditions, it is recommended that a temperature TMDL <u>not</u> be developed due to external sources of warm water temperature and habitat modification.

Flow alteration and habitat modification are not pollutants as described under §303(d) of the Clean Water Act (EPA, 1999). Furthermore, there are no water quality standards for habitat upon which to base a load allocation.

Fecal coliform (Fecal coli) bacteria levels exceed the water quality standards for both primary and secondary contact recreation. Increasing levels are noted from Black Canyon Dam to the Snake River, with exceedence of the water quality s from River Mile twenty-five to the confluence. Overall fecal coli reduction of 84% will be required to achieve water quality standrads. Load allocation will focus on non-point sources only (load allocation). If total elimination of bacteria from the point sources (municipal wastewater treatment plants) would occur, a total load reduction of 0.07% would be achieved. Overall contribution of Fecal coli bacteria load from these sources is 0.005%. Any reduction from point sources (wasteload allocations) will not impact the overall load to the lower Payette River.

Within eighteen months of the approval of the TMDL, an implementation plan will be developed by supporting agencies and stakeholders. The implementation plan will include a monitoring plan to determine effectiveness of best management practice in achieving targets of the TMDL. If further monitoring determines that specific targets are not appropriate, these targets may be adjusted and the TMDL revised accordingly.

1.1. Addressing Waterbody verses Hydrological Unit Area

In 1996, the Division of Environmental Quality-Boise Regional Office was assigned to develop a Subbasin Assessment and corresponding Total Maximum Daily Load (TMDL) for the lower Payette River. The directive at that time was to place the lower Payette River on the "High" priority list for development of the subbasin assessment and the corresponding TMDL (IDAPA 16.01.02.054.04). This action pre-dated the agreement between the United States Environmental Protection Agency, the plaintiffs (*Idaho Sportsmen's Coalition vs. Browner, Id.*) and Idaho Division of Environmental Quality for the development of Total Maximum Daily Loads based on hydrologic unit areas (*letter to United States Environmental Protection Agency, April 1997*). It is recognized that there are other "Water Quality Limited Segments" within the hydrologic unit area; however, they will not be addressed in this document.

The lower Payette River is a complex and diverse water body. The primary sources of the listed pollutants of concern are associated with agriculture; mainly irrigation water return and other non-point sources. Monitoring conducted from 1996 through 1998 focused on non-point sources in the lower Payette River drainage.

The other listed water quality limited segments within the Subbasin(Hydrologic Unit Area 17050122) are; Bissel Creek, Black Canyon Reservoir, Harris Creek, Little Squaw Creek, Shafer Creek, Upper Squaw Creek and Solider Creek (1996 303(d) List). Only Bissel creek is a direct tributary to the lower Payette River. The Division of Environmental Quality (DEQ) has proposed Harris Creek, Little Squaw Creek, Shafer Creek and Upper Squaw Creek for removal from the 303(d) list based on full support of beneficial uses. Big Willow Creek was added to the 1998 303(d) list, but to date, this list has not been approved by the United States Environmental Protection Agency.

It is recognized that Black Canyon Reservoir is a major influence on water temperature in the lower Payette River. However, increased temperature does not appear to be the limiting factor for full support of cold water species. Also, Black Canyon Reservoir pre-dates the Clean Water Act, which would indicate a pre-existing condition before 1974.

With these conditions in mind, and the lack of adequate data for the other segments, it is proposed that Bissel Creek and Big Willow Creek be addressed in 2001. The remainder of the hydrologic unit area be reevaluated and scheduled for a subbasin assessment and TMDL in conjunction with HUC 17050123 in 2003.

1.2. Public Involvement

In 1995, concerned citizens in the lower Payette River area formed the Lower Payette River Watershed Advisory Group (WAG). In 1996, the Division of Environmental Quality (DEQ) recognized the Lower Payette River WAG as the lead citizen group in representing stakeholders in the lower Payette River area. The focus of this WAG is to offer advice and recommendations to the DEQ in the development of the Subbasin Assessment and the Total Maximum Daily Load Management Plan. The WAG set up an Executive Officer committee where members were elected to represent certain stakeholders, such as: livestock interest, agricultural interest, municipalities, county government, recreationist, environmental, public at large, industry, and irrigation/water users. Election of a chairperson, vise-chairperson and secretary-treasure occur annually.

The Lower Payette WAG established a Technical Advisory Committee (TAC) to assist the WAG in evaluation of water quality data. This TAC was formed with local, state and federal agencies. Private groups, such as a local engineering firm and representatives from the irrigation interest were also members of the committee.

The TAC provided comments and evaluation of data along with editorial comments to draft documents. The TAC also provided direct input to the WAG concerning development of documents.

Appendix A contains dates and location of all WAG meetings held in the last four years. Appendix G contains comments on draft documents completed to date.

1.3. Acknowledgment

The State of Idaho, Division of Environmental Quality wishes to acknowledge the Lower Payette River Watershed Advisory Group and the Lower Payette River Technical Advisory Committee for their valuable input in the development of both the Subbasin Assessment and the Total Maximum Daily Load Management Plan. Local insight and input were a key component for the development of both documents.

Recognition is given to Kathy Skippen for assistance in developing the historic perspective; Bill Strowd, P.G., Holladay Engineering, for completing the geology portion of the Subbasin Assessment; and Liz Jenkins, State of Idaho, Division of Environmental Quality, for providing her technical writing expertise and clerical support.

Recognition is also given to Bill Stroud and staff and Dave Zimmer at the Bureau of Reclamation Laboratory in Boise, Idaho and Leslie Freeman and Amy Lunstrum from the Division of Environmental Quality, Boise Regional Office, for conducting the monitoring on the lower Payette River.

Lower Payette River TMDL Project Area

Project Area in Idaho

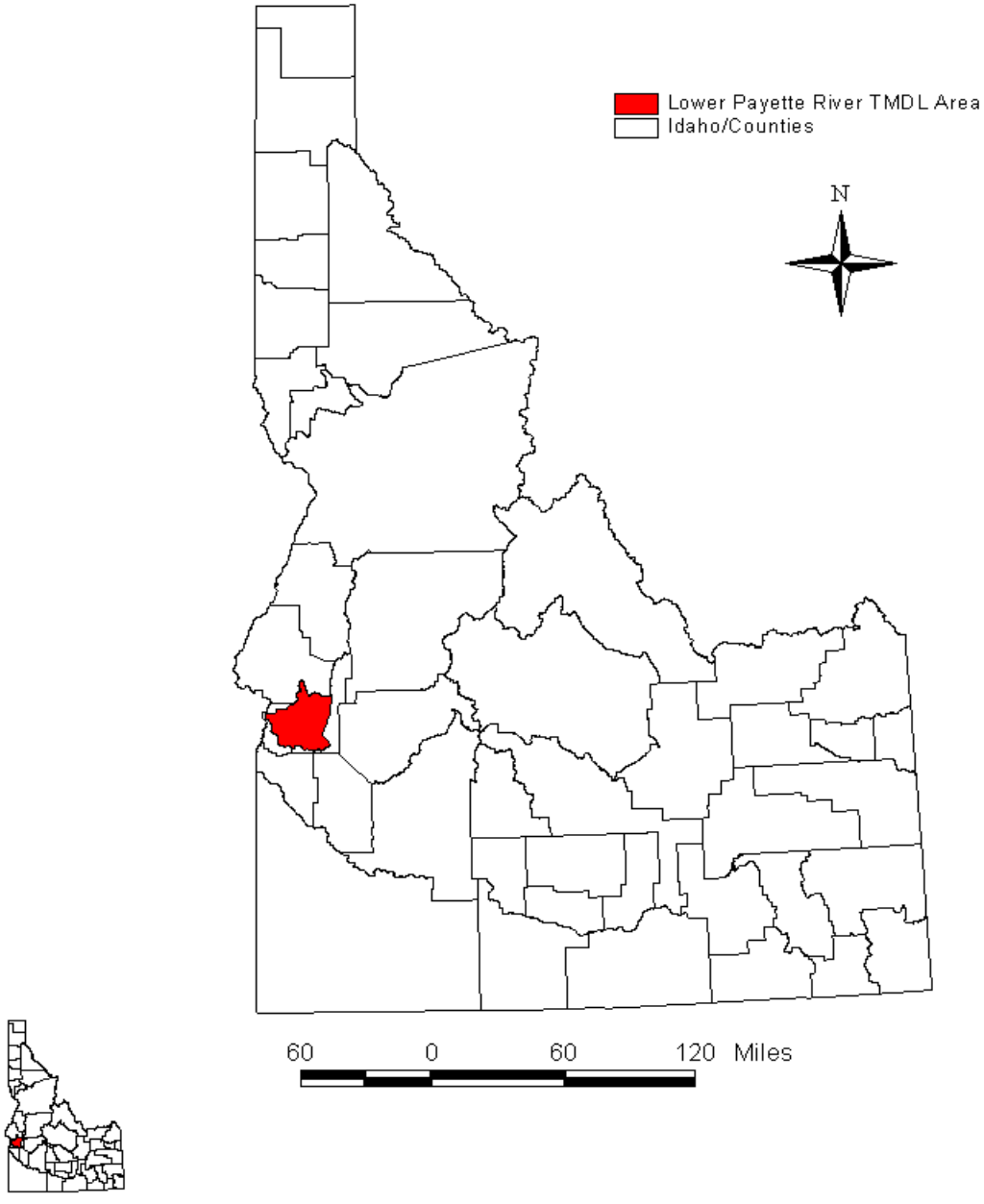

Figure 1. Lower Payette River TMDL Project Area.

2.0. Watershed/Water Quality Assessment

Lower Payette River	
Segment Identifier:	SWB-340 WQLSEG # 2689 PRNS # 689.00 HUC# 17050122
Pollutants of Concern:	Nutrients Temperature Bacteria
Beneficial Uses Affected:	Cold Water Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Known Sources:	**Point Sources**: Emmett WWTP New Plymouth WWTP Fruitland WWTP Payette WWTP CAFO's **Nonpoint Sources**: Agricultural Return Urban-Suburban-Rural Septic Systems

2.1. Watershed Description

The Payette River is located in Southwest Idaho and along with the Boise and Weiser River is one of three major tributaries contributing to the Snake River from the southwest portion of the state (Figure 1). The confluence with the Snake River is at River mile 365 (United States Geological Survey (USGS) 7.5 minute quad map, Payette). The entire Payette River basin, (HUC's #17050120, #17050121, #17050122 and #17050123) headwaters to mouth, is approximately 2,000,000 acres in size, 3,240 mi^2 (Figure 2). A majority of the land is either forested or open rangeland.

The lower Payette River (River mile 0 to 75) is located in the hydrologic unit code (HUC) #17050122 (4th field). The portion of the lower Payette River to be addressed in the development of the Subbasin Assessment - Total Maximum Daily Load Management Plan (SBA-TMDL) is from Black Canyon Dam to the confluence with the Snake River, Southwest Basin (SWB) #340, Payette River Mile 0 to 38.5 (Figure 3). This area includes the fifth field HUC#'s 010, 020, 030, 040, 050, 060, and 070 (Figure 4).

One other stream listed on the 1996 303(d) list is Bissel Creek, located on the north side of the river, in the fifth field HUC 040 (Idaho Department of Health and Welfare (IDHW), 1994). Bissel Creek will be addressed in a general SBA-TMDL document to be developed in 2001.

The watershed area below Black Canyon Dam is approximately 380,000 acres. Uplands, and non-irrigated rangeland constitute most of the land features and land use. Irrigated croplands, orchards and pastures make up approximately 100,000 acres. These are mainly in the lower Payette River Valley and the Big and Little Willow Creek drainages.

The lower Payette River was listed as "water quality limited" in 1994 (IDHW, 1994), and placed on the 303(d) list in accordance with the federal Clean Water Act. Water quality monitoring had determined nutrients, bacteria and temperature were at levels that may impair the designated beneficial uses for the river or exceed water quality standards. The designated beneficial uses for the lower Payette River are listed in Table 4. (IDAPA 16.01.2101,02.and IDAPA 16.01.2140,01.mm. in: Idaho Water Quality s and Wastewater Requirements (IDHW 1996)).

As described in IDAPA 16.01.02.053, a determination of beneficial uses support can be made if all applicable water quality s are being met or if water quality information indicates exceedence of water quality standards. It was determined that water quality standards in the lower Payette River were not being met. The purpose of the SBA is to determine the extent of impacts to beneficial uses and if adequate pollution control measures are in place to address pollutants of concern.

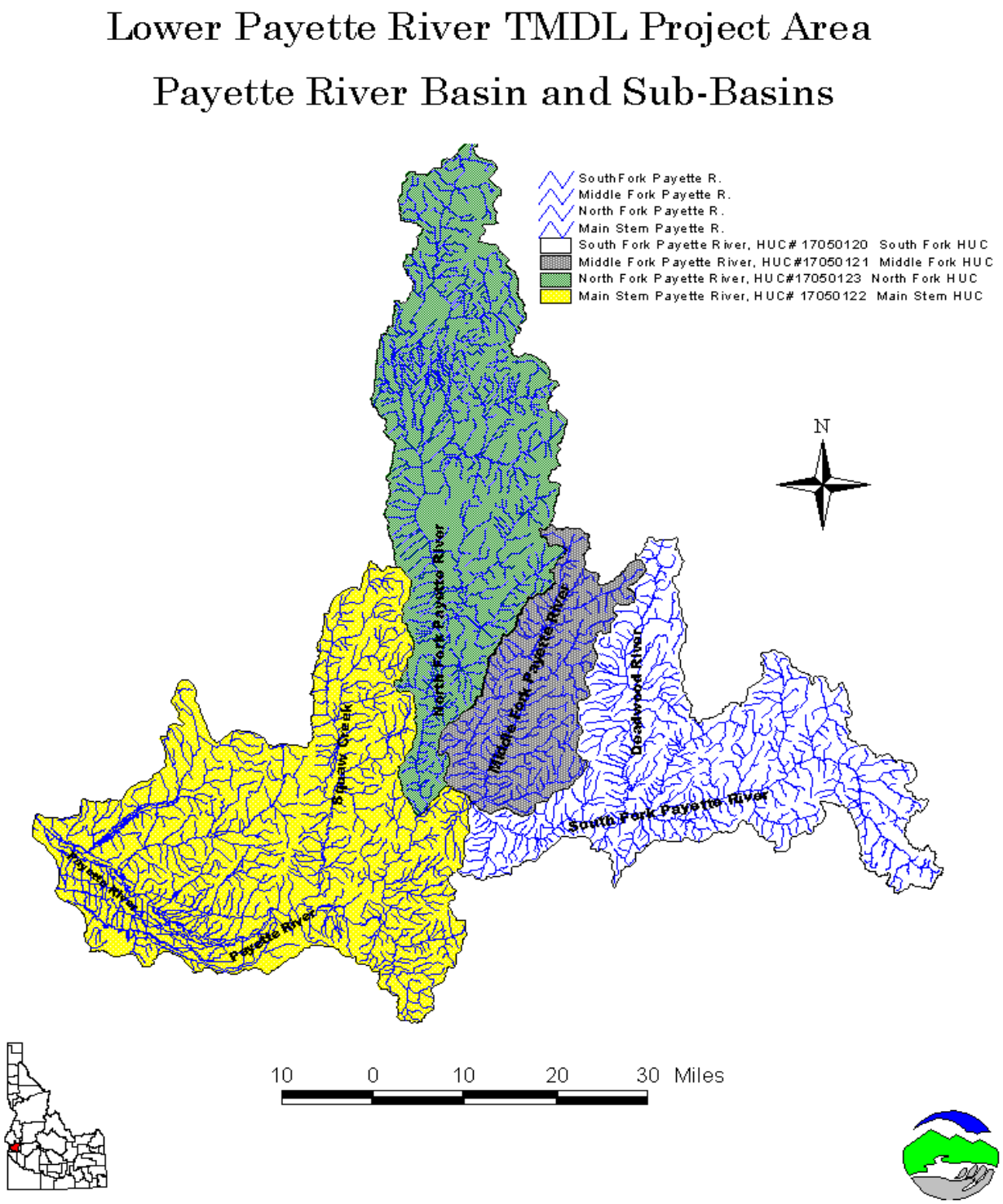

Figure 2. Payette River Basin and Sub-Basins. Lower Payette River TMDL Project Area.

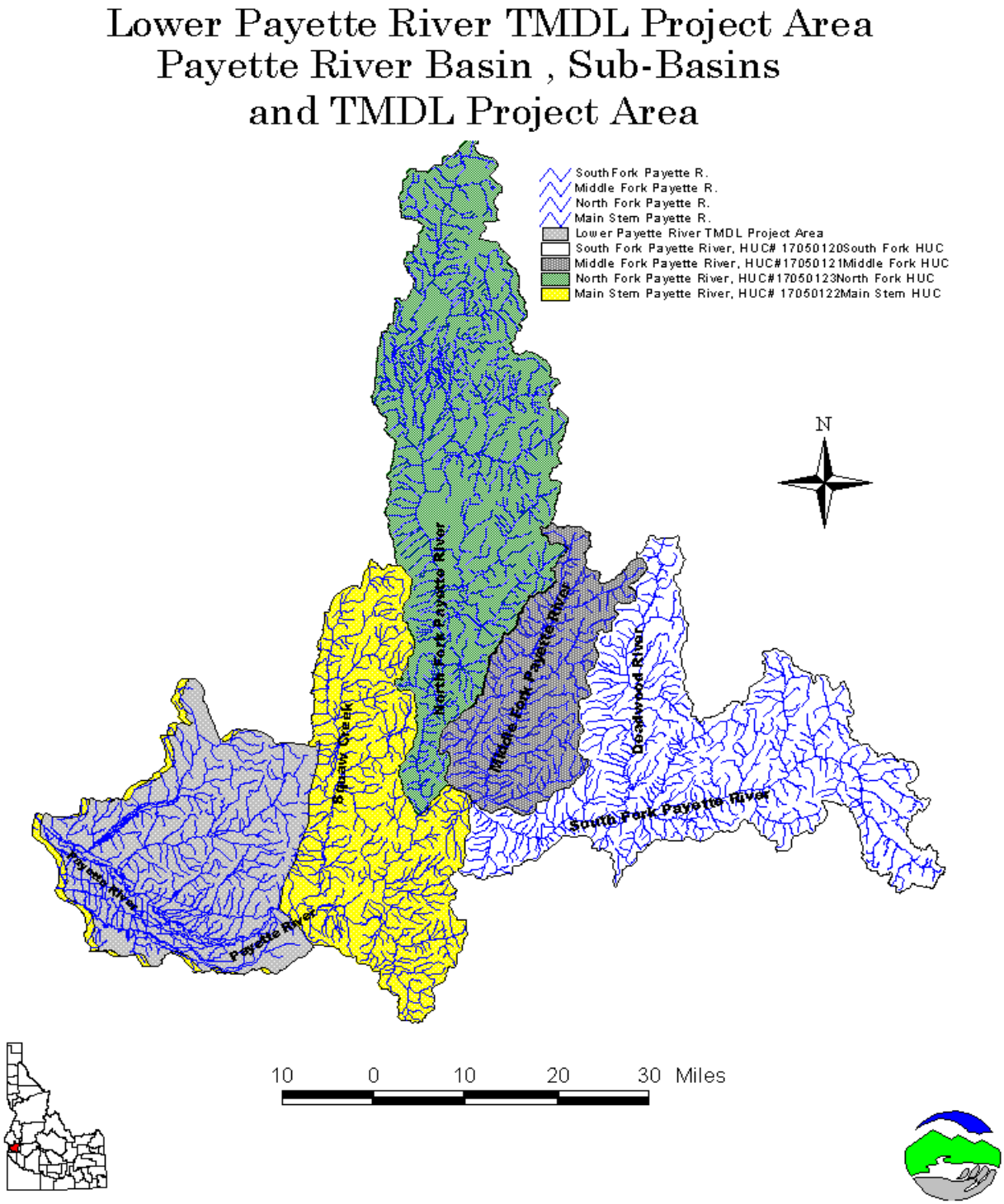

Figure 3. Payette River Basin, Sub-Basins and Lower Payette River TMDL Project Area.

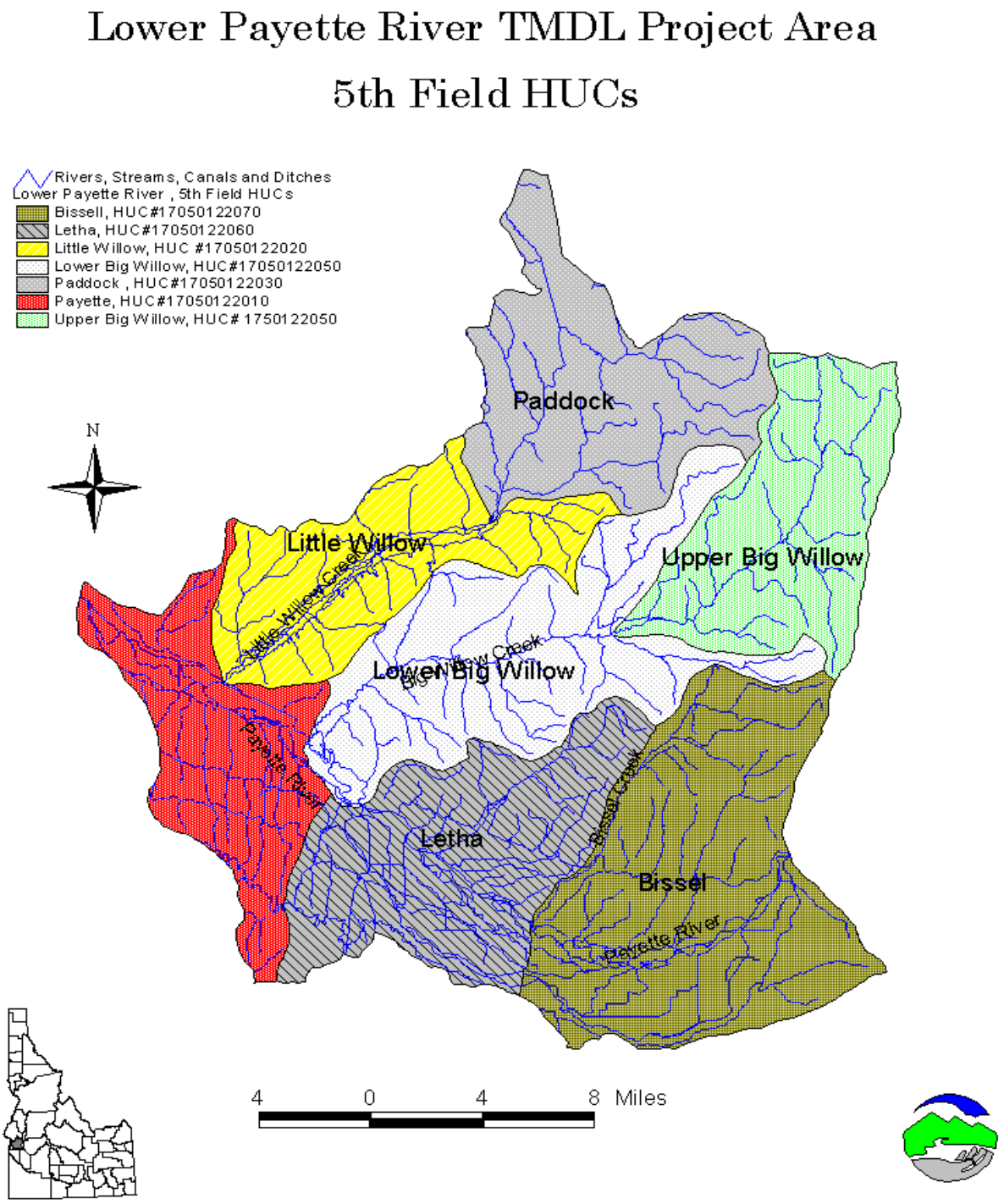

Figure 4. 5th Field Hydrologic Unit Areas. Lower Payette River TMDL Project Area.

2.1.1. Hydrology

The lower Payette River is the dominate hydrologic feature in the TMDL project area. The river flows westerly, and joins the Snake River near Payette, Idaho. The river is used for irrigation water and is the main receiving water for irrigation return flows and point source discharges. Figure 5 shows the major hydrology features.

Flows are governed by snowpack melt, precipitation events, reservoir storage, flood control, irrigation water demand and fish flow augmentations. Three major impoundments, outside the basin assessment area, are used to regulate flows. They are: Cascade Reservoir, located approximately 40 miles to the north, which regulates flows in the North Fork of the Payette River; Deadwood Reservoir, located approximately 50 miles northwest from the TMDL project area regulates flows in the South Fork of the Payette via the Deadwood River; and Black Canyon Reservoir, which is used primarily for water diversion to the Emmett Canal and the Black Canyon Canal. Some water is diverted out of the TMDL project area and pumped to the lower Boise River drainage, via the Black Canyon Canal. The remainder of the Black Canyon A-Line leaves the TMDL project area and is used for irrigation in the lower Boise River and Snake River area. The Lower Payette Canal (Payette Slough) services agricultural areas between Payette and Weiser, Idaho. Return flows are diverted into the Snake River or the Weiser River.

The Payette River is subject to out of bank events and extreme low flows. The extremes for both have occurred in the last 10 years (United States Geological Survey (USGS), 1998). On January 2, 1997, flooding occurred throughout the TMDL project area, with an estimated flow of 32,000 cfs at the USGS Gage at Payette, which was the highest on record. The lowest flow on record was on August 15, 1991, when a flow of 127 cfs was recorded. The seven day-ten year minimum (7Q10) was June, 1994, when the flow averaged 173 cfs (USGS, 1998). See Appendix C for flow data information.

The elevation at Black Canyon Dam is 2,400 feet, at Payette, Idaho, the elevation is 2138 feet. The distance from Black Canyon Dam to the confluence with the Snake River is 38.5 miles. The overall gradient is 0.13%. From Black Canyon Dam to Letha gage site the gradient is 0.17%, while from Letha to Payette the gradient is 0.11%.

The lower Payette River would naturally be a braided system due to low gradient and the large volume of sediment delivery. However, due to channelization for flood control, water diversions and Black Canyon Dam, the system is now an F channel type (Rosgen, 1996). F channel types are those characterized with confined banks and a high width to depth ratio.

The lower Payette River below Black Canyon Dam has diversions throughout the system, starting with the Last Chance Ditch just below Black Canyon Dam to the Washoe Canal, approximately four miles upstream from the Snake River confluence. Water diversion averages 1,200 cfs, or about 500,000 acre feet annually (Water District #65, 1997). Usually during the irrigation season, flows are lower at the established Bureau of Reclamation (BOR) gage site at Letha than those recorded at the Black Canyon Dam, ten miles upstream. Water withdrawals are measured and regulated by irrigation water demand and water rights through the Payette Water District #65 and the separate irrigation districts. The Noble Canal, Farmers Co-op Canal, Last Chance Canal, Black Canyon Canal and the Black Canyon A-Line services the south side of the river. The north side is mainly serviced by the Emmett Canal and the Lower Payette Canal. See Appendix C for a schematic of the major withdrawals along the lower Payette River.

The western section of the valley is primarily dominated by irrigation water return drains (“S” Series Drains), that drain agricultural lands south to north. These drains either followed natural ephemeral streams or were constructed. Whether natural or constructed, these drains assist in the removal of shallow ground water. Year-round flow indicates a contribution from ground water (Ingham, 1996). The northwest side of the lower Payette River Valley is mainly serviced by the 49'er Slough. The 49'er Slough is mainly used for irrigation water return and is either constructed or follows an old slough developed by the river. Although not as numerous, the eastern section also has constructed drains. The major drains are the County line (Gospel Drain), Tunnel #7 and Plaza. On the north side of the eastern section, the upper Emmett Bench area, drainage is through ephemeral, intermittent or perennial streams, such as Bissel and Haw Creeks. However, constructed drains, such as the Pioneer Drain and the Big 4 Drain, are also dominate drainage conveyances. See appendix C for a schematic of diversions and return drains.

Along with the irrigation water return ditches, there are three other sub-watersheds: Big Willow Creek, Little Willow Creek and Bissel Creek. All three originate from the northern section of the TMDL project area and flow south. All are utilized for irrigation water supply. Upper Bissel Creek is usually dry due to irrigation diversions and sporadic precipitation events, while lower Bissel Creek usually flows year round due to ground water and irrigation return flow. Big Willow Creek, the largest of the sub-watersheds, is diverted into the lower Payette Slough, where at the confluence with Little Willow Creek, it is then diverted into the lower Payette Canal. Excess water from the Payette Slough, Big Willow Creek and Little Willow Creek is then returned to the Payette River. Little Willow Creek flow is governed by water release from Paddock Reservoir located in the northern part of the headwaters. Both Big and Little Willow creeks are diverted for irrigation water in their respective watersheds. Irrigation water is then returned to the creeks. It is common for both streams to go dry during low precipitation periods.

Appendix C contains a table that shows an estimated water budget for the lower Payette River. Numbers shown in this table are obtained from Payette Water District #65 Watermaster’s Report (Water District #65, 1997), USGS (USGS, 1997), Idaho Department of Agriculture (IDA) monitoring (Campbell ,1997) and Idaho Division of Environmental Quality (DEQ) (Ingham, 1996). River flows from August 1996 were utilized because of stable flows during this period when precipitation events have little impact on the flows and consistent flow data for tributaries was available.

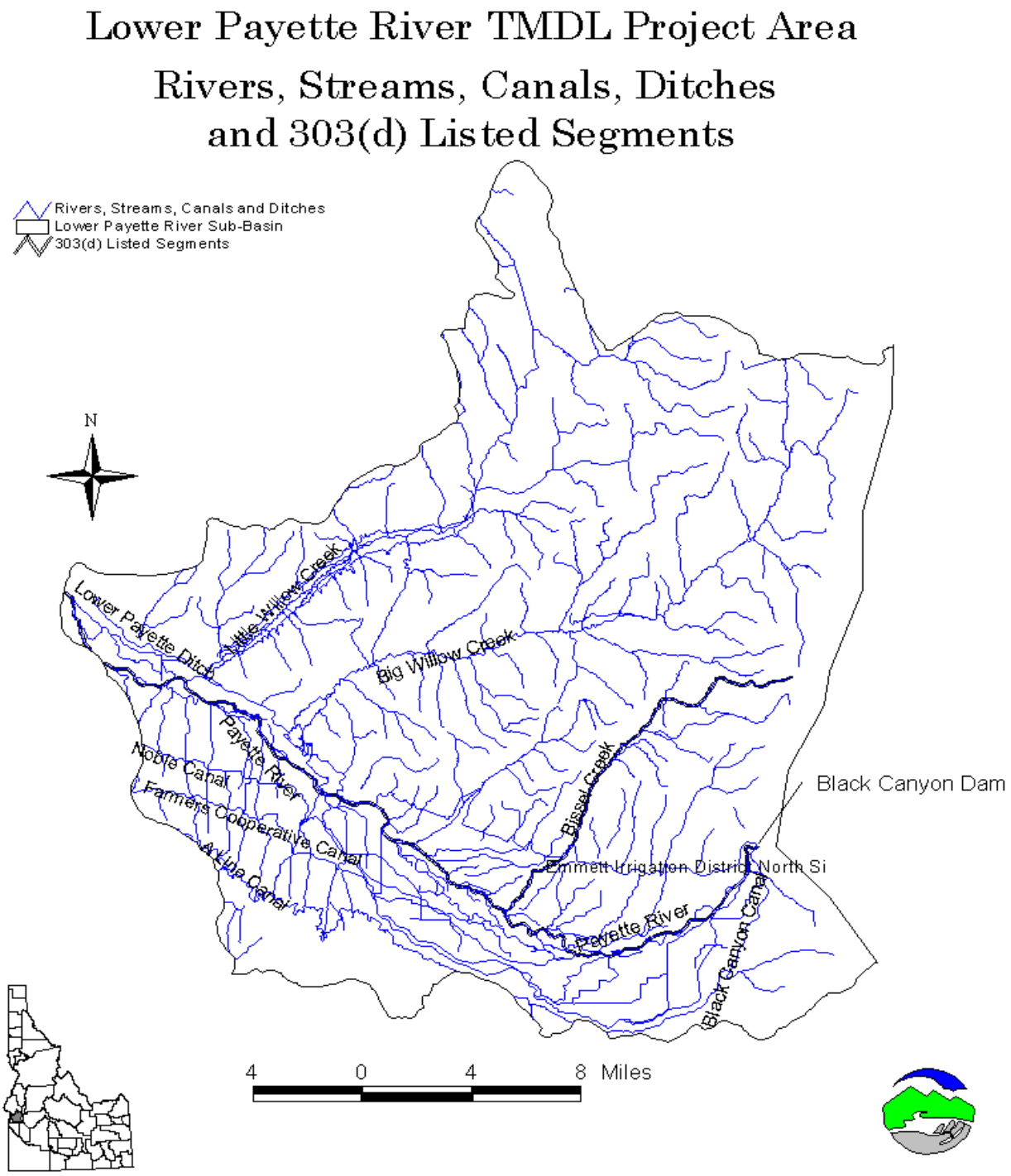

Figure 5. Rivers, Streams, Canals, Ditches and 303(d) Listed Segments. Lower Payette River

2.1.2. Climate

The lower Payette River is located in a semi-arid area. Precipitation is usually less than 20 inches/year throughout the TMDL project area. Summer months are usually hot and dry with occasional thunderstorms with brief heavy precipitation events. For the period from August 1, 1947 through June 30, 1997, at Payette, Idaho, the average maximum temperature for the months of June through September was 86.9^{o}F, with a minimum temperature during the same period of 51.7^{o}F. From June through September average monthly precipitation is 0.45 inches, with a total average precipitation for that period of 1.8 inches. Average annual precipitation is approximately 10.6 inches (Western Regional Climate Center, 1997).

The winter months, December through March, are usually cool with approximately half of the yearly precipitation events occurring during this period. The average maximum temperature for the period of August 1948 through June 1997 for the months of December through March was 44.5^{o}F, while the average minimum temperature was 24.3^{o}F. The average monthly precipitation is 1.27 inches. The average total precipitation is 5.1 inches during this period (Western Regional Climate Center, 1997).

Precipitation at Emmett, based on 1961-1990 data averaged 13.20 inches a year (Western Regional Climate Center, 1997). Winter months average 2.09 inches, with a total accumulative of 5.92 inches. Based on 1961-1990 data. The average yearly total precipitation at Ola is 19.7 inches. Although not in the TMDL project area, Ola does represent expected precipitation totals at mid elevation, 3,000-4,000 feet. Ola's elevation is 3,410 feet. For the winter months, the average is 2.09 inches per month with a total average of 9.38 inches for the period (Western Regional Climate Center-Internet Retrieval, 1998). This data demonstrates that the mid to higher elevations receive almost twice as much precipitation as those sites below 2,500 feet. The highest point in the lower Payette River TMDL project area is Squaw Butte, at 5,850 feet.

Rapid snowmelt, or rain on snow events, can occur in the lower Payette River TMDL project area. This occurred in January, 1997 when a heavy snow fall in December 1996 was followed by warm temperatures with rain. This event triggered a rapid, uncontrollable snowmelt in the low to moderate elevation (2,000-5,000 feet). The results were record flows on the Payette River at Payette, Idaho. Both Big and Little Willow Creeks contributed large flows during this period. This flooding weakened and caused many levee and dike failures throughout the lower Payette River TMDL project area.

2.1.3. Geology

The upper Payette River drains much of the highland areas of the Boise Mountains in west central Idaho. This area is dominated by Cretaceous granitic intrusive of the Idaho Batholith. However, in the vicinity of Black Canyon Reservoir the Payette River transects younger Miocene basalt lava flows (Figure 6). The lavas are part of the Weiser Embayment flood basalts correlative to the Columbia River Basalt Group of central and eastern Washington, northeastern Oregon and western Idaho. In contrast to this igneous terrain, most of the lower Payette River and its tributaries, below Black Canyon Dam to its confluence with the Snake River, flows upon a basement lithology of late Miocene and Pliocene lake and stream deposits and outwash from Pleistocene mountain glaciation which produced multiple fluvial deposits on the surface of the older lake beds. Most recently, Holocene alluvial clay, silt, sand and gravel compose the more surficial deposits within the lower Payette Rivers channel, floodplain and tributaries (Figure 6).

Geological History

The late Miocene and early Pliocene sediments consist of a thick sequence of mostly consolidated silt and clay deposited on the floor of a large, ancient, fresh-water lake occupying the western Snake River Plain. Named Lake Idaho, the lake resulted from an impoundment of the ancestral Snake River, which eventually drained at a low divide most likely in the present vicinity of Fair Well Bend, Oregon. This overflow, and consequent erosion, is believed to have established the present course of the Snake River through Hells Canyon along the Idaho-Oregon State Line. Prior to the lake draining, the Snake River possibly flowed south near Twin Falls, Idaho through northwest Nevada and into the Pacific via what is now the Sacramento River in California. This conclusion is based largely on regional similarities between characteristic fossil assembledges and geologic evidence of pre-existing topographic features (Repenning, et.al., 1995).

Lake Idaho and inflowing streams generated significant basin-fill as the western Snake River Plain tectonically extended and subsided in what is termed a rift zone. The lake and stream sediments exposed adjacent to the lower Payette Valley are designated the Glenns Ferry Formation, a member of the Idaho Group (Malde and Powers, 1962). Fine-grained sediments originating from lacustrine associated deposition approach 4,000 feet thick below and adjacent to the Payette River Valley as indicated in deep oil exploration drill holes. However, the total Idaho Group can exceed 6,000 feet near the center of the western plain.

Later, during Pleistocene glaciation, enormous volumes of water were released from Idaho's extensive mountain glaciers. This high-water period, called the Pluvial Stage, involved the ancestral Payette as well as most other rivers draining the Rocky Mountains. Multiple, extensive, sheet-like beds of sand and gravel were deposited on top of the finer grained Glenns Ferry Formation within the Snake River Plain and bordering tributaries. These sand and gravel deposits can be seen as topographically elevated benches above the lower Payette and lower Boise Rivers, as well as in other areas within the western Snake River Plain. They occur as broad high benches having been dissected by their respective river systems within recent Holocene time.

River and tributary stream alluvium resulting from more familiar fluvial processes, consisting mostly of unconsolidated floodplain clay and silt, and channel deposits of loose sand and gravel, constitute the uppermost strata within the modern valley system. These deposits have originated since the last glaciation approximately 10,000 years ago and generally are limited to thirty meters thick.

Structural Setting and Seismicity

A system of regional faults trend mostly along and parallel the margins of the Snake River Plain, and this includes the lower Payette River drainage area. The long linear bluff north of the river valley may be such a fault, modified little by erosion. As noted earlier, the plain is a structurally subsiding basin which induced fluvial and lacustrine sediment filling. This process continues today, being controlled mostly by long-lived normal faults of significant accumulated vertical displacement. The system of faults is complex in the western plain with down-dropping expressed as a series of echelon fractures along both margins, generally inclined toward the center of the plain where total net displacement is at its maximum. Seismic reflection profiles also indicate deep-seated faults buried by thick sediments which offset large structural blocks at depth (Wood, 1994).

Present Hydrogeologic Conditions

A significant contrast in river gradient and geomorphology is present between the upper and lower reaches of the Payette River. Descending from mountainous terrain, the upper Payette River is so steep it has a well known reputation for challenging white-water recreation. However, during normal flows the lower Payette River meanders relatively slowly down its low-relief valley, the drainage basically being a morphological extension of the Snake River Plain. The upper section of the Payette River is youthful with rapid erosional down-cutting within its narrow V-shaped valley. Current morphology of the river's lower section is at a mature stage of development with well-developed meanders and a broad floodplain. Consequently, the lower Payette Valley is choked with its own sediments, resulting in the propensity for the river jumping its banks during floods and thereby quickly changing its channel location. This is a stream process called planation which intermittently erodes portions of the valley sides and, through geologic time, widens the valley floor. The lower Payette River, in fact, jumped its channel early in this century with approximately six miles of the former river course being located where Big Willow Creek now parallels the river. With Black Canyon Dam now obstructing bed-load transport of sediments, river processes have since been changed below the reservoir. Although manmade levees bordering the river and dams controlling its flow have diminished the frequency of flooding, and to a degree, have modified the basic character of the valley, these structures cannot protect man's developments from particularly large, yet inevitable, floods in the future. The flood of January, 1997, which inundated portions of the City of Payette and surroundings, is a relatively small but clear example of this potential.

The granitic highlands of the upper river segments have a different geochemical composition than the basaltic terrain or sedimentary environment further down river. One fundamental difference is that, all other things being equal, water moving through granitic rocks tends to have a lower pH (more acidic) than that moving within basalt lavas. Water moving through the composited, heterogeneous sediments within the lower valley segment would also tend to have higher pH than in granitic terrain. In addition, water alkalinity may be expected to be higher within basalt and caliche-rich sediments of the lower valley. Dissolved oxygen also would likely be lower in the more sluggish water of the lower Payette River. Thus, background nutrient levels would tend to be higher in the more oxygen deficient water of the lower Payette River. Although other prevailing or localized conditions may override these environmental influences, variations in natural background conditions are still an important, domain-controlled factor determining the general hydrochemical facies of the water along the course of the river.

In summary, with contrasting geology, topography, hydrology, and climate influencing the upper and lower river segments, the two segments can be expected to possess different natural hydrogeochemical characteristics.

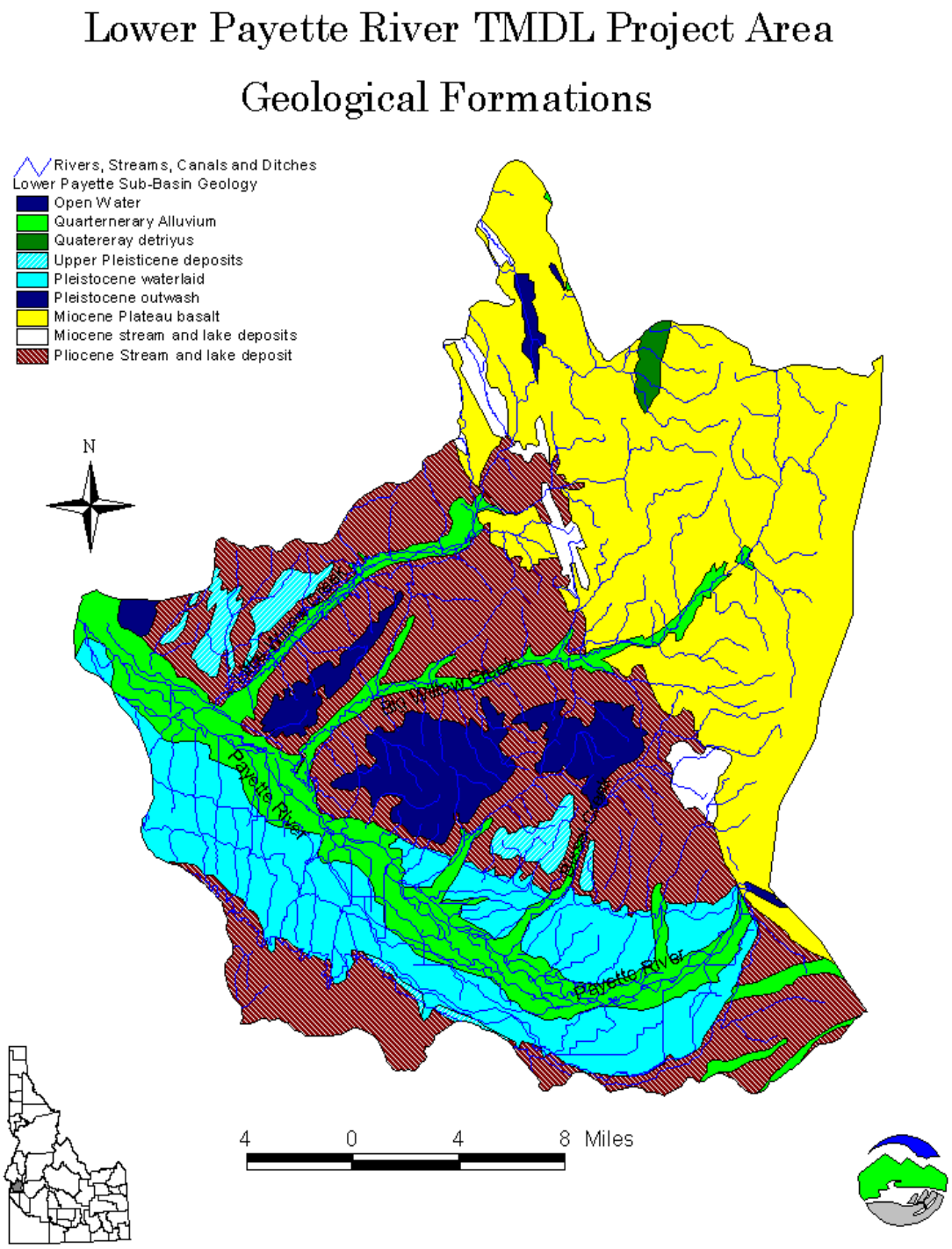

Figure 6. Geological Formations. Lower Payette River TMDL Project Area.

2.1.4. Fisheries

During the summer and fall of 1974 the Idaho Department of Fish and Game (IDFG) initiated a fishery study of the Payette River below Black Canyon Dam (Reid, 1975). The lower Payette River was resurveyed by IDFG in the summer and fall, 1997 (IDFG, in press). With this information, an excellent opportunity exists to compare the findings from 1974 to 1997. Table 1. lists the species found in 1974 and in 1997.

Table 1. Fish Species Found in the Lower Payette River During 1974 and 1997. Idaho Department of Fish & Game.

Common Name	Scientific Name	Present in:	
		1974	1997
Mountain Whitefish	*Prosopium williamsoni*	yes	yes
Rainbow Trout	*Oncorhynchus mykiss*	yes	yes
Brown Trout	*Salmo trutta*	yes	no
Smallmouth bass	*Micropterus dolomieui*	yes	yes
Largemouth bass	*Microterus salmoides*	yes	yes
Pumpkinseed	*Lepomis gibbosus*	yes	yes
Bluegill	*Lepomis macrochirus*	yes	yes
Black crappie	*Pomoxis nigromaculatus*	yes	no
Warmouth	*Lepomis gulosus*	yes	no
Brown bullhead	*Ictalurus nebulosus*	yes	yes
Channel catfish	*Ictalurus punctatus*	yes	yes
White catfish[1]	*Ictalurus catus*	yes	no
Largescale sucker	*Catostomus macrochulus*	yes	yes
Flannelmouth sucker[1]	*Catostomus latipinus*	yes	no
Bridgelip sucker	*Catostomus columbianus*	yes	yes
Carp	*Cyprinus carpio*	yes	yes
Chiselmouth	*Acrocheilus alutaceus*	yes	yes
Northern squawfish	*Ptychocheilus oregonensis*	yes	yes
Redside shiner	*Richardsonius balteatus*	yes	yes
Dace	*Rhinichthys sp.*	yes	yes
White crappie	*Pomoxis sp.*	no	yes
Unidentified sucker	*Catostomus sp.*	no	yes
Sculpin	*Cottus sp.*	yes	yes

1) Species may have been mis-identified in 1974

As demonstrated in Table 1., most species found in 1974 were also found in 1997. One salmonid species, Brown trout, was not found in 1997. However, as reported by Reid (1975), it was speculated the one Brown trout found in 1974 was of hatchery origin. Since most trout species

require clean spawning gravels, usually associated with smaller tributaries, trout spawning may not be an existing use in the lower Payette River. Access to the smaller tributaries and the upper reaches of the Payette River has been blocked by diversion structures. A resident population of trout species may be limited to those trout species that may migrate up from the Snake River (Grunder, Personal Communication, 1997). Reid (1975) recommended that the planting of Brown trout in the lower Payette River be continued. Reid felt that Brown trout could be supported based on observations of fish collected through electrofishing, temperature profiles and from bottom samples (substrate).

The number of cold water species, salmonids, were higher in the 1997 study than in 1974. Mountain whitefish, a cold water species, were found throughout the lower Payette River and appeared to be maintaining a diverse age class within all segments of the river. The larger populations of Mountain whitefish were noted in the mid-sections of the river, RM 15-33. Rainbow trout were found in the final segment at RM 36. The trout were determined to be of hatchery origin planted during the summer of 1997 (IDFG in press, 1997).

Warm water game fish; catfish, bass and crappie, were found to be more numerous in the lower sections. Non-game species; carp, dace, Redside shiners, suckers and squawfish were also noted throughout the lower Payette River. Unidentified species of sculpin, a cool-cold water species, were found in the upper six miles of the segment. Sculpins usually indicate higher water quality because of the need for clean gravels for habitat (Simpson and Wallace, 1982). More sculpins may be present in other sections of the river, but the physical characteristics of this species makes it difficult to electro-fish (Reid, 1975).

Reduction of water temperature in the lower Payette River will not in all likelihood greatly influence the maintenance of a viable trout population. Flow modification, habitat degradation, and diversion structures appear to be the limiting factors for trout species reproduction capability and survivability in the lower Payette River. However, Mountain Whitefish appear to be thriving and maintaining a viable and an assorted age class population, even though temperature standards for cold water biota are exceeded throughout the lower river (Grunder, Personal Communication , 1998).

2.1.5. Current Land Use

Since the white man's early settling of the lower Payette River valley, water diversion for irrigation has made agriculture the economic base of the valley. Approximately 30% of the area below Black Canyon Dam is under some form of irrigation, gravity or sprinkler (Table 2). This area also includes the Little and Big Willow Creek drainages (Figure 7). In the upper portion of the valley, furrowed crops are located mainly in the upper Emmett Bench area, while orchards and pastures dominant the river bottom area and valley side hills. Further down the valley, near New Plymouth and Fruitland, the dominant agricultural use is furrowed croplands. In this area, high water demanding crops, such as sugar beets, mint and onions are grown. Grains, wheat and barley, are found in most areas in the lower part of the valley, but the cropping pattern is also dependent on crop rotation. Corn, silage and sweet corn, can also be found throughout the lower and mid-points of the valley and in the upper Emmett Bench area. Some dryland agricultural areas can be found to the north of the river, but this makes up a small percentage of the overall agricultural use.

The foothills are used for open range grazing of cattle and sheep. Most of the land in this area is public land, managed by the Bureau of Land Management (BLM). Private land can also be found in this area, but for the most part, cattle forage and use is based on federal allotments. Grazing on both public and private lands occur all season long, with winter feeding and calving areas located in the lower valleys (including Big and Little Willow Creeks). Some sparse forested areas are located in the higher elevation, but silviculture is not a major land use.

Concentrated animal feeding operations (CAFOs) and concentrated feeding areas (CFAs) can be found in all areas of the lower Payette and Emmett Valleys. These facilities are either dairy or cattle feeding/polishing operations. Records indicate that no facility has over 1,000 head (IDHW, DEQ-Boise, File Review, 1998). Most of these facilities are limited to a few hundred head and are usually family owned operations. Idaho Department of Commerce reported the cattle population for both counties, Payette and Gem, was approximately 60,000 head. It is believed most of these animals are associated with cow-calf operations and not CAFOs (Idaho Dept. Of Commerce, Internet Retrieval. 1998).

Four urban areas are located within the valley. These are: the City of Payette, the City of Emmett, the City of Fruitland, and the City of New Plymouth. Another small community, Letha, can also be found in the valley. All communities are currently experiencing growth with new developments both in and out of established municipalities. The City of Emmett, and the surrounding area is quickly becoming a commuting community, or a bedroom community, for the City of Boise located thirty five miles to the southeast. With the expansion of subdivisions and the infrastructure that must follow, storm water management will become an increasing pollution source to be addressed.

The river bottom supports a wide variety of wildlife. Migratory waterfowl, along with resident populations are currently supported in the area. Non-game birds are also numerous and include eagles and herons. IDFG manages numerous parcels of land along the river for both conservation and hunting. Game birds, such as pheasants, can be found in many of the drain ditches and fields throughout the valley. Chukkers and other upland species can be found in the surrounding foothills.

Recreational use of the river area is diverse. Activities such as swimming, canoeing, floating, fishing, bird-watching, picnicking, and hunting, to name a few, can be observed throughout the year.

Table 2. Land use in acreage and percent.

Description of Land use	Overall Acreage[1]	Percent of Overall Acreage
Dense Urban	3177	0.85%
Sparse Urban	341	0.1%
Forest	12	<0.1%
Sparse Forest	451	0.1%
Forested Wetlands	66	<0.1%
Non-Forested Wetlands	2642	0.7%
Water	278	0.6%
Dryland Agriculture	2870	0.8%
Irrigated Agriculture	98054	26.1%
Rangeland	265861	70.6%
Total	373752	100%

1) Land use Acres differs by 9742 acres from Land Ownership and Geologic Formations, due to differing GIS coverages

2.1.6. Land Ownership

Most of the area below Black Canyon Dam is privately owned (62%). Forty three percent (43%) of all the privately held land is either irrigated agricultural or urban areas. The remainder being either open range area or dryland agriculture. Public lands managed by the BLM or State of Idaho makes up the remainder of the land ownership, or 39%. Most of the public lands are in the foothills to the north of the river, with some state managed lands along the river bottom.

Table 3. shows the break down of land ownership. Figure 8 shows the schematic of landownership in the lower Payette River TMDL project area.

Table 3. Land Ownership in the Lower Payette River area.

Ownership	Total Acreage[1]	% of Overall Acreage
Public (Federal)	128317	33.5%
Public (State)	19766	5.2%
Private	232265	60.6%
Open Water	2976	0.8%
Total	383314	100%

1)Land Ownership and Land use differ by 9742 Acres due to differing GIS Coverages.

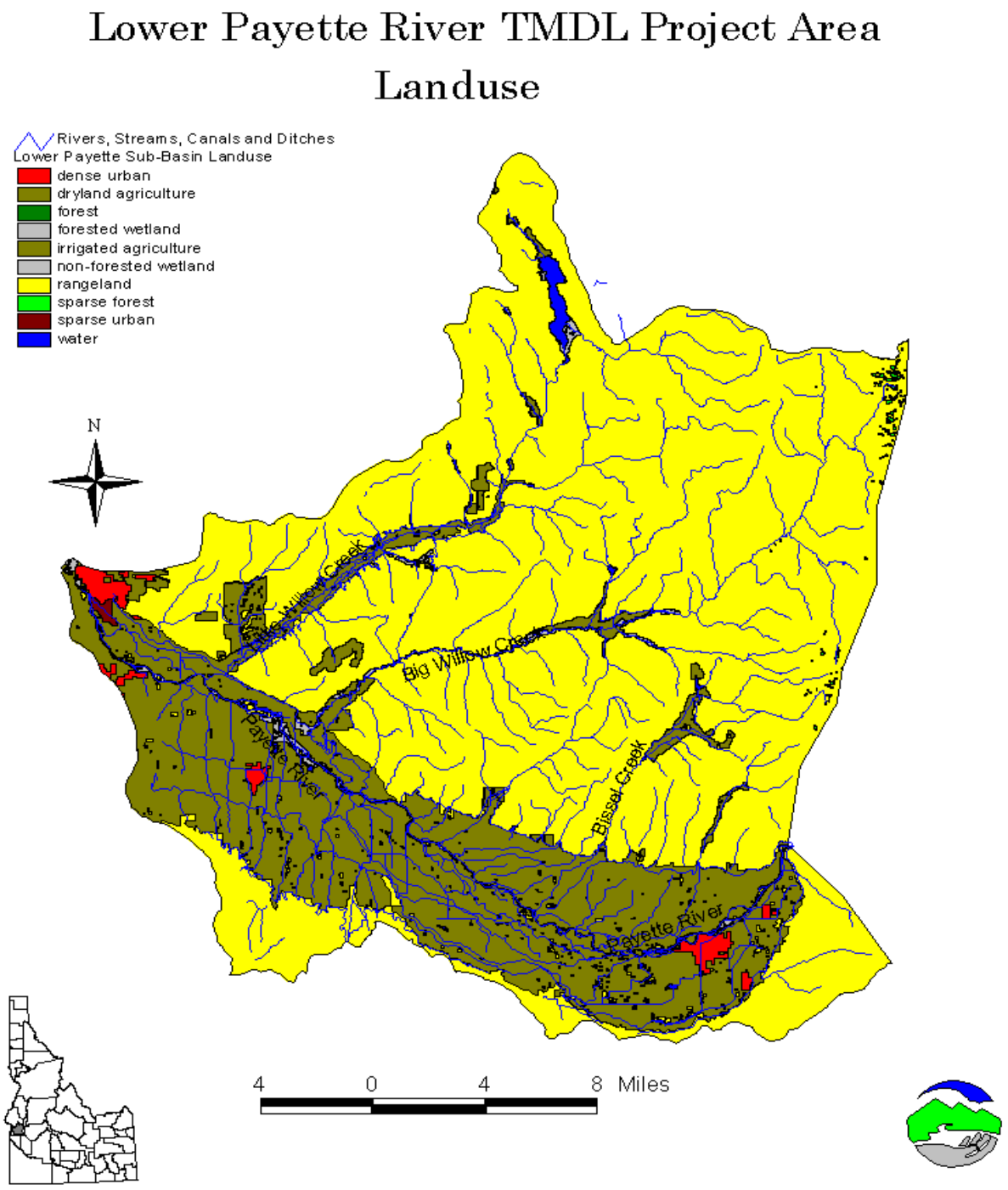

Figure 7. Landuse. Lower Payette River TMDL Project Area.

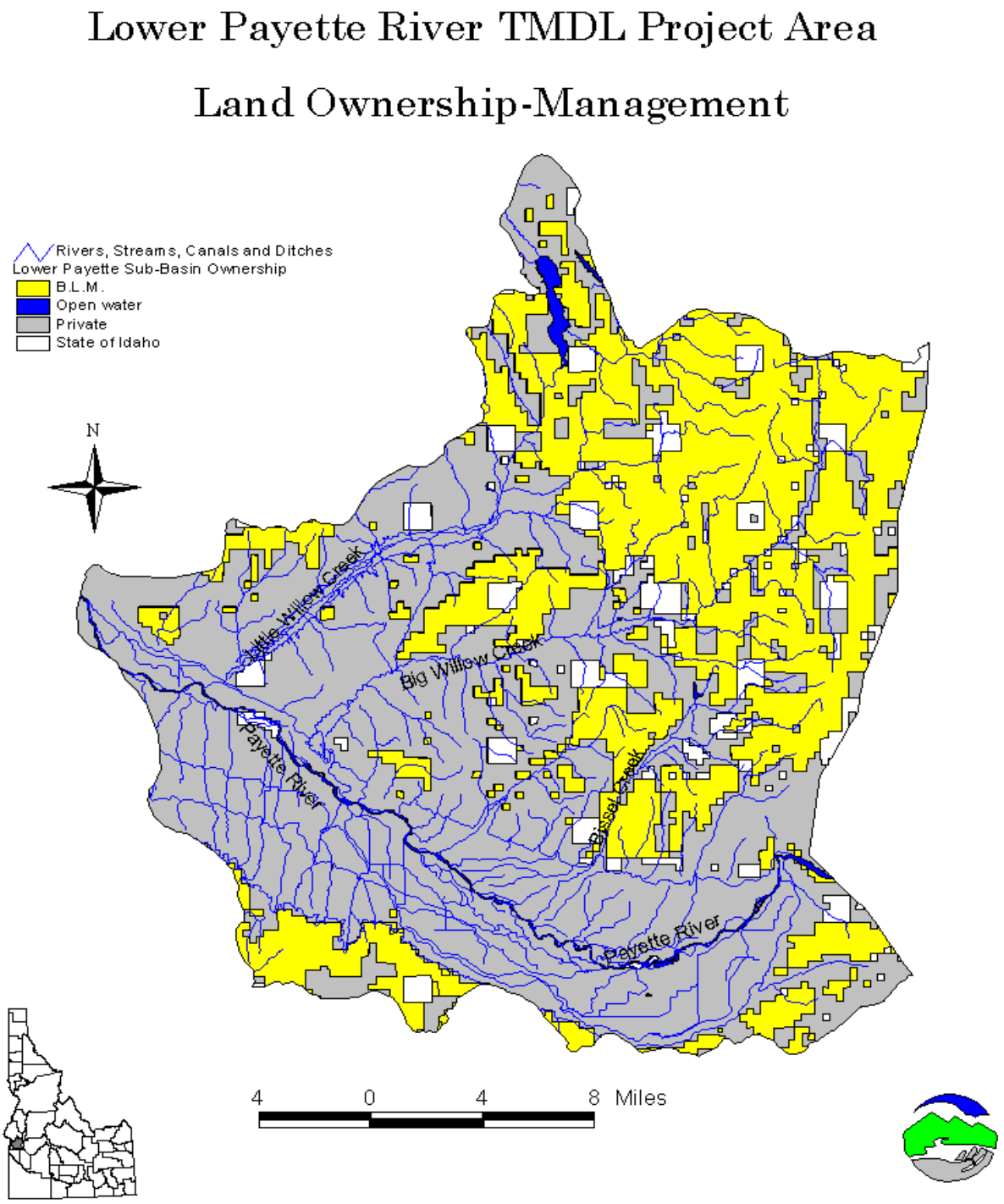

Figure 8. Land Ownership. Lower Payette River TMDL Project Area.

2.1.7. Historic Presence of Man

Mining, logging and ranching provided the foundation for the building of communities along the Payette River. Farmers (called Sagebrushers) began settling the valley from the 1860's to the 1880's. The towns of Martinsville and Emmettsville (later shortened to Emmett) were established in 1863. Emmett grew because it provided supplies to mining camps, feed for livestock and grain for flour. A lumber mill was also built to meet the needs of settlers during this time of rapid growth.

The first water right in the lower Payette River valley was filed in 1874 to irrigate fruit trees and crop land. Produce was sold to travelers on the Overland Road stage route. Early farmers in the basin tried to dryland farm, but soon discovered that the high desert was a hard place to grow crops without irrigation water. A group of farmers in the Emmett Valley contributed money to have a survey done and discovered there was a path for a canal that would irrigate most of the land they were trying to farm. They banned together and built the “Last Chance Canal”, so called because they saw it as their last chance to make a living in the valley as farmers. Much of the valley was soon growing bountiful crops because of their efforts. A few years later a cooperative ditch was built on the north side of the river.

In 1884, Peter Pence, one of the first large cattle ranchers in the valley, sold 1500 head of cattle to enlarge the northside ditch to carry more water to his ranch on Big Willow Creek. He also extended the ditch to benefit farmers to the north of the Payette River valley. Two thousand acres of sagebrush land below the Overland Road was also bought by two former mining partners to start a reclamation project that came to be known as the Nobel Canal. Even though agriculture was growing, irrigation water from these sources provided a relatively small amount of water in the months when it was most needed.

In 1924, Black Canyon Dam was completed, primarily as a diversion facility. It raised the water level to a point where water could flow down two more canals (Emmett and Black Canyon Canal), and irrigate vastly more land than before. In 1929, Deadwood Dam was completed primarily for water storage. Further storage was added with the completion of the Cascade Dam in 1948. This water storage and diversion system continues to provide the Payette River Basin with the lifeblood of its number one industry, agriculture.

2.1.8. Economic and Social Base

Both Payette and Gem Counties rely on agriculture for their economic health. In both counties, agriculture is the largest non-service employer with 1,849 jobs associated with the industry in 1993. Sixty-one percent (61%) of the population in Gem county is rural, while in Payette County the rural population accounts for fifty-one percent (51%) (Idaho Department of Commerce, Internet Retrieval, 1998). Annual product sale per farm, in 1992, was approximately $80,000.00 in Payette County. In Gem County, annual product sale per farm, was approximately $60,000.00. Other important economic factors include wood products, light industrial, retail sales and governmental services.

During the period from 1990-1994, the population of Payette County increased 19% and Gem County increased 17%. This followed the previous decade when the population increased only 4% during the entire decade for Payette County. Gem County, during the same period (1980-1989), showed an overall population decrease of 1% (Idaho Department of Commerce, Internet Retrieval, 1998). Lower property values and the local population willingness to commute greater distances

have contributed to the overall growth in both counties. As mentioned earlier, the City of Emmett and the surrounding area has seen a dramatic increase in a population that commutes to Boise, thirty five miles to the south-east, for employment.

2.2. Beneficial Use Designation History

In 1972, the Federal Water Pollution Control Act (Act) (PL-92-500) or Clean Water act (CWA), was passed by the United States Congress. This law gave the United States Environmental Protection Agency (EPA) authority to oversee state water quality programs.

Under 40 Code of Federal Regulations §131.10(a), each State has to specify appropriate water uses to be achieved and protected. In 1975, the State of Idaho complied with the Act and designated protected beneficial uses on certain water body segments within the state (IDAPA 16.01.02.110 through 16.01.02.160). The lower Payette River was one of these segments. At the time of designation, public input, available data and best professional judgement were utilized to determine uses (see table 4). Other streams and rivers without specific designated beneficial uses are protected under other portions of the water quality standards (IDAPA 16.01.02.200, 01 through 08 and IDAPA 16.01.02.100, 01 through 05).

A water quality standard defines the water quality goals of a particular water body by designating use or uses to be achieved for the water body and establishment of numeric and narrative criteria (ambient conditions) necessary to protect the existing uses. Existing use means those surface water uses actually attained on or after November 28, 1975, whether or not they are designated uses.

All waters are protected through general surface water quality criteria. A narrative criteria prohibits ambient concentrations of certain pollutants which may impair beneficial uses. For the state of Idaho these criteria include: hazardous materials, toxic substances, deleterious materials, radioactive materials, floating, suspended or submerged matter, excess nutrients, oxygen demanding materials and sediments (IDAPA 16.01.01.200).

2.2.1 Current Beneficial Use Status

The designated beneficial uses for industrial water supply, agricultural water supply, wildlife habitat and aesthetics appear to be fully supported for the lower Payette River. The domestic water supply designation may not be applicable to the lower Payette River, since no municipal water supplies obtain water from the river for domestic use.

Cold water biota is existing, but is classified as not full support. Those pollutants, or conditions, that would be viewed as impairing cold water biota in the lower Payette River are; temperature, habitat modification, and flow alteration. The presence of cold water species, mainly Mountain whitefish, would indicate that they are able to maintain a viable population in the river. The limited presences of other cold water species demonstrates that cold water biota is not fully supported.

Salmonid spawning appears to be existing, but is also classified as not full support. Those pollutants, or conditions, that would be viewed as impairing salmonid spawning in the lower Payette River are habitat modification and flow alteration. The diverse age classes of Mountain whitefish shows that salmonid spawning is existing in the river. The lack of other salmonid species age classes, mainly trout, would indicate spawning by other salmonid species is not fully supported.

Both primary and secondary contact recreation are classified as not full support. Current water quality information, for Fecal coli bacteria, demonstrates exceedences of water quality standards.

Table 4. Designated Beneficial Uses, Status and Pollutant(s) of Concern

Beneficial Use	Support Status 1975	Support Status 1998	Pollutant(s) of Concern
Agriculture Water Supply	Full Support	Full Support	N\A[1]
Domestic Water Supply	N\A[1]	N\A[1]	N\A[1]
Industrial Water Supply	Full Support	Full Support	N\A[1]
Wildlife Habitat	Full Support	Full Support	N\A[1]
Aesthetics	Full Support	Full Support	N\A[1]
Cold Water Biota	Existing[3] (Support Status Unknown)	Existing (Not Full Support)	Temperature Habitat Modification
Salmonid Spawning	Existing[3] Not Full Support	Existing (Not Full Support)	Temperature Habitat Modification
Primary Contact Recreation	N\A[2]	Not Full Support	Bacteria
Secondary Contact Recreation	N\A[2]	Not Full Support	Bacteria

N\A 1) Not Applicable
N\A 2) Available Information not Adequate
3) as per Idaho Fish and Game Study 1974 (Reid, 1975)

2.3. Designated Beneficial Uses Rationale/Justification

2.3.1. Agricultural Water Supply

The lower Payette River, along with most waters of the state, is protected for agricultural water supply (IDAPA 16.01.02140,01.mm and IDAPA 16.01.02100.01.a). In the water quality standards it is defined as follows: “Agricultural: waters which are suitable for the irrigation of crops or as drinking water for livestock.”

Agricultural water supply can be impaired by nutrients, bacteria (along with viruses and protozoans), algae, sediments, flow modification, and other conditions that may affect the quality and quantity of water. There are no numeric state standards to determine support status. Historical and current water quality information has demonstrated that agricultural water supply is fully supported in the lower Payette River.

2.3.2. Domestic Water Supply

Domestic water supply is a designated beneficial use for the lower Payette River (IDAPA 16.01.02.140,01.mm and IDAPA 16.01.02.100.01.b). The standards state "Domestic: water

which are suitable or intended to be made suitable for drinking water supply...". Although the lower Payette River is designated for domestic water supply, there are no public water systems collecting surface water from the lower Payette River for domestic use. Therefore, this designated beneficial use may not currently be applicable.

2.3.3. Industrial Water Supply

Industrial water supply is a protected beneficial use for the lower Payette River (IDAPA 16.01.02.100.01.c). Historical and present water quality information concludes that industrial water supply is supported in the lower Payette River.

2.3.4. Wildlife Habitat

All waters of the State, including the lower Payette River, are protected for wildlife habitat (IDAPA 16.01.02.100.04). Historical and present water quality information demonstrates that wildlife habitat is supported in the lower Payette River.

2.3.5. Aesthetics

All waters of the State, including the lower Payette River, are protected for aesthetics (IDAPA 16.01.02.100,05). There is no criteria with which to judge the aesthetics of a river. Moreover, the State of Idaho Division of Environmental Quality (DEQ) has not received complaints concerning the aesthetic quality of the lower Payette River.

2.3.6. Cold Water Biota

Cold Water Biota is a designated beneficial use for the lower Payette River (IDAPA 16.02.21.40.01.mm). There are numeric and narrative criteria within the water quality standards to protect cold water biota. Numeric standards for pH, total concentration of dissolved gases, toxic substance criteria and chlorine can be found in IDAPA 16.01.02.250.02. Water quality standards that are specific to cold water biota: dissolved oxygen concentrations; un-ionized ammonia; turbidity; and temperature can be located in IDAPA 16.01.02.250.02.c.

Historical and present water quality information demonstrates that cold water biota is existing. Temperature data demonstrates exceedence of the temperature standards during the months of June, July and August. The lack of other cold water indicators, mainly trout species, would demonstrate cold water biota is limited and not fully supported.

2.3.7. Salmonid Spawning

Salmonid spawning is a designated beneficial use for the lower Payette River (IDAPA 16.02.2140.01.mm). Numeric standards for pH, total concentration of dissolved gases, toxic substance criteria and chlorine are set in the water quality standards (IDAPA 16.01.02.250.02). Water quality standards that are specific to salmonid spawning: dissolved oxygen concentrations, un-ionized ammonia, intergravel dissolved oxygen, and temperature can be located in IDAPA 16.01.02.250.02.c. IDAPA 16.01.02.250.02.d.iv. describes time periods when salmonid spawning occurs and the period when salmonid spawning criteria should be applied. Table 5 shows the probable salmonid species of concern for the lower Payette River, and the time period that applicable water quality criteria should be applied.

Table 5. Probable salmonid species present in the Lower Payette River. Common name, scientific name and protected spawning periods.

Common Name	Scientific Name	Annual Period for Protection
Brown Trout	*Salmo trutta*	October 1 through April 1
Rainbow Trout	*Oncorhynchus mykiss*	Jan. 15 through July 15
Mountain Whitefish	*Prosopium williamsoni*	October 15 through March 15

Historical and present water quality information demonstrates that salmonid spawning is existing. Temperature data demonstrates exceedence of the temperature standards during May, June and July for trout species. The lack of other coldwater indicators, mainly trout species, would demonstrate salmonid spawning is limited, and not fully supported.

2.3.8. Recreational Use

Both primary contact recreation and secondary contact recreation are designated beneficial uses for the lower Payette River (IDAPA 16.02.2140.01.mm). Numeric standards to protect recreational uses are shown in IDAPA 16.01.02,250.01(see page 38). Primary contact recreation waters are to be protected for public health in those cases where the ingestion of small quantities of water is probable. Such activities are swimming, water skiing, scuba diving, etc. Secondary contact recreation protected waters are those waters where use is on or about the water. Those activities may include wading, fishing, boating or other activity where ingestion of raw water is not probable.

Historical and present water quality information demonstrates that primary and secondary contact recreation are not fully supported due to exceedence of bacteria standards during May 1st, through September 30th. The remainder of the year, October 1st through April 30th, secondary contact recreation is full support. No exceedences of the water quality standard for a instantaneous measurement of 800 CFU/100 ml was noted in 1997 or 1998 (page 39 Table 7. and Freeman IN Press, 1999.)

2.4. Water Quality Monitoring History

2.4.1. In-River Monitoring

Appendix D contains tables and maps of all historic, present monitoring sites. Appendix B contains 1996-1998 in-river water quality information.

The lower Payette River has three historical monitoring sites. The Payette River 0.5 miles below Black Canyon Dam (River mile 38) is an established BOR water quality and discharge (flow) monitoring site (EMM010). Water quality information is available from the mid 1980's. The Payette River at Letha Bridge (River mile 25) is also an established BOR site (EMM025) with historical water chemistry and physical water quality information available, along with continuous discharge information. Water quality information is available from the mid 1980's through the present. The final site is at the lower Payette River near the City of Payette (River mile 4.5) and is located at the U.S. Highway 95 Bridge. This site is maintained as a portion of the statewide

triennial monitoring effort by the USGS (USGS Site # 13251000) and DEQ. Water quality information from this site is available for 1990, 1993 and 1996; occasional information is available from the 1960's to the mid 1980's.

In 1996, DEQ set up continuous temperature monitoring sites at six river stations: 0.5 miles below Black Canyon Dam; 1 mile below the City of Emmett's Waste Water Treatment Plant (WWTP); Letha Bridge; 0.5 miles below the confluence of Willow Creek; Highway 95 Bridge; and directly below the City of Payette's WWTP. Temperature monitoring began in April 1996 and continued until the end of September the same year. Bacteria samples were also collected at these sites along with an additional site at Blacks Bridge located near New Plymouth, Idaho (Ingham, 1996a). Bacteria sampling was conducted during the months of June, August and September 1996, with five samples collected each month. This monitoring was duplicated again in 1997.

In October 1996, DEQ initiated the water quality monitoring program at each site along with an additional site at Faulk Bridge, located near the Gem and Payette County line (Ingham, 1996b). Chemical and physical water quality monitoring is ongoing at a total of eight (8) sites. Site LPR-006 was discontinued due to access denial. Escherichia Coli (E.*coli)* river monitoring will be conducted during the summer of 1999 (Ingham, 1998). This information will be used to determine future E.*coli* compliance with water quality standards. These standards are expected to be in place by the year 2000. Appendix D lists all historical and present monitoring sites, along with STORET Code, and river mile.

2.4.2. Point Source Monitoring Requirements

In accordance with the CWA, point sources such as wastewater treatment facilities are required to monitor their effluent. The frequency and parameters of the required monitoring varies with each facility and is part of the facilities National Pollutant Discharge Elimination System (NPDES) permit. The parameters required for evaluation are usually nutrients, total suspended solids, biochemical oxygen demand (BOD), pH, temperature, and bacteria. Appendix E has more information on point source monitoring requirements and locations.

2.4.3. Tributaries-Irrigation Return Drain Monitoring.

Numerous irrigation return drains and diversions complicate the tributary input of pollutants of concern. In 1996, IDA and the Gem Soil Conservation District (SCD) initiated a monitoring program on irrigation return drains in Gem County (Campbell, 1996). In 1997, IDA expanded the monitoring to Payette County. In 1998 IDA conducted tributary monitoring for E. *coli* bacteria. These monitoring efforts examined the pollutants of concern; nutrients, sediments, bacteria and other associated parameters (Campbell, 1997). The data collected in 1996, 1997 and 1998 are important for determining pollutant source and transport and for determining an accurate water budget for the lower Payette River.

In 1991, DEQ and the Payette Soil and Water Conservation District (SWCD) initiated water quality monitoring to assist in the planning-implementation of a State Agricultural Water Quality Program (SAWQP). This monitoring focused on evaluating water quality in selected agricultural return drains within the SAWQP planning area (Ingham, 1992). It was through this monitoring that the Payette SWCD was able to direct limited resources to areas of greatest concern. The data from this monitoring was published in 1996 and is being utilized as reference material for determining pollutant loads to the Payette River (Ingham, 1996).

Williams (1975) conducted limited monitoring in 1974 on numerous tributaries and drains on the tributaries. Tangarone and Brone (1976) also conducted limited monitoring on selected drains in 1975. The 1975 study included some diurnal monitoring for temperature and dissolved oxygen (DO). Monitoring was limited to a one month period in August and again in December 1975.

Appendix D contains a list of river and tributary monitoring sites.

2.5. Data Gaps

2.5.1. Urban-Suburban Areas

The lower Payette River offers a unique situation. Within the TMDL project area are four municipalities that can contribute to the pollution loads for nutrients, bacteria and temperature through urban-suburban sources (Appendix E). The individual municipal WWTPs have some data for loads to the lower Payette River, however nonpoint source information concerning contributions from urban-suburban sources is lacking. As an example, the Cities of Emmett and Fruitland, along with surrounding areas, have gone through an increase in population, with many new subdivisions developed on lands once classified as agricultural. To confound the situation, many of these developments discharge their stormwater into ditches designed for agricultural water return drains and to irrigation water supply canals. The increase of urban-suburban areas has also added different types and concentrations of pollutants that may originate from these areas. With a higher density of people now occupying these areas, stormwater, animal waste, human waste (through individual septic systems) and contribution from landscaped areas may heighten the amount of pollutants.

The municipalities and county governments have recognized the potential of these areas as a contributor of pollutants and to some extent have started asking developers for stormwater management plans. Local health officials also restrict the number of septic systems that can be installed depending on housing densities. However, current geographic information system (GIS) data lacks a comprehensive breakdown of urban type land use (industrial, residential, commercial...etc). Without adequate information from these areas and appropriate water quality data, it may be difficult to determine exact contributions, especially for those areas that may discharge directly into adjacent water bodies.

Models developed to determine urban area contributions are available (i.e., Schueler, 1987; USEPA, 1992; and Maquire, 1998). These models will be useful once more accurate GIS and water quality data is collected. Some data for nutrient and sediment loading has been obtained through the use of these models. However, in order to determine the actual loadings from these areas, more data will need to be collected.

2.5.2. Waste Water Treatment Plants

The Emmett, Fruitland and Payette WWTPs have, to some extent, increased their effluent monitoring. These increased efforts have been on a voluntary basis and have included nutrient evaluations that may or may not have been a requirement of their NPDES permit when issued. The City of New Plymouth has regularly monitored their effluent in accordance with their NPDES permit. Review of their discharge monitoring reports (DMRs) has indicated exceedences of bacteria in their effluent limitations. Some information is available from the City of New Plymouth for 1990 when limited nutrient monitoring was conducted. This information provides some information on nutrient loading from this facility. However, more current information

would allow for a more accurate evaluation. The current load evaluations for the New Plymouth WWTP are based on estimates generated from the EPA Design Manual for Municipal Wastewater Stabilization Ponds (USEPA, 1983) and from the data provided by the City of New Plymouth. These calculations may not indicate the actual load originating from this facility.

2.5.3. Rural Areas

Rural areas can contribute to pollutants in the lower Payette River directly or through contamination of the shallow ground water. Faulty septic systems, direct discharge of waste or grey water, improper disposal of pesticides and/or fertilizers, poor road construction, are potential pollution sources.

Both Gem and Payette Counties have an extensive network of county roads and major highways (Figure 10). Along with these maintained roads are numerous private driveways and access roads. Overall contributions from these areas may also be difficult to determine without a mathematical model. However, it is expected these areas contribute to the overall pollutant load.

2.5.4. In-River Biological Indicators (Bio-Monitoring)

Future in-river monitoring will focus on biological indicators. The current focus of Idaho's biological monitoring has been on smaller streams and rivers that have conformed to the Beneficial Use Reconnaissance Project (BURP) monitoring (IDHW, 1995) . The State recently received protocols for biological assessment of large rivers from Idaho State University (Royer and Minshall, 1996). These protocols are currently being evaluated for quality assurance and quality control for determining beneficial use status for larger systems, such as the lower Payette River (Grafe, 1997).

During the implementation phase of the TMDL, an in-depth monitoring plan will have to be developed to determine the effectiveness of the TMDL on the lower Payette River. Due to the high cost of water column evaluation, it is expected the evaluation of biological indicators will be an important component of any TMDL effectiveness monitoring. Some macroinvertebrate data has been collected from the river, but has not been evaluated against any biotic indices (BIs) to determine support status. However, this information will be valuable once a method is approved.

2.5.5. Ground Water Contribution

Past studies by the USGS (Newton 1989), EPA (Trangrone and Brogue, 1976), and BOR (Williams, 1975) have indicated ground water baseline nutrient loading to the lower Payette River. Drain monitoring conducted by DEQ in 1992-93 showed increased nitrogen concentrations during the non-irrigation periods (Ingham, 1996). This information was also verified by IDA monitoring conducted in 1996 and 1997 in both Gem and Payette Counties (Campbell, 1996-1997 Unpublished). The water quality information for the drains and return flows is well documented. The direct input (bank springs and seeps) is not well known and may be difficult to determine.

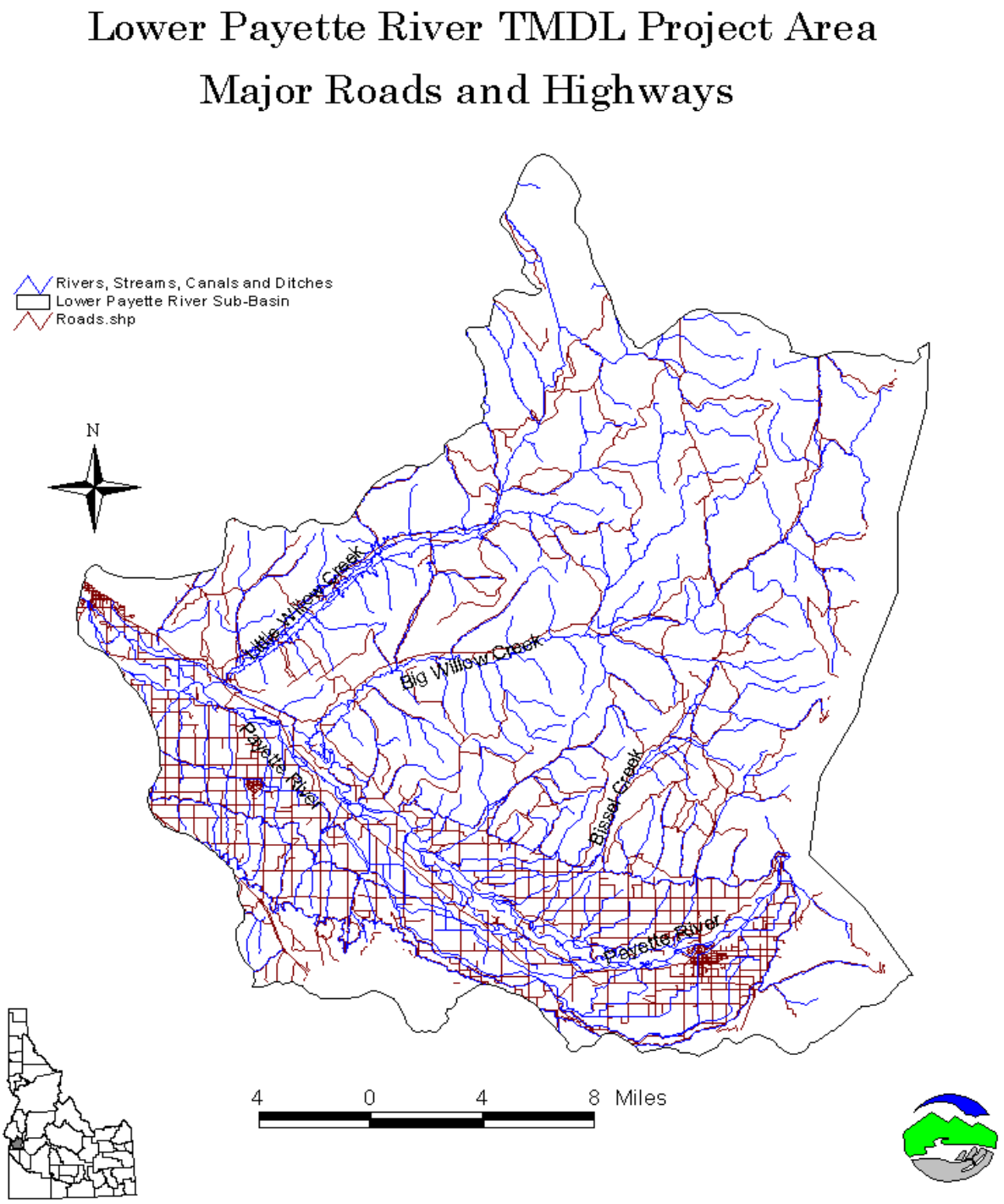

Figure 9. Major Roads and Highways. Lower Payette River TMDL Project Area.

2.6. Pollutant(s) of Concern/Water Quality Impairment

2.6.1. Nutrients

Criteria/Standard

The State of Idaho utilizes a narrative criteria for nutrients, which states "Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or nuisance aquatic growth impairing designated or protected beneficial uses..." (IDAPA 16.01.22.00,03.b (1994)). Quality Criteria for Water (EPA, 1986) includes some recommended numeric criteria for total phosphorus. For total phosphorus the recommended concentration is 100 ug/l (0.1 mg/l) or less. Scientific literature referenced in this EPA publication suggests that concentrations above these values may promote excessive and nuisance aquatic growth. Other literature sources recommend concentrations of less than 0.3 mg/l for nitrates (inorganic nitrogen) to reduce eutrophic conditions (IDHW, 1980).

Historical Data

Although past river monitoring has not specifically focused on nuisance aquatic growth, instream water column monitoring has determined there are exceedences of the EPA and State of Idaho recommended criteria for nutrients (EPA, 1986 and IDHW, 1980). These in river concentrations ranged as high as 0.35 mg/l for total phosphorus and 1.7 mg/l for dissolved nitrite-nitrate (NO_2 + NO_3 as N Total) in 1976 (BOR and USGS STORET Retrieval, 1996).

A study of the lower Payette River by Tangarone and Brone (1976) theorized algae growth was causing dissolved oxygen (DO) supersaturation and depletion of DO, thus threatening cold water biota. Tangarone and Brone (1976) found DO concentration sags at night, and supersaturation during more productive daytime hours. They concluded that nutrient input was causing cycling of DO levels.

Water Quality Impairment

Nuisance aquatic plant growth (phytoplankton, periphyton and macrophytes) will impact other beneficial uses such as recreational uses, industrial water supply and agricultural water supply. Plant growth affects water clarity, reduces aesthetic quality and may contribute to increased maintenance of pumping equipment. Some species of algae produce toxins that impact both primary and secondary contact recreation, and agricultural water supply. Excessive periphyton growth may displace the resident benthic invertebrate population and promote the colonization of undesirable species.

Sources

Both point sources and nonpoint sources contribute nutrients. Point sources, namely municipal sources, are very effective in removing large amounts of solids and those nutrients that may be attached. The effectiveness of nutrient removal can differ greatly depending on the operation of the WWTP. Biological activity, chemical activity, along with physical attributes can affect nutrient removal (EPA, 1983).

Effective removal of nitrogen (both organic and inorganic forms) can vary from 10% to 99%, depending on the system (EPA, 1983). Phosphorus removal is also dependent on a wide range of

chemical, biological and physical attributes. Most studies of WWTPs have shown an average of 30-95% removal of total phosphorus, also depending on the system (EPA, 1983).

Nonpoint sources are more difficult to control. Total phosphorus and organic forms of nitrogen are easily attached to sediments. These are associated with erosion, storm water runoff, agricultural water return and other non-discrete discharges. Urban-suburban areas also contribute to nutrients through over application of fertilizers and over irrigating. Faulty septic systems contribute by allowing nutrients to be passed on through ground water or direct discharge.

Transport

Nutrients can be transported by varying mechanisms; dissolved within the water column, attached to suspended solids (sediments or organic), bedload movement, biological spiraling, and other physical, chemical and/or biological means. The transport of nutrients can vary depending on the nutrient involved, land use and the time of season.

For the lower Payette River, data from Williams (1976),Tangarone and Brone (1975), Payette Soil and Water Conservation District (SWCD) (1992) and Ingham (1996) indicated that total phosphorus was associated with high sediment loads in the extensively irrigated row crop areas. At Station S-2, an area dominated by irrigated pastures and non-row crop areas, an r^2 value of 0.06 was obtained. This value indicates little if any correlation to total phosphorus and suspended sediment. The area that is drained by S-12 is primarily row crops, and is a prime area for growing sugar beets, onions and other high water demanding crops. At Station S-12, an r^2 value of 0.72 was obtained. A r^2 value 0.72 would indicate a positive correlation between total phosphorus and suspended sediment (Ingham, 1996).

STORET retrieval data (USGS and BOR, 1996) indicated a <u>majority</u> of the phosphorus from pasture land, during irrigation and non-irrigation seasons, is in the form of dissolved ortho-phosphate. The BOR station at Letha Bridge showed an average percent of dissolved ortho-phosphate to total phosphorus of 54% (n=11), while at the downstream site, Highway 95, it was 44% (n=11)(Ingham, 1996). Since most of the sediment loading is occurring in the area below Letha, it is expected most of the phosphorus is tied or bound to sediments.

Current Water Quality Impairment

Aquatic vegetation thrives on two major essential elements, sunlight and nutrients. For most systems the amount of sunlight is usually limited by the amount of stream shading, water depth (sunlight penetration) and water clarity. The lower Payette River is a wide, shallow (high width-depth ratio) river with little shading capability. Controlling the amount of available sunlight for photosynthesis may be difficult in the lower Payette River. When nutrients exceed a certain threshold they will, when certain other environmental factors are right, promote aquatic vegetation growth that may impair beneficial uses. For the lower Payette River, this impairment was theorized to impact DO concentration and cold water biota (Tangarone and Brone, 1976).

Twenty-four hour temperature and dissolved oxygen (DO) monitoring was conducted in August 1997 and again in September 1998. The purpose of this monitoring was to determine if algae productivity was impacting the supply of DO to the water column, and to determine temperature change during a twenty-four hour period. This monitoring determined that aquatic vegetation was not affecting DO concentrations. Dissolved oxygen concentrations did not drop below levels that would impact beneficial uses (Freeman, IN Press, 1999) (Appendix B).

Water column monitoring for Chlorophyll *a* also showed much lower levels of productivity than what would be critical for maintaining cold water biota DO criteria. None of the Chlorophyll *a* results in 1997 or 1998 exceeded 8 ug/l. This is far less than the State of Oregon criterion of 15 ug/l, and the North Carolina criterion of 40 ug/l (periphyton samples were collected during the same period, however, the results for either year have not been received.)

Even though there is no recent documentation of DO depletion, nutrient concentrations are at levels that can cause nuisance aquatic growth. Above normal flows during the period from May through July for 1996, 1997, and 1998, may have impacted the ability for aquatic vegetation to become established (USGS, 1997; USGS, 1998; and USGS, 1999). Percent variation from normal are listed in table 6.

Table 6. Percent Change in Historic Flows on the Payette River USGS Gage at Highway 95 Bridge

	Years of Monitoring		
Months	1996	1997	1998
April	38%	32%	-4%
May	40%	41%	35%
June	40%	37%	24%
July	24%	22%	17%
August	-5%	23%	-18%

Nutrient levels found during the 1996-1997 monitoring of the river often exceed recommended criteria suggested by EPA (EPA, 1986) and the State of Idaho (IDHW, 1980). It is uncertain to what extent the nutrient levels may have had on water quality if the river was experiencing normal flows during the period monitoring was conducted. Table 7. shows the average and maximum results obtained in 1996 and 1997 for nitrate+nitrite and total phosphorus.

Table 7. Nutrient Results from 1996-1997 in River Monitoring Effort. Total Nitrite+Nitrate (average and maximum) and Total Phosphorus (average and maximum).[1]

Station	Total NO2+NO3 as N Maximum mg/l	Total NO2+NO3 as N Average mg/l	Total Phosphorus Maximum mg/l	Total Phosphorus Average mg/l
LPR-001	0.24	0.06	0.140	0.050
LPR-002	0.88	0.08	0.170	0.057
LPR-003	0.60	0.12	0.161	0.066
LPR-004	0.48	0.11	0.180	0.082
LPR-005	0.50	0.16	0.264	0.092
LPR-007	1.06	0.29	0.231	0.095
LPR-008	1.02	0.30	0.400	0.125

[1] Data is provisional, do not cite.

Nutrients from the lower Payette River are likely contributing to impacts on beneficial uses in the lower Snake River and Brownlee Reservoir. Data from the Idaho Power Company show the lower Payette River contributes between 15-25% of the yearly total phosphorus load to the lower Snake River (Myers, et al., 1997). In-reservoir modeling of Brownlee Reservoir has indicated nutrient and algae loads (phytoplankton) have degraded its water quality (Harrison and Andersen, 1997). Input from the Snake River, to Brownlee Reservoir has been shown to cause depressed DO concentrations resulting in fish kills during low water years. The completion of the lower Snake River and Brownlee Reservoir TMDL is currently scheduled for the year 2001. Load reductions for nutrients in the lower Payette River may be reevaluated at this time.

2.6.2. Temperature

Criteria/Standard

The State of Idaho has established temperature standards to protect both cold water biota and salmonid spawning. These standards are based on a one time sampling event and/or a daily average. For cold water biota, the standard is a water temperature of 22°C or less with a daily average no greater than 19°C (IDAPA 16.01.2250,04.c). For salmonid spawning, the standard is a maximum water temperature of 13°C or less with a maximum daily average of 9°C (IDAPA 16.01.22.50,05.c.).

Historical Data

Past USGS and BOR (STORET Retrieval, 1996) monitoring determined that the temperature standard had been exceeded in the lower Payette River. Since 1991, the 22°C standard was exceeded at all historic monitoring sites during summertime low-flow periods, except in 1993. No information for daily averages is available for this period.

Water Quality Impairment

High water temperature aggravates the depletion of DO and impacts growth and other physiological development of cold water fishes. Salmonids need certain temperatures and DO concentrations for egg development. The DO standard for salmonid spawning is a one (1) day minimum of no less than 6.0 mg/l or ninety (90) percent (%) of saturation, whichever is greater (IDAPA 16.01.02.250,02.d.i.2a).

Sources

Sources for high temperatures are solar radiation, thermal modification (industrial) and/or geothermal input. Geothermal input is limited in the lower Payette River area. There is some indication of geothermal activity in a few wells monitored in the valley (Idaho Department of Water Resources (IDWR) Map, 1980). There are no known industrial sources that would return warm water to the lower Payette River that would provide thermal modification . Warm water discharges from municipal WWTPs may occur, but the amount of water being discharged is not a significant, approximately 4 cfs/day.

Temperature increases may also occur from : 1) irrigation water return (may be warmer than ambient stream temperature); 2) modification to the river channel (does not allow for an adequate riffle-pool ratio); 3) removal of riparian vegetation and trees (that provide shading of the river) (Stacey, 1993); 4) warm water from upstream (Black Canyon Reservoir). Another physical problem may be the lack of access to the historic flood plain that would provide stream bank ground water storage.

Transport
Temperature is easily influenced by thermal input (solar radiation) and input from external sources (tributaries). Warmer water can easily be transported if physical means (shading, ground water recharge and pools) are not available for cooling.

Current Water Quality Impairment
During the period, April 1996 through September 1996, continuous temperature recording devices were placed at six sites along the river. At Highway 95, average daily temperatures exceeded the average daily standard (19°C), from July 31, 1996 to September 25, 1996, on 52% of the dates. The maximum instantaneous temperature standard (22°C) was exceeded on 32% of the dates. At Black Canyon Dam, the average daily standard was exceeded on 27% of the dates. The maximum instantaneous temperature standard was not exceeded during this period. It should be noted that the continuous recorder was removed during the month of July at the Black Canyon Dam site, so no data is available for the month of July. The 1997 temperature monitoring also showed similar results to those obtained in 1996.

The data also indicates the salmonid spawning standards were exceeded at both stations. For this survey, monitoring was conducted from April 1, 1996 to June 25, 1996. At Highway 95, the average daily standard of 9°C was violated on 90% of the dates. The maximum daily temperature standard of 13°C was exceeded on 49% of the dates. At Black Canyon Dam, the average daily standard was exceeded on 68% of the dates and the maximum instantaneous standard was exceeded on 32% of the dates (Freeman, IN Press, 1999).

All stations receiving either instantaneous or continuous temperature monitoring in 1996, 1997 and 1998 showed exceedences of both the criterion for salmonid spawning and cold water biota. The highest instantaneous temperature recorded over the last three years was 26°C below City of Payette WWTP. The highest instantaneous temperature at Black Canyon Dam was 23°C (Freeman, IN Press, 1999).

Overall average temperatures exceeded the 19°C standard at all stations. At the water quality monitoring station at Back Canyon Dam, in 1996 (August 1, thru September 26), this standard was exceeded 25.5% of the time. While during the same period at the water quality monitoring site at Highway 95, the 19°C standard was exceeded 44.5% of the time (Freeman, IN Press, 1999).

Although it is demonstrated that water temperatures exceed current State of Idaho criteria for cold water biota and salmonid spawning, it is believed that water temperature is not the limiting condition impairing beneficial uses. Habitat modification, flow alteration and access to historic spawning areas are limiting the support of these uses. Other conditions that preclude the development of a TMDL, for temperature, include warm water temperatures that exceed State of Idaho criteria from Black Canyon Reservoir (40 CFR 131.10(g)(3) (4)(5)). This criteria was exceeded on more than 25% of the monitoring dates (August 1, thru September 26).

2.6.3. Bacteria

Criteria/Standard
The State of Idaho has established Fecal coliform bacteria criteria to determine support status of the beneficial uses primary and secondary contact recreation. The lower Payette River is protected

for both primary and secondary contact recreation (IDAPA 16.01.21.40,01.mm). The standard for primary contact recreation, from May 1st to September 30th, is (IDAPA 16.01.22.50.01.):

a. 500/100 ml at any time; or

b. 200/100 ml in no more than ten percent (10%) of the total samples taken over a thirty (30) day period; or

c. A geometric mean of 50/100 ml based on a minimum of five samples taken over a thirty day period.

The standard for secondary contact recreation is (IDAPA 16.01.2250.02.):

a. 800/100 ml at any time; or

b. 400/100 ml in no more than ten percent (10%) of the total samples taken over a thirty (30) day period;

c. A geometric mean of 200/100 ml based on a minimum of five samples taken over a thirty day period.

Historic Data

Historic USGS and BOR (USGS and BOR STORET Retrieval, 1996) data indicates bacteria counts in violation of water quality standards for both primary and secondary contact recreation.

Further evaluations completed in June, August and September 1996, and in 1997 showed violations for a geometric mean for primary contact recreation (50 CFU/100 ml) at all stations from Letha Bridge to the Snake River. Secondary contact recreation geometric means were exceeded (200 CFU/100 ml) at three stations from Letha Bridge to the Snake River. See Table 8.

Table 8. Geometric Means for Bacteria, Lower Payette River June, August and September 1996 and 1997

Station	Fecal Coliform Bacteria (Geometric Mean) CFU/100 ml					
	June 1996	June 1997	August 1996	August 1997	September 1996	September 1997
Black Canyon Dam (RM 38)	19	22	5	4	4	4
Below Emmett WWTP (RM 29.5)	29	30	33	7	20	13
Letha Bridge (RM 21)	19	48	60	40	362	60
Blacks Bridge (RM14)		119	161	76	126	103
Highway 95 (RM 4)	50	101	294	112	77	159
Below Payette WWTP (RM 0.5)	100	163	317	207	180	177

Water Quality Impairment
Although Fecal coli are not known pathogens, they are an indicator of the presence of potential pathogens (bacteria, viruses and protozoans). The existence of pathogens is of public health concern and can contribute to the spread of disease in humans, domestic livestock and wildlife.

Sources
Both point and nonpoint sources contribute to bacteria in the river. Without adequate treatment, a WWTP can be a source of bacteria to the lower Payette River. The New Plymouth WWTP does not disinfect its effluent, but this does not appear to be a significant source of bacteria due to retention time in the lagoons. The three other WWTPs all disinfect their effluent to assist with the reduction of microorganisms. CAFOs or CFAs are point sources that can generate large amounts of animal waste, and if not properly managed, are a source of bacteria. Faulty septic systems, sludge disposal, industrial land application, animal waste land application, stormwater, or other non-discrete sources can also contribute to bacterial contamination.

Transport
Bacteria are easily transported with both organic and inorganic material. The survivability of bacteria in water is limited and can be affected by a variety of conditions including sunlight, available food, nutrients, and water temperature.

Current Water Quality Impairment
Under the current water quality standards, the lower Payette River Fecal coli bacteria levels exceed levels for the protection of both primary and secondary contact recreation during the period from May 1st through September 30th (Freeman, IN Press, 1999).

2.7. Source Identification

2.7.1. Point Sources
Point sources are described as those sources that have a discrete (individual-distinct) conveyance, or discharge, to a receiving body of water. Four point sources are municipal WWTPs and one is an industrial discharge. Discharge from the WWTPs range from 0.16 MGD (0.07 cfs) to 2.25 MGD (0.92 cfs). All municipal and industrial point sources are currently under a National Pollutant Discharge Elimination System (NPDES) permit. The other point sources are CAFOs and CFAs that may or may not have NPDES permits. CAFOs or CFAs are easily tracked and the determination as a point source or a significant contributor of pollutants can be made. Table 9. lists the known point source discharges with NPDES permits. Appendix E describes in more detail the NPDES permitted facilities and their monitoring requirements.

2.7.2. Nonpoint Sources
Nonpoint sources are pollution sources that may not allow for easy tracking of pollutants. Sources could be from urban-suburban areas, faulty septic systems, storm water runoff, agricultural practices, non-designated CAFOs and CFAs, mining, roads, wildlife, sludge and animal waste land application sites, and other non-discrete sources.

2.7.3. Background

Background pollutant sources in the lower Payette River basically relates to the quality of water as it leaves Black Canyon Reservoir. Water quality monitoring below Black Canyon Dam provides historical background information. This information should provide the necessary data to determine what loads and stressors may not be controllable through the development of the lower Payette River TMDL.

2.7.4. Natural Contribution

Every watershed will add pollutants and/or stressors to a system through erosion, precipitation, land disturbance, fire, etc. Since pre-man influences will not be easily determined, literature values may have to be extrapolated to determine what pollutants/stressors are present and how they may impact water quality. These will be addressed in the Implementation Plan

Table 9. Known Point Source Discharge and NPDES Number.

MUNICIPALITIES WWTP	NPDES IDENTIFICATION NUMBER
City of Emmett	ID-002031-1
City of New Plymouth	ID-002038-9
City of Fruitland	ID-002119-9
City of Payette	ID-002067-2
INDUSTRIAL	
American Fine Foods	ID-0000213
CAFOs or CFAs	
CM Ranch	ID-002214-4
Emmett Feedlot	ID-002174-1
American Dairy Heifer Feedlot	ID-002282-9
Bien Livestock	ID-002132-6
Callender's Inc.	ID-G-01-0017
Collingsworth Brother Dairy	ID-G-01-0005
David Holm	ID-G-01-0019
Ankerman Dairy Farm	ID-G-01-0009

2.8. Carriers/Linkage

2.8.1. Sediment

Sediment can be a transport mechanism for nutrients and bacteria. Sediment can also impair aesthetic quality, agriculture water supply, water clarity needed for fish feeding activity, cover spawning gravels needed for cold water species, cover interstitial space needed for benthic invertebrates, and fill in pools needed for temperature control and fish refuge. For the lower Payette River, sediments are a major transport mechanism for associated pollutants and the pollutants of concern for the river.

Excess sediment is usually associated with nonpoint activity such as agriculture, storm water, mining, forest practices, stream bank erosion and other mechanisms that may contribute to the erosion potential of the surrounding area. Point sources are strictly monitored to prevent the discharge of solids (organic and inorganic) to receiving waters, and at this time they are not believed to be a significant source of sediment.

Transport of sediment is directly related to stream energy, a product of velocity and flow. Sediment can be transported by suspension in the water column (suspended sediment) if small enough in size. Larger sediment particles are transported along the bottom (bedload sediment). The function of total sediment load in each mode of transport depends of the particle size distribution and stream energy at any given time. Bedload sediment can provide for clean gravels and cobbles needed for fish and benthic species.

2.8.2. Ground Water

Ground water is a linkage to surface water quality issues in the lower Payette River area. Ground water in the Payette County area has shown concentrations of Nitrite-Nitrates (NO_2+NO_3) ranging from less than 2 mg/l to 60 mg/l (Ingham, 1996). In areas where high concentrations of NO_2+NO_3 were found in surface waters, high concentrations of NO_2+NO_3 in ground water were also found. IDA surface water information collected in both Payette and Gem Counties in 1996 and 1997 showed similar results with high concentrations of NO_2+ NO_3 during the non-irrigation season (Campbell, 1996-1997 Unpublished Data). Some of these drains serviced a watershed smaller than 500 acres. There was no surface runoff or irrigation during this period of low flows. Concentrations in surface waters ranged from 0.3 to 9.1 mg/l of NO_2+NO_3 as N during the non-irrigation season. Since it appears that groundwater was the only source of water for these drains, it could be assumed ground water is a source of nutrients.

2.9. Stressors

2.9.1. Stream/River Bank Modification

Most of the lower Payette River banks have been altered to reduce flooding in flood prone areas. These modifications can alter the rivers ability to construct pools and riffles that assist in water temperature control. Also, lack of access to the historical floodplain can affect ground water recharge to the river, which can affect water temperature. Water that is stored in the floodplain will release cooler ground water in low flow periods.

2.9.2. Flow Modification

The lower Payette River is a regulated system. Near its headwaters (Cascade Reservoir, Big Payette Lake, and Deadwood Reservoir) water release is governed by irrigation water demand, conservation pool storage in Cascade Reservoir, salmon flow augmentation and flood control. During recent years, salmon flow augmentation water rented by the BOR has been split between summer and winter months. The water quality impacts of this increased flow in the lower Payette River during critical summer months is still being assessed. These flows are in excess of irrigation demands and simply pass out of the basin without diversion for other uses.

3.0. Pollution Control Efforts

3.1. Ongoing Projects

3.1.1. Nonpoint Sources

In both Payette and Gem Counties there are water quality based programs for pollutant reductions. Most of these programs are federally funded through the Natural Resource Conservation Service (NRCS), through past and present Farm Bills authorized by the United States Congress. These programs are targeted at the agricultural community to assist with conservation practices. In Payette County, the Payette SWCD has a SAWQP in place which addresses on -farm sediment and nutrient reductions (Payette SWCD, 1991). This program is a State of Idaho water quality program which provides cost share incentives to local operators for pollutant reduction. Table 10., shows a breakdown of known water quality incentive projects in both counties, along with the number of acres treated or acres under contract for treatment in the immediate future (Payette and Gem SCDs, Personal Communications, 1998).

The agricultural community, through local SCDs, have demonstrated a willingness to protect water quality in the lower Payette River Valley. The lower Payette River SAWQP planning project (Payette SWCD, 1991) addressed almost 32,000 acres of agricultural lands for treatment with best management practices (BMPs) to reduce pollutant loads to the river. The current SAWQP project has provided cost share incentives to approximately 19 individual landowners to address pollution reduction on 5,000 acres. It should be mentioned that the current SAWQP program is not providing funding for the implementation of BMPs. Funding for this program should be continued after internal State of Idaho review of goals and objectives, and administrative needs. The lower Payette River SAWQP project is currently on hold due to reorganization of administrative functions and new allocation of funding sources.

The Hydrologic Unit Area (HUA) and Water Quality Incentive Program (WQIP) project encompasses seven counties in Southwest Idaho. Both Payette and Gem Counties were targeted for projects to demonstrate BMPs to address both surface and ground water concerns. These BMPs address irrigation water management, nutrient management and many other water quality protection practices. The HUA is no longer providing funding and is not expected to be a funding source in the future.

Current Federal funding of the Environmental Quality Incentive Program (EQIP) is targeted for livestock feeding operations (CAFOs and CFA), and irrigation induced erosion. Participation from local operators has been competitive for the available funds from this program.

Table 10. On-going Pollution Abatement Project for Agricultural Activity.

Project Name	Amount of Acres
Payette County	
State Agricultural Water Quality Project (SAWQP)	1147
Conservation Reserve Program	900
Environmental Quality Incentive Program	180
Hydrologic Unit Area/ Water Quality Incentive Program	1058
Agricultural Crop Program*	69
Total	3354
Gem County	
Environmental Quality Incentive Program	781
Hydrologic Unit Area/ Water Quality Incentive Program	888
Total	1669

* Program is no longer available

3.1.2. Point Sources

In the last few years, the WWTPs in Emmett, Fruitland and Payette have completed upgrades for facilities to provide secondary treatment of waste water from these municipalities. A considerable effort has been made to decrease ground water infiltration into the facilities, thus reducing the amount of water that needs treatment. All of the municipalities are currently regulated under the NPDES permitting program. Each permitted facility is required to monitor their effluent to determine compliance with the individual NPDES permit. All of the permits have expired and new permits will be issued at the completion of the TMDL. Appendix E contains a brief description of waste water treatment plant operations and permit requirements.

The State of Idaho, through a revolving fund (Water Pollution Control Fund), offers facilities either grants or low interest loans for facilities upgrades. Funding from this source can be used to upgrade facilities and/or other related infrastructure.

In 1995, a Memorandum of Understanding (MOU) between the EPA, DEQ and IDA was signed to provide IDA authority to oversee the waste management of dairies statewide. This MOU has provided an enforcement mechanism to assure dairies adequately manage animal waste.

In 1996, EPA reissued the Idaho general NPDES permit for CAFOs. This new general permit allows permitted facilities to discharge animal waste only during unusual climatic events. The new permit also requires permitted facilities to land apply animal waste at agronomic rates, and requires record keeping of animal waste management practices. It is believed these provisions will reduce the occurrence of discharges to surface waters and reduce impacts to ground water.

The State of Idaho, municipalities, the agriculture community and industrial components within the lower Boise River TMDL project area have had numerous discussions of effluent trading between the nonpoint and point sources within that area. Effluent trading may be a viable option as a portion of the implementation plan of the lower Payette TMDL.

4.0 Bacteria Loading Analysis and Load Reduction

4.1. Introduction

The lower Payette River is not meeting water quality standards for both primary and secondary contact recreation (IDAPA 16.01.02, 250.01). The criteria for secondary contact recreation was not exceeded during the months of October through April(800 CFU/100 ml).

Analysis of monitoring data from six in-river stations on the lower Payette River showed an overall reduction of 84% for Fecal coliform (Fecal coli) bacteria would be required to achieve water quality standards for May through September. All reduction targets must come from non-point sources (agricultural, urban-rural storm water, faulty septic systems, etc.). Reduction from point sources (municipal WWTPs) would have no impact to the load reductions needed.

All loads are based on Colony Forming Units/second (CFU/sec).

4.1.1. Review of Data

Data reviewed from the Environmental Protection Agency's (EPA) STORET Database indicated that Fecal coli levels in the lower Payette River exceeded the water quality standard for primary and secondary contact recreation. All the data came from once a month grab samples collected at Black Canyon Dam, Letha Bridge and Highway 95. The agencies responsible for this water collection and analysis were BOR and USGS. Data collected by these agencies is spotty, with limited collection periods and spotty historical collection (see section 2.4.1).

In 1996, the Lower Payette River WAG requested DEQ and IDA conduct a more in-depth bacteria evaluation to determine the extent of bacterial contamination (Ingham, 1996a and Campbell, 1996). In June, 1996, DEQ initiated a monitoring program that would generate five(5) samples collected over a thirty (30) day period for the months of June, August and September. This study was repeated again in 1997. Six (6) river sites were monitored during this period. They were: Payette River at Plaza Road (RM 38), LPR-001; Payette River below the City of Emmett Wastewater Treatment Plant (WWTP) (RM 29.5), LPR-002; Payette River at Letha Bridge (RM 25)LPR-003; Payette River at Blackbridge (RM 13), LPR-005; Payette River at Highway 95 (RM 4), LPR-007; and Payette River below the City of Payette WWTP (RM 0.5), LPR-008. The geometric mean results for this monitoring effort is outlined in Table 11 (Freeman, 1999: IN PRESS). Appendix B, shows the monitoring stations.

The results of this monitoring indicated that the bacteria levels in the lower Payette River exceeded water quality standards and that primary and secondary contact recreation beneficial uses are not fully supported. These standards were exceeded from the Letha Bridge (LPR-003) site down to the confluence with the Snake River (LPR-008).

Table 11. Geometric Mean Results (CFU*/100 ml) Lower Payette River Bacteria Monitoring. 1996 and 1997.

Stations	June	1996 August	September	June	1997 August	September
LPR-001	19	5	4	22	4	5
LPR-002	28	33	20	30	7	10
LPR-003	19	60 [2]	362 [3]	48	40	54 [2]
LPR-005	NM[1]	161 [2]	126 [2]	119 [2]	76 [2]	116 [2]
LPR-007	50	294 [3]	77 [2]	100 [2]	112 [2]	251 [3]
LPR-008	99 [2]	318 [3]	180 [2]	163 [2]	207 [3]	291 [3]

[1] Not Monitored Until August 1996
[2] Exceeds Primary Contact Criteria
[3] Exceeds Both Primary Contact and Secondary Criteria
*CFU, colony forming unit

4.1.2. Data for Bacteria Load Determination

Bacteria results from the monitoring conducted in 1996 and 1997 were used to calculate in river geometric means. The month of August 1996 appears to be the most critical for bacteria loading to the lower Payette River and will be utilized for all loading analysis. Drains and tributary monitoring conducted in 1996 and 1997 will be used for loading analysis to determine load allocation and current load. Geometric means were taken from the drain monitoring effort for the months of May through September. There is not enough data to determine an accurate geometric mean for just the month of August.

Flow was determined from the BOR and USGS gaging sites and from flow data obtained from the IDA drain and tributary monitoring conducted in 1996-97 (Campbell, 1997b). With inflow information, a water budget was developed to determine discharge from sites without permanent gaging sites (Appendix D).

Determining loads for bacteria is not conclusive. Bacteria, are not usually uniform throughout the water column. Two samples taken side by side at the same time may show completely different results. However, to determine a load reduction for the lower Payette River, it will have to be assumed the bacteria levels are uniform throughout the water column.

4.2 Loading Calculations

4.2.1 Methods for Calculations:

To determine the load or the level expected in the volume of water the following formula was used:

$$\text{CFU/sec} = \text{CFU/100 ml} * \text{Flow(cfs)} * 28.32(\text{l/cf}) * 10(\text{100 ml/l})$$

This formula provides the number of organisms passing a certain point in one second. As an example:

Station LPR-002 has a bacteria level of 33 CFU/100 ml, and a flow of 1140 cfs. Using the above formula, the calculated CFU/second is *1.07E+7 CFU/sec*. With calculating a die off rate (*see determining die off rate/disappearance rate*) the number of units reaching LPR-003 from this site is *1.02E+7 CFU/sec*. Adding in the input from three drains; Beacon Drain, Bissel Creek and Tunnel#7; and subtracting the load reduced by the 7 Mile Slough diversion, the calculated load at Station LPR-003 would be *2.09E+7 CFU/sec*.

The expected bacteria level at LPR-003, after contributions from input drains, reduction from diversions and the existing bacteria in the system, is *85 CFU/100 ml* (after die off calculations). This value is obtained by the following formula:

$$\textbf{CFU/100 ml = CFU/100 ml/Flow(cfs)/28.32(l/cf)/10(100 ml/l)}$$

The measured geometric mean for LPR-003 in August 1996 was *60 CFU/100 ml*.

4.2.2. Die off Rates/Disappearance Rates

The rate of die off is affected by many factors; sunlight penetration, available organic matter, nutrients, temperature, turbidity, toxins ...etc. To simplify the die off rate for the lower Payette River the following formula was utilized (Tetra Tech, 1985):

$$C_t = C_o e^{-(kt)}$$

where:
C = coliform concentrations, CFU/100ml
C_o = initial coliform concentrations, CFU/100ml
C_t = coliform concentration at time t, CFU/100ml
k = disappearance rate constant, day^{-1} or $hour^{-1}$
t = exposed time, days or hours

Chen and Wells (1975)(IN: Tetra Tech 1985) determined a k value of 0.02 in the Boise River. This value will be used in the lower Payette River due to the similarities of the two systems.

The t value uses the distance traveled between each of the in-river monitoring sites and the distance from drains' confluence to the next in-river station. This formula assumes velocity remains constant at 3 feet/second. As an example, between Stations LPR-005 and LPR-007 is 9 miles or 47,520 feet. At 3 feet/second travel time is 4.4 hours (t = 4.4 hr).

The C_o is known from the in-river geometric mean values for August 1996 at Stations LPR-002, LPR-003, LPR-005, LPR-007 and LPR-008 (Table 11).

As an example, the expected survivability in the river at Station LPR-007 from LPR-005 would be:

$$\mathbf{C_t = 161e^{-(0.088)} = 147\ CFU/100ml}$$
or a die off rate of 8.7%

Where:
C_o= 161 CFU/100ml (geometric mean at LPR-005)
k= 0.02 (Tetra Tech, 1995)
t= 9 miles at 3 ft/sec= 4.4 hours

At station LPR-007, the in-river bacteria level remaining from LPR-005 would be 147 CFU/100ml. This figure is then utilized to calculate in-river load originating from the up-river station, LPR-005. See Appendix F for further loading analysis.

4.3. Load Reductions

To achieve the load capacity of 1.76E+07 CFU/sec at the confluence of the lower Payette River and the Snake River, an overall load reduction of approximately 84% will need to occur. This can be achieved by setting discharge limitations at all water return drains that discharge to the river. Another important issue is maintaining the appropriate bacteria level, or load, to achieve the water quality standards throughout the river. Load capacity at each river station is shown in Table 12.

Table 12. Load Capacity for the Payette River at Each Station. Lower Payette River.

River Station	Flow cfs	Measured Level CFU/100ml [2]	Measured Load CFU/sec	In-Stream Criteria CFU/100ml [3]	Load Capacity CFU/sec	% Load Reduction To Meet Criteria CFU/sec
LPR-001	1554	5	2.20E+06	50	2.02E+06	0%
LPR-002	1140[1]	33	1.07E+07	50	1.61E+07	0%
LPR-003	869[1]	60	1.48E+07	50	1.34E+07	9.5%
LPR-005	778[1]	161	3.55E+07	50	1.10E+07	69.0%
LPR-007	1142[1]	294	9.51E+07	50	1.82E+07	81.0%
LPR-008	1242[1]	318	1.12E+08	50	1.76E+07	84.8%

[1] Estimated Flows
[2] Geometric Mean from August 1996
[3] Instream Criteria is Based on water quality standards for Primary Contact Recreation, and the Geometric Mean Criteria

4.3.1. Load Analysis

Table 12. shows the current load analysis for both point and non-point sources. To reduce the probability of "double" counting, withdrawals are shown to give a more accurate loading analysis. Table 13 shows calculated load reductions to achieve water quality standards.

Table 13. Current Load Calculation with Withdrawals, and Current Measured Load near Confluence.

Calculated Load From Drains and Point Sources CFU/sec	Calculated Withdrawals CFU/sec	Calculated Load after Withdrawals CFU/sec	River Load @ 318 CFU/100ml CFU/sec	Difference in Measured and Calculated CFU/sec
1.47E+08	1.13E+07	1.36E+08	1.12E+08	17.4%

Table 14. Load and Wasteload Allocations with Withdrawals, and Capacity Load near Confluence.

Calculated Load From Drains and Point Sources at Target Reductions CFU/sec	Calculated Withdrawals CFU/sec	Calculated Load after Withdrawals CFU/sec	River Load @ 50 CFU/100ml CFU/sec	Difference in Allocation and Capacity CFU/sec
2.09E+07	3.48E+06	1.74E+07	1.76E+07	0.1%

4.3.2. Wasteload Allocation

For the Lower Payette River the wasteload allocation is set at the less stringent discharge limitations under the current NPDES permit.. The overall contribution by the municipal waste water treatment plants (WWTP) is minimal, with an over all contribution of approximately 0.004% of the total load to the river. Their current discharge (5.97E+03 CFU/sec) is a fraction of this based on discharge monitoring reports (DMRs) from January 1998 to July 1999. Or about 0.005% of the total measured load of 1.12E+07 CFU/sec after die-off calculations. Further reductions, or total elimination from the NPDES permitted facilities would have no impact to the overall bacteria load reduction goals. Table 14 shows the current bacteria loading analysis from point sources. Die-off calculations are based on distance traveled to the next monitoring station. Further die-off is expected downstream based on distance from source to the confluence with the Snake River.

Table 15. Point Sources Load Analysis.

Point Sources	Current Load CFU/sec[1]	Load After Die-Off CFU/sec	Percent of Total Load[2] %
Emmett WWTP	7.82E+02	7.82E+02	0.00053
New Plymouth WWTP	3.85E+02	3.37E+02	0.00023
Fruitland WWTP	5.95E+01	5.95E+01	0.00004
Payette WWTP	4.76E+03	4.76E+03	0.00324

[1] Taken From Facilities DMRs (January 1998 through Jule 1999)

[2] Calculated Load From All Sources 1.47E+08 CFU/sec

Further analysis of point source contribution after achieving the load to meet water quality standards in the river are listed in Tables 15 and 16. Target load in the river at the confluence with

the Snake River is 1.76E+07 CFU/sec. If facilities discharged under the less stringent allowable level, the over contribution would be approximately 0.043% of the load capacity. Under the most stringent discharge allowed under their current NPDES permit, the total contribution to the load capacity is 0.016%. Under current loading analysis, they are contributing 0.034% to the load capacity.

Table 16. Point Sources Load Capacity at Lower Payette River's Capacity at 50 CFU/100ml. (1.76E+07 CFU/sec).

Point Sources	Load at 50 CFU/100ml CFU/sec[1]	Load After Die-Off CFU/sec	Percent of Total Load Capacity %
Emmett WWTP	1.30E+04	1.28E+04	0.0612
New Plymouth WWTP	2.41E+03	2.27E+03	0.0109
Fruitland WWTP	9.91E+02	9.63E+02	0.0046
Payette WWTP	7.98E+03	7.98E+03	0.0382

[1]Most Stringent Allowable Discharge Under Current NPDES Permit
[2] Calculated Load Capacity 1.76E+07 CFU/sec

Table 17. Point Sources Load Capacity at Lower Payette River's Capacity at 50 CFU/100ml. (1.76E+07 CFU/sec).

Point Sources	Load at 200 CFU/100ml CFU/sec[1]	Load After Die-Off CFU/sec	Percent of Total Load[2] %
Emmett WWTP	5.210E+04	5.11E+04	0.2445
New Plymouth WWTP	9.63E+03	9.08E+03	0.0434
Fruitland WWTP	3.96E+02	3.96E+02	0.0019
Payette WWTP	3.17E+03	3.16E+03	0.0151

[1]Least Stringent Allowable Discharge Under Current NPDES Permit
[2] Calculated Load Capacity 1.76E+07 CFU/sec

Confined animal feeding operations (CAFOs) or confined feeding operations (CFAs) are also given a **zero wasteload allocation** based on the assumption they do not discharge in accordance with their NPDES permits. Although it should be noted, they are permitted to discharge under certain climatic events (i.e., 25 year, 24 hour storm event).

4.3.3. Load Allocation

Non-point sources are the major contributor to the bacteria load to the lower Payette River. Fortunately, water quality data is available to determine a load allocation for these non-point sources, and load allocation can be established at individual drains to achieve in river load capacity. Overall, the current loading from these drains is ***1.47E+08 CFU/sec, 1.36E+08 CFU/sec*** after die-off calculations. To reduce double counting, withdrawals are removed from all

loading analysis and equal ***1.13E+07 CFU/sec***. Calculated loading after withdrawals and die-off is ***1.36E+08 CFU/sec***. See Tables 14 and 15. This leaves a 84.8% reduction target to achieve water quality standards at 50 CFU/100ml ***(1.76E+07 CFU/sec load capacity)*** at the confluence with the Snake River, and other locations upstream.

Individual loading analysis, die-off calculations, and load capacity are shown in Table 18. Loading allocation is based on levels of either 95 or 100 CFU/100ml at all drains. Die off calculations are figured into the loading analysis. However, complete die off to the Snake River is not factored in. For point sources, the level is 200 CFU/100ml, the least stringent under current NPDES permits.

4.3.4. Margin of Safety

Margin of safety (MOS) will be based on a load allocation of ***1.74E+7 CFU/sec***. This is 0.1% less than the load capacity of ***1.76E+07 CFU/sec***. MOS is calculated with die-off rates from the drains to the LPR-008, or the Snake River, approximately 17.4%, or an additional **3.05E+06 CFU/sec.** The additional die-off is based on the difference between the current load at LPR-008, **1.12E+08 CFU/sec,** and the current loading of **1.47E+08 CFU/sec**, minus withdrawals of **1.13E+07 CFU/sec, 1.36E+08 CFU/sec**. It is assumed that the difference between the calculated current loading and the measured load at LPR-008 is the result of die-off between the stations. All die-off calculations are based on the discharge point to the next monitoring station, and not to the confluence with the Snake River. Further die off will occur before the bacteria load reaches the Snake River.

4.3.5. Wasteload Allocation, Load Allocation and Total Maximum Daily Load

Table 17. shows the final analysis for the Fecal Coli load to the lower Payette River.

Table 18. Final Load Analysis, TMDL, Wasteload Allocation, Load Allocation and Margin of Safety.

Load Capacity/ Total Maximum Daily Load		Wasteload Allocation		Load Allocation after Die-off		Margin of Safety
1.76E+07 CFU/sec	=	6.37E+04 CFU/sec	+	1.74E+07 CFU/sec	+	17.40%

Table 19. Current Load, Load After Die-Off, and Allocated Load.

River Station				Current Load	Load After Die-Off	Load Allocation[1]	Reduction
	Name	Point Source	Non-Point Source	Load CFU/sec	Load CFU/sec	Load CFU/sec	%
LPR-001	Lower Payette River						
	Emmett WWTP	WWTP		7.82E+02	7.82E+02	5.11E+04	
	Plaza Drain		Drain	2.31E+06	2.20E+06	1.89E+05	90%
	Mesa Drain		Drain	2.98E+06	2.89E+06	2.97E+05	88%
	Big 4 Drain		Drain	6.70E+06	6.57E+06	9.80E+05	82%
	CAFO's	CAFOs		0.00E+00	0.00E+00	0.00E+00	
LPR-002	Lower Payette River						
	Tunnel #7		Drain	3.60E+06	3.51E+06	1.110+06	64%
	Bissel Cr.		Drain	1.85E+06	1.83E+06	4.77E+05	70%
	Beacon		Drain	6.51E+06	6.35E+06	9.67E+05	70%
	CAFOs	CAFOs		0.00E+00	0.00E+00	0.00E+00	
LPR-003	Lower Payette River						
	Silverleaf		Drain	7.79E+06	7.06E+06	4.43E+05	92%
	7 Mile Slough		Drain	3.78E+06	3.42E+06	9.51E+05	63%
	Countyline		Drain	4.88E+06	4.51E+06	5.98E+05	83%
	S-1		Drain	7.50E+06	7.08E+06	1.20E+06	78%
	S-2		Drain	2.84E+06	2.70E+06	6.59E+05	69%
	S-3		Drain	3.37E+06	3.21E+06	3.17E+05	87%
	S-4		Drain	1.45E+06	1.42E+06	8.28E+05	28%
	Sand Hollow		Drain	4.28E+05	3.89E+05	8.85E+04	70%
	CAFOs	CAFOs		0.00E+00	0.00E+00	0.00E+00	
LPR-005	Lower Payette River						
	S-5		Drain	8.23E+06	7.58E+06	1.58E+06	75%
	S-6		Drain	1.37E+06	1.26E+06	5.47E+05	48%
	S-7		Drain	7.93E+04	7.33E+04	1.76E+05	-188%
	S-8		Drain	2.08E+06	1.94E+06	5.28E+05	67%
	S-9		Drain	3.96E+05	3.73E+05	1.77E+05	43%
	S-10		Drain	3.75E+06	3.54E+06	6.34E+05	78%
	S-11		Drain	4.56E+06	4.32E+06	1.78E+05	95%
	S-12		Drain	2.15E+06	2.04E+06	2.05E+05	88%
	S-13		Drain	1.57E+07	1.49E+07	1.15E+06	91%
	S-14		Drain	5.78E+06	5.50E+06	4.36E+05	90%
	S-15		Drain	1.12E+07	1.09E+07	7.84E+05	91%
	Willow Creek		Trib.	2.44E+07	2.32E+07	4.10E+06	79%
	New Plymouth WWTP	WWTP		3.85E+02	3.37E+02	8.90E+03	
	CAFOs	CAFOs		0.00E+00	0.00E+00	0.00E+00	
LPR-007	Lower Payette River						
	49er Slough		Drain	1.64E+07	1.61E+07	1.19E+06	91%
	Fruitland WWTP	WWTP		5.95E+01	5.95E+01	3.96E+03	
	Payette WWTP	WWTP		4.76E+03	4.76E+03	3.17E+04	
	CAFOs	CAFOs		0.00E+00	0.00E+00	0.00E+00	
LPR-008	Lower Payette River						
Totals				1.52E+08	1.45E+08	2.09E+07	

[1] Load Capacity or Target Loading Does Not Calculated Die-off Rates to the Snake River, Approximately 17.4%

5.0. Reasonable Assurance

For watersheds that have a combination of point and non-point sources where pollution reductions goals can only be achieved by including some non-point source reduction, a reasonable assurance must be incorporated into the TMDL (EPA, 1991). The Lower Payette River TMDL load reductions will rely on non-point sources to achieve desired water quality and to restore designated beneficial uses. If appropriate load reductions are not achieved from non-point sources through existing voluntary programs, then reductions must come from point sources.

5.1. Point Sources

The point sources that discharge into the Lower Payette River are permitted facilities administered by the EPA. These facilities are mainly confined to the municipalities. Wasteload allocations (WLAs) reductions can be implemented by modification of the NPDES permit. However, the load reductions (WLAs and LAs) needed to achieve desired water quality and restore beneficial uses in the river can not be achieved by upgrades of the point sources alone.

Current NPDES permits should be sufficient for dairies and feedlot operations. CAFOs and CFAs are not required to monitor and are allowed to discharge wastewater only under certain infrequent climatic conditions (EPA, 1996).

The state has responsibility under §401 of the CWA to provide water quality certification. Under this authority, the state reviews the projects to determine applicability to local water quality issues.

5.2. Non-Point Sources

Under §319 of the CWA, each sate is required to develop and submit a non-point source management plan. Idaho's Non-Point Source Management Program (Bauer, 1989) was submitted and approved by the EPA. The non-point management program describes many of the voluntary and regulatory approaches the state will take to abate non-point pollution sources. Since the development of the Non-point Source Management Program in 1989, revisions of the water quality standards have occurred. Many of these revisions have adopted provisions for public involvement, such as the formation of Basin Advisory Groups (BAGs) and WAGs (IDAPA 16.01.02.052). The WAGs are to be established in high priority watersheds to assist DEQ and other state agencies in developing TMDLs and Watershed Management Plans (WMPs) for those segments.

The water quality standards refer to other programs whose mission is to control non-point pollution sources. Some of these programs and responsible agencies are listed in Table 20.

Table 20. State of Idaho's Regulatory Authority for Non-Point Pollution Sources.

Citation	IDAPA Citation	Responsible Agency
Idaho Forest Practice Rules	16.01.02.350.03(a)	Idaho Department of Lands (IDL)
Rules Governing Solid Waste Management	16.01.02.350.03(b)	Idaho Department of Health and Welfare
Rules Governing Subsurface and Individual Sewage Disposal Systems	16.01.02.350.03©	Idaho Department of Health
Rules and Standards for Stream-channel Alteration	16.01.02.350.03(d)	Idaho Department of Water Resources
Rules Governing Exploration and Surface Mining Operations in Idaho	16.01.02.350.03(e)	Idaho Department of Lands
Rules Governing Placer and Dredge Mining in Idaho	16.01.02.350.03(f)	Idaho Department of Lands
Rules Governing Dairy Waste	16.01.02.350.03.(g) or IDAPA 02.04.14	Idaho Department of Agriculture

The State of Idaho uses a voluntary approach to control agricultural non-point sources. However, regulatory authority can be found in the water quality standards (IDAPA 16.01.02.350.01 through 16.01.02.350.03). The State of Idaho Agricultural Pollution Abatement Plan (Ag Plan), as described in IDAPA 16.01.02.054.07, provides direction to the agricultural community for approved BMPs (IDHW **et al**, 1993). As a portion of the Ag Plan, it outlines responsible agencies or elected groups (SCDs) that will take the lead if non-point pollution problems need addressing. For agricultural activity, it assigns the local SCDs to assist the landowner/operator to develop and implement BMPs to abate non-point pollution associated with the land use. If a voluntary approach does not succeed in abating the pollutant problem, the state may provide injunctive relief for those situations that may be determined an imminent and substantial danger to public health or environment (IDAPA 16.01.02.350.02(a)).

If a non-point pollutant(s) is determined to be impacting beneficial uses and the activity already has in place referenced BMPs, or knowledgeable and reasonable practices, the state may request the BMPs be evaluated and/or modified to determine appropriate actions. If evaluations and/or modifications do not occur, injunctive relief may be requested (IDAPA 16.01.02.350.2,ii(1).

It is expected that a voluntary approach will be able to achieve LAs needed. Public involvement along with the eagerness of the agricultural community demonstrates a willingness to implement BMPs and protect water quality. In the past, projects that were cited in Table 8. have provided the agricultural community technical assistance, information and education (I&E), and the cost share incentives to implement BMPs. The continued funding of these projects will be critical for the LAs to be achieved in the Lower Payette River area.

5.3. Time frame for Compliance

Upon approval of this document by EPA, the Lower Payette River WAG, along with associated state and federal agencies will commence with the development of the implementation plan portion of the TMDL. The implementation plan will need to be completed within eighteen(18) months after the approval of this document. Table 19, describes a tentative list of objects to be achieved in the implementation plan or the Watershed Management Plan.

Table 21. Objectives for the Implementation Plan for the Lower Payette River TMDL.

Action Item	Targeted Source Allocation
Funding Sources	LAs
Identify Critical Acres	LAs
Identify BMPs	LAs
Schedule for Implementation	LAs
In River Monitoring	LAs
Pollution Trading-Banking	LAs
BMP Effectiveness	LAs

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8.0 Glossary of Terms and Acronyms

§303 (d) - Section 303(d) of the Clean Water Act, which requires states prepare and supply, for approval, a list of all water bodies not fully supporting designated beneficial uses. EPA approves or disapproves list and forwards to congress.

BAG - Basin Advisory Group

BAT - Best Available Technology

BMP - Best Management Practice

biota - living organisms

BOR - U.S. Bureau of Reclamation

CAFO - Concentrated Animal Feeding Operations

CFA - Concentrated Feeding Areas

CFU- Colony Forming Units

CFR - Code of Federal Regulations

cfs - cubic feet per second

CWA - Clean Water Act

DO - Dissolved Oxygen

EPA - Environmental Protection Agency

EQIP - Environmental Quality Incentive Program

GIS - Geological Information System, a georeferenced data base.

Hydrologic Unit Code (HUC) - A watershed numbering system developed by US Geological Survey. All waters that flow to a common point have the same number. For example all of the waters that flow out of the Columbia River system begin with the number 17 (first field watershed), and all of those waters that flow the South Arm of Lucky Peak Reservoir 17050113 (fourth field watershed). Every two digits counts as a new field.

IDA - Idaho Department of Agriculture

IDAPA - Idaho Water Quality Standards and Wastewater Requirements

IDEQ(DEQ) - Idaho Division of Environmental Quality

IDFG - Idaho Department of Fish & Game

IDHW - Idaho Department of Health and Welfare

IDL - Idaho Department of Lands

IDWR - Idaho Department of Water Resources

LA - Load Allocations

LPR - Lower Payette River

MGD - Million Gallon / Day

MOU - Memorandum of Understanding

NPDES - Nation Pollution Discharge Elimination System

SAWQP - State Agricultural Water Quality Program

SCC - Soil Conservation Commission

SWCD - Soil and Water Conservation District

TMDL - Total Maximum Daily Load

USGS - United States Geological Survey

WAG - Watershed Advisory Group

WLA - Waste Load Allocations

WMP - Watershed Management Plan

WWTP - Wastewater Treatment Plant

Conversion Figures

Celsius to Fahrenheit = (9/5* ^{o}**C**)+32=^{o}**F**

Load (mass/unit/time)= concentration*flow*28.32*time (second, minute, hours or day)

Appendix A. Watershed Advisory Group Meeting Dates and Locations

Lower Payette River Watershed Advisory Group Meeting Dates and Locations

September 21, 1995	Emmett, Idaho
November 15, 1995	Emmett, Idaho
December 13, 1995	New Plymouth, Idaho
January 24, 1996	Emmett, Idaho
February 28, 1996	Fruitland, Idaho
March 21, 1996	Emmett, Idaho
April 18, 1996	Emmett, Idaho
May 29, 1996	Payette, Idaho
June 27, 1996	New Plymouth, Idaho
August 22, 1996	Emmett, Idaho
September 19, 1996	Fruitland, Idaho
October 24, 1996	Emmett, Idaho
November 21, 1996	Emmett, Idaho
January 16, 1997	Emmett, Idaho
February 20, 1997	Fruitland, Idaho
March 20, 1997	Emmett, Idaho
April 9, 1997	Emmett, Idaho
May 15, 1997	Emmett, Idaho
June 19, 1997	Fruitland, Idaho
July 17, 1997	Emmett, Idaho
August 21, 1997	Emmett, Idaho
September 18, 1997	Fruitland, Idaho
November 20, 1997	Emmett, Idaho
December 18, 1997	Fruitland, Idaho
February 19, 1998	Emmett, Idaho
March 19, 1998	Emmett, Idaho
April 23, 1998	Fruitland, Idaho
June 16, 1998	Emmett, Idaho
July 23, 1998	Fruitland, Idaho
September 17, 1998	Emmett, Idaho
December 17, 1998	Fruitland, Idaho
February 18, 1999	Emmett, Idaho
April 21, 1999	Emmett, Idaho
May 20, 1999	Fruitland, Idaho
September 16, 1999	Emmett, Idaho (Public Meeting)
October 28, 1999	Emmett, Idaho

Appendix B. Water Quality Information 1997-199Lower Payette River

Lower Payette River Monitoring
September 1996 through October 1998

Provisional Data, Do Not Cite

Station LPR-001, Lower Payette River @ Black Canyon Dam, STORET #2040689

	Temp.	Dissolved Oxygen	Conductivity	Flow measured	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
29-Oct-96	6.9	11.5	69.3	1130	7.67	0.01	0.19	0.02	0.024	0.007	0.2		250	6	2	8	12	
20-Nov-96	5.0	13.3	54.8	6600	7.43	0.09	0.36	0.01	0.081	0.013	0.2		1650	44	21	196	280	
16-Dec-96	1.4	16.1	53.1	3520	7.18	0.11	0.24	0.02	0.04	0.014	0.2		710	6	5	15	40	
21-Jan-97	3.2	15.1		6810	7.92	0.11	0.29	0.03	0.055	0.017	0.2		700	14	9	10	4	
18-Feb-97	4.4		49.8	7320	6.76	0.12	0.24	0.02	0.051	0.019	0.2		700	8	7	36	4	
25-Mar-97	5.8	13.5	49.3	9480	6.92	0.08	0.27	0.01	0.08	0.023	0.2		1290	36	16	10	4	
08-Apr-97	6.7	12.4	49.6	5450	7.49	0.04	0.21	0.01	0.053	0.017	0.2		640	14	8	4	2	
22-Apr-97	7.6	13.7	41.1	11500	7.76	0.2	0.28	0.01	0.12	0.028	0.2		2720	73	42	80	32	
07-May-97	9.6	13.4	44.7	9230	7.22	0.03	0.18	0.01	0.058	0.018	0.2		850	19	11	32	8	
21-May-97	10.1	13.4	36.5	11700	7.18	0.06	0.17	0.01	0.066	0.016	0.2		1100	40	19	400	60	
03-Jun-97	11.6	13.6	35.0	12000	7.55	0.05	0.14	0.01	0.042	0.011		2.0	770	28	11	40	20	
17-Jun-97	14.2	12.6	34.2	12100	7.63	0.06	0.21	0.01	0.039	0.011		2.0	600	16	7	20	8	
14-Jul-97	17.4		44.5	3060	7.57	0.02	0.12	0.01	0.027	0.013		2.0	240	6	3	8	4	
29-Jul-97	20.2	9.0	48.9	2300	8.01	0.02	0.18	0.02	0.043	0.006			380	9	2	12	44	
13-Aug-97	19.7	9.1	47.4	2180	7.43	0.02	0.24	0.02	0.032	0.007		2.0	320	7	3	4	4	
26-Aug-97	19.7	8.6	52.0	1600	8.41	0.02	0.2	0.02	0.035	0.007		2.0	290	6	2	6	6	
09-Sep-97	20.0	8.9	57.6	536	7.67	0.03	0.22	0.01	0.024	0.008		2.0	230	5	2	2	4	
23-Sep-97	16.9	10.3	66.0	483	8.15	0.04	0.27	0.04	0.032	0.008		2.0	280	8	3	2	32	
27-Oct-97	7.8	12.2	86.0	1170	8.7	0.04	0.21	0.02	0.037	0.004		1.0	340	5	3	2	2	
18-Nov-97	3.0	12.4	83.0	1160	7.72	0.04	0.32	0.16	0.047	0.009		1.0	750	8	4	4	2	
09-Dec-97	1.5	15.6	57.0	1770	7.83	0.05	0.2	0.02	0.035	0.007		1.0	190	3	3	2	4	
21-Jan-98	1.5		77.0	1570	7.69	0.24	0.42	0.07	0.14	0.043		1.0	4490	43	48	190	580	
23-Jan-98	4.7	15.4	77.0	1970	8.08	0.07	0.18	0.02	0.051	0.015		1.0	550	4	4	8	12	
19-Mar-98	6.6	14.8	63.0	2930	7.71	0.06	0.21	0.02	0.047	0.011		1.0	590	5	6			
24-Mar-98				2930												106	80	
06-Apr-98	6.9	14.6	55.0	4210	7.61	0.08	0.28	0.01	0.047	0.015		1.0	630	6	6	2	10	2
26-Apr-98	10.3	14.6	39.0	6370	7.52	0.09	0.23	0.03	0.044	0.016		1.0	530	7	5	42	40	2
12-May-98	10.4	14.3	37.0	9550		0.06	0.24	0.02	0.079	0.015		1.0	1260	30	9	120	78	30
28-May-98				16900		0.03	0.29	0.02	0.096	0.028		1.0	1770	28	19	1440	1660	16
08-Jun-98	12.9	13.8	38.1	10300	7.41	0.01	0.24	0.02	0.043	0.011		1.0	430	9	5	20	20	2
22-Jun-98	14.9		34.4	5590	7.79	0.06	0.16	0.02	0.035	0.008		1.0	320	6	3	30	16	2
06-Jul-98	19.0		37.8	4210	7.72	0.02	0.2	0.02	0.028	0.011		1.0	310	6	4	30	24	12
20-Jul-98	22.3	8.7	47.8	1950	7.37	0.07	0.19	0.02	0.028	0.01		1.0	220	4	2	20	78	4
05-Aug-98	22.2	8.8	66.2	1600	7.87	0.01	0.27	0.02	0.043	0.008		1.0	510	13	4	12	4	2
17-Aug-98	21.8	9.8	65.4	1430	7.73	0.16	0.22	0.04	0.03	0.008		1.0	340	5	2	2	4	2
02-Sep-98	19.4	9.0	43.0	991	7.65	0.02	0.22	0.03	0.03	0.004		1.0	360	8	2	4	12	2
28-Sep-98	16.0		63.4	633		0.01	0.25	0.02	0.039	0.003		1.0	450	8	4	6	8	4

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

wpayte\lprtmdl\sba-tmdl.wk4

Station LPR-001, Lower Payette River @ Black Canyon Dam, STORET #2040689

Statistical Summary

	Temp.	Dissolved Oxygen	Conductivity	Flow measured	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
Overall																		
Average	11.5	12.4	53.1	4979.3	7.6	0.06	0.23	0.02	0.050	0.013	0.2	1.2	771	15	9	81	89	7
Stand. Dev.	6.7	2.4	14.2	4210.6	0.4	0.05	0.06	0.03	0.026	0.008	0.0	0.5	813	15	10	242	285	8
Count	35	29	34	37	33	36	36	36	36	36	10	25	36	36	36	36	36	12
Max.	22.3	16.1	86.0	16900.0	8.7	0.24	0.42	0.16	0.140	0.043	0.2	2.0	4490	73	48	1440	1660	30
Min.	1.4	8.6	34.2	483.0	6.8	0.01	0.12	0.01	0.024	0.003	0.2	0.0	190	3	2	2	2	2
Water year 1997																		
Average	11.1	12.1	49.1	5944	7.6	0.1	0.2	0.01	0.050	0.014	0.20	2	762	19	10	49	32	ERR
Stand. Dev.	6.3	2.3	9.4	4136	0.4	0.0	0.1	0.01	0.024	0.006	0.00	1	610	18	10	96	63	ERR
Count	18	16	17	18	18	18	18	18.00	18	18	10	7	18	18	18	18	18	0
Max.	20.2	16.1	69.3	12100	8.4	0.2	0.4	0.04	0.120	0.028	0.20	2	2720	73	42	400	280	ERR
Min.	1.4	8.6	34.2	483	6.8	0.0	0.1	0.01	0.024	0.006	0.20	0	230	5	2	2	2	ERR
Irrigation Season 1997																		
Average	14.5	11.4	46.5	6012	7.7	0.05	0.20	0.01	0.048	0.013	0.2	1.7	702	19	9	51	19	ERR
Stand. Dev.	4.9	2.1	9.0	4684	0.3	0.05	0.05	0.01	0.025	0.006	0.0	0.7	665	19	11	108	18	ERR
Count	12	11	12	12	12	12	12	12	12	12	4	7	12	12	12	12	12	0
Max.	20.2	13.7	66.0	12100	8.4	0.20	0.28	0.04	0.120	0.028	0.2	2.0	2720	73	42	400	60	ERR
Min.	6.7	8.6	34.2	483	7.2	0.02	0.12	0.01	0.024	0.006	0.2	0.0	230	5	2	2	2	ERR
Non-Irrigation 1997																		
Average	4.5	13.9	55.3	5810	7.3	0.09	0.27	0.02	0.055	0.016	0.2	ERR	883	19	10	46	57	ERR
Stand. Dev.	1.8	1.6	7.3	2724	0.4	0.04	0.05	0.01	0.020	0.005	0.0	ERR	457	15	7	68	100	ERR
Count	6	5	5	6	6	6	6	6	6	6	6	0	6	6	6	6	6	0
Max.	6.9	16.1	69.3	9480	7.9	0.12	0.36	0.03	0.081	0.023	0.2	ERR	1650	44	21	196	280	ERR
Min.	1.4	11.5	49.3	1130	6.8	0.01	0.19	0.01	0.024	0.007	0.2	ERR	250	6	2	8	4	ERR
Water year 1998																		
Average	11.8	12.6	57.1	4065	7.8	0.06	0.24	0.03	0.050	0.013	ERR	1.0	780	11	7	113	146	7
Stand. Dev.	7.1	2.6	16.8	4074	0.3	0.06	0.06	0.03	0.028	0.009	ERR	0.0	975	11	11	326	389	8
Count	17	13	17	19	15	18	18	18	18	18	0	18	18	18	18	18	18	12
Max.	22.3	15.6	86.0	16900	8.7	0.24	0.42	0.16	0.140	0.043	ERR	1.0	4490	43	48	1440	1660	30
Min.	1.5	8.7	34.4	633	7.4	0.01	0.16	0.01	0.028	0.003	ERR	1.0	190	3	2	2	2	2
Irrigation Season 1998																		
Average	16.0	11.7	47.9	5311	7.6	0.05	0.23	0.02	0.045	0.011	ERR	1.0	594	11	5	144	163	7
Stand. Dev.	5.1	2.7	11.8	4668	0.2	0.04	0.04	0.01	0.020	0.006	ERR	0.0	438	8	5	392	452	8
Count	11	8	11	12	9	12	12	12	12	12	0	12	12	12	12	12	12	12
Max.	22.3	14.6	66.2	16900	7.9	0.16	0.29	0.04	0.096	0.028	ERR	1.0	1770	30	19	1440	1660	30
Min.	10.3	8.7	34.4	633	7.4	0.01	0.16	0.02	0.028	0.003	ERR	1.0	220	4	2	2	4	2
Non-Irrigation 1998																		
Average	4.2	14.1	73.8	1929	8.0	0.08	0.26	0.05	0.060	0.015	ERR	1.0	1152	11	11	52	113	ERR
Stand. Dev.	2.4	1.5	10.4	689	0.4	0.07	0.09	0.05	0.036	0.013	ERR	0.0	1504	14	16	72	211	ERR
Count	6	5	6	7	6	6	6	6	6	6	0	6	6	6	6	6	6	0
Max.	7.8	15.6	86.0	2930	8.7	0.24	0.42	0.16	0.140	0.043	ERR	1.0	4490	43	48	190	580	ERR
Min.	1.5	12.2	57.0	1160	7.7	0.04	0.18	0.02	0.035	0.004	ERR	1.0	190	3	3	2	2	ERR

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998

Provisional Data, Do Not Cite

Station LPR-002, Lower Payette River below Emmett WWTP STORET #2040631

	Temp.	Dissolved Oxygen	Conductivity	Flow estimated	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
29-Oct-96	7.23	12	78.56	756	7.8	0.03	0.16	0.01	0.024	0.011	0.2		180	2	2	16	16	
20-Nov-96	5.11	12.58	59.28	6226	7.3	0.1	0.44	0.01	0.091	0.013	0.2		1340	35	17	100	272	
16-Dec-96	2.03	16.23	55.7	3146	7.51	0.12	0.24	0.02	0.047	0.018	0.2		460	3	5	15	20	
21-Jan-97	2.77	15.64	48.3	6436	7.25	0.12	0.26	0.04	0.055	0.019	0.2		770	14	8	8	6	
18-Feb-97	5.04		51.4	6946	6.83	0.13	0.24	0.02	0.055	0.021	0.2		750	9	6	8	2	
25-Mar-97	7.62	12.71	51.77	9106	7.05	0.11	0.26	0.01	0.078	0.025	0.2		1300	27	15	12	10	
08-Apr-97	7.32	12.24	51.8	5076	7.62	0.05	0.21	0.01	0.052	0.018	0.2		640	9	8	4	4	
22-Apr-97	8.51	13.13	42.3	11126	7.88	0.09	0.31	0.01	0.147	0.028	0.2		2600	79	44	48	100	
07-May-97	11.24	12.46	46.5	8856	7.24	0.04	0.23	0.01	0.059	0.019	0.2		880	20	10	36	24	
21-May-97	11.36	12.61	37.4	11326	7.28	0.06	0.16	0.01	0.073	0.02	0.2		1240	41	16	24	60	
03-Jun-97	12.52	12.46	36.6	11626	7.45	0.05	0.14	0.01	0.043	0.011		2.0	810	28	13	54	52	
17-Jun-97	15.67	11.77	36	11726	7.7	0.03	0.18	0.01	0.053	0.012		2.0	750	21	7	24	320	
14-Jul-97	19.8		50	2686	7.97	0.02	0.17	0.01	0.039	0.012		2.0	350	21	3	8	4	
29-Jul-97	22.47	9.6	55.1	1926	8.41	0.02	0.24	0.01	0.016	0.007		2.0	240	6	2	2	4	
13-Aug-97	21.4	10.43	52.7	1806	7.96	0.02	0.25	0.01	0.035	0.01		2.0	200	4	2	22	28	
26-Aug-97	19.16	9.63	61	1226	7.81	0.03	0.24	0.01	0.033	0.03		2.0	230	5	2	4	4	
09-Sep-97	22.76	13.7	153	162	8.45	0.05	0.26	0.01	0.047	0.018		2.0	310	5	2	60	4	
23-Sep-97	17.76	13.42	119	109	8.44	0.06	0.3	0.05	0.082	0.021		2.0	520	10	2	8	16	
27-Oct-97	7.75	13.86	94	796	8.32	0.04	0.18	0.01	0.04	0.007		1.0	280	4	2	2	4	
18-Nov-97	3.71	12.78	88	786	7.72	0.08	0.28	0.12	0.055	0.013		1.0	610	6	4	2	2	
09-Dec-97	1.86	16.48	61	1396	8.14	0.06	0.2	0.02	0.046	0.012		1.0	250	3	3	2	16	
21-Jan-98	2.56		83	1196	7.6		0.46	0.09	0.17			1.0	4560	54	44			
23-Jan-98	4.81	15.25	90	1596	8.13	0.08	0.24	0.02	0.058	0.018		1.0	630	6	5	4	4	
19-Mar-98	8.28	15.23	65	2556	8.08	0.05	0.2	0.02	0.048	0.012		1.0	680	6	5			
24-Mar-98				2556												132	76	
06-Apr-98	8.21	14.35	56	3836	7.63	0.07	0.28	0.01	0.043	0.016		1.0	660	10	6	4	10	2
26-Apr-98	11.99	13.37	48	5996	8.03	0.07	0.28	0.03	0.033	0.019		1.0	630	9	6	40	34	2
12-May-98	11.4	14.1	40	9176		0.06	0.26	0.02	0.068	0.017		1.0	980	17	9	220	200	38
28-May-98				16526		0.05	0.31	0.02	0.102	0.031		1.0	2010	32	20	1460	1820	24
08-Jun-98	14.35	13.19	40	9926	7.43	0.02	0.24	0.02	0.064	0.013		1.0	590	15	6	20	20	2
22-Jun-98	16.78		38	5216	8.05	0.88	0.14	0.02	0.038	0.01		1.0	220	6	3	16	130	2
06-Jul-98	19.63	11.67	43	3836	8.01	0.01	0.21	0.02	0.036	0.013		1.0	360	7	3	50	40	12
20-Jul-98	24.75	9.76	52.4	1576	8.43	0.02	0.15	0.02	0.034	0.012		1.0	280	5	2		10	
05-Aug-98	23.74	9.89	75.6	1226	8.34	0.01	0.23	0.01	0.034	0.012		1.0	250	5	2	14	24	2
17-Aug-98	22.7	12.6	76.2	1056	8.47	0.01	0.24	0.02	0.03	0.014		1.0	240	5	2	4	16	2
01-Sep-98	24.1		63.4	617	8.53	0.01	0.26	0.01	0.033	0.003		1.0	260	6	2	20	20	20
28-Sep-98	15.5		90.8	259		0.02	0.28	0.02	0.077	0.009		1.0	230	3	2	10	16	4

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-002, Lower Payette River below Emmett WWTP, STORET #2040631
Statistical Summary

Provisional Data, Do Not Cite

Date Sample Taken	Temp. C	Dissolved Oxygen mg/l	Conductivity umhos	Flow estimated CFS	pH su	Nitrates/ Nitrites mg/l	TKN mg/l	Ammonia mg/l	Total Phos. mg/l	ortho-Phos. mg/l	Hg ug/l	Ar ug/l	Fe ug/l	Susp. Solids mg/l	Turbidity FTU	Fecal Coliform CFU/100 ml	Fecal Strep. CFU/100 ml	E. coli CFU/100 ml
Overall																		
Average	12.6	12.4	62.6	4605	7.8	0.08	0.24	0.02	0.057	0.016	0.2	1.3	758	15	8	72	97	10
Stand. Dev.	7.2	2.9	24.8	4211	0.5	0.14	0.07	0.02	0.031	0.006	0.0	0.5	823	16	10	245	305	12
Count	35	30	35	37	33	35	36	36	36	35	10	26	36	36	36	34	35	11
Max.	24.8	16.5	153.0	16526	8.5	0.88	0.46	0.12	0.170	0.031	0.2	2.0	4560	79	44	1460	1820	38
Min.	1.9	0.0	36.0	109	6.8	0.01	0.14	0.01	0.016	0.003	0.2	1.0	180	2	2	2	2	2
Water year 1997																		
Average	12.2	11.8	60.4	5944	7.7	0.1	0.2	0.01	0.057	0.017	0.20	2	754	19	9	25	53	ERR
Stand. Dev.	6.8	3.4	29.0	4136	0.5	0.0	0.1	0.01	0.029	0.006	0.00	0	577	18	10	25	90	ERR
Count	18	17	18	18	18	18	18	18.00	18	18	10	8	18	18	18	18	18	0
Max.	22.8	16.2	153.0	12100	8.5	0.1	0.4	0.05	0.147	0.030	0.20	2	2600	79	44	100	320	ERR
Min.	2.0	0.0	36.0	483	6.8	0.0	0.1	0.01	0.016	0.007	0.20	2	180	2	2	2	2	ERR
Irrigation Season 1997																		
Average	15.8	12.0	61.8	5638	7.9	0.04	0.22	0.01	0.057	0.017	0.2	2.0	731	21	9	25	52	ERR
Stand. Dev.	5.3	1.4	34.7	4684	0.4	0.02	0.05	0.01	0.032	0.007	0.0	0.0	641	21	11	20	86	ERR
Count	12	11	12	12	12	12	12	12	12	12	4	8	12	12	12	12	12	0
Max.	22.8	13.7	153.0	11726	8.5	0.09	0.31	0.05	0.147	0.030	0.2	2.0	2600	79	44	60	320	ERR
Min.	7.3	9.6	36.0	109	7.2	0.02	0.14	0.01	0.016	0.007	0.2	2.0	200	4	2	2	4	ERR
Non-Irrigation 1997																		
Average	5.0	11.5	57.5	5810	7.3	0.10	0.27	0.02	0.058	0.018	0.2	ERR	800	15	9	27	54	ERR
Stand. Dev.	2.1	5.4	10.0	2724	0.3	0.03	0.08	0.01	0.022	0.005	0.0	ERR	417	12	5	33	98	ERR
Count	6	6	6	6	6	6	6	6	6	6	6	0	6	6	6	6	6	0
Max.	7.6	16.2	78.6	9480	7.8	0.13	0.44	0.04	0.091	0.025	0.2	ERR	1340	35	17	100	272	ERR
Min.	2.0	0.0	48.3	1130	6.8	0.03	0.16	0.01	0.024	0.011	0.2	ERR	180	2	2	8	2	ERR
Water year 1998																		
Average	13.1	13.3	65.0	3691	8.1	0.09	0.25	0.03	0.056	0.014	ERR	1.0	762	11	7	125	144	10
Stand. Dev.	7.7	1.9	19.1	4074	0.3	0.20	0.07	0.03	0.033	0.006	ERR	0.0	1011	12	10	349	422	12
Count	17.0	13.0	17.0	19	15	17	18	18	18	17	0.0	18	18	18	18	16	17	11
Max.	24.8	16.5	94.0	16526	8.5	0.88	0.46	0.12	0.170	0.031	ERR	1.0	4560	54	44	1460	1820	38
Min.	1.9	9.8	38.0	259	7.4	0.01	0.14	0.01	0.030	0.003	ERR	1.0	220	3	2	2	2	2
Irrigation Season 1998																		
Average	17.6	12.4	56.7	4937.2	8.1	0.10	0.24	0.02	0.049	0.014	ERR	1.0	559	10	5	169	195	10
Stand. Dev.	5.5	1.7	16.9	4667.8	0.4	0.24	0.05	0.01	0.022	0.006	ERR	0.0	494	8	5	412	493	12
Count	11	8	11	12	9	12	12	12	12	12	0	12	12	12	12	11	12	11
Max.	24.8	14.4	90.8	16526.0	8.5	0.88	0.31	0.03	0.102	0.031	ERR	1.0	2010	32	20	1460	1820	38
Min.	8.2	9.8	38.0	259.0	7.4	0.01	0.14	0.01	0.030	0.003	ERR	1.0	220	3	2	4	10	2
Non-Irrigation 1998																		
Average	4.8	14.7	80.2	1555	8.0	0.06	0.26	0.05	0.070	0.012	ERR	1.0	1168	13	11	28	20	ERR
Stand. Dev.	2.4	1.3	12.6	689	0.3	0.02	0.10	0.04	0.045	0.003	ERR	0.0	1526	18	15	52	28	ERR
Count	6	5	6	7	6	5.00	6.00	6.00	6.000	5.000	0	6	6	6	6	5	5	0
Max.	8.3	16.5	94.0	2556	8.3	0.08	0.46	0.12	0.170	0.018	ERR	1.0	4560	54	44	132	76	ERR
Min.	1.9	12.8	61.0	786	7.6	0.04	0.18	0.01	0.040	0.007	ERR	1.0	250	3	2	2	2	ERR

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-003, Lower Payette River @ Letha Bridge STORET #2040690

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow measured	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
29-Oct-96	7.78	11.8	116.28	1100	7.58	0.11	0.18	0.01	0.056	0.016	0.2		440	12	2	28	16	
20-Nov-96	5.65	12.15	80.14	6970	7.38	0.15	0.37	0.02	0.082	0.022	0.2		1240	29	15	72	268	
16-Dec-96	2.78	15.43	83.9	3450	7.4	0.21	0.34	0.03	0.06	0.028	0.2		1520	32	9	5	10	
21-Jan-97	2.77	15.64	48.3	6710	7.25	0.14	0.26	0.03	0.064	0.02	0.2		760	13	9	18	10	
18-Feb-97	5.22	16.73	54.12	7150	6.8	0.14	0.26	0.02	0.055	0.02	0.2		730	9	7	10	10	
25-Mar-97	7.68	12.46	55.14	9090	7.07	0.1	0.24	0.01	0.077	0.025	0.2		1330	22	15	40	16	
08-Apr-97	7.2	11.83	58.1	4640	7.61	0.06	0.21	0.01	0.054	0.02	0.2		630	8	7	80	40	
22-Apr-97	8.93	12.99	47.5	10700	7.68	0.09	0.32	0.01	0.155	0.032	0.2		2700	84	43	96	140	
07-May-97	11.7	12.15	48.9	8190	7.4	0.04	0.22	0.01	0.059	0.02	0.2		800	18	10	28	52	
21-May-97	11.36	12.32	39.3	10300	7.35	0.07	0.23	0.01	0.073	0.02	0.2		1200	35	18	16	68	
03-Jun-97	12.56	12.21	37.2	10500	7.38	0.07	0.14	0.01	0.049	0.012		2.0	860	22	12	40	70	
17-Jun-97	15.97	11.52	26.1	10400	7.71	0.05	0.22	0.01	0.049	0.012		2.0	750	20	7	8	48	
14-Jul-97	19.6		58.3	2320	7.86	0.04	0.2	0.01	0.038	0.014		2.0	310	7	3	56	44	
29-Jul-97	20.21	7.85	70.3	1540	7.85	0.06	0.2	0.01	0.046	0.015		2.0	450	15	3	128	600	
13-Aug-97	20.4	10.29	68.5	1470	7.62	0.05	0.24	0.01	0.033	0.014		2.0	310	10	3	20	100	
26-Aug-97	18.78	9.98	90.7	927	7.71	0.08	0.26	0.01	0.042	0.015		2.0	330	9	2	60	68	
09-Sep-97	20.32	10.08	229	112	7.96	0.28	0.33	0.02	0.092	0.065		2.0	460	8	3	84	150	
26-Sep-97	17.99	10.52	210	98	7.99	0.44	0.52	0.02	0.161	0.056		1.0	1980	77	8	64	64	
27-Oct-97	8.25	14.75	140	895	8.2	0.2	0.18	0.01	0.063	0.031		1.0	340	5	3	20	44	
18-Nov-97	3.75	13.16	104	1330	7.99	0.12	0.22	0.08	0.049	0.012		1.0	550	6	3	2	2	
09-Dec-97	1.76	16.37	72	1790	7.53	0.1	0.16	0.01	0.04	0.011		1.0	260	4	4	4	12	
21-Jan-98	1.41		95	1700	7.87	0.29	0.58	0.08	0.15	0.041		1.0	4060	45	38	70	450	
23-Jan-98	4.29	14.84	89	2050	7.99	0.1	0.23	0.02	0.062	0.019		1.0	790	9	6	32	8	
19-Mar-98	8.36	15.05	70	2850	8	0.05	0.12	0.01	0.045	0.012		1.0	580	6	5			
24-Mar-98				2850								1.0				102	78	
06-Apr-98	8.11	14	61	4130	7.66	0.08	0.3	0.01	0.042	0.016		1.0	660	7	7	26	46	2
26-Apr-98	11.85	13.63	43	5730	8.53	0.13	0.32	0.03	0.046	0.021		1.0	620	10	5	310	64	2
12-May-98	11.4	13	41	9360		0.07	0.26	0.02	0.081	0.017		1.0	1050	18	10	220	380	60
28-May-98				14900		0.06	0.38	0.02	0.11	0.034		1.0	2140	33	22	1580	1740	32
08-Jun-98	14.41	12.96	41	10000	7.29	0.01	0.2	0.01	0.052	0.018			420	9	5	20	20	2
22-Jun-98	16.56		41	4830	8.02	0.02	0.18	0.01	0.031	0.01		1.0	390	7	3	54	68	20
06-Jul-98	22.44	11.74	87.4	3550	7.9	0.38	0.22	0.02	0.057	0.024		1.0	400	6	3	60	40	32
20-Jul-98	24.18	9.86	65.9	1360	8.4	0.15	0.6	0.04	0.044	0.018		1.0	340	9	2		64	
05-Aug-98	22.39	9.74	103.4	905	8.55	0.03	0.027	0.01	0.04	0.018		1.0	330	7	3	60	100	2
17-Aug-98	21.37	11.87	110.6	800	8.17	0.06	0.17	0.01	0.039	0.017		1.0	380	7	2	42	80	2
31-Aug-98	23.6		125	921	8.24	0.05	0.27	0.02	0.042	0.013		1.0	380	10	4	108	520	2
28-Sep-98	15		211.6	272		0.2	0.33	0.03	0.124	0.034		2.0	1940	69	6	160	360	16

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-003, Lower Payette River @ Letha Bridge STORET #2040690
Statistical Summary

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow measured	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
Overall																		
Average	12.5	12.6	83.5	4483.5	7.8	0.12	0.26	0.02	0.066	0.022	0.2	1.3	901	19	9	106	163	16
Stand. Dev.	7.0	2.1	49.0	3903.8	0.4	0.10	0.12	0.02	0.034	0.012	0.0	0.5	792	20	9	260	306	18
Count	35	30	35	37	33	36	36	36	36	36	10	26	36	36	36	35	36	11
Max.	24.2	16.7	229.0	14900.0	8.6	0.44	0.60	0.08	0.161	0.065	0.2	2.0	4060	84	43	1580	1740	60
Min.	1.4	7.9	26.1	98.0	6.8	0.01	0.03	0.01	0.031	0.010	0.2	1.0	260	4	2	2	2	2
Water year 1997																		
Average	12.1	12.1	79.0	5315	7.5	0.1	0.3	0.01	0.069	0.024	0.20	2	933	24	10	47	99	ERR
Stand. Dev.	6.2	2.2	54.0	3876	0.3	0.1	0.1	0.01	0.035	0.014	0.00	0	621	22	9	34	137	ERR
Count	18.0	17.0	18.0	18	18	18	18	18.00	18	18	10	8	18	18	18	18	18	0
Max.	20.4	16.7	229.0	10700	8.0	0.4	0.5	0.03	0.161	0.065	0.20	2	2700	84	43	128	600	ERR
Min.	2.8	7.9	26.1	98	6.8	0.0	0.1	0.01	0.033	0.012	0.20	1	310	7	2	5	10	ERR
Irrigation Season 1997																		
Average	14.8	11.2	79.9	5407	7.63	0.11	0.26	0.01	0.071	0.025	0.2	2	932	26	10	55	112	ERR
Stand. Dev.	4.9	1.4	61.7	4306	0.26	0.11	0.09	0.01	0.040	0.016	0.0	0	690	25	11	34	145	ERR
Count	13	12	13	13	13	13	13	13	13	13	5	8	13	13	13	13	13	0
Max.	20.4	13.0	229.0	10700	7.99	0.44	0.52	0.02	0.161	0.065	0.2	2	2700	84	43	128	600	ERR
Min.	7.2	7.9	26.1	98	7.07	0.04	0.14	0.01	0.033	0.012	0.2	1	310	7	2	8	16	ERR
Non-Irrigation 1997																		
Average	5.3	14.0	73.0	5745	7.2	0.14	0.28	0.02	0.066	0.022	0.2	ERR	1003	20	10	29	55	ERR
Stand. Dev.	2.0	1.9	23.6	2660	0.3	0.04	0.06	0.01	0.010	0.004	0.0	ERR	383	9	5	22	95	ERR
Count	6	6	6	6	6	6	6	6	6	6	6	0	6	6	6	6	6	0
Max.	7.8	16.7	116.3	9090	7.6	0.21	0.37	0.03	0.082	0.028	0.2	ERR	1520	32	15	72	268	ERR
Min.	2.8	11.8	48.3	1100	6.8	0.10	0.18	0.01	0.055	0.016	0.2	ERR	440	9	2	5	10	ERR
Water year 1998																		
Average	12.9	13.2	88.3	3696	8.0	0.12	0.26	0.02	0.062	0.020	ERR	1.1	868	15	7	169	226	16
Stand. Dev.	7.7	1.9	42.6	3764	0.3	0.09	0.14	0.02	0.032	0.009	ERR	0.2	932	17	9	362	401	18
Count	17.0	13.0	17.0	19	15	18	18	18	18	18	0.0	18	18	18	18	17	18	11
Max.	24.2	16.4	211.6	14900	8.6	0.38	0.60	0.08	0.150	0.041	ERR	2.0	4060	69	38	1580	1740	60
Min.	1.4	9.7	41.0	272	7.3	0.01	0.03	0.01	0.031	0.010	ERR	1.0	260	4	2	2	2	2
Irrigation Season 1998																		
Average	17.4	12.1	84.6	4730	8.1	0.10	0.27	0.02	0.059	0.020	ERR	1.1	754	16	6	240	290	16
Stand. Dev.	5.4	1.5	49.7	4390	0.4	0.10	0.13	0.01	0.029	0.007	ERR	0.3	608	18	5	432	465	18
Count	11	8	11	12	9	12	12	12	12	12	0	11	12	12	12	11	12	11
Max.	24.2	14.0	211.6	14900	8.6	0.38	0.60	0.04	0.124	0.034	ERR	2.0	2140	69	22	1580	1740	60
Min.	8.1	9.7	41.0	272	7.3	0.01	0.03	0.01	0.031	0.010	ERR	1.0	330	6	2	20	20	2
Non-Irrigation 1998																		
Average	4.6	14.8	95.0	1924	7.9	0.14	0.25	0.04	0.068	0.021	ERR	1.0	1097	13	10	38	99	ERR
Stand. Dev.	2.8	1.0	23.4	677	0.2	0.08	0.15	0.03	0.038	0.011	ERR	0.0	1336	15	13	36	159	ERR
Count	6	5	6	7	6	6	6	6	6	6	0	7	6	6	6	6	6	0
Max.	8.4	16.4	140.0	2850	8.2	0.29	0.58	0.08	0.150	0.041	ERR	1.0	4060	45	38	102	450	ERR
Min.	1.4	13.2	70.0	895	7.5	0.05	0.12	0.01	0.040	0.011	ERR	1.0	260	4	3	2	2	ERR

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-004, Lower Payette River @ Faulk Bridge STORET #2040692

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow estimated	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
29-Oct-96	8.03	12.97	120.01	1253	8.3	0.11	0.23	0.03	0.07	0.014	0.2		753	14.8	14	20	20	
20-Nov-96	5.59	12.38	71.76	7123	7.32	0.02	0.28	0.02	0.036	0.006	0.2		420	9	4	66	200	
16-Dec-96	2.35	15.26	68.8	3603	6.9	0.15	0.33	0.01	0.162	0.017	0.2		1160	26	7	5	10	
21-Jan-97	2.62	14.77	54.32	6863	6.98	0.14	0.25	0.04	0.059	0.021	0.2		810	13	9	16	34	
18-Feb-97	4.89	15.21	56.06	7303	6.81	0.15	0.26	0.02	0.055	0.02	0.2		750	9	7	16	4	
25-Mar-97	7.3	12.41	56.7	9243	7.26	0.08	0.26	0.01	0.084	0.025	0.2		1380	24	15	40	60	
08-Apr-97	6.61	11.65	58.1	4793	7.5	0.07	0.25	0.01	0.055	0.018	0.2		650	9	8	60	28	
22-Apr-97	8.8	12.62	46.3	10853	7.75	0.1	0.38	0.01	0.163	0.032	0.2		2980	87	46	188	140	
07-May-97	11.49	11.71	51.9	8343	7.29	0.05	0.22	0.01	0.059	0.02	0.2		770	17	10	30	40	
21-May-97	11.22	12.06	41.6	10453	7.46	0.07	0.24	0.01	0.079	0.019	0.02		1300	44	20	110	110	
03-Jun-97	12.77	11.78	48.1	10653	7.31	0.06	0.12	0.01	0.056	0.012		2.0	930	30	12	90	50	
17-Jun-97	16.02			10553	7.84	0.04	0.2	0.01	0.051	0.012		2.0	750	20	3	30	30	
14-Jul-97	18.85	12.37	67.3	2473	8.11	0.08	0.22	0.01	0.051	0.019		2.0	470	13	4	28	80	
29-Jul-97	21.95	10.11	82	1693	8.61	0.08	0.24	0.01	0.085	0.015		2.0	910	28	5	144	660	
13-Aug-97	19.71	10.35	112.9	1623	7.83	0.08	0.3	0.01	0.046	0.02		2.0	600	17	4	100	400	
26-Aug-97	19.33	11.09	107.9	1080	8.05	0.1	0.45	0.02	0.153	0.1		2.0	2840	139	11	140	180	
09-Sep-97	16.66	10.93	189	265	8.07	0.33	0.3	0.01	0.078	0.034		2.0	680	22	4	120	200	
26-Sep-97	19.06	11.47	213.7	251	8.05	0.48	0.36	0.02	0.092	0.049		2.0	460	10	4	20	20	
27-Oct-97	8.39	16.18	140	1048	8.53	0.09	0.18	0.01	0.045	0.009		1.0	470	11	3	10	4	
18-Nov-97	4.05	13.3	119	1483	7.98	0.19	0.17	0.04	0.052	0.012		1.0	480	6	3	10	6	
09-Dec-97	1.42	16.16	87	1943	8.03	0.16	0.2	0.01	0.051	0.012		1.0	500	10	5	10	44	
21-Jan-98	1.32		109	1853	8.09	0.33	0.5	0.09	0.18	0.047		1.0	4090	44	40			
23-Jan-98	3.85	14.68	96	2203	7.95	0.15	0.2	0.02	0.056	0.021		1.0	750	8	5	20	26	
19-Mar-98	7.43	14.7	76	3003	7.76	0.08	0.2	0.01	0.046	0.011		1.0	580	7	5			
24-Mar-98				3003												560	300	
06-Apr-98	8.08	13.5	64	4283	7.74	0.11	0.2	0.01	0.048	0.016		1.0	800	8	7	48	60	
29-Apr-98	11.31	13.53	52.4	5883	7.44	0.06	0.26	0.02	0.059	0.016		1.0	660	12	6	58	122	6
12-May-98	11.71	11.44	56	9513		0.05	0.32	0.02	0.093	0.026		1.0	1190	23	10	440	440	134
28-May-98				15053		0.08	0.43	0.02	0.12	0.052		1.0	1930	23	19			
08-Jun-98	14.5	12.32	43.5	10153	7.37	0.02	0.2	0.01	0.046	0.013		1.0	500	12	5	310	350	2
22-Jun-98	16.63		49.9	4983	7.73	0.05	0.26	0.01	0.079	0.012		1.0	710	16	4	36	52	8
06-Jul-98	22.66	10.46	75.8	3703	7.7	0.03	0.32	0.03	0.079	0.024		1.0	620	10	4	54	110	24
20-Jul-98	21.87	10.21	78.2	1513	8.39	0.047	0.22	0.02	0.082	0.038		1.0	750	28	4		190	
05-Aug-98	21.84	9.64	126.2	1058	8.3	0.06	0.28	0.02	0.112	0.025		1.0	1200	46	5	70	420	2
17-Aug-98	19.69	12.12	134.2	953	8.24	0.06	0.47	0.02	0.138	0.023		1.0	1890	58	7	62	660	4
01-Sep-98	24.33		147.7	1074	8.63	0.1	0.68	0.03	0.117	0.015		1.0	1730	54	7	60	740	10
28-Sep-98	15.6		166.1	425	7.1	0.22	0.4	0.2	0.104	0.026		1.0	1910	38	7	200	180	16

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-004, Lower Payette River @ Faulk Bridge STORET #2040692
Statistical Summary

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow estimated	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
Overall																		
Average	12.2	12.6	90.2	4637	7.8	0.11	0.29	0.02	0.082	0.024	0.2	1.3	1094	26	9	96	176	23
Stand. Dev.	6.9	1.8	43.4	3904	0.5	0.09	0.11	0.03	0.038	0.017	0.1	0.5	803	26	9	123	201	40
Count	35	30	34	37	34	36	36	36	36	36	10	26	36	36	36	33	34	9
Max.	24.3	16.2	213.7	15053	8.6	0.48	0.68	0.20	0.180	0.100	0.2	2.0	4090	139	46	560	740	134
Min.	1.3	9.6	41.6	251	6.8	0.02	0.12	0.01	0.036	0.006	0.0	1.0	420	6	3	5	4	2
Water year 1997																		
Average	11.7	12.5	88.1	5235	7.7	0.12	0.27	0.01	0.078	0.024	0.2	1.9	1004	29	10	65	119	ERR
Stand. Dev.	6.1	1.7	48.7	3899	0.5	0.11	0.07	0.01	0.038	0.020	0.1	0.3	704	31	10	53	160	ERR
Count	19	18	18	19	19	19	19	19	19	19	10	9	19	19	19	19	19	0
Max.	22.0	16.2	213.7	10853	8.6	0.48	0.45	0.04	0.163	0.100	0.2	2.0	2980	139	46	188	660	ERR
Min.	2.4	10.1	41.6	251	6.8	0.02	0.12	0.01	0.036	0.006	0.0	1.0	420	9	3	5	4	ERR
Irrigation Season 1997																		
Average	14.7	11.9	96.6	4929	7.9	0.13	0.27	0.01	0.078	0.028	0.2	1.9	1062	34	10	82	149	ERR
Stand. Dev.	4.9	1.5	55.5	4320	0.4	0.12	0.09	0.01	0.037	0.023	0.1	0.3	819	36	11	55	180	ERR
Count	13	12	12	13	13	13	13	13	13	13	4	9	13	13	13	13	13	0
Max.	22.0	16.2	213.7	10853	8.6	0.48	0.45	0.02	0.163	0.100	0.2	2.0	2980	139	46	188	660	ERR
Min.	6.6	10.1	41.6	251	7.3	0.04	0.12	0.01	0.045	0.009	0.0	1.0	460	9	3	10	4	ERR
Non-Irrigation 1997																		
Average	5.1	13.8	71.3	5898	7.3	0.11	0.27	0.02	0.078	0.017	0.2	ERR	879	16	9	27	55	ERR
Stand. Dev.	2.1	1.3	22.8	2660	0.5	0.05	0.03	0.01	0.040	0.006	0.0	ERR	310	7	4	20	68	ERR
Count	6	6	6	6	6	6	6	6	6	6	6	0	6	6	6	6	6	0
Max.	8.0	15.3	120.0	9243	8.3	0.15	0.33	0.04	0.162	0.025	0.2	ERR	1380	26	15	66	200	ERR
Min.	2.4	12.4	54.3	1253	6.8	0.02	0.23	0.01	0.036	0.006	0.2	ERR	420	9	4	5	4	ERR
Water year 1998																		
Average	12.9	12.7	92.6	4005	7.9	0.11	0.31	0.03	0.086	0.023	ERR	1.0	1194	24	8	138	247	23
Stand. Dev.	7.7	1.9	36.3	3808	0.4	0.08	0.14	0.05	0.037	0.012	ERR	0.0	890	17	9	169	225	40
Count	16	12	16	18	15	17	17	17	17	17	0	17	17	17	17	14	15	9
Max.	24.3	16.2	166.1	15053	8.6	0.33	0.68	0.20	0.180	0.052	ERR	1.0	4090	58	40	560	740	134
Min.	1.3	9.6	43.5	425	7.1	0.02	0.17	0.01	0.046	0.011	ERR	1.0	480	6	3	10	6	2
Irrigation Season 1998																		
Average	17.1	11.7	90.4	4883	7.9	0.07	0.34	0.03	0.090	0.024	ERR	1.0	1158	27	7	134	302	23
Stand. Dev.	5.1	1.4	42.4	4390	0.5	0.05	0.13	0.05	0.028	0.011	ERR	0.0	540	17	4	131	228	40
Count	11	8	11	12	10	12	12	12	12	12	0	12	12	12	12	10	11	9
Max.	24.3	13.5	166.1	15053	8.6	0.22	0.68	0.20	0.138	0.052	ERR	1.0	1930	58	19	440	740	134
Min.	8.1	9.6	43.5	425	7.1	0.02	0.20	0.01	0.046	0.012	ERR	1.0	500	8	4	36	52	2
Non-Irrigation 1998																		
Average	3.6	14.7	97.4	2248.0	8.0	0.2	0.3	0.0	0.1	0.0	ERR	1.0	1280.0	15.0	11.6	150.0	94.0	ERR
Stand. Dev.	2.2	1.0	15.3	573.9	0.1	0.1	0.1	0.0	0.1	0.0	ERR	0.0	1408.2	14.6	14.2	236.7	119.7	ERR
Count	5	4	5	6	5	5	5	5	5	5	0	5	5	5	5	4	4	0
Max.	7.4	16.2	119.0	3003.0	8.1	0.3	0.5	0.1	0.2	0.0	ERR	1.0	4090.0	44.0	40.0	560.0	300.0	ERR
Min.	1.3	13.3	76.0	1483.0	7.8	0.1	0.2	0.0	0.0	0.0	ERR	1.0	480.0	6.0	3.0	10.0	6.0	ERR

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-005, Lower Payette River @ Black Bridge, STORET #2040692

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow estimated	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
29-Oct-96	8.76	13.41	141.44	1078	8.53	0.24	0.26	0.01	0.081	0.019	0.2		900	33	4	40	12	
20-Nov-96	5.7	12.22	82.83	6948	5.97	0.05	0.28	0.02	0.05	0.007	0.2		560	15	4	80	220	
16-Dec-96	2.43	15.06	72.1	3428	7.56	0.28	0.26	0.01	0.049	0.021	0.2		590	8	5	5	20	
21-Jan-97	2.47	14.61	58.1	6688	7.01	0.16	0.26	0.04	0.06	0.024	0.2		740	16	9	22	16	
18-Feb-97	4.4	15.94	58.22	7128	7.03	0.15	0.26	0.02	0.055	0.02	0.2		730	9	7	18	4	
25-Mar-97	6.67	12.06	59.25	9068	7.14	0.09	0.28	0.01	0.085	0.026	0.2		1390	28	14	20	40	
08-Apr-97	6.35	11.48	63.4	4618	7.39	0.09	0.22	0.01	0.063	0.022	0.2		800	13	8	148	160	
22-Apr-97	8.31	12.59	50.3	10678	7.79	0.11	0.38	0.01	0.161	0.035	0.2		3640	94	50	310	148	
07-May-97	10.92	11.48	58.1	8168	7.43	0.07	0.22	0.01	0.061	0.023	0.2		850	18	10	140	80	
21-May-97	10.95	11.69	47.2	10278	7.4	0.09	0.23	0.01	0.08	0.021	0.2		1250	44	21	150	50	
03-Jun-97	12.72	11.46	46.2	10478	7.4	0.07	0.17	0.01	0.058	0.014		2.0	990	28	12	160	100	
17-Jun-97	15.68	10.62	45.1	10378	7.37	0.06	0.18	0.01	0.058	0.013		2.0	820	22	7	70	70	
14-Jul-97	17.22		83	2298	7.66	0.13	0.022	0.01	0.065	0.028		2.0	490	12	4	100	160	
29-Jul-97	21.15	9.99	108.5	1518	8.5	0.13	0.54	0.03	0.264	0.023		2.0	1563	48	15	80	72	
13-Aug-97	19.07	9.69	110.8	1448	7.52	0.14	0.59	0.02	0.237	0.03		2.0	3740	133	15	72	180	
26-Aug-97	20	11.3	152	905	8.03	0.22	0.51	0.02	0.115	0.04		3.0	1400	63	8	48	120	
09-Sep-97	16.22	11.48	261.3	90	8.08	0.45	0.26	0.01	0.087	0.054		6.0	300	7	3	170	180	
26-Sep-97	18.4	8.98	261.3	76	7.39	0.5	0.31	0.02	0.114	0.061			710	20	6	40	80	
27-Oct-97	9.34	16.46	165	873	8.42	0.22	0.18	0.01	0.063	0.022		1.0	340	8	2	10	16	
18-Nov-97	4.29	12.52	134	1308	7.93	0.23	0.22	0.04	0.053	0.013		1.0	460	8	3	24	8	
09-Dec-97	1.47	14.75	100	1768	8.05	0.21	0.24	0.03	0.054	0.015		1.0	500	13	5	32	72	
21-Jan-98	2.06		113	1678	7.73		0.58	0.07	0.12			1.0	3170	51	28			
23-Jan-98	3.74	14.41	110	2028	7.99	0.17	0.23	0.03	0.058	0.023		1.0	830	10	6	28	28	
19-Mar-98	6.23	13.88	85	2828	7.65	0.08	0.23	0.02	0.048	0.01		1.0	630	9	5			
24-Mar-98				2828													154	
06-Apr-98	7.47	12.97	70.5	4108	7.7	0.14	0.28	0.02	0.06	0.017		1.0	960	14	8	360	260	28
28-Apr-98	9.1	12.81	61.9	5708	7	0.09	0.27	0.02	0.063	0.02		1.0	720	13	6	200	82	60
12-May-98	12.01	12.15	45.9	9338		0.08	0.29	0.03	0.075	0.021		1.0	1170	18	11	6000	390	60
28-May-98				14878		0.07	0.47	0.04	0.11	0.04		1.0	4130	41	24	280	1760	80
08-Jun-98	13.82	12.41	45.3	9978	7.43	0.02	0.19	0.02	0.052	0.014		1.0	560	14	6	1560	40	2
22-Jun-98	15.11		46.5	4808	7.92	0.14	0.19	0.02	0.051	0.013		1.0	540	12	4	40	58	10
06-Jul-98	21.32	12.1	71.6	3528	8.29	0.06	0.27	0.03	0.044	0.025		1.0	430	8	4	56	58	20
20-Jul-98	21.11	8.78	108.3	1338	7.73	0.17	0.3	0.02	0.101	0.034		1.0	1210	40	7	42	260	
06-Aug-98	22.5	8.32	187	883	7.75	0.19	0.47	0.03	0.16	0.047		1.0	2250	69	10	120	520	2
17-Aug-98	19.9	10.75	202	778	7.96	0.19	0.37	0.03	0.096	0.042		1.0	880	22	5	60	120	2
01-Sep-98	23.59		209	899	8.51	0.21	1.05	0.05	0.179	0.03		3.0	2380	76	10	220	700	40
28-Sep-98	15.5		203.6	250	7.25	0.32	0.97	0.03	0.169	0.048		5.0	3910	184	23	100	140	2

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-005, Lower Payette River @ Black Bridge, STORET #2040692
Statistical Summary

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow estimated	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
Overall																		
Average	11.9	12.2	106.2	4462	7.7	0.16	0.33	0.02	0.092	0.026	0.2	1.7	1293	34	10	318	182	28
Stand. Dev.	6.7	2.0	62.0	3904	0.5	0.10	0.20	0.01	0.053	0.013	0.0	1.3	1080	37	9	1023	307	27
Count	35	30	35	37	34	35	36	36	36	35	10	25	36	36	36	34	35	11
Max.	23.6	16.5	261.3	14878	8.5	0.50	1.05	0.07	0.264	0.061	0.2	6.0	4130	184	50	6000	1760	80
Min.	1.5	8.3	45.1	76	6.0	0.02	0.02	0.01	0.044	0.007	0.2	1.0	300	7	2	5	4	2
Water year 1997																		
Average	11.5	12.0	97.7	5293	7.5	0.2	0.3	0.01	0.097	0.027	0.20	3	1192	34	11	93	95	ERR
Stand. Dev.	6.1	1.8	65.5	3876	0.6	0.1	0.1	0.01	0.061	0.013	0.00	1	941	32	11	74	65	ERR
Count	18	17	18	18	18	18	18	18.00	18	18	10	7	18	18	18	18	18	0
Max.	21.2	15.9	261.3	10678	8.5	0.5	0.6	0.04	0.264	0.061	0.20	6	3740	133	50	310	220	ERR
Min.	2.4	9.0	45.1	76	6.0	0.1	0.0	0.01	0.049	0.007	0.20	2	300	7	3	5	4	ERR
Irrigation Season 1997																		
Average	14.7	11.0	107.3	5078	7.7	0.17	0.30	0.01	0.114	0.030	0.2	2.7	1379	42	13	124	117	ERR
Stand. Dev.	4.6	1.0	75.7	4343	0.4	0.14	0.16	0.01	0.068	0.014	0.0	1.4	1089	37	12	71	45	ERR
Count	12	11	12	12	12	12	12	12	12	12	4	7	12	12	12	12	12	0
Max.	21.2	12.6	261.3	10678	8.5	0.50	0.59	0.03	0.264	0.061	0.2	6.0	3740	133	50	310	180	ERR
Min.	6.4	9.0	45.1	76	7.4	0.06	0.02	0.01	0.058	0.013	0.2	2.0	300	7	3	40	50	ERR
Non-Irrigation 1997																		
Average	5.1	13.9	78.7	5723	7.2	0.16	0.27	0.02	0.063	0.020	0.2	ERR	818	18	7	31	52	ERR
Stand. Dev.	2.3	1.4	29.5	2660	0.8	0.08	0.01	0.01	0.014	0.006	0.0	ERR	279	9	4	24	76	ERR
Count	6	6	6	6	6	6	6	6	6	6	6	0	6	6	6	6	6	0
Max.	8.8	15.9	141.4	9068	8.5	0.28	0.28	0.04	0.085	0.026	0.2	ERR	1390	33	14	80	220	ERR
Min.	2.4	12.1	58.1	1078	6.0	0.05	0.26	0.01	0.049	0.007	0.2	ERR	560	8	4	5	4	ERR
Water year 1998																		
Average	12.3	12.5	115.2	3674	7.8	0.15	0.38	0.03	0.086	0.026	ERR	1.3	1393	34	9	571	274	28
Stand. Dev.	7.3	2.2	56.6	3764	0.4	0.08	0.25	0.01	0.043	0.012	ERR	1.0	1195	42	7	1448	416	27
Count	17	13	17	19	16	17	18	18	18	17	0	18	18	18	18	16	17	11
Max.	23.6	16.5	209.0	14878	8.5	0.32	1.05	0.07	0.179	0.048	ERR	5.0	4130	184	28	6000	1760	80
Min.	1.5	8.3	45.3	250	7.0	0.02	0.18	0.01	0.044	0.010	ERR	1.0	340	8	2	10	8	2
Irrigation Season 1998																		
Average	16.5	11.3	113.8	4708	7.8	0.14	0.43	0.03	0.097	0.029	ERR	1.5	1595	43	10	753	366	28
Stand. Dev.	5.3	1.7	67.7	4390	0.4	0.08	0.28	0.01	0.047	0.012	ERR	1.2	1238	48	7	1632	465	27
Count	11	8	11	12	10	12	12	12	12	12	0	12	12	12	12	12	12	11
Max.	23.6	13.0	209.0	14878	8.5	0.32	1.05	0.05	0.179	0.048	ERR	5.0	4130	184	24	6000	1760	80
Min.	7.5	8.3	45.3	250	7.0	0.02	0.19	0.02	0.044	0.013	ERR	1.0	430	8	4	40	40	2
Non-Irrigation 1998																		
Average	6.5	13.5	138.3	1673	7.9	0.24	0.28	0.03	0.073	0.024	ERR	1.0	949	17	8	27	60	ERR
Stand. Dev.	5.4	2.3	55.6	875	0.3	0.13	0.13	0.02	0.028	0.017	ERR	0.0	919	14	8	10	50	ERR
Count	7	6	7	8	7	6	7	7	7	6	0	6	7	7	7	5	6	0
Max.	18.4	16.5	261.3	2828	8.4	0.50	0.58	0.07	0.120	0.061	ERR	1.0	3170	51	28	40	154	ERR
Min.	1.5	9.0	85.0	76	7.4	0.08	0.18	0.01	0.048	0.010	ERR	1.0	340	8	2	10	8	ERR

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-007, Lower Payette River @ Highway 95 Bridge, STORET #2040691

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow measured	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
29-Oct-96	8.83	12.74	174	1450	8.45	0.31	0.19	0.01	0.047	0.02	0.2		300	8	3	40	60	
20-Nov-96	6.02	11.91	90.3	6790	7.57	0.08	0.37	0.02	0.085	0.018	0.2		1250	46	8	102	168	
16-Dec-96	2.48	14.31	89.5	3740	7.51	0.24	0.32	0.01	0.062	0.024	0.2		720	12	6	25	10	
21-Jan-97	2.46	14.03	67.8	7120	7.03	0.19	0.28	0.04	0.059	0.024	0.2		760	14	8	28	38	
18-Feb-97	3.95	15	69.04	7770	6.96	0.18	0.3	0.02	0.066	0.024	0.2		990	13	8	40	16	
25-Mar-97	6.04	12.11	64.73	10100	7.38	0.11	0.26	0.01	0.1	0.025	0.2		670	16	24	60	30	
08-Apr-97	6.26	11.79	66.4	5490	7.29	0.12	0.26	0.01	0.181	0.023	0.2		1590	25	9	148	70	
22-Apr-97	8.08	12	53.3	13800	7.9	0.12	0.46	0.02	0.216	0.037	0.2		4850	134	61	300	180	
07-May-97	10.18	11.03	61.2	9050	7.4	0.08	0.24	0.01	0.075	0.026	0.2		1280	26	11	130	110	
21-May-97	10.62	11.32	50.3	12100	7.63	0.09	0.2	0.01	0.096	0.024	0.2		1530	48	20	180	170	
03-Jun-97	12.68	10.99	48.5	12700	7.47	0.08	0.24	0.01	0.09	0.015		2.0	1550	59	14	210	160	
17-Jun-97	15.39	10.26	48.6	12600	7.57	0.06	0.17	0.01	0.063	0.013		2.0	1020	26	9	110	90	
14-Jul-97	17.8		101.3	2900	7.77	0.17	0.42	0.01	0.082	0.023		2.0	1010	30	6	80	164	
29-Jul-97	21.88	8.83	142.2	1810	7.93	0.35	0.36	0.02	0.231	0.034		2.0	2090	50	8	56	60	
13-Aug-97	20.09	8.75	145	1780	7.63	0.41	0.31	0.01	0.093	0.037		2.0	940	22	6	80	540	
26-Aug-97	21.58	11.97	182	1370	8.43	0.48	0.31	0.02	0.113	0.052		4.0	880	28	6	100	170	
09-Sep-97	15.92	9.39	271.1	608	7.8	0.8	0.36	0.01	0.08	0.04		6.0	530	14	4	100	190	
26-Sep-97	18.67	9.85	290.6	555	7.93	1.06	0.31	0.02	0.114	0.061		5.0	710	20	6	40	80	
27-Oct-97	10.1		181	1430	6.81	1.02	0.26	0.01	0.079	0.025		1.0	760	24	4	20	24	
18-Nov-97	4.81	11.68	160	1520	7.87	0.3	0.19	0.01	0.059	0.015		1.0	490	8	3	16	6	
09-Dec-97	1.45	14.1	125	1960	8.4	0.28	0.24	0.01	0.064	0.019		1.0	440	9	5	28	82	
21-Jan-98	2.05		126	2210	8.34		0.7	0.08	0.13			1.0	6450	120	47			
23-Jan-98	3.79	13.51	124	2390	8.09	0.24	0.3	0.03	0.082	0.036		1.0	1180	18	8	140	40	
19-Mar-98	6.05	13.09	95	3160	7.2	0.11	0.27	0.01	0.057	0.013		1.0	780	14	6			
24-Mar-98				3160												540	140	
06-Apr-98	7.24	12.4	80	4290	7.75	0.1	0.27	0.01	0.064	0.018		1.0	1150	20	10	180	108	56
28-Apr-98	9	12.81	65.4	5590	6.99	0.1	0.3	0.02	0.073	0.022		1.0	980	16	8	162	96	20
12-May-98	10.76	12.02	52.5	9680		0.09	0.33	0.02	0.097	0.025		1.0	1460	32	11	540	540	116
28-May-98				18100		0.06	0.51	0.03	0.16	0.057		1.0	4130	73	32	3100	3040	44
08-Jun-98	13.34	11.62	55.7	10400	7.06	0.03	0.19	0.01	0.057	0.016		1.0	680	16	6	80	80	2
22-Jun-98	14.66		55.5	5200	7.96	0.07	0.2	0.01	0.058	0.014		1.0	650	14	4	140	76	10
06-Jul-98	19.37	10.98	92.9	4130	7.93	0.13	0.28	0.02	0.056	0.012		1.0	650	13	4	60	74	52
20-Jul-98	22.87	8.86	141.4	1520	7.81		0.36	0.02	0.098	0.038		1.0	850	22	6	1070	570	80
05-Aug-98	22.48	7.83	231	1190	8.18	0.54	0.36	0.01	0.1	0.054		3.0	820	22	7	180	340	4
17-Aug-98	19.69	9.79	265	1040	7.88	0.63	0.28	0.02	0.112	0.049		4.0	990	22	8	260	700	60
31-Aug-98	23.86		235	1380	8.53	0.54	0.44	0.03	0.113	0.048		3.0	1180	34	9	660	580	40
28-Sep-98	16.1	8.1	217	858	7.25	0.65	0.33	0.02	0.105	0.048		2.0	1050	24	9	300	230	24

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-007, Lower Payette River @ Black Bridge, STORET #2040691
Statistical Summary

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow measured	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
Overall																		
Average	11.9	11.4	123.4	5161	7.3	0.29	0.31	0.02	0.095	0.029	0.2	2.0	1316	30	11	266	258	42
Stand. Dev.	6.9	1.9	71.0	4489	1.8	0.27	0.10	0.01	0.042	0.014	0.0	1.4	1241	28	12	531	511	32
Count	35	30	35	37	36	34	36	36	36	35	10	26	36	36	36	35	35	12
Max.	23.9	15.0	290.6	18100	8.5	1.06	0.70	0.08	0.231	0.061	0.2	6.0	6450	134	61	3100	3040	116
Min.	1.5	7.8	48.5	555	0.0	0.03	0.17	0.01	0.047	0.012	0.2	1.0	300	8	3	16	6	2
Water year 1997																		
Average	11.6	11.5	112.0	6207	7.6	0.3	0.3	0.01	0.103	0.029	0.20	3	1259	33	12	102	128	ERR
Stand. Dev.	6.4	1.8	72.7	4522	0.4	0.3	0.1	0.01	0.051	0.012	0.00	2	970	28	13	70	117	ERR
Count	18.0	17.0	18.0	18	18	18	18	18.00	18	18	10	8	18	18	18	18	18	0
Max.	21.9	15.0	290.6	13800	8.5	1.1	0.5	0.04	0.231	0.061	0.20	6	4850	134	61	300	540	ERR
Min.	2.5	8.8	48.5	555	7.0	0.1	0.2	0.01	0.047	0.013	0.20	2	300	8	3	25	10	ERR
Irrigation Season 1997																		
Average	14.9	10.6	121.7	6230	7.7	0.32	0.30	0.01	0.120	0.032	0.2	3.1	1498	40	13	128	165	ERR
Stand. Dev.	5.1	1.2	83.2	5168	0.3	0.31	0.08	0.01	0.055	0.014	0.0	1.5	1094	31	15	70	122	ERR
Count	12	11	12	12	12	12	12	12	12	12	4	8	12	12	12	12	12	0
Max.	21.9	12.0	290.6	13800	8.4	1.06	0.46	0.02	0.231	0.061	0.2	6.0	4850	134	61	300	540	ERR
Min.	6.3	8.8	48.5	555	7.3	0.06	0.17	0.01	0.063	0.013	0.2	2.0	530	14	4	40	60	ERR
Non-Irrigation 1997																		
Average	5.0	13.4	92.6	6162	7.5	0.19	0.29	0.02	0.070	0.023	0.2	ERR	782	18	10	49	54	ERR
Stand. Dev.	2.3	1.2	37.8	2813	0.5	0.08	0.06	0.01	0.018	0.003	0.0	ERR	292	13	7	26	54	ERR
Count	6	6	6	6	6	6	6	6	6	6	6	0	6	6	6	6	6	0
Max.	8.8	15.0	174.0	10100	8.5	0.31	0.37	0.04	0.100	0.025	0.2	ERR	1250	46	24	102	168	ERR
Min.	2.5	11.9	64.7	1450	7.0	0.08	0.19	0.01	0.047	0.018	0.2	ERR	300	8	3	25	10	ERR
Water year 1998																		
Average	12.2	11.3	135.4	4169	6.9	0.31	0.32	0.02	0.087	0.030	ERR	1.4	1372	28	10	440	396	42
Stand. Dev.	7.3	2.0	67.1	4225	2.5	0.28	0.12	0.02	0.029	0.015	ERR	0.9	1461	26	11	719	697	32
Count	17	13	17	19	18	16	18	18	18	17	0	18	18	18	18	17	17	12
Max.	23.9	14.1	265.0	18100	8.5	1.02	0.70	0.08	0.160	0.057	ERR	4.0	6450	120	47	3100	3040	116
Min.	1.5	7.8	52.5	858	0.0	0.03	0.19	0.01	0.056	0.012	ERR	1.0	440	8	3	16	6	2
Irrigation Season 1998																		
Average	16.3	10.5	135.6	5282	6.4	0.27	0.32	0.02	0.091	0.033	ERR	1.7	1216	26	10	561	536	42
Stand. Dev.	5.5	1.8	80.9	4966	2.9	0.25	0.09	0.01	0.030	0.016	ERR	1.0	909	16	7	816	787	32
Count	11	9	11	12	12	11	12	12	12	12	0	12	12	12	12	12	12	12
Max.	23.9	12.8	265.0	18100	8.5	0.65	0.51	0.03	0.160	0.057	ERR	4.0	4130	73	32	3100	3040	116
Min.	7.2	7.8	52.5	858	0.0	0.03	0.19	0.01	0.056	0.012	ERR	1.0	650	13	4	60	74	2
Non-Irrigation 1998																		
Average	6.7	12.4	157.4	2297	7.8	0.50	0.32	0.02	0.084	0.028	ERR	1.6	1544	30	11	131	62	ERR
Stand. Dev.	5.6	1.5	60.2	1053	0.5	0.39	0.16	0.02	0.026	0.017	ERR	1.4	2015	37	15	188	44	ERR
Count	7	5	7	9	7	6	7	7	7	6	0	7	7	7	7	6	6	0
Max.	18.7	14.1	290.6	4290	8.4	1.06	0.70	0.08	0.130	0.061	ERR	5.0	6450	120	47	540	140	ERR
Min.	1.5	9.9	95.0	555	6.8	0.11	0.19	0.01	0.057	0.013	ERR	1.0	440	8	3	16	6	ERR

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-008, Lower Payette River below Payette WWTP, STORET #2040688
Statistical Summary

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow estimated	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
29-Oct-96	8.8	12.49	179	1543	8.44	0.36	0.2	0.01	0.057	0.026	0.2		340	8	3	52	48	
20-Nov-96	5.87	11.97	92.4	6883	7.63	0.1	0.38	0.02	0.077	0.017	0.2		1170	40	8	68	560	
16-Dec-96	2.41	14.02	92.4	3833	7.58	0.25	0.3	0.01	0.066	0.025	0.2		740	10	6	120	30	
21-Jan-97	2.46	13.83	76.4	7213	7.49	0.22	0.27	0.04	0.064	0.029	0.2		820	17	8	20	18	
18-Feb-97	4.2	14.51	91.3	7863	6.81	0.2	0.25	0.02	0.065	0.027	0.2		850	10	8	24	20	
25-Mar-97	6.04	12.37	67.28	10193	7.24	0.08	0.39	0.01	0.136	0.046	0.2		2040	40	17	60	40	
08-Apr-97	7.38	9.81	133	5583	6.21	0.12	0.41	0.02	0.149	0.036	0.2		2640	66	15	100	110	
22-Apr-97	8.11	11.87	57.7	13893	7.99	0.15	0.52	0.02	0.257	0.047	0.2		4480	134	13	580	320	
07-May-97	10.77	9.46	95.3	9143	7.36	0.11	0.032	0.02	0.114	0.05	0.2		1650	33	13	200	160	
21-May-97	10.97	9.57	62.5	12193	7.51	0.12	0.32	0.02	0.14	0.05	0.2		4130	119	39	120	160	
03-Jun-97	12.77	10.73	54.9	12793	7.34	0.11	0.37	0.02	0.192	0.04		2.0	3510	106	24	100	130	
17-Jun-97	15.51	9.92	54.2	12693	7.79	0.21	0.42	0.02	0.241	0.167		2.0	930	14	6	140	700	
14-Jul-97	18.31		106.7	2993	7.92	0.22	0.42	0.01	0.118	0.024		2.0	1340	42	7	140	140	
29-Jul-97	22.07	8.76	148.8	1903	7.81	0.4	0.33	0.01	0.1	0.036		2.0	3310	30	7	50	60	
13-Aug-97	20.35	8.73	149	1873	7.71	0.46	0.36	0.02	0.102	0.043		3.0	1040	30	7	140	320	
26-Aug-97	21.17	12.3	188	1463	8.53	0.5	0.28	0.02	0.108	0.055		4.0	790	22	5	260	120	
09-Sep-97	18.84	9.83	280	701	7.68	0.8	0.38	0.02	0.09	0.05		6.0	610	18	5	140	220	
26-Sep-97	16.24	8.36	267	648	7.37	1.02	0.45	0.02	0.124	0.062		5.0	700	18	5	30	10	
27-Oct-97	10		186	1523	6.82	0.02	0.23	0.01	0.086	0.027		1.0	860	27	4	80	36	
18-Nov-97	5.02	11.59	163	1613	7.98	0.32	0.24	0.01	0.066	0.16		1.0	510	11	4	26	16	
09-Dec-97	1.5	14.1	125	2053	8.4	0.31	0.23	0.01	0.067	0.019		1.0	530	13	6	26	96	
21-Jan-98	2.17		130	2303	7.75		0.77	0.09	0.27			1.0	6590	122	44			
23-Jan-98	3.99	13.69	126	2483	8	0.31	0.24	0.03	0.08	0.049		1.0	1310	21	8	60	20	
19-Mar-98	6.43	13.3	98	3253	7.55	0.13	0.27	0.02	0.083	0.015		1.0	1040	30	7			
24-Mar-98				3253												136	160	
06-Apr-98	7.32	12.53	82.8	4383	7.76	0.16	0.3	0.01	0.063	0.02		1.0	1000	15	8	140	60	12
28-Apr-98	9.21	12.04	69.1	5683	7.06	0.13	0.37	0.03	0.4	0.036		1.0	5130	139	11	146	121	36
12-May-98	13.1	8.6	92	9773		0.039	0.39	0.03	0.14	0.037		1.0	1780	41	12	440	600	130
28-May-98				18193														
08-Jun-98	13.34	11.62	55.7	10493	7.06	0.06	0.74	0.02	0.2	0.02		1.0	3250	127	14	120	120	2
22-Jun-98	14.85		61.2	5293	8.34	0.54	0.27	0.02	0.075	0.019		1.0	870	22	6	250	220	10
06-Jul-98	19.54	11.07	112.6	4223	7.97	0.15	0.12	0.03	0.065	0.019		1.0	720	18	4	60	60	10
20-Jul-98	23.11	9.07	148	1613	7.87	0.91	0.38	0.02	0.11	0.017		1.0	1160	32	7	540	340	54
05-Aug-98	22.8	8.31	238	1283	8.08	0.57	0.33	0.1	0.11	0.059		3.0	1100	26	8	280	600	4
17-Aug-98	19.82	9.72	274	1133	7.8	0.01	0.44	0.03	0.122	0.056		5.0	1180	26	7	140	80	60
31-Aug-98	23.44	11.99	239	1473	8.45	0.61	0.61	0.04	0.132	0.057		4.0	1480	46	11	640	360	60
28-Sep-98	15.7	7.8	218	951	7.4	0.63	0.44	0.03	0.121	0.058		4.0	1270	27	7	40	70	12

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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Lower Payette River Monitoring
September 1996 through October 1998
Station LPR-008, Lower Payette River below Payette WWTP, STORET #2040688
Statistical Summary

Provisional Data, Do Not Cite

	Temp.	Dissolved Oxygen	Conductivity	Flow estimated	pH	Nitrates/ Nitrites	TKN	Ammonia	Total Phos.	ortho-Phos.	Hg	Ar	Fe	Susp. Solids	Turbidity	Fecal Coliform	Fecal Strep.	E. coli
	C	mg/l	umhos	CFS	su	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	mg/l	FTU	CFU/100 ml	CFU/100 ml	CFU/100 ml
Overall																		
Average	12.1	11.1	131.8	5254	7.7	0.30	0.36	0.02	0.125	0.044	0.2	2.2	1739	43	10	161	180	35
Stand. Dev.	6.8	2.0	67.0	4489	0.5	0.26	0.15	0.02	0.072	0.033	0.0	1.5	1460	39	9	158	186	37
Count	35	31	35	37	34	34	35	35	35	34	10	25	35	35	35	34	34	11
Max.	23.4	14.5	280.0	18193	8.5	1.02	0.77	0.10	0.400	0.167	0.2	6.0	6590	139	44	640	700	130
Min.	1.5	7.8	54.2	648	6.2	0.01	0.03	0.01	0.057	0.015	0.2	1.0	340	8	3	20	10	2
Water year 1997																		
Average	11.8	11.1	122.0	6300	7.6	0.3	0.3	0.02	0.122	0.046	0.20	3	1727	42	11	130	176	ERR
Stand. Dev.	6.4	1.9	66.9	4522	0.5	0.3	0.1	0.01	0.056	0.032	0.00	1	1274	38	9	125	186	ERR
Count	18.0	17.0	18.0	18	18	18	18	18.00	18	18	10	8	18	18	18	18	18	0
Max.	22.1	14.5	280.0	13893	8.5	1.0	0.5	0.04	0.257	0.167	0.20	6	4480	134	39	580	700	ERR
Min.	2.4	8.4	54.2	648	6.2	0.1	0.0	0.01	0.057	0.017	0.20	2	340	8	3	20	10	ERR
Irrigation Season 1997																		
Average	15.2	9.9	133.1	6323	7.6	0.35	0.36	0.02	0.145	0.055	0.2	3.3	2094	53	12	167	204	ERR
Stand. Dev.	4.9	1.2	75.4	5168	0.5	0.29	0.12	0.00	0.054	0.035	0.0	1.5	1375	41	10	137	173	ERR
Count	12	11	12	12	12	12	12	12	12	12	4	8	12	12	12	12	12	0
Max.	22.1	12.3	280.0	13893	8.5	1.02	0.52	0.02	0.257	0.167	0.2	6.0	4480	134	39	580	700	ERR
Min.	7.4	8.4	54.2	648	6.2	0.11	0.03	0.01	0.090	0.024	0.2	2.0	610	14	5	30	10	ERR
Non-Irrigation 1997																		
Average	5.0	13.2	99.8	6255	7.5	0.20	0.30	0.02	0.078	0.028	0.2	ERR	993	21	8	57	119	ERR
Stand. Dev.	2.2	1.0	36.7	2813	0.5	0.09	0.07	0.01	0.027	0.009	0.0	ERR	527	14	4	33	197	ERR
Count	6	6	6	6	6	6	6	6	6	6	6	0	6	6	6	6	6	0
Max.	8.8	14.5	179.0	10193	8.4	0.36	0.39	0.04	0.136	0.046	0.2	ERR	2040	40	17	120	560	ERR
Min.	2.4	12.0	67.3	1543	6.8	0.08	0.20	0.01	0.057	0.017	0.2	ERR	340	8	3	20	18	ERR
Water year 1998																		
Average	12.4	11.1	142.3	4262	7.8	0.31	0.37	0.03	0.129	0.042	ERR	1.7	1752	44	10	195	185	35
Stand. Dev.	7.3	2.0	65.5	4225	0.5	0.26	0.18	0.02	0.086	0.035	ERR	1.3	1634	41	9	183	186	37
Count	17	14	17	19	16	16	17	17	17	16	0	17	17	17	17	16	16	11
Max.	23.4	14.1	274.0	18193	8.5	0.91	0.77	0.10	0.400	0.160	ERR	5.0	6590	139	44	640	600	130
Min.	1.5	7.8	55.7	951	6.8	0.01	0.12	0.01	0.063	0.015	ERR	1.0	510	11	4	26	16	2
Irrigation Season 1998																		
Average	16.6	10.3	144.6	5375	7.8	0.35	0.40	0.03	0.140	0.036	ERR	2.1	1722	47	9	254	239	35
Stand. Dev.	5.3	1.7	78.6	4966	0.5	0.30	0.16	0.02	0.090	0.017	ERR	1.5	1260	41	3	192	198	37
Count	11	10	11	12	10	11	11	11	11	11	0	11	11	11	11	11	11	11
Max.	23.4	12.5	274.0	18193	8.5	0.91	0.74	0.10	0.400	0.059	ERR	5.0	5130	139	14	640	600	130
Min.	7.3	7.8	55.7	951	7.1	0.01	0.12	0.01	0.063	0.017	ERR	1.0	720	15	4	40	60	2
Non-Irrigation 1998																		
Average	4.9	13.2	138.0	2354	7.8	0.22	0.33	0.03	0.109	0.054	ERR	1.0	1807	37	12	66	66	ERR
Stand. Dev.	2.8	1.0	28.6	651	0.5	0.12	0.20	0.03	0.073	0.054	ERR	0.0	2157	38	14	41	55	ERR
Count	6	4	6	7	6	5	6	6	6	5	0	6	6	6	6	5	5	0
Max.	10.0	14.1	186.0	3253	8.4	0.32	0.77	0.09	0.270	0.160	ERR	1.0	6590	122	44	136	160	ERR
Min.	1.5	11.6	98.0	1523	6.8	0.02	0.23	0.01	0.066	0.015	ERR	1.0	510	11	4	26	16	ERR

Blank Spaces=Data Not Available, Underlined Values=Less Than, Irrigation Season Defined as April 1 through Sept. 30

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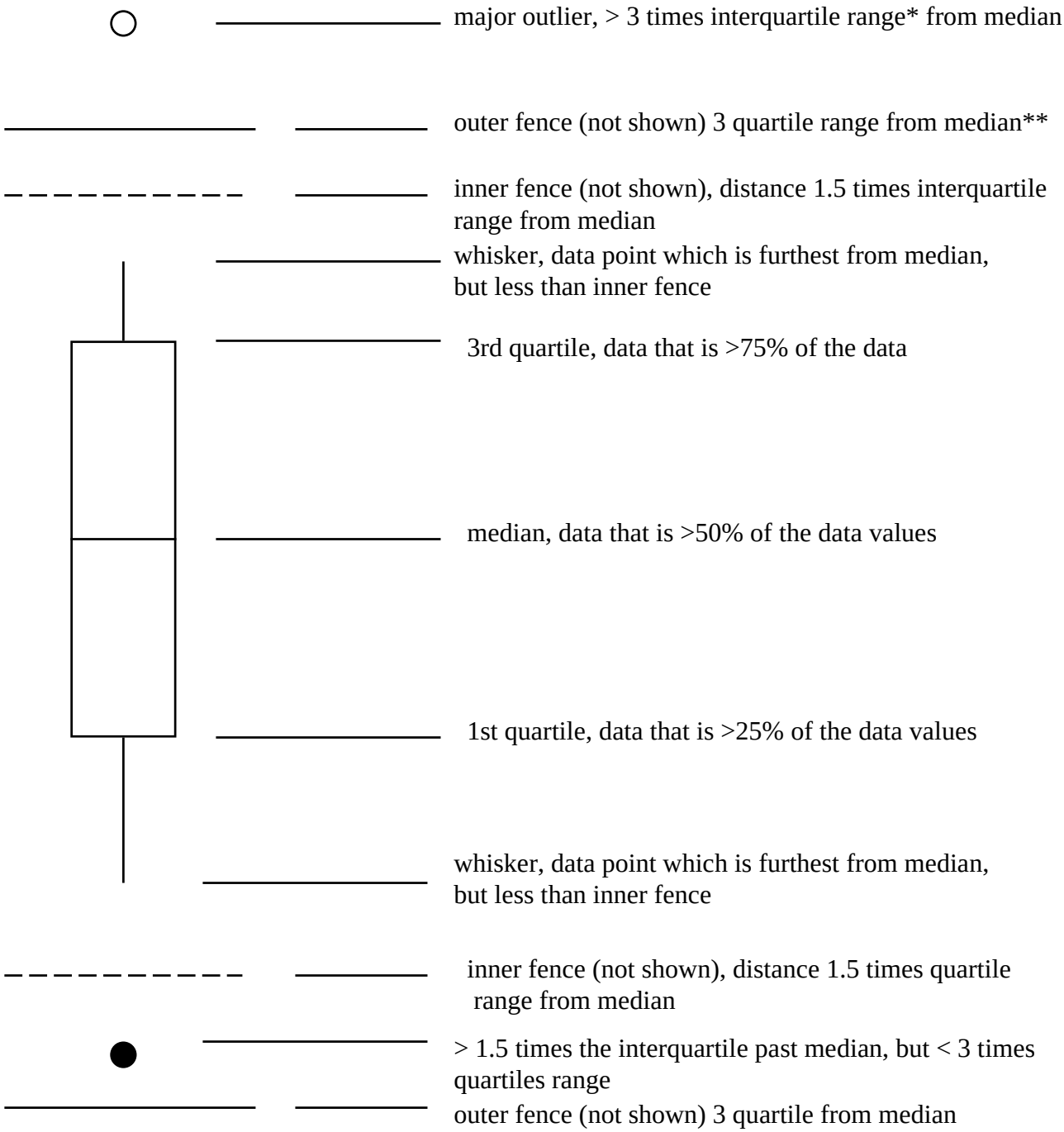
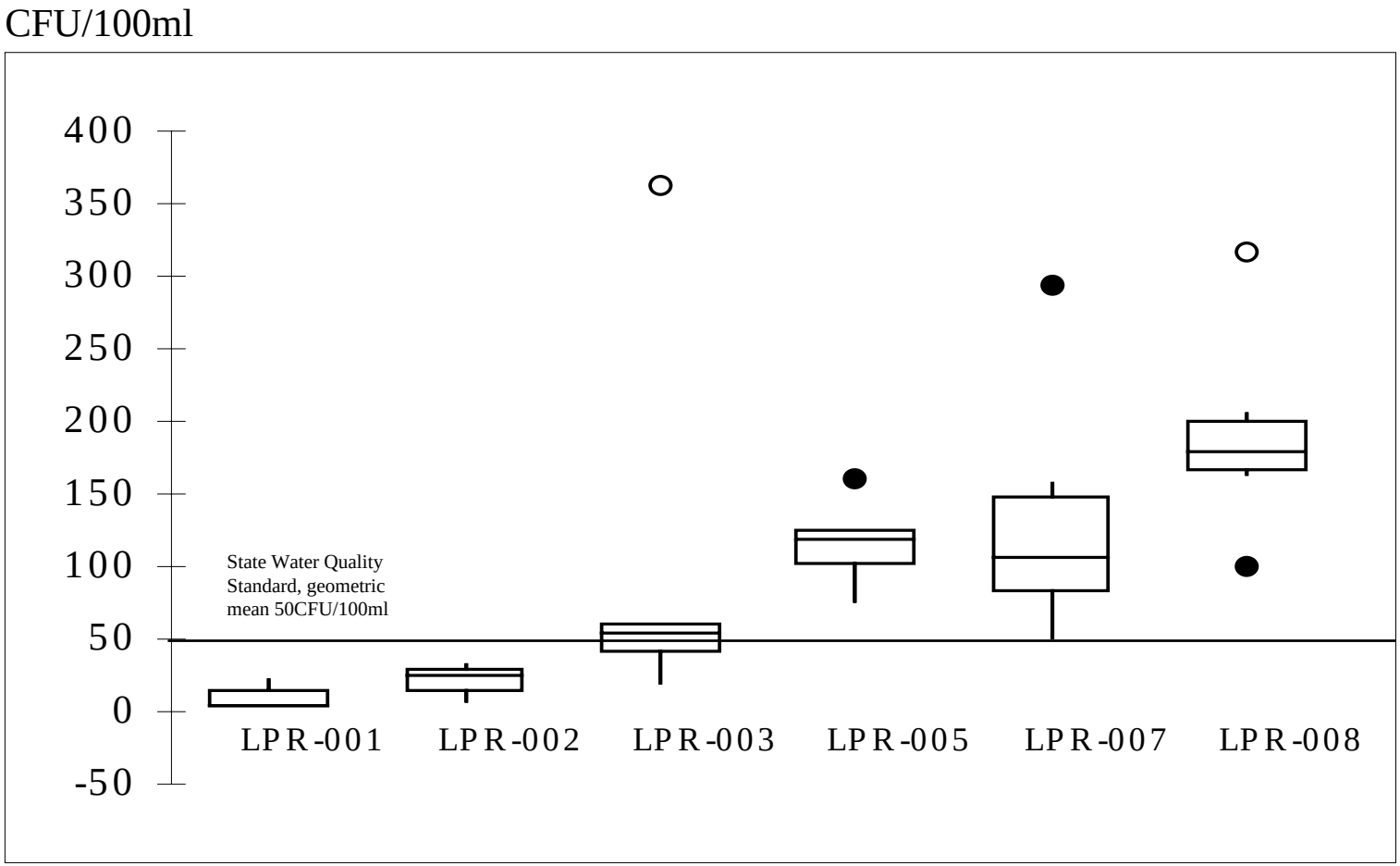
Explanation of Box-Whisker Graphs



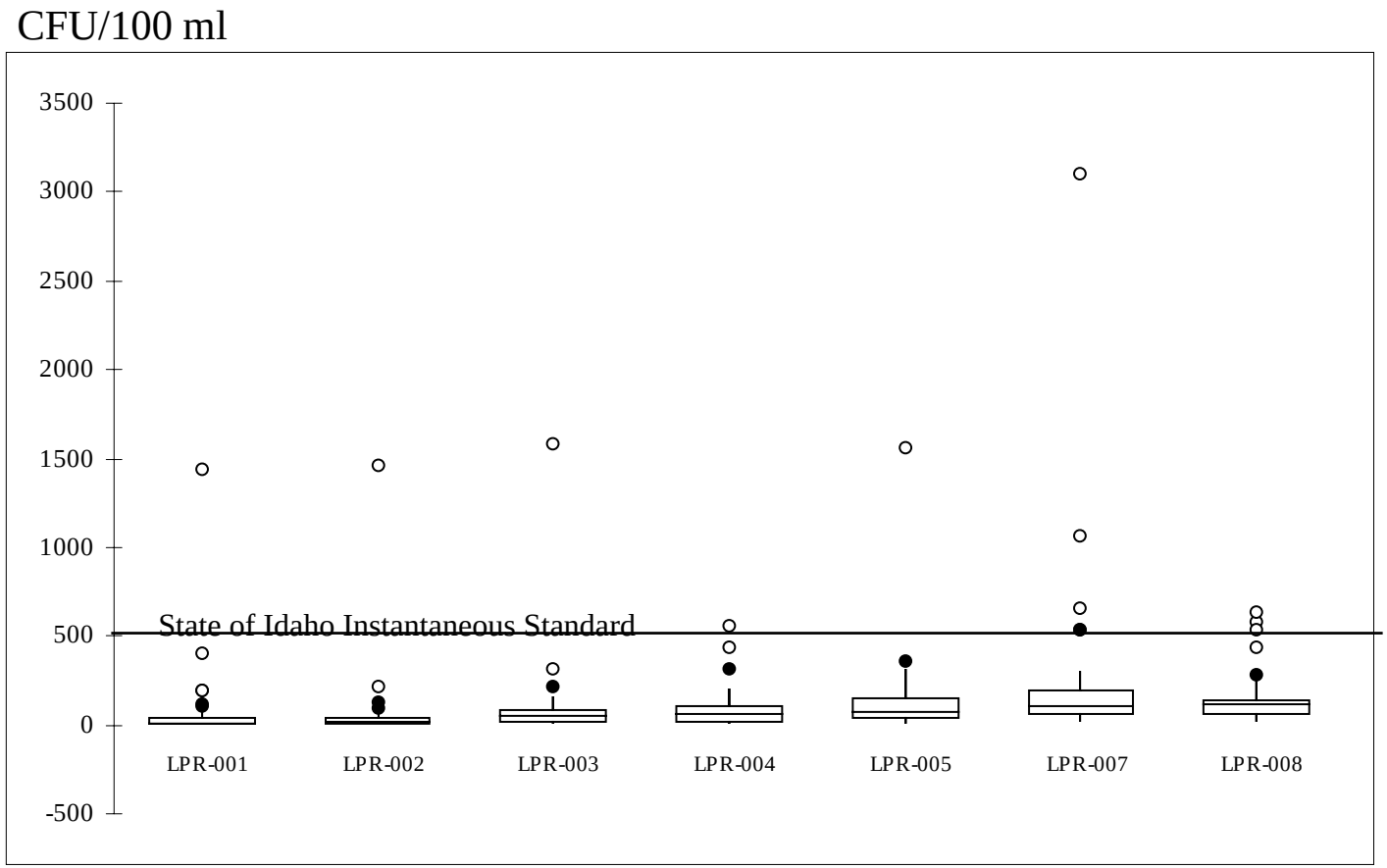
* quartile range: the distance between 1st and 3rd quartile
**inner and outer fences are not indicated on graphs

Fecal Coliform Bacteria Results, WY 1997 and 1998

Geometric Mean Station all stations, Lower Payette River
June, July & August 1997 and 1998

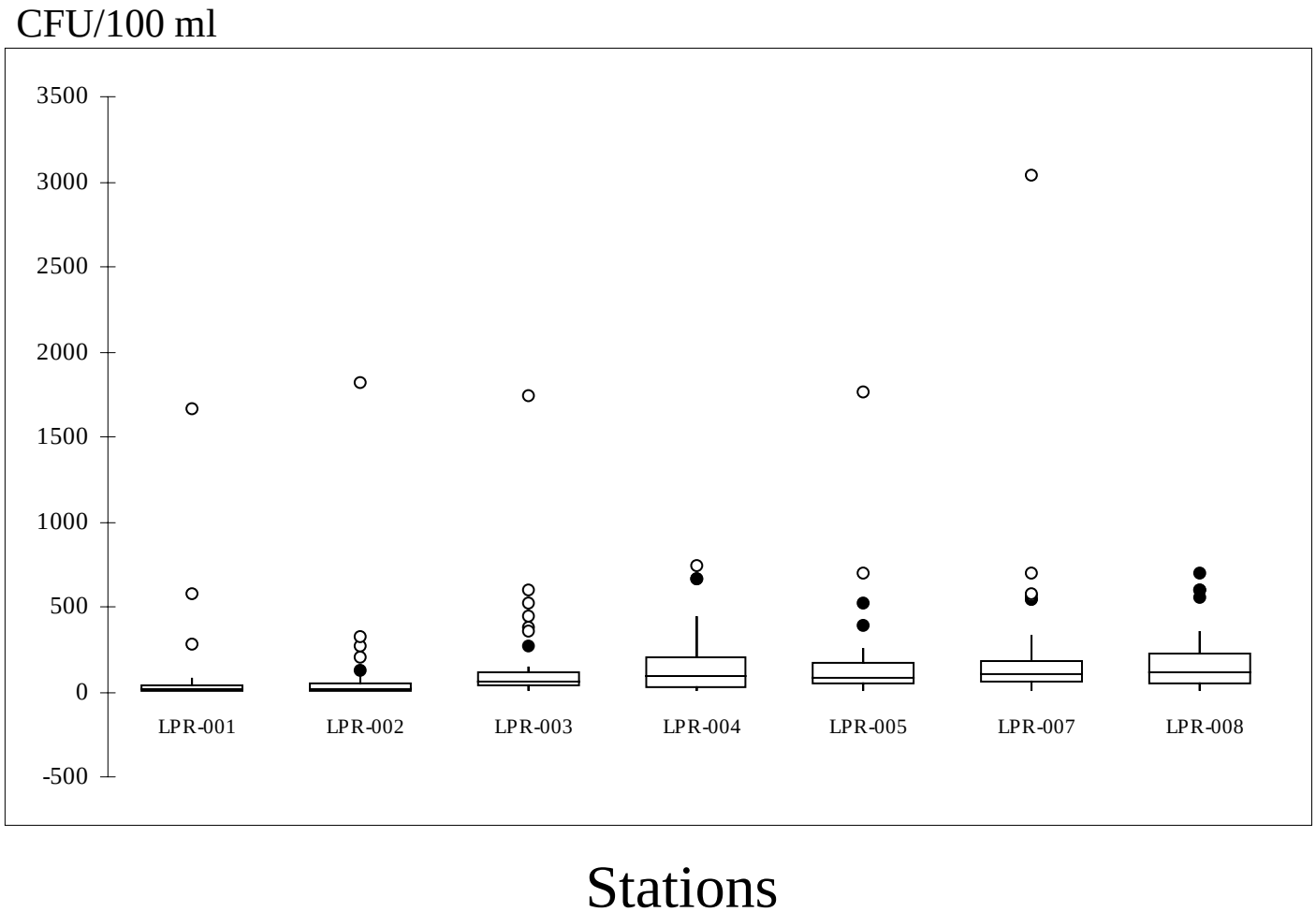


Fecal Coliform Results, WY 1997-98
Lower Payette River

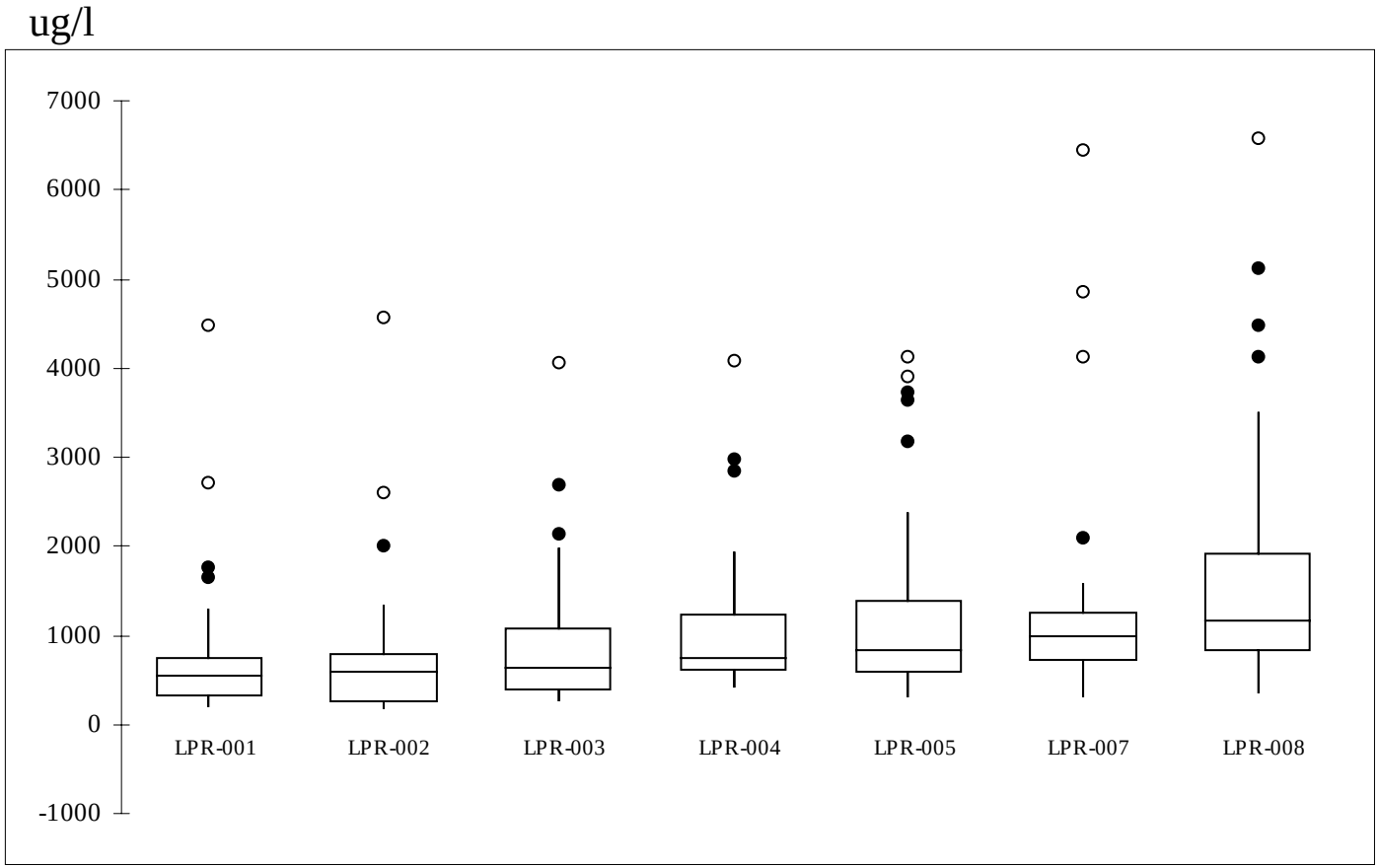


Stations

Fecal Streptococcus Results, WY 1997-98
Lower Payette River

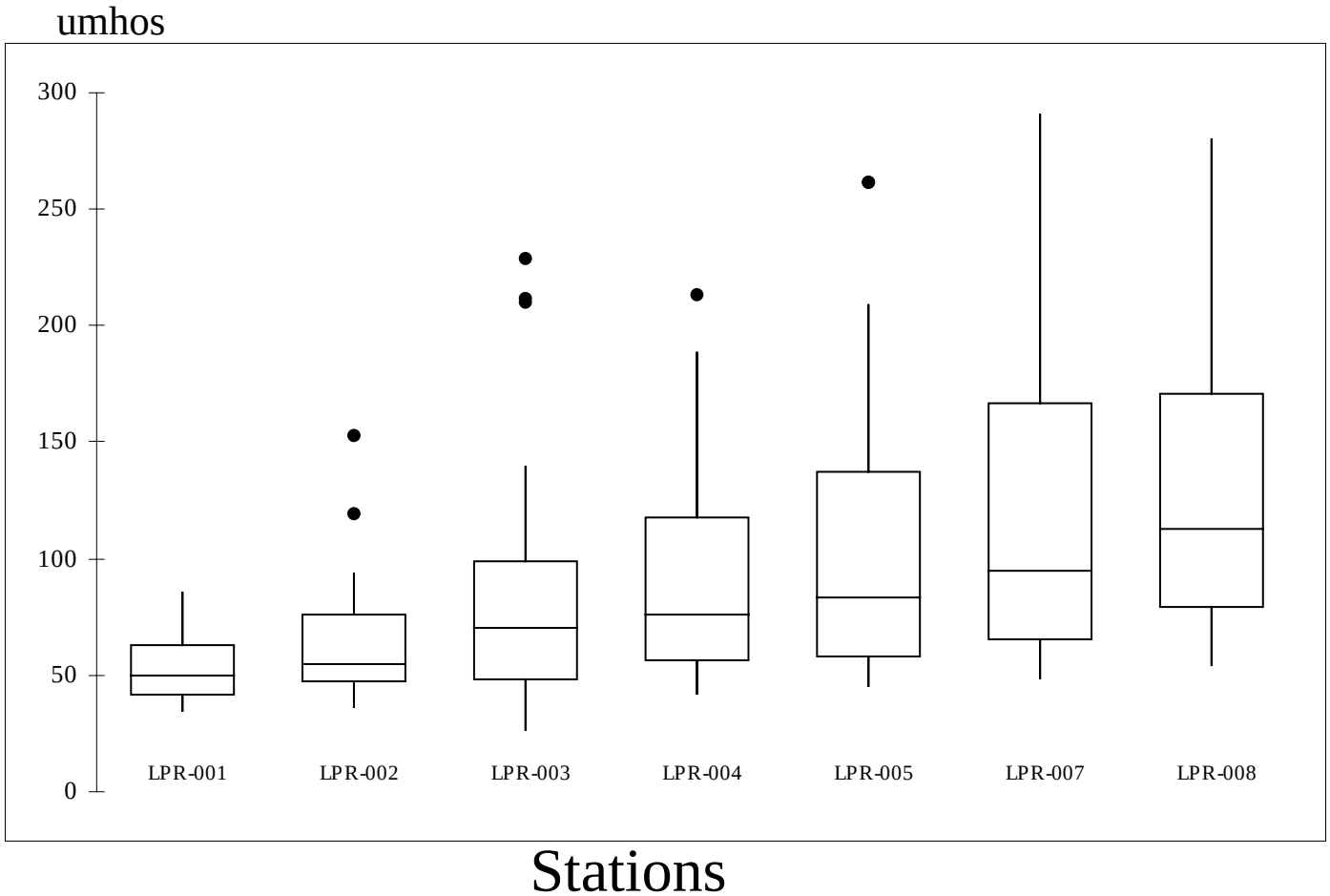


Total Iron Results, WY 1997-98
Lower Payette River

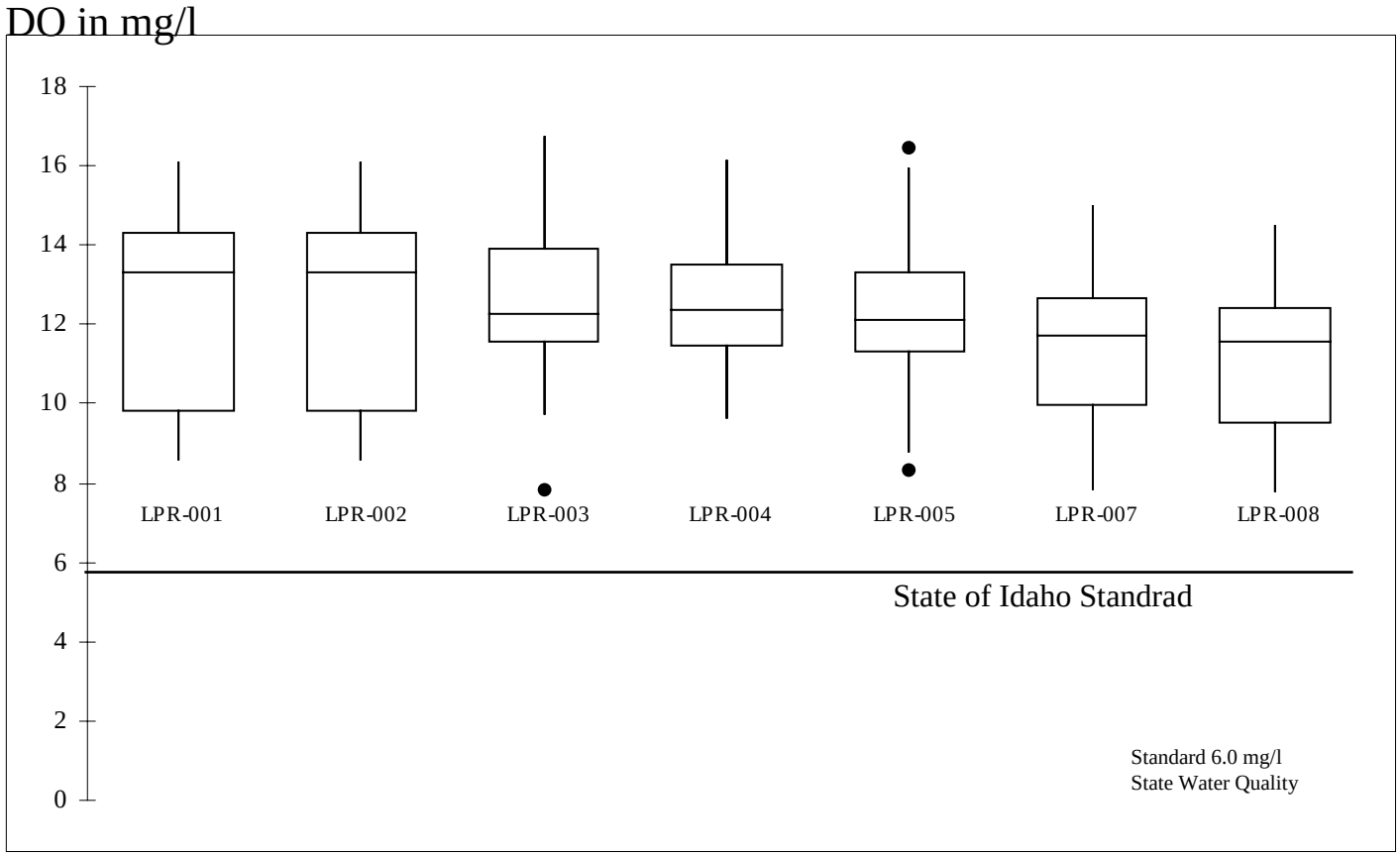


Stations

Instantaneous Conductivity Results, WY 1997-98
Lower Payette River

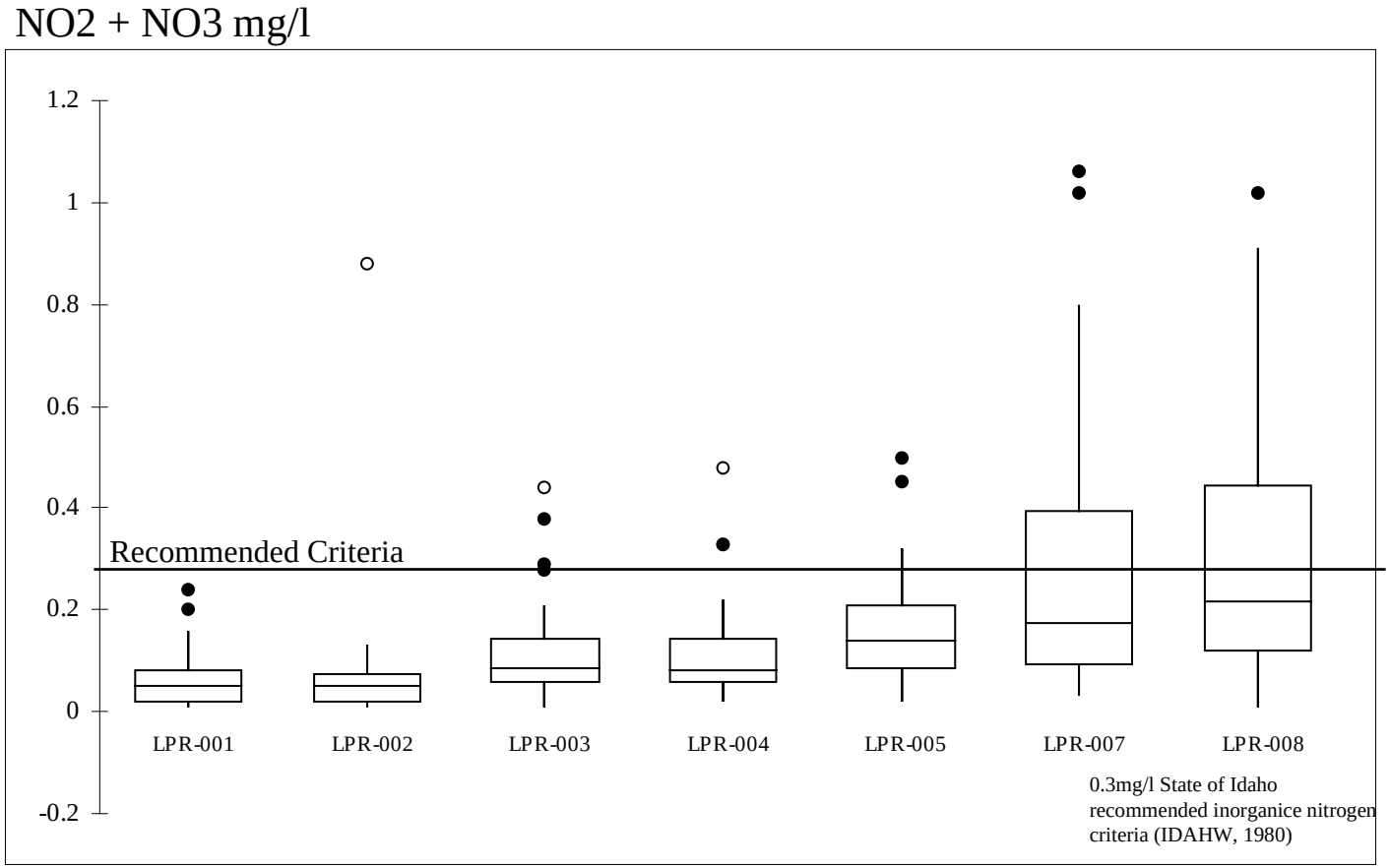


Instantaneous Dissolved Oxygen Results, WY 1997-98
Lower Payette River



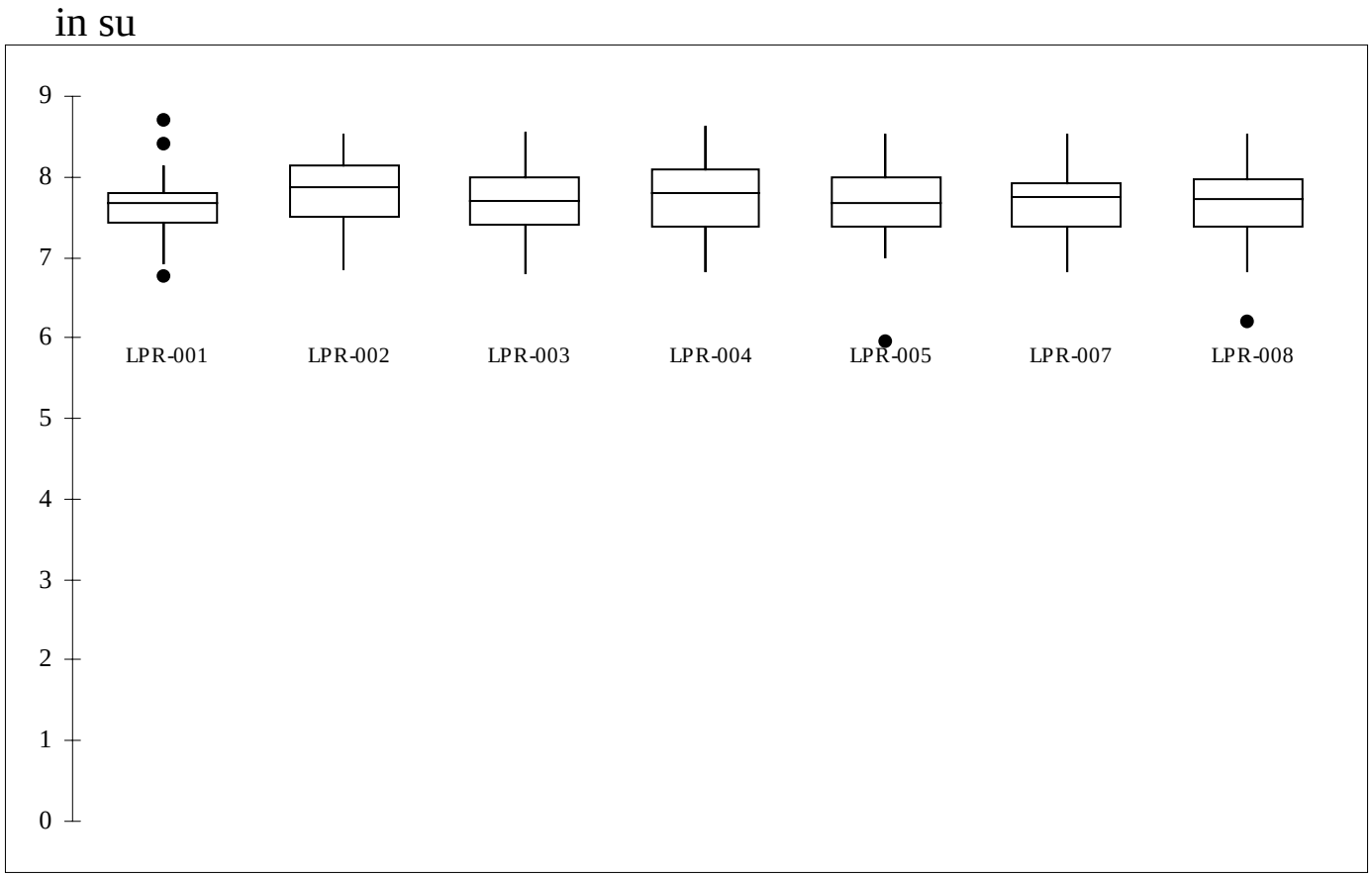
Stations

Nitrite+Nitrates as N Results, WY 1997-98
Lower Payette River



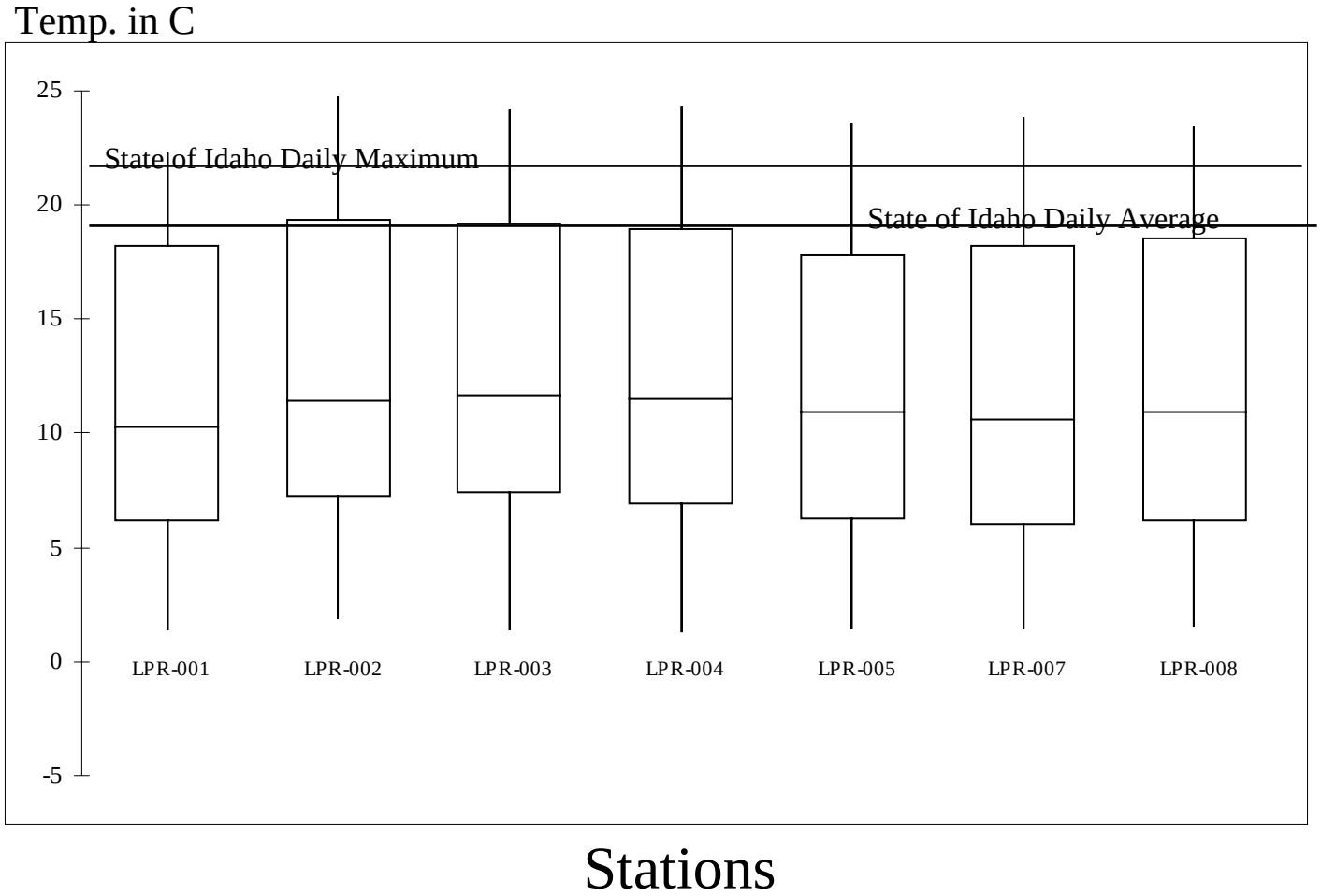
Stations

Instantaneous pH Results, WY1997-98
Lower Payette River

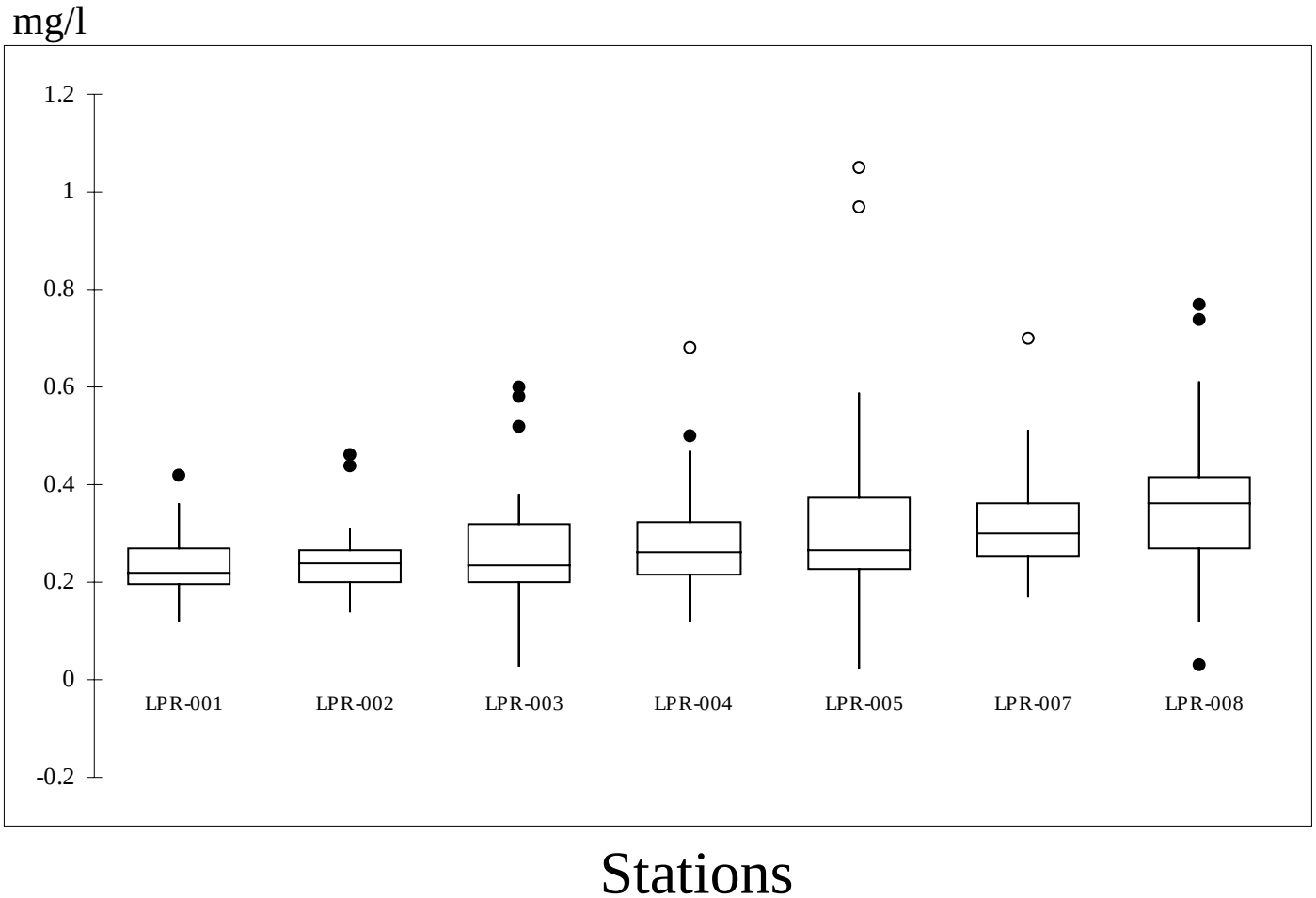


Stations

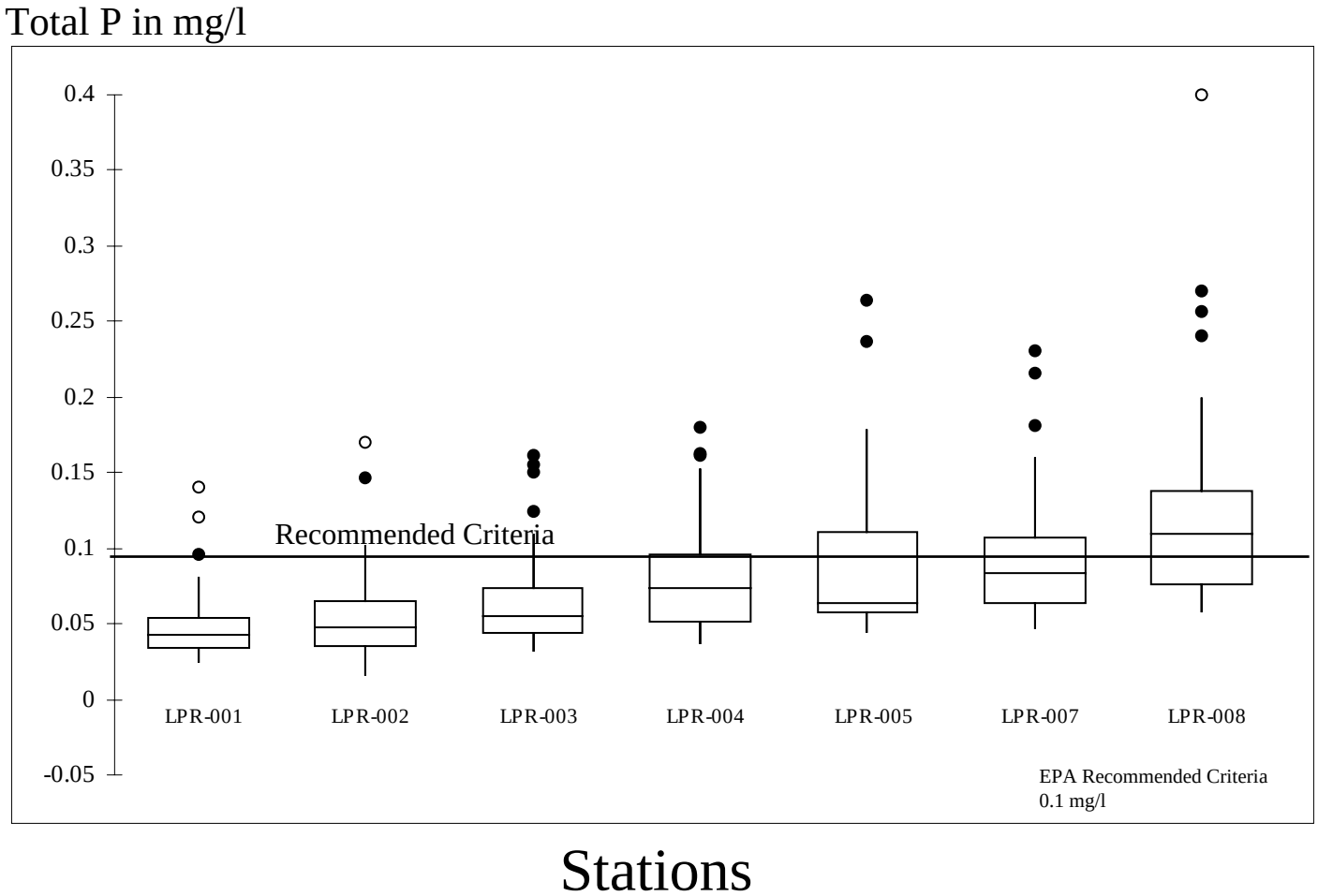
Instantaneous Temperature Results, WY 1997-98
Lower Payette River



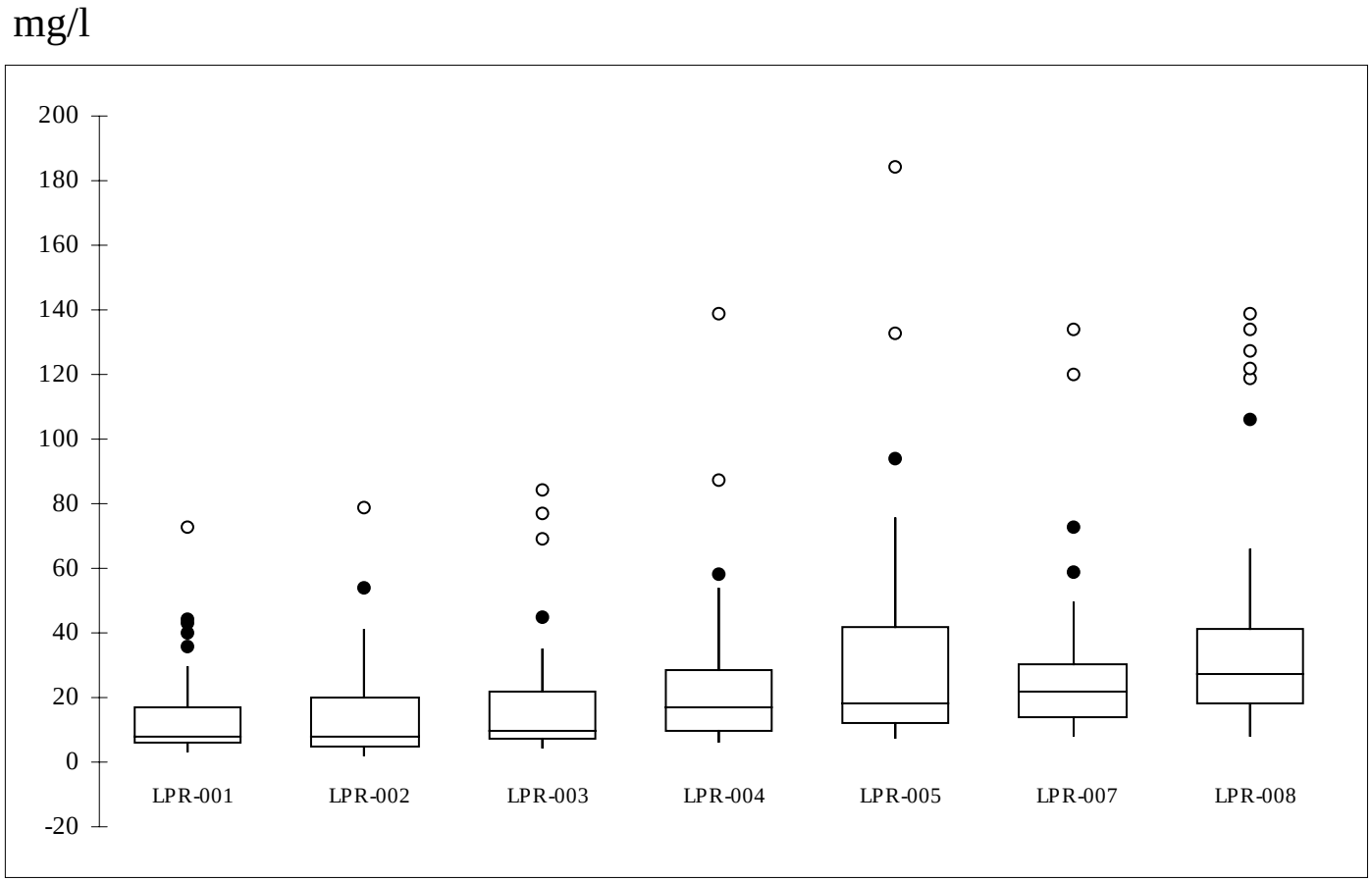
Total Kjeldahl Nitrogen Results, WY 1997-98
Lower Payette River



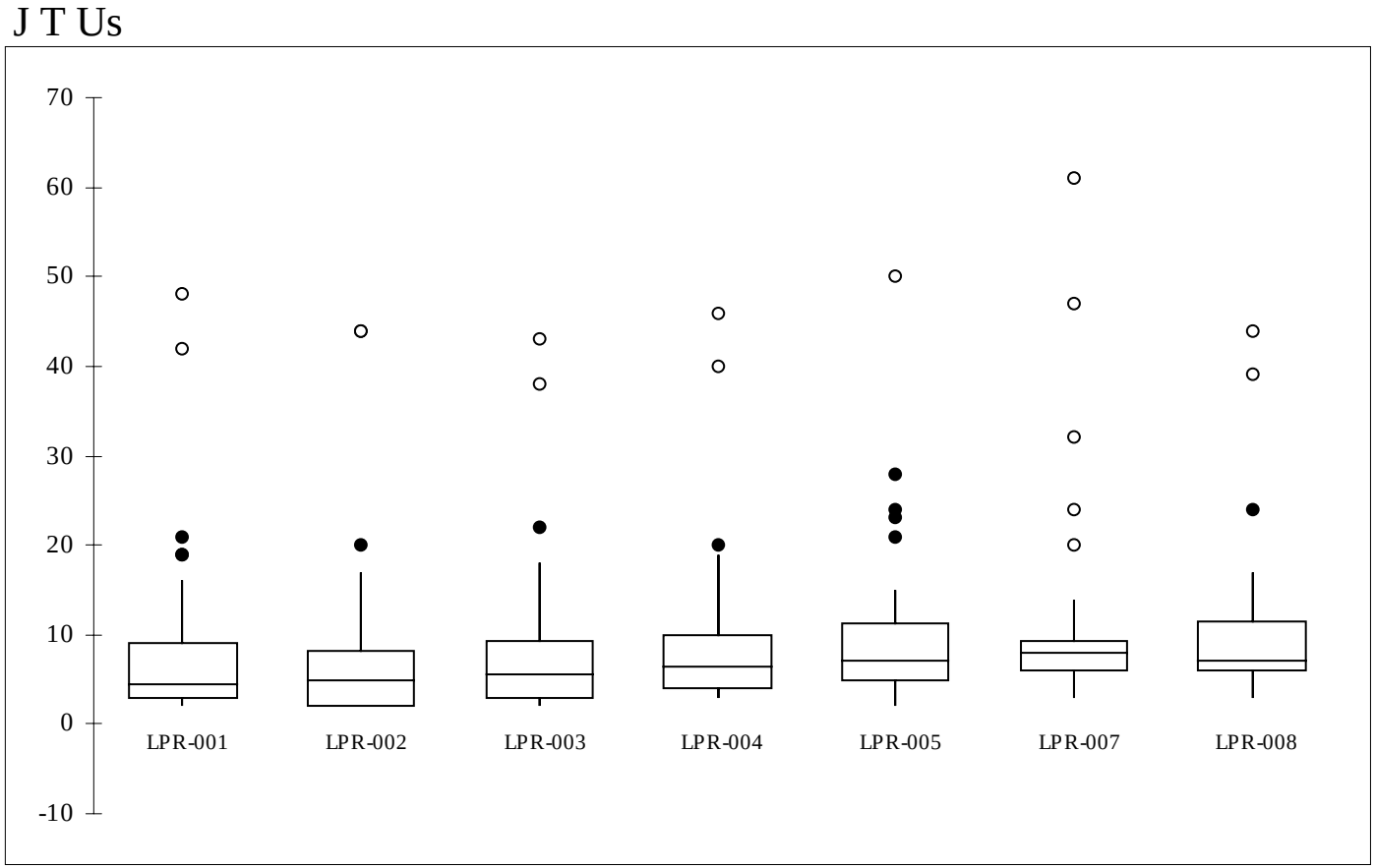
Total Phosphorus Results, WY 1997-98
Lower Payette River



Total Suspended Solids Results, WY 1997-98
Lower Payette River

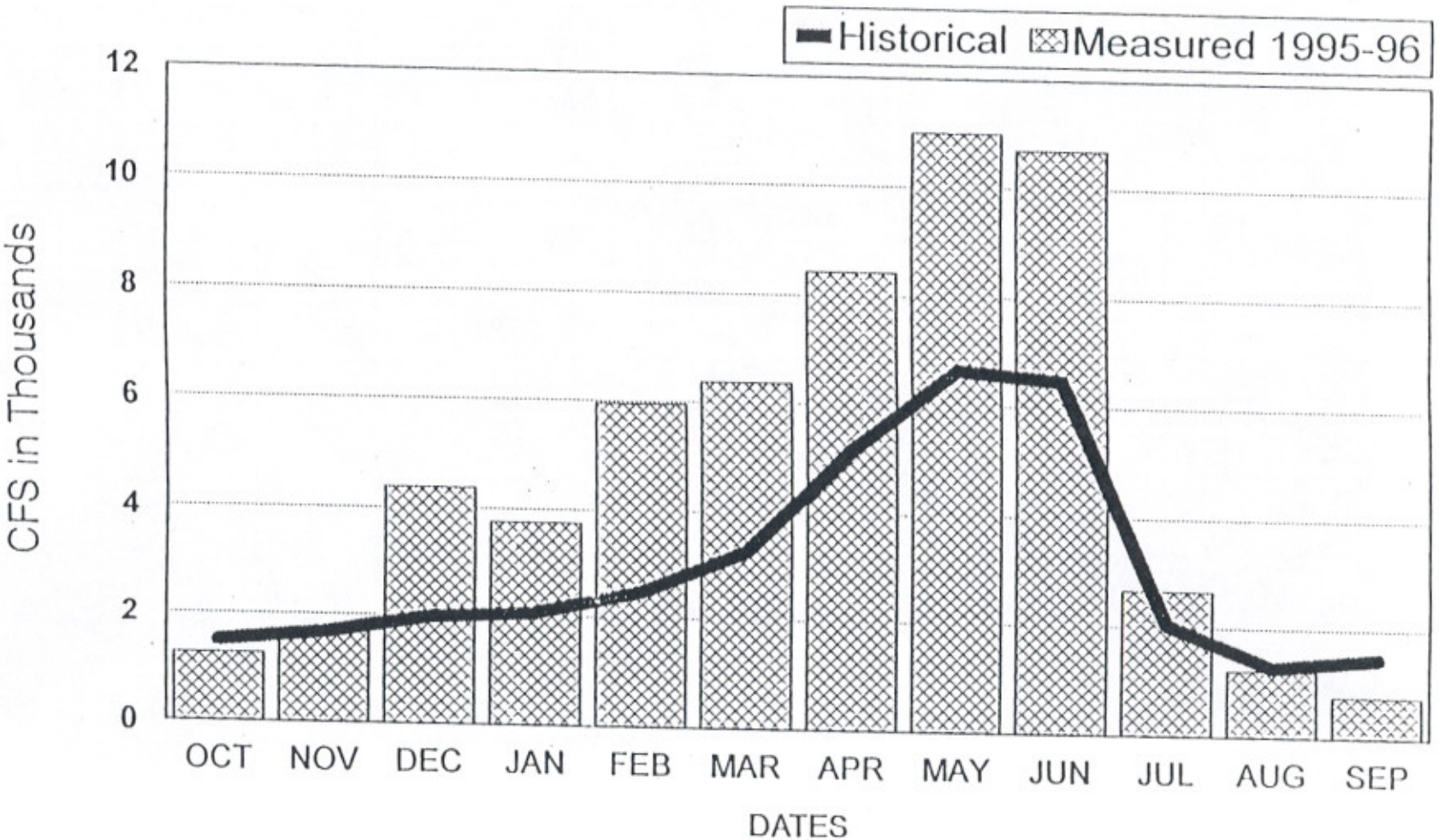


Turbidity Results, WY 1997-98
Lower Payette River



Stations

Historical Flow Data, 1935-1996, & Flow Data 1995-96
Lower Payette River @ Highway 95, Near Payette, Idaho



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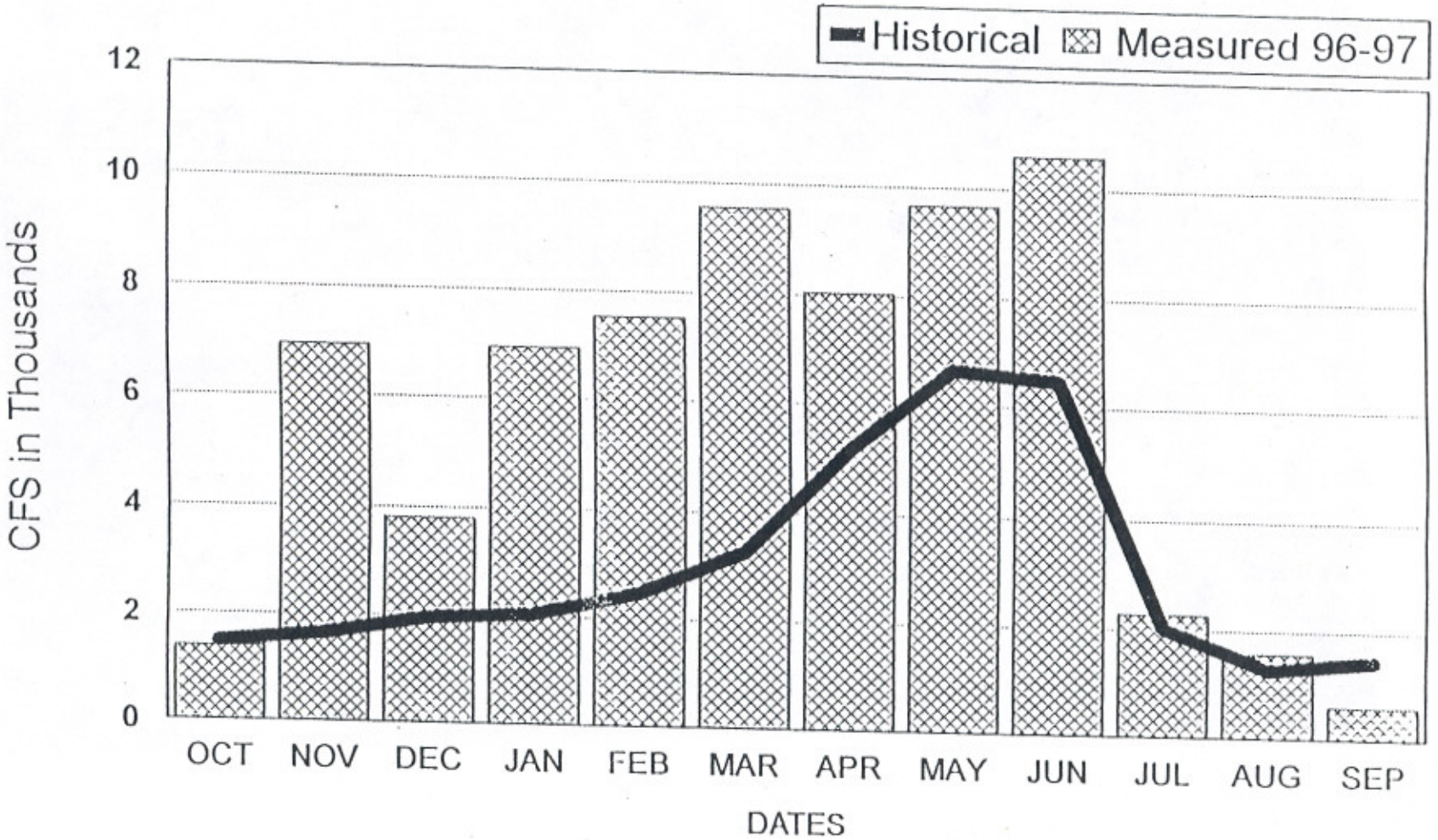
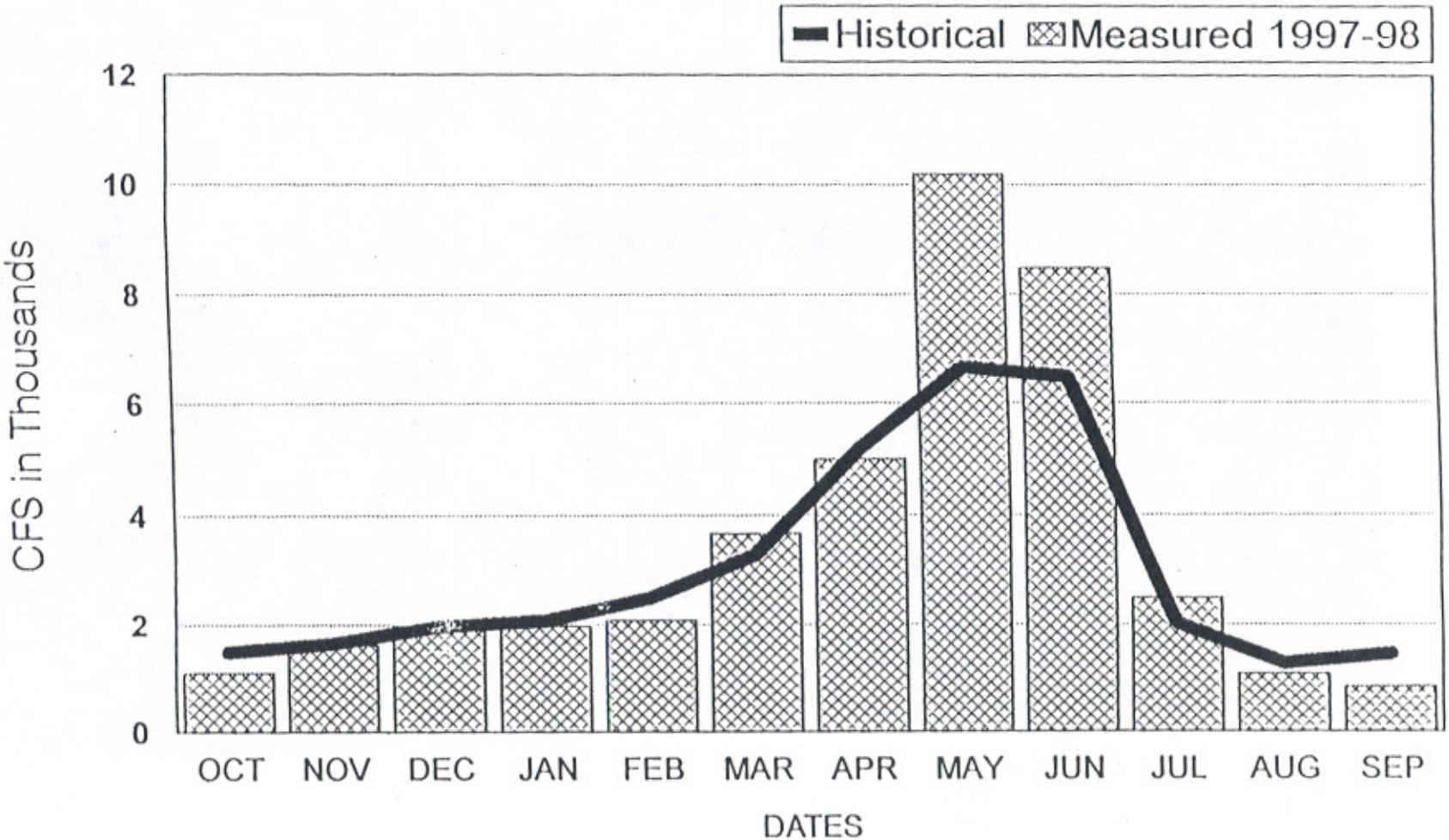
Historical Flow Data, 1935-1996, & Flow Data 1996-97
Lower Payette River @ Highway 95, Near Payette, Idaho



Historical Flow Data, 1935-1996, & Flow Data 1997-98*
Lower Payette River @ Highway 95, Near Payette, Idaho



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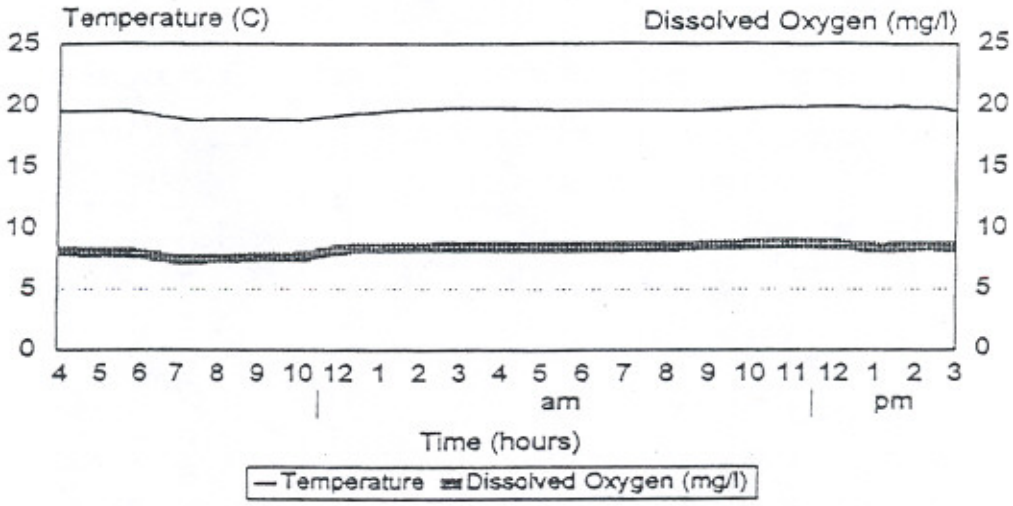
24 Hour Dissolved Oxygen/Temperature Res

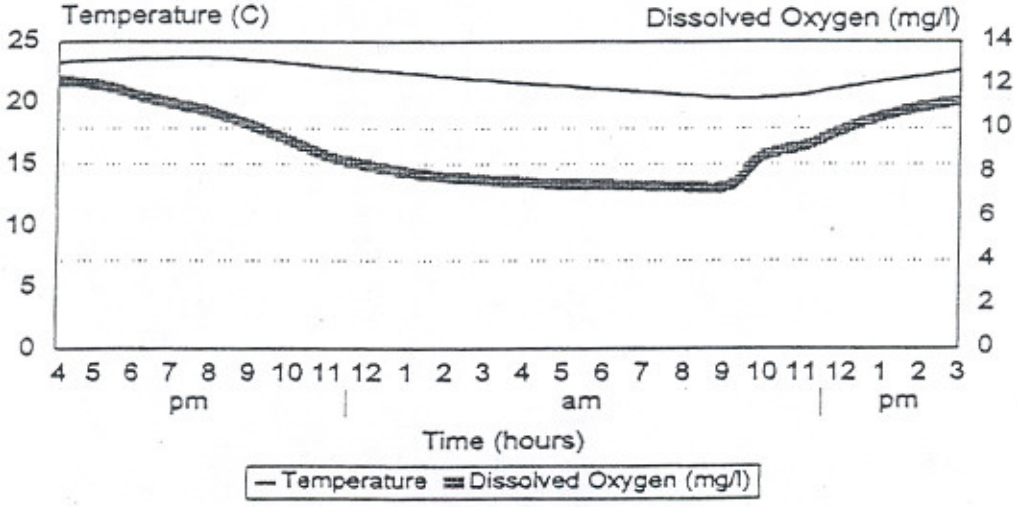
Lower Payette River below Black Canyon Dam



August 18-19, 1997

24 Hour Dissolved Oxygen/Temperature Result

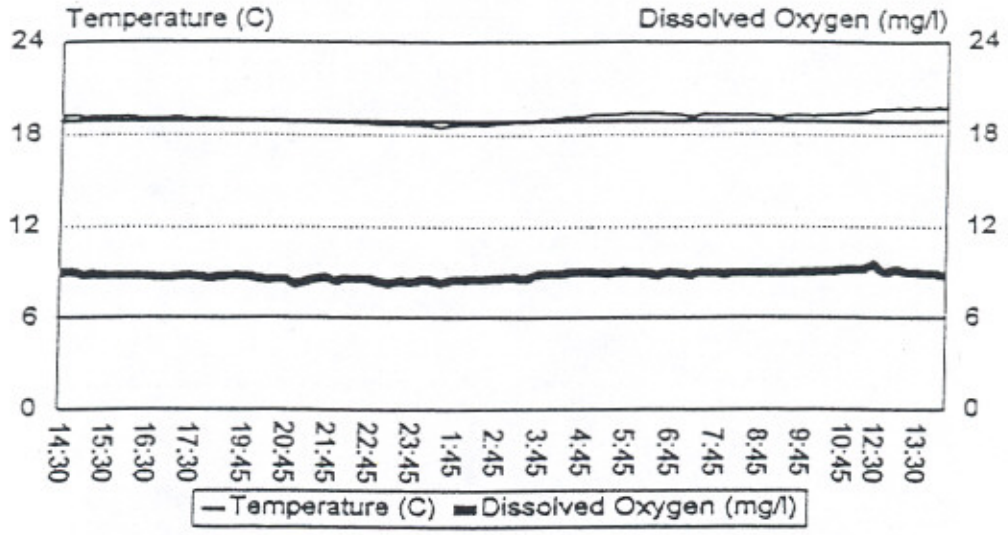
Lower Payette River at Payette Waste Water Treatment F



August 19-20, 1997

24 Hour Dissolved Oxygen/Temperature Results

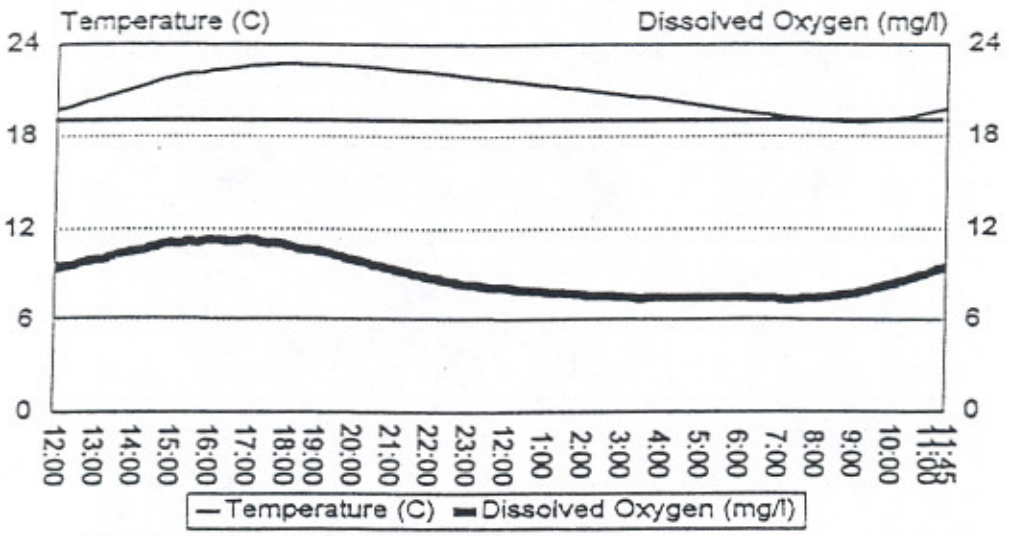
Lower Payette River Below Black Canyon Dam



September 3-4, 1998

24 Hour Dissolved Oxgyen/Temperature Results

Lower Payette River at Payette WWTP



August 31, 1998- September 1, 1998

Appendix C. Flow Budget, In-Flow Schematic and Out-Flow Schematic Lower Payette River, 1996

Station to Station Redrawals and Returns, August 1996
Estimated Return Flow. Model has not been verified,

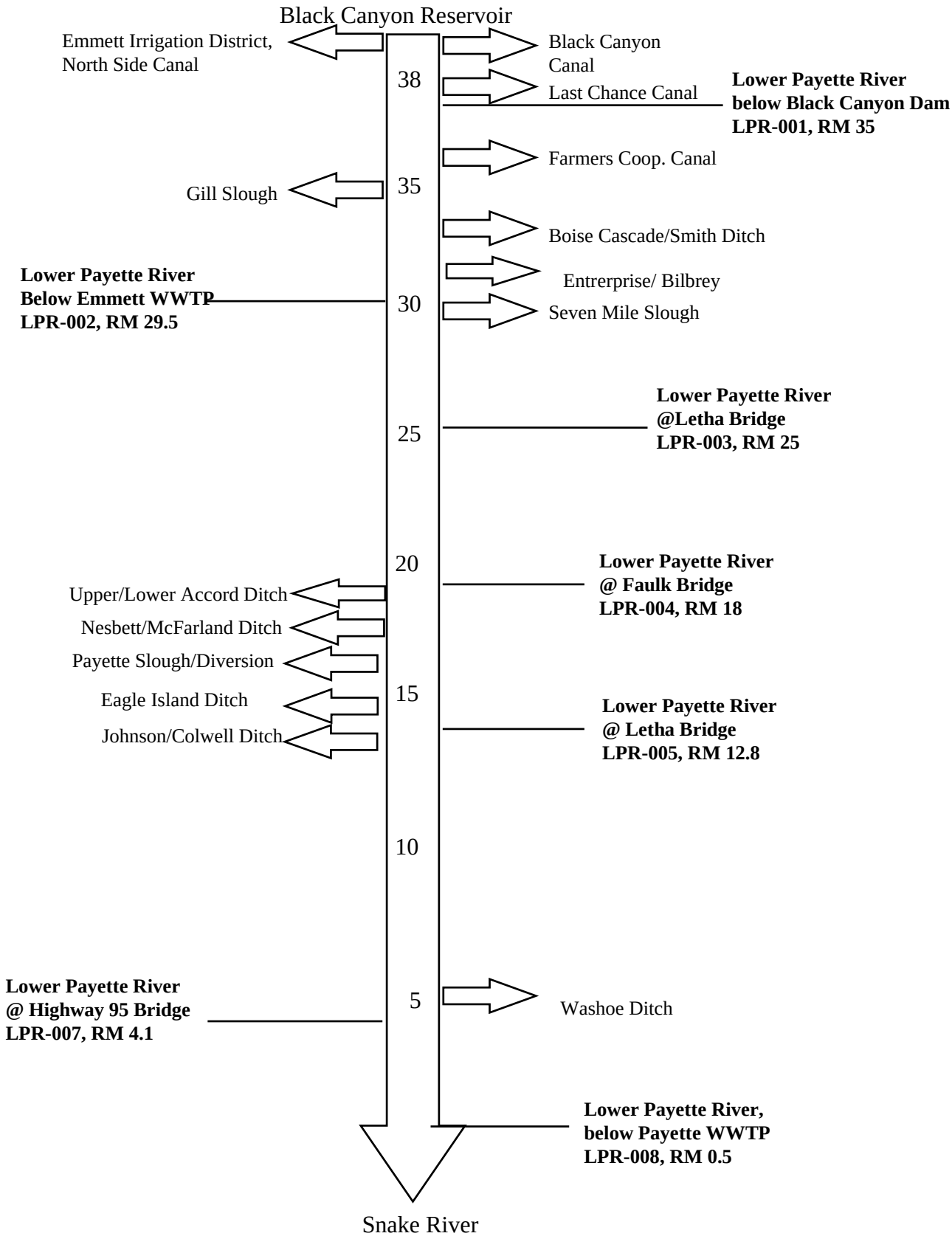
	Identified	Measured	Estimated	Withdrawals	Return
	Sourse	Flow	Flow		
	Diversion/Return	cfs	cfs	cfs	cfs
LPR-001					
RM 38		1554			
	Last Chance			109	
	Farmer's			369	
	Enterprise/Bilbrey			98	
	Emmett WWTP				5
	Plaza				7
	Mesa				11
	Big 4				36
	Ground Water*				80
	Misc.			20	43
Total				596	182
LPR-002					
RM 29.5			1140		
	Pioneer				6
	Beacon				13
	7 Mile Slough			367	
	Tunnell #7				32
	Ground Water*				43
	Misc			20	23
Total				387	116
LPR-003					
RM 25		949	869		
	Silverleaf				20
	Sand Hollow				4
	7 Mile Slough				43
	Accord Ditches			21	
	Countyline				26
	Ground Water*				43
	Misc.			20	8
Total				41	143

*Estimated Ground Water Return at 9.5 cfs/mile of River

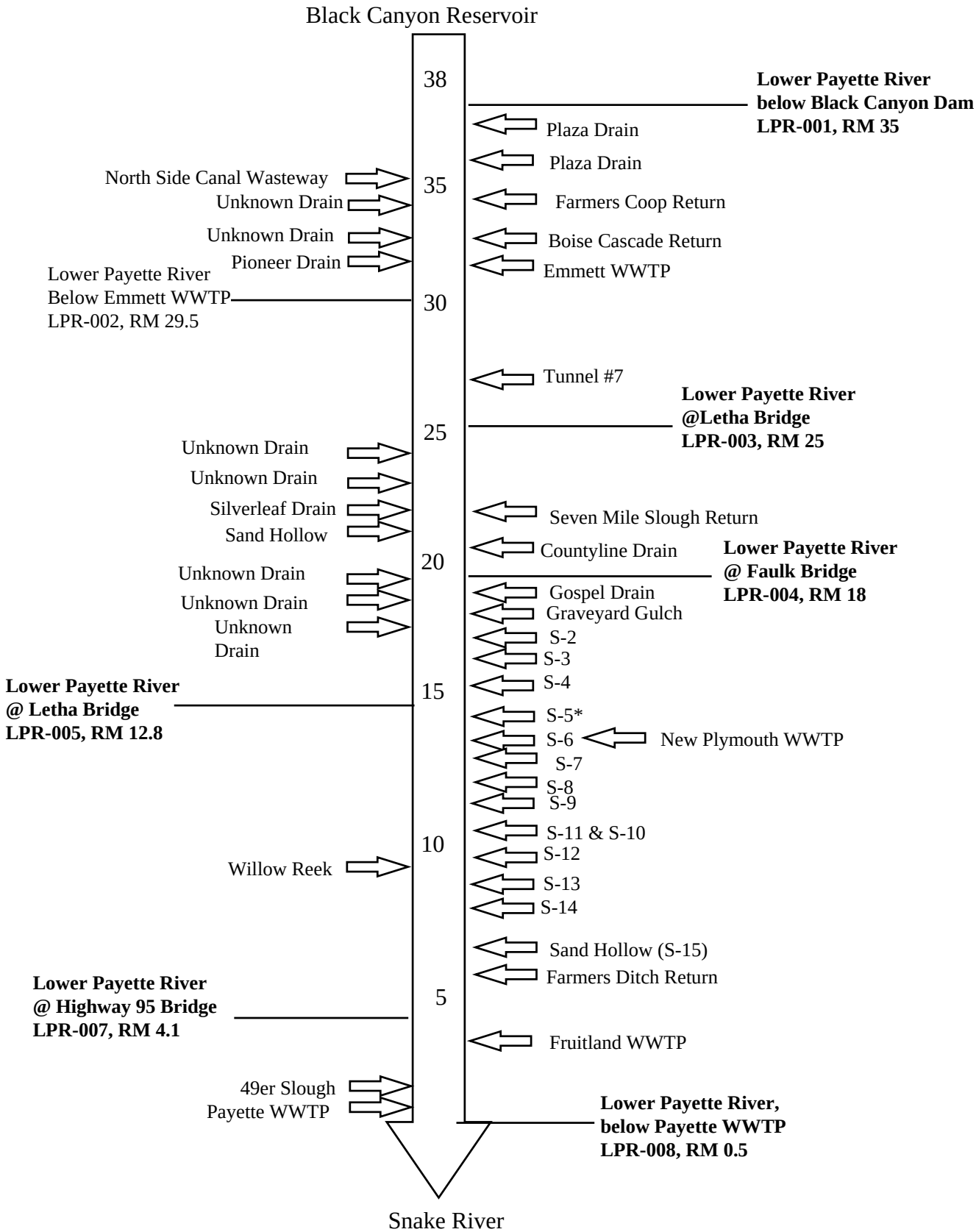
Station to Station Redrawals and Returns, August 1996
Estimated Return Flow. Model has not been verified,

LPR-004					
RM 18			971		
	Nesbitt/McFar Ditch			12	
	Low Payette Ditch			256	
	Eagle Island			30	
	J/C Ditch			42	
	Bissel Cr.				17
	S-1 (Graveyard)				38
	S-2				27
	S-3				13
	GroundWater*				47
	Misc			20	25
Total				360	167
LPR-005					
RM 13			778		
	Simplot Pumps			50	
	Washoe Ditch			20	
	S-4				13
	S-5				54
	S-6				22
	S-7				7
	S-8				21
	S-9				7
	S-10				17
	S-11				7
	S-12				8
	S-13				47
	S-14				17
	S-15				27
	Willow Cr.				69
	49er Slough				45
	GroundWater*				47
	Misc.			20	45
Total				90	453
LPR-007					
RM 4		1287	1141		
	Fruitland WWTP				0.2
	Payette WWTP				4.6
	49er Slough				45
	GroundWater*				33
	Misc.				18
Total				0	100
LPR-008					
RM 0.5			1242		

*Estimated Ground Water Return at 9.5 cfs/mile of River



Major Diversion Sites on the Lower Payette River
Diagram is not to scale, and should be used only as reference to river locations.



Major Irrigation Water Return Drains and Tributaries
Diagram is not to scale, and should be used only as reference to river locations.

Appendix D. Lower Payette River Monitoring Sites

Table 1. Historic BOR Monitoring, As Per the 1975 Study.

Station Description	Agency	Agency ID	STORET Number	Year(s) of Monitoring	Latitude	Longitude
Payette River near Emmett, Idaho	BOR	EMM001		1974	43°56'18"	116°26'45"
Combine Drain and Tunnel #7	BOR	EMM002		1974	43°52'45"	116°37'10"
Bissel Creek	BOR	EMM003		1974	43°53'45.0	116°37'00"
Graveyard Wasteway	BOR	EMM004		1974	43°57'00"	116°44'20"
Drain ½ mi. East of Graveyard Wasteway	BOR	EMM004A		1974	43°57'00"	116°43'40"
Payette River near Faulk Bridge	BOR	EMM005		1974	43°57'15"	116°43'00"
B Lateral Drain	BOR	EMM006		1974	43°57'10"	116°44'55"
Cemetery Drain	BOR	EMM007		1974	43°58'50"	116°48'50"
Drain Near New Plymouth	BOR	EMM008		1974	43°58'35"	116°50'10"
Cr. Near New Plymouth	BOR	EMM008A		1974	43°00'38"	116°5 ‘16"
Sand Hollow Cr. Near Fruitland	BOR	EMM009		1974	43°01'30"	116°53'55"
Payette River near Payette	BOR	EMM010		1974	43°02'35"	116°55'25"
Big Willow Creek @ Tom Pence Ranch	BOR	EMM017		1974	43°00'20"	116°46'15"

Table 2. Historic BOR and USGS Monitoring.

Station Description	Agency	Agency ID	Year(s) of Monitoring	Latitude	Longitude
Payette R. Below Black Canyon Dam	BOR	EMM025	numerous since 1925	43°55'50"	116°26'30"
Payette River 2 Letha Bridge	BOR	EMM015	Numerous since 1978	43°53'47"	116°37'33"
Payette River at Payette (Highway 95)	USGS	13251000	Numerous since 1935	44°02'33"	116°55'27"

Table 3. DEQ-WAG Monitoring Sites, 1996 (Bacteria), 1997-98 (Water Column Chemistry)

Station Description	Agency	Agency ID	Year(s) of Monitoring	Latitude	Longitude
Payette R. Below Black Canyon Dam	DEQ-WAG	LPR-001	1996, 97-98	43°55'50"	116°26'30"
Payette River 1 mile below Emmett WWTP	DEQ-WAG	LPR-002	1996, 97-98		
Payette River @ Letha Bridge	DEQ-WAG	LPR-003	1996, 97-98	43°53'47"	116°37'33"
__Payette River @ Faulk Bridge	DEQ-WAG	LPR-004	1996, 97-98	43°57'15"	116°43'00"
Payette River @ Blacks Bridge (Willow Creek Road)	DEQ-WAG	LPR-005	1996, 97-98		
Payette River at Payette (Highway 95	DEQ-WAG	LPR-007	1996, 97-98	44°02'33"	116°55'27"
Payette River ½ mile below Payette WWTP (South Side of River)	DEQ-WAG	LPR-008	1996, 97-98		

Table 4. DEQ-Payette SWCD Monitoring Sites, As Per the 1991, 92 & 93 Study.

Station Description	Agency	Agency ID	STORET Number	Year(s) of Monitoring	Latitude	Longitude
Drain @ Payette River, River Mile 16.5	DEQ-SWCD	S-1	2040487	1991	43° 57'29"	116 45'23"
Drain @ Payette River, River Mile 15.75 (South Side)	DEQ-SWCD	S-2	2040488	1991-92&93	43 57'42"	116 45'23"
Drain @ Payette River, River Mile 15.25 (South Side)	DEQ-SWCD	S-3	2040489	1991-92&93	43°57'52	116°45'42"
Drain 0.25 Mi NE of Kenedy Cemetery	DEQ-SWCD	S-4	2040490	1991	43 58'24"	116 47'10"
0.25 miles Downstream of Willow Creek Road Bridge (Blacks Bridge)	DEQ-SWCD	S-5	2040491	1991-92&93	44°59'39"	116°47'54"
0.75 Mi W of Adams Rd	DEQ-SWCD	S-6	2040492	1991	44 00'03"	116 48'55"
Drain 0.5 mi W of Adam Rd.	DEQ-SWCD	S-7	2040493	1991	44 00'10"	116 49'16"
Drain 0.25 mi W of Adam Rd	DEQ-SWCD	S-8	2040494	1991	44 00'14"	116 49'29"
Drain @ Payette River, RM 10	DEQ-SWCD	S-9	2040495	1991	44 00'36"	116 49'57"
0.2 Mile north of River Road	DEQ-SWCD	S-10	2040496	1991-92&93	44°00'24"	116°50'11"
Drain 0.2 mi N of River Rd.	DEQ-SWCD	S-11	2040497	1991	44 00'24"	116 50'14"
Payette River @ River Road	DEQ-SWCD	S-12	2040498	1991-92&93	44°01'46"	116°52'44"
0.5 Mile North of River Road	DEQ-SWCD	S-13	2040499	1991-92&93	44°01'21"	116°52'08"
Drain 0.25 N of River Rd	DEQ-SWCD	S-14	2040450	1991	44 01'17"	116 52'21"
Sand Hollow Drain at 16th St.	DEQ-SWCD	S-15	2040501	1991	44 01'36"	116 53'58"
Willow Creek @ Highway 52	DEQ-SWCD	C-7	2040486	1991-92&93	44 01'46	116 50'27"

Table 5. Historic EPA Monitoring Sites, As Per the 1975 Study.

Station Description	Agency	Agency ID	STORET Number	Year(s) of Monitoring	Latitude	Longitude
Payette River Below Black Canyon Dam	EPA`		153681	1975	43°55'50"	116°26'22"
Froze Dog Drain near Emmett	EPA		153682	1975	43°53'22"	116°27'09"
Payette River 100ft below Payette WWTP	EPA		153741	1975	44°04'51"	116°56'51"
Payette River @ Emmett (Hwy 52)	EPA		153683	1975	44°04'47"	116°29'57"
Emmett WWTP	EPA		153756	1975	43°52'45"	116°30'30"
Haw Creek 1 mi west of Emmett	EPA		153684	1975	43°52'47"	116°32'07"
Bissel Cr. 2.5 mi east of Letha	EPA		153687	1975	43°53'51"	116°36'55"
Tunnel #7 @ Vanderdassen Rd.	EPA		153685	1975	43°53'07"	116°37'17"
Payette River @ Letha Bridge	EPA		153686	1975	43°53'49"	116°37'36"
Drain @ West Hanna Rd.	EPA		153732	1975	43°54'55"	116°39'42"
Hanna Drain	EPA		153733	1975	43°55'37"	116°40'39"
Drain nr Bank Payette River, (RM 21)	EPA		153734	1975	43°55'47"	116°40'59"
Sand Hollow 3 mi East of Letha	EPA		153735	1975	43°55'58"	116°41'19"
Sevenmile Slough 1.3 mi NW of Letha	EPA		153688	1975	43°54'55"	116°40'10"
Farmer’s Coop Wasteway	EPA		153689	1975	43°56'02"	116°42'40"
Drain E. Bank Payette River (RM 18.9)	EPA		153736	1975	43°56'39"	116°42'20
Payette R. @ Faulk Bridge	EPA		153690	1975	43°57'16"	116°43'00"

Table 5. Historic EPA Monitoring Sites, As Per the 1975 Study.

Station Description	Agency	Agency ID	STORET Number	Year(s) of Monitoring	Latitude	Longitude
B Laterial 1 mi East of Halmonton Cr.	EPA		153691	1975	43°57'09"	116°44'56"
Drain near Halmonton Cr.	EPA		153692	1975	43°57'36	11644'56
Drain S. Bank Payette River (RM 15.3)	EPA		153706	1975	43°57'50"	116°45"42"
Payette River nr New Plymouth Hwy 52	EPA		153693	1975	43°58'09	116°46'30"
Drain S. Bank Payette River (RM 13.42)	EPA		133739	1975	43°58'50"	116°47'08"
Drain S. Bank Payette River (RM 13.4)	EPA		133740	1975	43°58'51"	116°47'10"
Payette R. @ Willow Cr. Road Bridge	EPA		153694	1975	43°59'26"	116°47'42"
Cemetery Drain near New Plymouth	EPA		153695	1975	43°58'44"	116°47'53"
New Plymouth WWTP	EPA		153755	1975	43°59'00"	116°47'47"
Drain South Side of Payette River (RM 9.9)	EPA		153696	1975	43°00'31"	116°47'00"
Drain South Side of Payette River (RM 9.8)	EPA		153748	1975	44°00'31"	116°49'51"
Drain South Side Payette River (RM 9.7)	EPA		153697	1975	44°00'39"	116°50'10"
Drain South Bank Payette River(RM 9.6)	EPA		153698	1975	44°00'42"	116°50'50"

Table 5. Historic EPA Monitoring Sites, As Per the 1975 Study.

Station Description	Agency	Agency ID	STORET Number	Year(s) of Monitoring	Latitude	Longitude
Drain South Bank Payette River (RM 9.3)	EPA		153699	1975	44°00'52"	116°50'43
Big Willow Creek 4 mi SE of Payette	EPA		153745	1975	44°01'34"	116°50'27"
Drain Left Bank Payette River (RM 7.5)	EPA		153747	1975	44°01'03"	116°52'15'
Drain 2 mi E Fruitland (RM 7.3)	EPA		153700	1975	44°01'06"	116°52'26"

Table 5. Historic EPA Monitoring Sites, As Per the 1975 Study. Cont.

Station Description	Agency	Agency ID	Year(s) of Monitoring	STORET #	Latitude	Longitude
Sand Hollow near Fruitland	EPA		153701	1975	44°01'31"	116°53'58"
Farmer's Ditch Ingrad near Payette	EPA		153702	1975	44°01'47"	116°55'19"
Fruitland WWTP	EPA		153753	1975	44°02'15"	116°55'32"
Payette River @ Payette (Hwy 95)	EPA		153703	1975	44°02'33"	116°55'28"
Payette River @ Payette (Kiawnis Park)	EPA		153704	1975	44°03'35"	116°56'04"
49 Slough @Kiawnis Pary	EPA		153705	1975	44°04'05"	116°56'07"
Payette WWTP	EPA		153752	1975	44°05'01"	116°57'05"

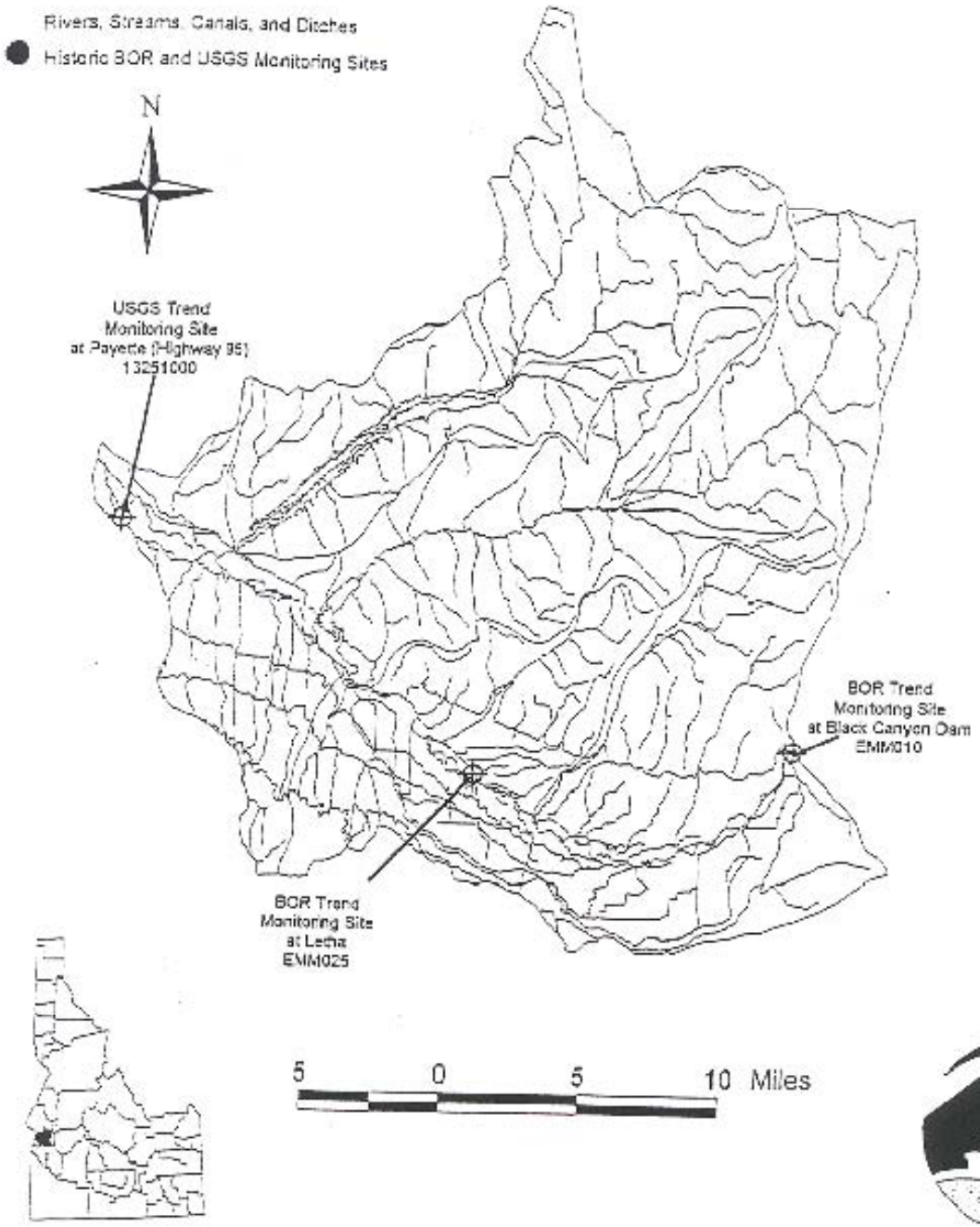
Table 6. Idaho Department of Agriculture, 1996-97 Study.

Station Description	Agency	Agency ID	Year(s) of Monitoring	STORET #	Latitude	Longitude
Emmett Irrigation District Canal	IDA		1996-97			
Pioneer Drain	IDA		1996-97			
Mesa Drain	IDA		1996-97			
Big 4 Drain	IDA		1996-97			
Beacon Drain	IDA		1996-97			
Bissel Creek	IDA		1996-97			
Tunnel #7	IDA		1996-97			
Silverleaf Drain	IDA		1996-97			

Table 6. Idaho Department of Agriculture, 1996-97 Study.

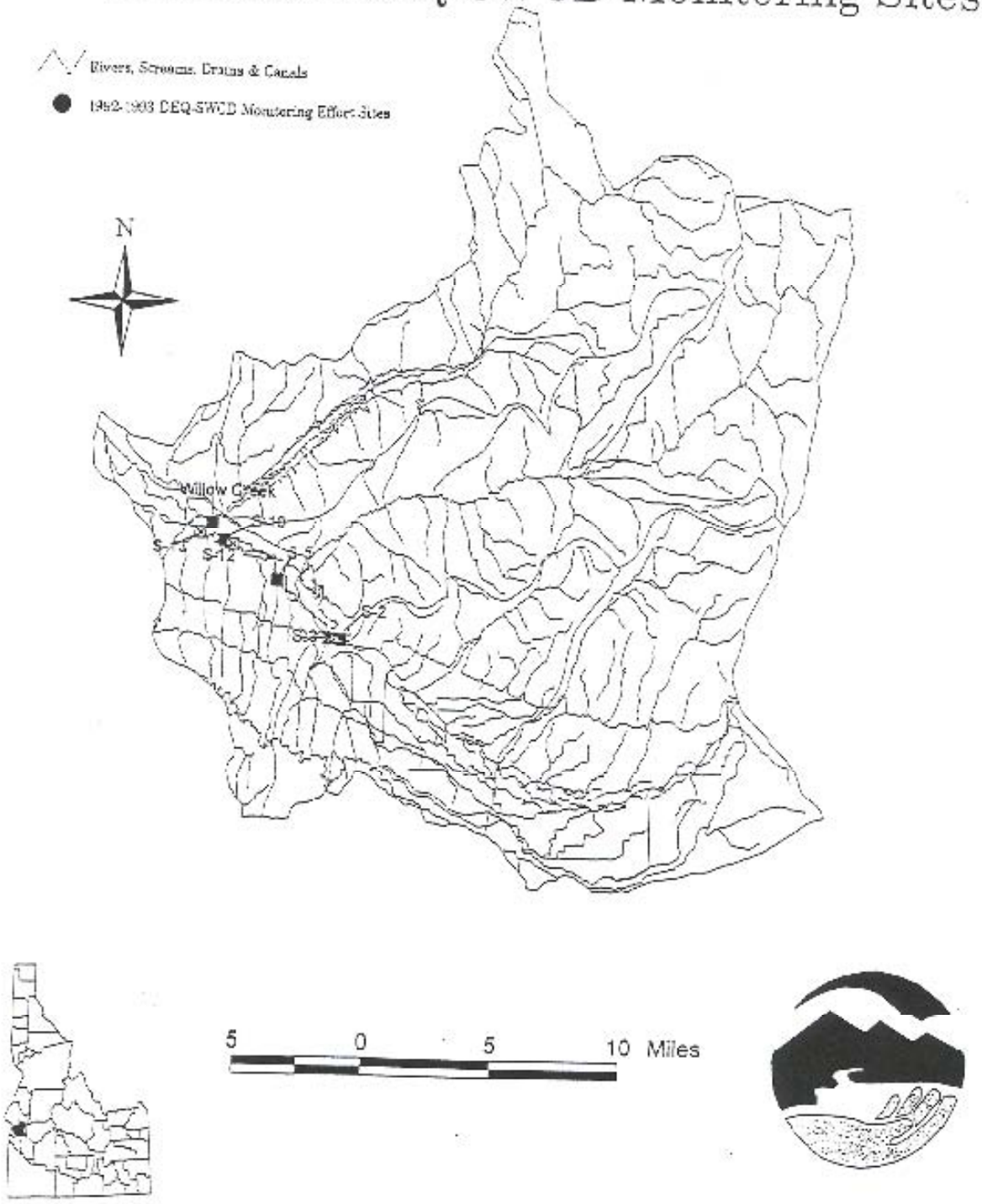
Station Description	Agency	Agency ID	Year(s) of Monitoring	STORET #	Latitude	Longitude
Sand Hollow	IDA		1996-97			
Seven Mile Slough	IDA		1996-97			
County Line Drain	IDA		1996-97			
Drain @ Payette River, RM 15.75	IDA	S-2	1997	2040488		
Drain @ Payette River, RM 15.25	IDA	S-3	1997	2040489	43°7'52"	116°45'42"
0.25 Miles Downstrem of Willow Creek Road (Blacks Bridge)	IDA	S-5	1997	2040491	43°59'39"	116°47'54"
0.2 Miles North of River Road	IDA	S-10	1997	2040496	44°00'24	116°50'11"
Payette River @ River Road	IDA	S-12	1997	2040498	44°01'46"	116°50'44"
0.5 Miles North of River Road	IDA	S-13	1997	2040499	44°01'21"	116°52'08"
Sand Hollow Creek	IDA	S-15	1997	2040501		
Willow Creek	IDA	C-7	1997			
49er Slough	IDA		1997			

LOWER PAYETTE RIVER TMDL PROJECT
Historic BOR-USGS Monitoring Sites



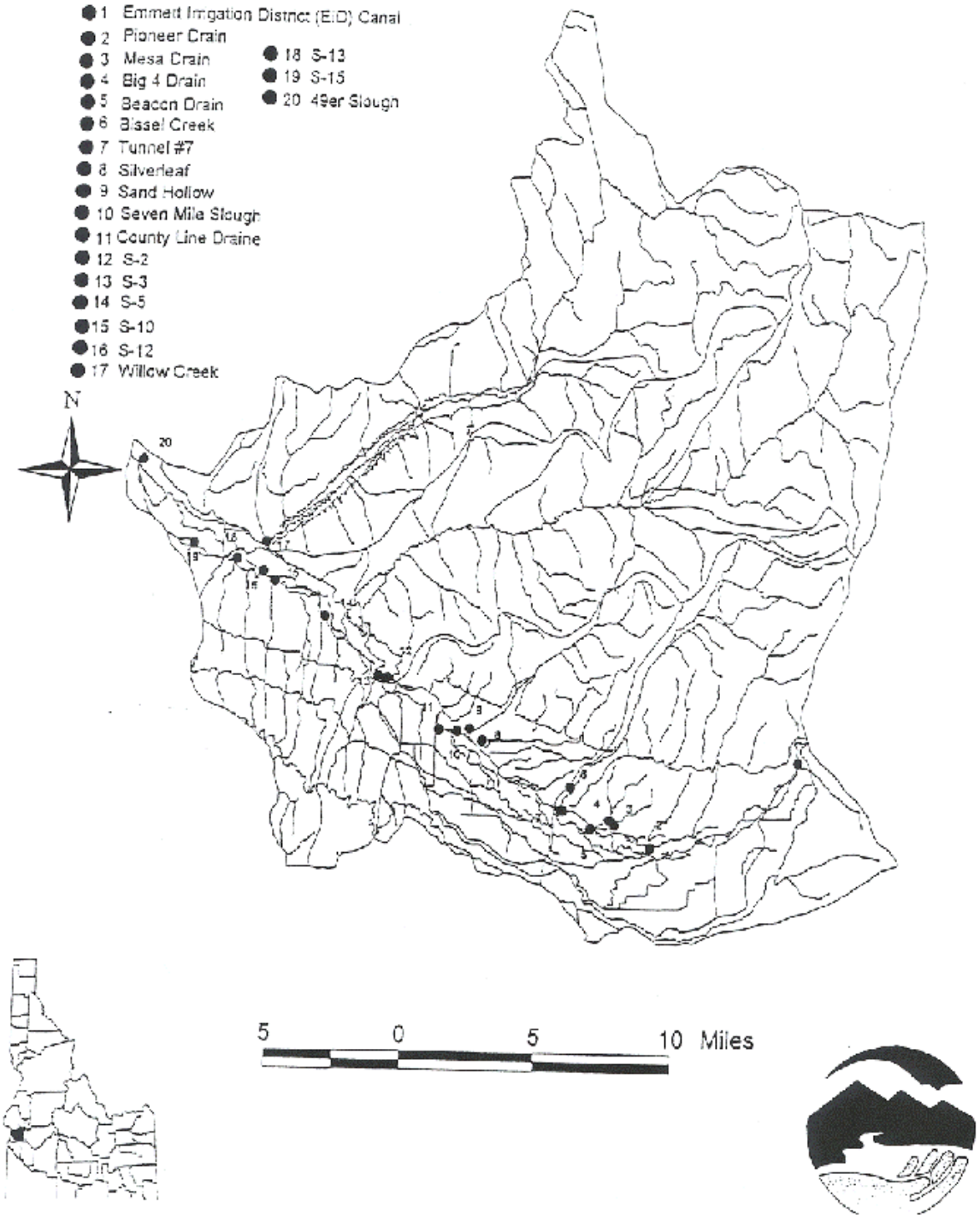
LOWER PAYETTE RIVER TMDL PROJECT

1992-1993 DEQ-SWCD Monitoring Sites

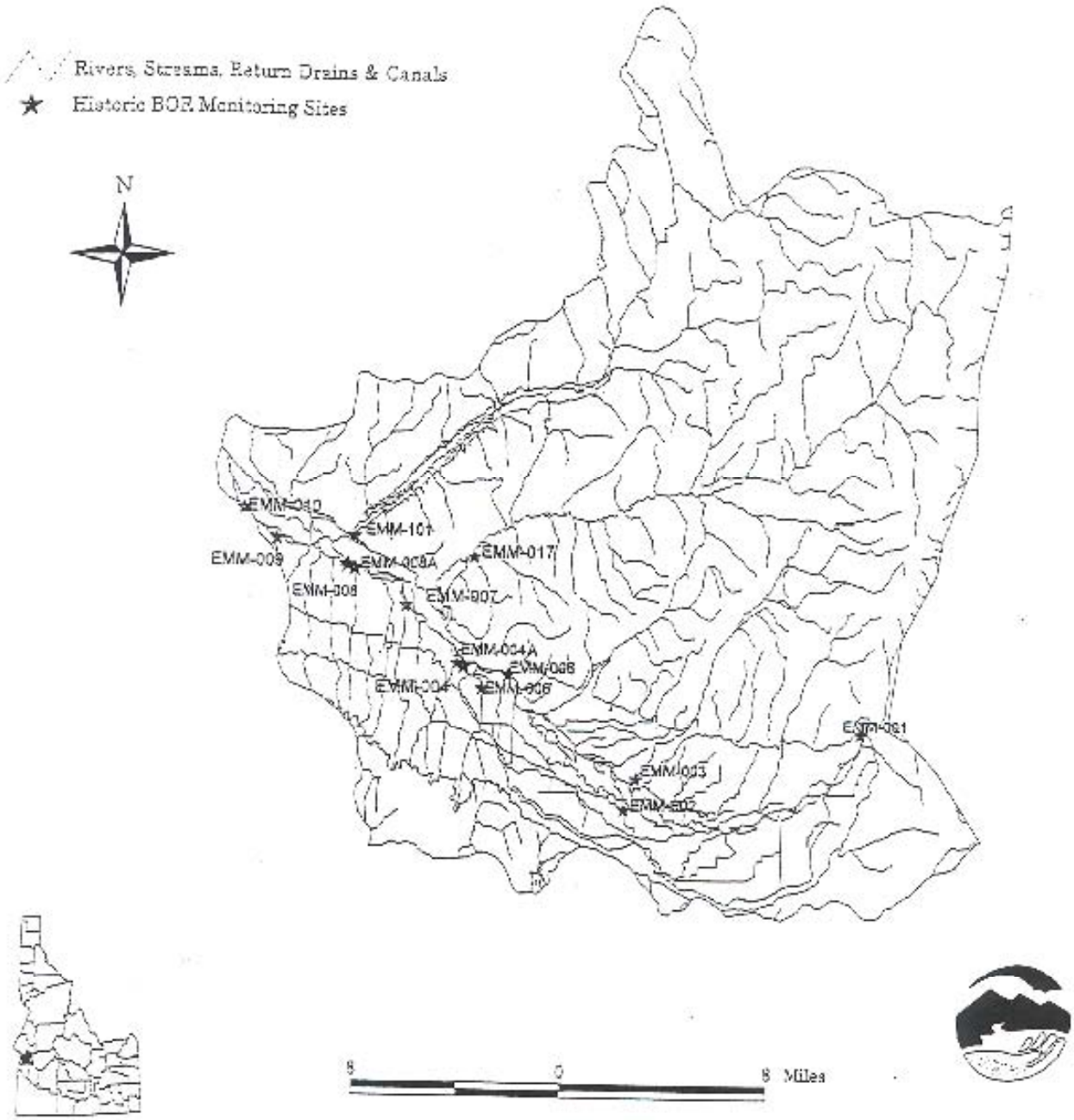


LOWER PAYETTE RIVER TMDL PROJECT

1996-1997 IDA Monitoring Sites



LOWER PAYETE RIVER TMDL PROJECT
Historic BOR Monitoring Sites

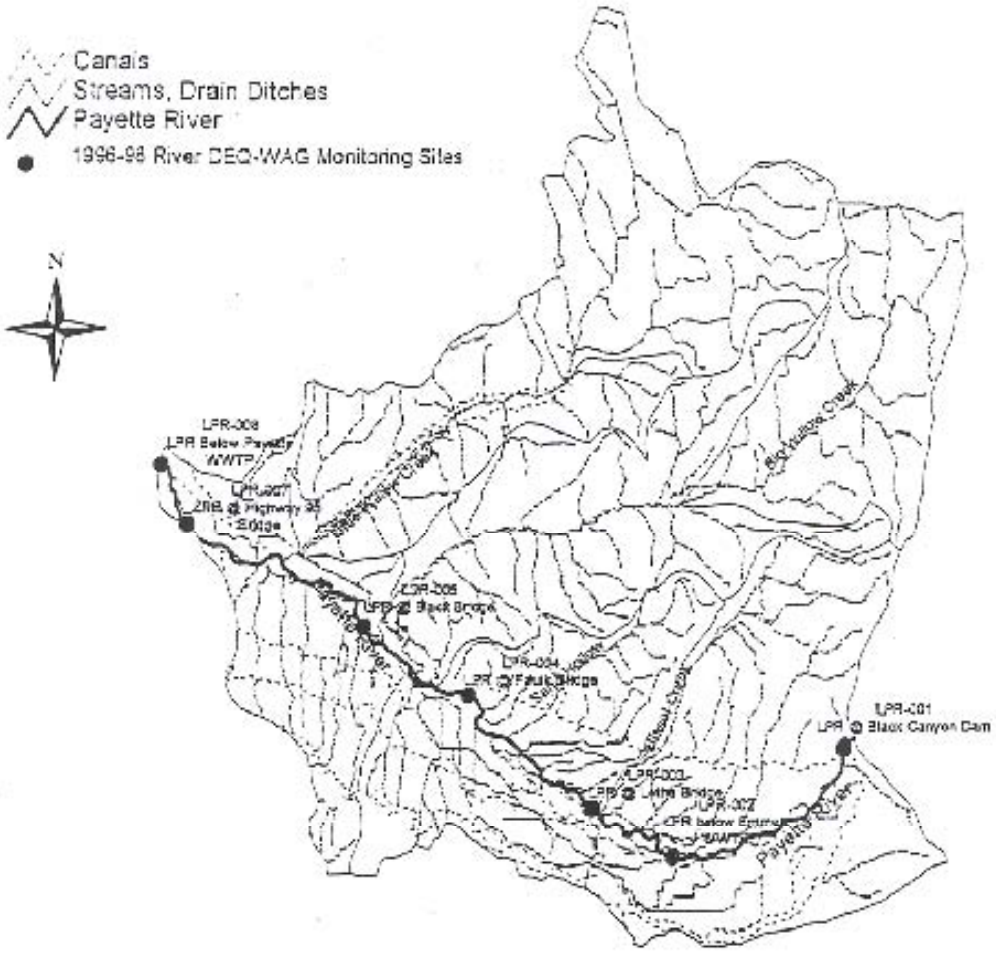


LOWER PAYETTE RIVER TMDL PROJECT NPDES Facilities

* NPDES Permitted Facilities
Cense Urban Areas

5 0 5 10 Miles

Lower Payette River SBA
1996-98 River Monitoring Sites



5 0 5 10 Miles

Appendix E. Point Source Description and Monitoring Requirements

1.0. Point Source Description and Reporting Requirements

Most municipal wastewater treatment plants (WWTP) are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit to discharge treated wastewater to the waters of the United States. The NPDES permit is issued by the United States Environmental Protection Agency (USEPA). In Idaho, the state does not have primacy over NPDES permits, but does receive a copy of the Discharge Monitoring Reports (DMRs) to assist in evaluating water quality impacts to the receiving waters and compliance with the permit. The State of Idaho, Division of Environmental Quality (DEQ), does review and approve all system facility plans and modifications. DEQ also inspects facilities once a year.

1.1 City of Emmett, Wastewater Treatment Plant

USEPA-NPDES # ID-002031-1; Issued: October, 1990

The City of Emmett operates a wastewater treatment facility downstream from the City of Emmett, at approximately River Mile (RM) 31.5. The facility was constructed in 1987, with modifications completed in 1994. Wastewater is treated through the use of aeration and facultative lagoons. Gas chlorination is used before discharging into the Payette River. The facility was designed to handle 2.8 million gallons per day (MGD). NPDES reporting requirements are listed in Table 1. The current NPDES permit issued in 1991 has expired and will be reissued at the completion of the TMDL.

Table 1. City of Emmett WWTP, NPDES Reporting/Monitoring Requirements.

Parameter/Frequency	Daily	Weekly	Monthly
BOD, Influent (lbs/day)		X	30 day average
BOD, Effluent (lbs/day)		X	30 day average
BOD, (% Reduction)		X	Monthly Average
pH (su)		X	Weekly
Fecal Coliform (CFU per/100ml)		X	Weekly Average
Total Suspended Solids (TSS)(mg/l or lbs/day)		X	Weekly Average
Total Chlorine Residual (mg/l)		X	Weekly Average
Flow thru plant (MGD)	X		Continuous

Over the last few years the City of Emmett has taken measures to reduce the amount of infiltration into its sewer lines, thus reducing the amount of wastewater requiring treatment. More work on infiltration reduction is planned.

The City has voluntarily increased their monitoring to include the lower Payette River. This effort includes upstream and downstream of the facility's discharge point and includes a variety of nutrients, bacteria and solids. In 1998 the City began monitoring for E.coli bacteria in anticipation of future changes in effluent monitoring requirements. E. coli monitoring is also being conducted in the river.

1.2. Letha

The City of Letha does not discharge to the waters of the United States, so a NPDES permit is not required. No monitoring is done.

1.3. City of New Plymouth Wastewater Treatment Plant
USEPA-NPDES # ID-002038-9; Issued November, 1990

The City of New Plymouth facility uses facultative lagoons for primary treatment. In 1990, the USEPA determine the discharge from this facility to be minor and did not require disinfection of the discharge water. The facility discharges to an irrigation water return drain located on the east side of the 4th cell. This irrigation water return drain ditch connects with another drain located on the west side of the lagoons. This drain forms drain S-6, which then discharges to the lower Payette River downstream of Blacks Bridge (LPR-005). Discharge location is at approximately RM 11. Discharges are seasonal with most discharges occurring in August, September and the early part of October. The remainder of the year, evaporation usually exceeds the influent. Monitoring is usually limited to periods of discharge only.

Table 2. shows the City of New Plymouth WWTP's DMR requirements. A DMR is also required even when the facility is not discharging, but no monitoring is conducted.

Table 2. City of New Plymouth WWTP, NPDES Reporting\Monitoring Requirements

Parameter/Frequency	Daily	Weekly	Comments
BOD, Influent (lbs/day)			once a month during discharge
BOD, Effluent (lbs/day)			same as above
BOD, (% Reduction)			same as above
pH (su)			same as above
Fecal Coliform (CFU per/100ml)			same as above
Total Solids (mg/l)			same as above
Flow thru plant (MGD)	X		Limited Data Available

Actual discharge data is limited, but the facility is designed to release approximately 0.03 MGD during periods of discharge. Over the past few years, the city has increased their monitoring effort to characterize water quality in the effluent and receiving waters. Included in this monitoring effort are other parameters besides those required in the NPDES permit. These parameters included nutrients, bacteria and physical constituents (DO, temp, pH).

1.4. City of Fruitland Wastewater Treatment Plant
USEPA-NPDES # ID-002119-9; Issued: September, 1993

The City of Fruitland has two wastewater treatment facilities. One facility (USEPA NPDES# ID-002033-8) discharges into the Snake River. The other is the Payette River Facility (USEPA NPDES# ID-002119-9). The Payette River facility discharges approximately 0.25-0.4 MGD to the lower Payette River. The discharge point is approximately one-half mile below the US Highway 95 Bridge at RM 3.9. Treatment consist of primary aeration and facultative lagoons, and rock filter. Disinfection, by chlorine gas, occurs before discharging into the Payette River.

The City of Fruitland-Payette River Facility receives both industrial wastewater from a food processing facility and from residential housing. The food processing facility can account for 25 to 50% of the total

inflow into the system.

The Fruitland-Payette River WWTP is unique for the Payette since the NPDES permit requires both WWTP effluent monitoring, and in river monitoring. Table 3 shows the NPDES reporting/monitoring requirements. Table 4 shows the in river monitoring to be conducted. Beside conducting the required lower Payette River NPDES monitoring, the City conducts river monitoring for other chemical, physical and biological parameters.

Table 3. City of Fruitland-Payette River WWTP, NPDES Reporting/Monitoring Requirements, influent-effluent.

Parameter/Frequency	Daily	Weekly	Others/Comments
BOD, Influent (lbs/day)		X	1 sample every 7 days
BOD, Effluent (lbs/day)		X	1 sample every 7 days
BOD, (% Reduction)			Monthly
pH (su)	X		5 samples a week
Fecal Coliform (CFU/100ml)		X	7 day average
Total Suspended Solids (TSS) (mg/l or lbs/day)		X	7 day average
Total Residual Chlorine (mg/l)	X		5 samples a week
Dissolved Oxygen (Effluent)	X		5 samples a week
Total Kjeldahl Nitrogen (mg/l)			Quarterly
Nitrate as N (mg/l)			Quarterly
Nitrite as N (mg/l)			Quarterly
Total Phosphorus (mg/l)			Quarterly
Diss. Ortho-Phosphorus (mg/l)			Quarterly
Ammonia as N (mg/l)		X	2 samples a month
Flow thru plant (MGD)	X		Continuous

Table 4. City of Fruitland-Payette River WWTP, NPDES Reporting/Monitoring Requirements, Payette River. January, May, August and September.

Parameter/Frequency	Daily	Weekly	Others/Comments
Total Ammonia as N (mg/l)			Quarterly
Temperature			Quarterly
pH (SU)			Quarterly

1.5 City of Payette Wastewater Treatment Plant
USEPA-NPDES # ID-002067-2; Issued: April, 1991
The City of Payette WWTP consists of an oxygenation ditch, secondary clarifiers and disinfection. Sludge drying beds are also located on site and receive sludge from the clarifiers. Sludge is then either transported to the local landfill or land applied. After disinfection (chlorination) the wastewater is discharged to the lower Payette River at RM 0.5. DMR records show the facility discharges approximately 1.2-2.2 MGD of treated effluent.

NPDES influent-effluent monitoring requirements are listed in Table 5. When the NPDES permit was issued in 1991, the USEPA required that the City of Payette WWTP conduct one year of in river monitoring. These in river monitoring requirements are listed in Table 6.

Table 5. City of Payette WWTP, NPDES Reporting/Monitoring Requirements, influent-effluent.

Parameter/Frequency	Daily	Weekly	Others/Comments
BOD, Influent (mg/l)		X	2 sample every 7 days
BOD, Effluent (mg/l)		X	2 sample every 7 days
BOD, (% Reduction)		X	2 sample every 7 days
pH (su)	X	X	5 samples a week
Fecal Coliform (CFU per/100ml)		X	2 samples a week
Total Suspended Solids (TSS) (mg/l or lbs/day)		X	2 samples a week
Total Solids Effluent (mg/l)		X	2 samples a week
Total Residual Chlorine (mg/l)	X		7 samples a week
Total Kjeldahl Nitrogen (mg/l)			Monthly
Nitrate as N (mg/l)			Monthly
Nitrite as N (mg/l)			Monthly
Total Phosphorus (mg/l)			Monthly
Ammonia as N (mg/l)		X	2 samples a month
Flow thru plant (MGD)	X		Continuous

Table 6. City of Payette WWTP, NPDES Reporting/Monitoring Requirements, Payette River. For one year beginning in 1991.

Parameter/Frequency	Daily	Weekly	Others/Comments
Total Ammonia as N (mg/l)			every 2 weeks, 1991
Total Phosphorus (mg/l)			monthly, ongoing
Nitrate as N (mg/l)			monthly, 1991
Nitrite as N (mg/l)			Quarterly, 1991
Total Kjeldahl Nitrogen (mg/l)			Quarterly, 1991
Temperature			every 2 weeks, 1991
pH (SU)			every 2 week, 1991

As with the other NPDES permits on the lower Payette River, the permit for the City of Payette has expired. A new permit will be issued upon development of the TMDL for the lower Payette River.

The city has an on-going effort to reduce infiltration into the sewer system. This consist of repairing manholes and replacing outdated sewer lines. The City is also conducting Total Phosphorus monitoring above and below the treatment plant outfall.

Appendix F. Bacteria Load Reductions Tables

Explanation of Spreadsheets

Table 1, explains the break down of the cell addresses used to develop the loading estimates and load reductions for the lower Payette River for fecal coliform bacteria. The spreadsheets are simply mass balance equations with die off rates determined for each segment based on distance traveled. Loading estimates are then calculated using die-off rates, distance traveled, input from; drains, creeks, and in river values; and subtraction from withdrawals. Table 1 shows cell addresses as related to the spreadsheets.

Tables 2 through 6 show expected load from station to station based on the mass-balance formulas explained in Table 1. The calculated load (CFU/sec) and levels (CFU/100ml) for both actual results and those projected are displayed. Flow data was obtained from either the BOR gaging sites, USGS sites, or from Appendix D. The SBA used estimated values based on a mass balance for withdrawals (canals and pumps) and input from drains and creeks.

Tables 7 through 12 show individual reductions needed by drains or tributaries.

Table 1. Explanation of Bacteria Loading Spreadsheet

Cell Addresses	Explanation or Formula
A1,2,3	Header for Station
A4,5,6-M4,5,6	Headers for Columns
A8	Preceding River Station (up river station)
A10	Header for Return Drains
A11-A20	Return Drains
A22, F22, I22, L22	Sub-total Return Drains
A24	Header For Withdrawals (Canals, Pumps)
A25-A33	Withdrawals
A35, F35, I35, L35	Sub-Total Withdrawals
A37, F37, I37, L37	Totals (F22+F35, I22+I35, L22+L35)
A38,39,40-M38,39,40	Headers for Downstream River Station
B8-B41	Flows: River, Drains or Withdrawals
C8-C41	Miles to next River Station
D8-D41	Travel Time (miles*5280ft/(3ft/s)/(60*60))
E8-E37	Existing Count (CFU) or Calculated from previous Station (CFU/100ml)
F8-F37	Calculated Load (CFU/sec=(E8*28.32*B8*10))
G8-G20	Coefficient for Determining Die-off Rate (Treta Tech, 1975)
H8-H20	Bacteria Level After Die-Off
I8-20, I25-I33	Bacteria Load After Die-Off
J8-J36	% Contribution at Next Stations (I8/I36)
K8-K20	Projected Percent (%) Load Reduction for Drains (0 for accuracy of spreadsheet with no reduction goals)
L8-L20	Projected Load Reductions in Drains (CFU/sec)
M8-M20	Projected Level Individual Drains (CFU/100ml) number will change as % reduction changes depending on input to cells K8-K20

E41	Fecal Coliform Bacteria Geometric Mean for August 1996 @ next Station
F41	Calculated Load (CFU/sec=(E41*28.32*B41*10))
G41	Calculated Level (CFU/100ml=(I36/B41/28.32/10))
H42	% Difference from Projected Levels and Actual Monitored Levels
K42	River Target Level (number changes as % reduction (J8-J20) change)
H44	% Reduction Levels at LPR-008

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Table 2.												
2	Bacteria Load Calculations												
3	Station LPR-003 to LPR-005						WITH REDUCTIONS						
4	Letha Bridge to Blacks Bridge												
5	Station	Flow	Miles to	time traveled	Existing	Load	Coefficient	Remaining	Load After	%	Reduction	Load	Target
6		cfs	next Station	next station	Count			after die-off	Die Off	Contribution	Goals	Reduction	Level
7				hours	CFU/100ml	CFU/sec		CFU/100ml	CFU/sec	after die-off	%	CFU/sec	CFU/100ml
8													
9	LPR-003	949	12.2	6.0	50	1.34E+07	0.02	44	1.19E+07	33%		1.19E+07	50
10													
11	Returns												
12	Silverleaf	20	10	4.9	1375	7.79E+06	0.02	1247	7.06E+06	19%	80%	1.41E+06	249
13	7 Mile Slough	43	10	4.9	310	3.78E+06	0.02	281	3.42E+06	9%	80%	6.85E+05	56
14	Countyline	26	8	3.9	663	4.88E+06	0.02	613	4.51E+06	12%	80%	9.03E+05	123
15	S-1	50	6	2.9	530	7.50E+06	0.02	500	7.08E+06	19%	80%	1.42E+06	100
16	S-2	27	5	2.4	371	2.84E+06	0.02	353	2.70E+06	7%	75%	6.75E+05	88
17	S-3	13	5	2.4	915	3.37E+06	0.02	871	3.21E+06	9%	80%	6.42E+05	174
18	S-4	32	2	1.0	160	1.45E+06	0.02	157	1.42E+06	4%	75%	3.55E+05	39
19	Sand Hollow	4	10	4.9	378	4.28E+05	0.02	343	3.88E+05	1%	75%	9.71E+04	86
20						0.00E+00	0.02		0.00E+00			0.00E+00	
21						0.00E+00	0.02		0.00E+00			0.00E+00	
22						0.00E+00	0.02		0.00E+00			0.00E+00	
23						0.00E+00	0.02		0.00E+00			0.00E+00	
24													
25													
26	Sub-Total					4.55E+07			4.17E+07	114%		1.81E+07	
27													
28	Withdraws												
29	Accord Ditches	21			50	-2.97E+05			-2.97E+05	-1%		-2.97E+05	
30	ower Payette Ditc	256			50	-3.62E+06			-3.62E+06	-10%		-3.62E+06	
31	Eagle Ditch	30			50	-4.25E+05			-4.25E+05	-1%		-4.25E+05	
32	J/C Ditch	42			50	-5.95E+05			-5.95E+05	-2%		-5.95E+05	
33	Fesbit/MaCFar	12			50	-1.70E+05			-1.70E+05	0%		-1.70E+05	
34						0.00E+00			0.00E+00			0.00E+00	
35						0.00E+00			0.00E+00			0.00E+00	
36						0.00E+00			0.00E+00			0.00E+00	
37						0.00E+00			0.00E+00			0.00E+00	
38													
39	Sub-Total					-5.11E+06			-5.11E+06	-14%		-5.11E+06	
40													
41	Total					4.52E+07			3.66E+07	100%		1.30E+07	
42													
43	Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
44		cfs			Count	Load	After Die Off	from Projected			Level		
45					CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
46	At Station	927			161	4.23E+07	139	-13%			50		
47	LPR-005												
48													
49													

Table 3

Bacteria Load Calculations

Station LPR-002 to LPR-003 NO REDUCTIONS

Below Emmett W W TP to Letha Bridge

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-002	1180	4.5	2.2	33	1.10E+07	0.02	32	1.06E+07	56%		1.06E+07	33
Returns												
Tunnel #7	40	2.5	1.2	318	3.60E+06	0.02	310	3.52E+06	19%		3.52E+06	310
Bissel Cr.	17	1	0.5	384	1.85E+06	0.02	380	1.83E+06	10%		1.83E+06	380
Beacon	35	2.5	1.2	657	6.51E+06	0.02	641	6.35E+06	34%		6.35E+06	641
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
Sub-Total					2.30E+07			2.23E+07	118%		2.23E+07	
Withdraws												
7 Mile Slough	367			33	-3.43E+06			-3.43E+06	-18%		-3.43E+06	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					-3.43E+06			-3.43E+06	-18%		-3.43E+06	
Total					1.96E+07			1.88E+07	100%		1.88E+07	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-003	949			60	1.61E+07	70	17%			70		

Table 4.
Bacteria Load Calculations
Station LPR-003 to LPR-005
Letha Bridge to Blacks Bridge

NO REDUCTIONS

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-003	949	12.2	6.0	60	1.61E+07	0.02	53	1.43E+07	38%		1.43E+07	60
Returns												
Silverleaf	20	10	4.9	1375	7.79E+06	0.02	1247	7.06E+06	19%		7.06E+06	1247
7 Mile Slough	43	10	4.9	310	3.78E+06	0.02	281	3.42E+06	9%		3.42E+06	281
Countyline	26	8	3.9	663	4.88E+06	0.02	613	4.51E+06	12%		4.51E+06	613
S-1	50	6	2.9	530	7.50E+06	0.02	500	7.08E+06	19%		7.08E+06	500
S-2	27	5	2.4	371	2.84E+06	0.02	353	2.70E+06	7%		2.70E+06	353
S-3	13	5	2.4	915	3.37E+06	0.02	871	3.21E+06	8%		3.21E+06	871
S-4	32	2	1.0	160	1.45E+06	0.02	157	1.42E+06	4%		1.42E+06	157
Sand Hollow	4	10	4.9	378	4.28E+05	0.02	343	3.88E+05	1%		3.88E+05	343
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
Sub-Total					4.82E+07			4.41E+07	116%		4.41E+07	
Withdraws												
Accord Ditches	21			60	-3.57E+05			-3.57E+05	-1%		-3.57E+05	
ower Payette Ditc	256			60	-4.35E+06			-4.35E+06	-11%		-4.35E+06	
Eagle Ditch	30			60	-5.10E+05			-5.10E+05	-1%		-5.10E+05	
J/C Ditch	42			60	-7.14E+05			-7.14E+05	-2%		-7.14E+05	
Fesbit/MaCFar	12			50	-1.70E+05			-1.70E+05	0%		-1.70E+05	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					-6.10E+06			-6.10E+06	-16%		-6.10E+06	
Total					4.78E+07			3.80E+07	100%		3.80E+07	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-005	927			161	4.23E+07	145	-10%			145		

Table 5.
Bacteria Load Calculations
Station LPR-005 to LPR-007 NO REDUCTIONS
Blacks Bridge to Highway 95 Bridge

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-005	927	8.7	4.3	161	4.23E+07	0.02	148	3.88E+07	35%		3.88E+07	161
Returns												
S-5	64	8.5	4.2	454	8.23E+06	0.02	418	7.57E+06	7%	0%	7.57E+06	418
S-6	22	8	3.9	220	1.37E+06	0.02	203	1.27E+06	1%	0%	1.27E+06	203
S-7	7	7	3.4	40	7.93E+04	0.02	37	7.41E+04	0%	0%	7.41E+04	37
S-8	21	7	3.4	350	2.08E+06	0.02	327	1.94E+06	2%	0%	1.94E+06	327
S-9	7	6.5	3.2	200	3.96E+05	0.02	188	3.72E+05	0%	0%	3.72E+05	188
S-10	25	6	2.9	530	3.75E+06	0.02	500	3.54E+06	3%	0%	3.54E+06	500
S-11	7	5.5	2.7	2300	4.56E+06	0.02	2180	4.32E+06	4%	0%	4.32E+06	2180
S-12	8	5	2.4	947	2.15E+06	0.02	902	2.04E+06	2%	0%	2.04E+06	902
S-13	45	5	2.4	1231	1.57E+07	0.02	1172	1.49E+07	13%	0%	1.49E+07	1172
S-14	17	5	2.4	1200	5.78E+06	0.02	1143	5.50E+06	5%	0%	5.50E+06	1143
S-15	30	3	1.5	1317	1.12E+07	0.02	1279	1.09E+07	10%	0%	1.09E+07	1279
Willow Cr.	160	5	2.4	539	2.44E+07	0.02	513	2.33E+07	21%	0%	2.33E+07	513
Sub-Total					1.22E+08			1.15E+08	103%		1.15E+08	
Withdraws												
Simplots Pumps	50			161	-2.28E+06			-2.28E+06	-2%		-2.28E+06	
Washoe Ditch	20			161	-9.12E+05			-9.12E+05	-1%		-9.12E+05	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					-3.19E+06			-3.19E+06	-3%		-3.19E+06	
Total					1.20E+08			1.11E+08	100%		1.11E+08	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-007	1288			294	1.07E+08	305	4%			305		

Table 6.
Bacteria Load Calculations
Station LPR-007 to LPR-008 NO REDUCTIONS
Highway 95 Bridge to Below Payette WWTP

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-007	1288	4.5	2.2	294	1.07E+08	0.02	281	1.03E+08	86%		1.03E+08	294
Returns												
49er Slough	45	2	1.0	1288	1.64E+07	0.02	1263	1.61E+07	14%	0%	1.61E+07	1263
Fruitland WWTP	0.2	3	1.5	21	1.19E+03	0.02	20	1.16E+03	0%	0%	1.16E+03	20
Payette WWTP	2.6	0.5	0.2	17	1.25E+04	0.02	17	1.25E+04	0%	0%	1.25E+04	17
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
Sub-Total					1.24E+08			1.19E+08	100%		1.19E+08	
Withdraws												
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					0.00E+00			0.00E+00	0%		0.00E+00	
Total					1.24E+08			1.19E+08	100%		1.19E+08	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-008	1380			318	1.24E+08	304	-4%			304		
Overal Reduction, Payette River@ Snake River							-4%					

Table 7
Bacteria Load Calculations
Station LPR-002 to LPR-003
Below Emmett WWTP to Letna Bridge

WITH REDUCTIONS

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-002	1180	4.5	2.2	33	1.10E+07	0.02	32	1.06E+07	56%		1.06E+07	33
Returns												
Tunnel #7	40	2.5	1.2	318	3.60E+06	0.02	310	3.52E+06	19%	45%	1.93E+06	171
Bissel Cr.	17	1	0.5	384	1.85E+06	0.02	380	1.83E+06	10%	45%	1.01E+06	209
Beacon	35	2.5	1.2	657	6.51E+06	0.02	641	6.35E+06	34%	45%	3.50E+06	353
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
Sub-Total					2.30E+07			2.23E+07	118%		1.70E+07	
Withdraws												
7 Mile Slough	367			33	-3.43E+06			-3.43E+06	-18%		-3.43E+06	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					-3.43E+06			-3.43E+06	-18%		-3.43E+06	
Total					1.96E+07			1.88E+07	100%		1.36E+07	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-003	949			60	1.61E+07	70	17%			50		

Table 8.
Bacteria Load Calculations
Station LPR-003 to LPR-005
Letha Bridge to Blacks Bridge

WITH REDUCTIONS

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-003	949	12.2	6.0	50	1.34E+07	0.02	44	1.19E+07	33%		1.19E+07	50
Returns												
Silverleaf	20	10	4.9	1375	7.79E+06	0.02	1247	7.06E+06	19%	80%	1.41E+06	249
7 Mile Slough	43	10	4.9	310	3.78E+06	0.02	281	3.42E+06	9%	80%	6.85E+05	56
Countyline	26	8	3.9	663	4.88E+06	0.02	613	4.51E+06	12%	80%	9.03E+05	123
S-1	50	6	2.9	530	7.50E+06	0.02	500	7.08E+06	19%	80%	1.42E+06	100
S-2	27	5	2.4	371	2.84E+06	0.02	353	2.70E+06	7%	75%	6.75E+05	88
S-3	13	5	2.4	915	3.37E+06	0.02	871	3.21E+06	9%	80%	6.42E+05	174
S-4	32	2	1.0	160	1.45E+06	0.02	157	1.42E+06	4%	75%	3.55E+05	39
Sand Hollow	4	10	4.9	378	4.28E+05	0.02	343	3.88E+05	1%	75%	9.71E+04	86
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
					0.00E+00	0.02		0.00E+00			0.00E+00	
Sub-Total					4.55E+07			4.17E+07	114%		1.81E+07	
Withdraws												
Accord Ditches	21			50	-2.97E+05			-2.97E+05	-1%		-2.97E+05	
ower Payette Ditc	256			50	-3.62E+06			-3.62E+06	-10%		-3.62E+06	
Eagle Ditch	30			50	-4.25E+05			-4.25E+05	-1%		-4.25E+05	
J/C Ditch	42			50	-5.95E+05			-5.95E+05	-2%		-5.95E+05	
Fesbit/MaCFar	12			50	-1.70E+05			-1.70E+05	0%		-1.70E+05	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					-5.11E+06			-5.11E+06	-14%		-5.11E+06	
Total					4.52E+07			3.66E+07	100%		1.30E+07	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-005	927			161	4.23E+07	139	-13%			50		

Table 9.
Bacteria Load Calculations
Station LPR-005 to LPR-007 WITH REDUCTIONS
Blacks Bridge to Highway 95 Bridge

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-005	927	8.7	4.3	50	1.31E+07	0.02	46	1.21E+07	14%		1.21E+07	50
Returns												
S-5	64	8.5	4.2	454	8.23E+06	0.02	418	7.57E+06	9%	90%	7.57E+05	42
S-6	22	8	3.9	220	1.37E+06	0.02	203	1.27E+06	1%	90%	1.27E+05	20
S-7	7	7	3.4	40	7.93E+04	0.02	37	7.41E+04	0%	90%	7.41E+03	4
S-8	21	7	3.4	350	2.08E+06	0.02	327	1.94E+06	2%	90%	1.94E+05	33
S-9	7	6.5	3.2	200	3.96E+05	0.02	188	3.72E+05	0%	90%	3.72E+04	19
S-10	25	6	2.9	530	3.75E+06	0.02	500	3.54E+06	4%	90%	3.54E+05	50
S-11	7	5.5	2.7	2300	4.56E+06	0.02	2180	4.32E+06	5%	90%	4.32E+05	218
S-12	8	5	2.4	947	2.15E+06	0.02	902	2.04E+06	2%	90%	2.04E+05	90
S-13	45	5	2.4	1231	1.57E+07	0.02	1172	1.49E+07	17%	90%	1.49E+06	117
S-14	17	5	2.4	1200	5.78E+06	0.02	1143	5.50E+06	6%	90%	5.50E+05	114
S-15	30	3	1.5	1317	1.12E+07	0.02	1279	1.09E+07	13%	90%	1.09E+06	128
Willow Cr.	160	5	2.4	539	2.44E+07	0.02	513	2.33E+07	27%	92%	1.86E+06	41
Sub-Total					9.28E+07			8.78E+07	101%		1.92E+07	
Withdraws												
Simplots Pumps	50			50	-7.08E+05			-7.08E+05	-1%		-7.08E+05	
Washoe Ditch	20			50	-2.83E+05			-2.83E+05	0%		-2.83E+05	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					-9.91E+05			-9.91E+05	-1%		-9.91E+05	
Total					9.21E+07			8.68E+07	100%		1.82E+07	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-007	1288			294	1.07E+08	238	-19%			50		

Table 10.
Bacteria Load Calculations
Station LPR-007 to LPR-008 WITH REDUCTIONS
Highway 95 Bridge to Below Payette WWTP

Station	Flow cfs	Miles to next Station	time traveled next station hours	Existing Count CFU/100ml	Load CFU/sec	Coefficient	Remaining after die-off CFU/100ml	Load After Die Off CFU/sec	% Contribution after die-off	Reduction Goals %	Load Reduction CFU/sec	Target Level CFU/100ml
LPR-007	1288	4.5	2.2	50	1.82E+07	0.02	48	1.75E+07	52%		1.75E+07	50
Returns												
49er Slough	45	2	1.0	1288	1.64E+07	0.02	1263	1.61E+07	48%	88%	1.93E+06	152
Fruitland WWTP	0.2	3	1.5	21	1.19E+03	0.02	20	1.16E+03	0%	0%	1.16E+03	20
Payette WWTP	2.6	0.5	0.2	17	1.25E+04	0.02	17	1.25E+04	0%	0%	1.25E+04	17
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
					0.00E+00	0.02	0	0.00E+00	0%		0.00E+00	
Sub-Total					3.47E+07			3.36E+07	100%		1.94E+07	
Withdraws												
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00	0%		0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
					0.00E+00			0.00E+00			0.00E+00	
Sub-Total					0.00E+00			0.00E+00	0%		0.00E+00	
Total					3.47E+07			3.36E+07	100%		1.94E+07	
Station	Flow			Existing	Calculated	Calculated	% Difference			Target		
	cfs			Count	Load	After Die Off	from Projected			Level		
				CFU/100ml	CFU/sec	CFU/100ml	to Actual			CFU/100ml		
At Station LPR-008	1380			318	1.24E+08	86	-73%			50		
Overal Reduction, Payette River@ Snake River							-84%					

Table 11.
Bacteria Load Reductions Calculations With Reductions @ 115 /100ml
LPR-005 to LPR-007

Station	Flow	Miles to Next Station	Time next	Existing Count	Load	Die Off Coefficant	Remaining After Die Off	Load After Die Off	% After Die Off	Allocation	Load Reduction	Target
	cfs	Miles to	hours	CFU/100ml	CFU/sec		CFU/100ml	CFU/sec	%	CFU/sec	%	CFU/100ml
LPR-005	778	9	4.4	29	6..39E+06	0.02	27	5.85E+06	64.2%	5.85E+06	0.0%	27
INFLOWS												
S-5	64	8.5	4.2	95	1.72E+06	0.02	87	1.58E+06	9.68%	1.58E+06	0.0%	87
S-6	22	8	3.9	95	5.92E+08	0.02	88	5.47E+05	3.35%	5.47E+05	0.0%	88
S-7	7	7	3.4	95	1.88E+05	0.02	89	1.76E+05	1.07%	1.76E+05	0.0%	89
S-8	21	7	3.4	95	5.65E+05	0.02	89	5.28E+05	0.23%	5.28E+05	0.0%	89
S-9	7	6.5	3.2	95	1.88E+05	0.02	89	1.77E+05	0.07%	1.77E+05	0.0%	89
S-10	25	6	2.9	95	6.73E+05	0.02	90	6.34E+05	0.23%	6.34E+05	0.0%	90
S-11	7	5.5	2.7	95	1.88E+05	0.02	90	1.78E+05	0.06%	1.78E+05	0.0%	90
S-12	8	5	2.4	95	2.15E+05	0.02	90	2.05E+05	0.06%	2.05E+05	0.0%	90
S-13	45	5	2.4	95	1.21E+06	0.02	90	1.55E+06	0.35%	1.15E+06	0.0%	90
S-14	17	5	2.4	95	4.57E+05	0.02	90	4.36E+05	0.13%	4.36E+05	0.0%	90
S-15	30	3	1.5	95	8.07E+05	0.02	92	7.84E+05	0.14%	7.84E+05	0.0%	92
Willow Cr.	160	5	2.4	95	4.30E+06	0.02	90	4.10E+06	1.26%	4.10E+06	0.0%	90
New Plymouth	0.17	8	3.9	200	9.63E+03	0.02	185	8.90E+03	0.00%	8.90E+03	0.0%	185
									0.00%			
Sub-Total					1.11E+07			1.05E+07	3.73%	1.05E+07		
									0.00%			
Sub Total												
Inflows			0.0		1.75E+07	0.02		1.64E+07	84.6%	1.64E+07		74
WITHDRAWLS												
Simplots	50	0	0.0	29	4.11E+05	0.02	29	4.11E+05	0.77%	6.51E+05		29
Washoe	20	0	0.0	29	1.64E+05	0.02	29	1.64E+05	0.29%	2.61E+05		29
			0.0	29	0.00E+00	0.02	29	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
Sub-Total					5.75E+05			5.75E+05		5.75E+05		
Sub Totals												
Out Flows			0.0		5.75E+05	0.02	0	5.75E+05	3.4%	5.75E+05		#DIV/0!
Totals					**1.69E+07**			**1.58E+07**	**81.17%**	**1.58E+07**		**48.812**

Station	Flow	Existing Count	Calculated Load	Calculated After Die Off	% Difference from Projected to Actual	Calculated Load After Reductions	Calculated after Reductions	Target Load	Target Level
		CFU/100ml	CFU/sec	CFU /100ml		CFU /00ml	CFU/100ml	CFU/sec	CFU 100/ml
LPR-007	1142	294	9.51E+07	1.58E+07	602%	49	1.58E+07	1.62E+07	50

Table 12.
Bacteria Load Reductions Calculations
LPR-007 to LPR-008

With Reductions @ 115/ 100ml

Station	Flow	Miles to Next Station	Time Traved next Station	Existing Count	Load	Die Off Coefficant	Remaining After Die Off	Load After Die Off	% Contribution After Die Off	Allocation	Load Reduction	Target
	cfs	Miles to	hours	CFU/100ml	CFU/sec		CFU/100ml	CFU/sec	%	CFU/sec	%	CFU/100ml
LPR-007	1142	3.5	1.7	47	1.52E+07	0.02	45	1.47E+07	7.7%	1.47E+07		45
INFLOWS												
49 er Slough	45	2	1.0	95	1.21E+06	0.02	93	1.19E+06	7.46%	1.19E+06		93
Fruitland WWTP	0.07	3	1.5	200	3.96E+03	0.02	194	3.85E+03	0.02%	3.85E+03		194
Payette WWTP	0.56	0.5	0.2	200	3.17E+04	0.02	199	3.16E+04	0.20%	3.16E+04		199
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
Sub-Total					1.25E+06			1.22E+06		1.22E+06		
Sub Total												
Inflows					1.64E+07			1.59E+07	15.4%	1.59E+07		49
WITHDRAWLS												
		0	0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
		0	0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
			0.0		0.00E+00	0.02	0	0.00E+00	0.00%	0.00E+00		#DIV/0!
Sub-Total					0.00E+00			0.00E+00		0.00E+00		
Sub Totals												
Out Flows			0.0		0.00E+00	0.02	0	0.00E+00	0.0%	0.00E+00		#DIV/0!
Totals					**1.64E+07**			**1.59E+07**	**15.37%**	**1.59E+07**		**45.238**

Station	Flow			Existing Count	Calculated Load		Calculated After Die Off	% Difference from Projected	Calculated Level	Calculated after Reductions	Target Load	Target Level
				CFU/100ml	CFU/sec		CFU /100ml	to Actual	CFU /00ml	CFU/100ml	CFU/sec	CFU 100/ml
LPR-008		1242		318	1.12E+08		1.59E+07	-603%	45	1.59E+07	1.76E+07	50

Appendix G. Comments to Previous Draft Documents

From: Randy Phelan, **NRCS, March 15, 1999**

Page 3: Pollutants of Concern, Sediment is not listed. It seems strange that the South Fork Payette River (17050120), the Middle Fork Payette (17050120), Bissel Creek (17050123), Black Canyon Reservoir (17050122-2695) and the Snake River (17050103) are all listed for sediment, but the Lower Payette River below Black Canyon Reservoir to the mouth of the Snake River (17050122-2689) is not listed for sediment and therefore not addressed in this Sub-Basin Assessment.

Response: The 1994 303(d) list did not list sediments as a pollutant of concern. There is no compiling evidence that sediments are impairing beneficial uses in the lower Payette River. Turbidity data collected during the 1997 and 1998, did not indicate suspended sediments were at levels that would impair sight feeding capability of fisheries.

Page 16: 2.1.4. Fisheries, last sentence, "Since most trout species require clean spawning gravels, usually associated with smaller tributaries, trout spawning may not be present in the lower Payette River." This eludes to the fact that sediment is effecting the cold water Boita.

Response: Since no native trout species were documented in 1974 (Reid, 1975). It would be assumed that trout were not utilizing the lower Payette River for spawning at that time. Most trout species do not utilize large river systems for spawning, but use the larger systems for rearing. The lack of access to historic spawning areas, would be classified as habitat modification. Habitat modification is not considered a pollutant to be addressed by TMDLs..

Page 27: 2.3.8 Recreational Use, last sentence, "Historical and present water quality information demonstrates that primary and secondary contact recreation are not fully supported due to the exceedence of bacteria standards and sediment." If this is indeed the case then we should be addressing sediment in the TMDL.

Response: The impairment by sediments to primary and secondary contact recreation was a typo error and has been removed. It was not demonstrated that sediment was impairing primary or secondary contact recreation beneficial uses. Nor, has it ever been noted that sediments were impairing these uses. It is stated in Section 2.8, that sediment and bacteria are somewhat correlated, and that sediment should be addressed as a linkage to bacteria.

Page 33: Transport, the second and third paragraphs monitoring substantiates that suspended sediment is a transport and a problem.

Response: It is recognized that sediment is a link between it and other pollutants of concern, Section 2.8.

Page 34: Current Water Quality Impairment, the third paragraph states that "Based on these results, DEQ has determined that nutrients are not impacting the beneficial uses, namely sediment filling the gravel substrate?

Response: The result of sediments filling pools and covering gravels is more associated with river channel alterations and flow modifications. It was never demonstrated that sediments were directly impairing beneficial uses.

Page 34: Temperature, I believe it would be helpful to farmers to have the Fahrenheit degrees listed with the Celsius temperatures.

Response: A temperature conversion from centigrade to Fahrenheit is incorporated in the Glossary Terms and Acronyms.

Page 35: Temperature, Transport, Does the monitoring data show that sediment may be an external input to the increase in temperature?

Response: There was no monitoring completed to demonstrated that sediment and temperature are correlated. However, at monitoring Station LPR-001 where suspended sediment levels are low, water temperature still exceeded state water quality standards.

Page 37: 2.6.3 Bacteria, Transport, second to last paragraph, This is reason to have sediment as part of the TMDL.

Response: The 1994 303(d) list did not list sediments as a pollution of concern. It is demonstrated that there is a correlation between bacteria and sediment. The development of the implementation plan and watershed management plan will need to address sediment as a link between both nutrients and bacteria.

Page 39: 2.8 Carriers/Linkage, 2.8.1. Sediment, first paragraph, Mike makes a good argument, why sediment should be targeted for the TMDL and why a sediment reduction must be included in the TMDL.

Response: The 1994 303(d) list did not list sediments as a pollution of concern, but a link to be associated with other pollutants.

Page 40: 2.9.2 Flow Modification, When will the salmon flow augmentation assessment be completed and if positive, can we continue the process for water quality?

Response: It was not within the scope of this SBA-TMDL to determine what were the impacts from the flow augmentation in the lower Payette River. If water quality degrades after the flow augmentation is complete, the data will be available to determine what the overall impacts to water quality were.

Appendix A: graphs, add foot noted and list the state water quality standard. List the name of station under the number.

Response: Graphs will be modified if resources are available.

Appendix A,
Flow Data: Mike, you stated that you used flow data after August of 1996. Does that data include the flow data for 1997-1998? If not, how would the pollutant loads equate of you used the 1997-1998 data where the measured flow more closely follows the historical flow data?

Response: August 1996 flow data was used for bacteria loading only. August 1996 showed the highest bacteria levels for the six months of monitoring for bacteria. It is appropriate that 1996 flow data be used for bacteria loading analysis. If further development of a watershed management plan is to occur, then flow data for 1997-1998 should be utilized for that plan.

I believe that we need to address sediment in the Lower Payette TMDL.

Response: The 1994 303(d) list did not list sediments as a pollution of concern. There is no compiling evidence that sediments are impairing beneficial uses in the lower Payette River. Turbidity data collected during the 1997 and 1998, did not indicate suspended sediments were at levels that would impair sight feeding capability of fisheries.

Ron Brooks, Idaho Soil Conservation Commission, March 16, 1999

I have completed my review of the Lower Payette River Sub-Basin Assessment distributed February 18, 1999 at the Watershed Advisory Group meeting. Upon review of this document, my primary concern was the use and interpretation of the data collected for nutrient concentrations in the Lower Payette River.

Response: No response warranted.

I believe there needs to be more discussion in the text about the nutrient concentrations measured in 1996, 1997, 1998. At present, these data are neither discussed in the text nor referenced as being in the Appendix. After reviewing, these data it is my opinion that the measured nutrient concentrations provide stronger evidence that nutrients are impacting beneficial uses.

Response: The State of Idaho utilizes a narrative criteria for nutrients. It was not demonstrated that nutrients were impairing beneficial uses with the data collected in 1997-1998. It was stated in the Executive Summary that nutrients were at levels that may cause impairment of beneficial uses. And, it is recommended that a watershed management plan be developed for the lower Payette River to address nutrients.

On page 33 you state, "... nutrient concentrations are at levels that may cause nuisance aquatic growth." You also provide EPA's recommended criteria for total Phosphorus and Nitrates, concentrations that if exceeded, may cause excessive or nuisance aquatic growth. According to the data in the Appendix, 61 samples from LPR-001 to LPR-008 contained Phosphorus concentrations occasions, the nitrates criteria of 0.3 mg/L was exceeded, the majority of which occurred from LPR-007 to LPR-008.

Response: The EPA recommendations are recommendations which are not included in the state water quality standards. Since it was not demonstrated that nutrients were impairing beneficial uses, the State of Idaho Water Quality Standards were not exceeded.

I believe it is safe to assume that if there is nuisance aquatic growth, then there would be also be impairment of beneficial uses; at a minimum an impairment of primary and secondary contact recreation. I also believe that these data provide strong evidence that the nutrient concentrations measured from 1996-1998 were at levels that may cause nuisance aquatic growth, at least in portions of the river. Unfortunately, this growth could not occur and impairment of beneficial uses could not be shown due to the record flow conditions during much of the sampling period. However, under normal conditions I think that impairment of beneficial uses caused by excessive nutrients would be quite easy to document on the Lower Payette River.

Response: It is speculated that nuisance aquatic vegetation growth may occur at lower historical flows. However, there has never been any demonstration that aquatic vegetation has ever impaired beneficial uses.

I hope these comments are useful. I realize that nutrients will have to be addressed under a load allocation once the Brownlee TMDL is finished. However, I think we can be further along in the meeting the Brownlee allocation

if we include a load allocation now for nutrients in the Lower Payette TMDL. If you have any questions call me at 642-4402 ext. 111.

Response: Thank you for your comments. The Snake-Brownlee TMDL will be completed by 2001. Reduction targets for nutrients may have to be addresseded at that time for the lower Payette River.

Michael A Raymond, NRCS, March 12, 1999

I have the following comments regarding the Lower Payette River Sub-Basin Assessment:
The Appendix to the report contains a great deal of data collected over the last three years. However, the text does little to summarize or explain the significance of these data. There are also numerous references made to historical data in the text, but little of is included for review. Perhaps these data should also be included in the report, especially those pertaining to past main-stem river monitoring. It would also be very valuable to have each parameter compared to appropriate water quality standards.

Response: Any data that was comparable to numeric water quality standards was (temperature and bacteria). Most of the historical data was examined to show why the lower Payette River was listed on the 303(d) list. The purpose of the SBA is to determine the extent of impairment to the beneficial uses.

The assessment indicates that no complaints have been received concerning the aesthetics of the river. However, the Lower Payette River Water Quality Planning Project Final Report (Payette SWCD, 1993) contains information to the contrary (see, Aesthetics, page 92). If there is a more formal process required for notifying DEQ of a concern with the river's aesthetics, please let me know.

Response: The lower Payette River is protected for Aesthetics, however there are no numeric standards to judge aesthetics. And, the State DEQ has no recorded complaints on aesthetics quality in the lower Payette River.

The text states on page 32 under "Nutrients-History" that the highest total P concentrations measured for the river was 0.35 mg/l. The data in the appendix shows a monitored level of 0.4 mg/l in 1998.

Response: This value is left in the tables to show overall water quality of the lower Payette River. Statisically, this value would be considered to be an outlier, but was left to show high nutrients that can be found in the lower Payette River. If the data in Appendix B is to be utilized in the development of a watershed management plan, this value would be removed from overall analysis.

On page 37 in the discussion of bacteria transport, the assessment states that there is a general relationship between fecal coliform and sediments. This implies a correlation between these variables was made. Similar implied correlations are made at several points in the report. If correlations were run, I suggest that the appropriate statistics be provided to support these statements. If correlations were not made, maybe they would be helpful for interpretation of the data.

Response: Correlation values can be found in referenced material Lower Payette River Agriculture Irrigation Water Return and Ground Water Evaluation (Ingham, 1996)

For some time, I have been concerned about the exclusion of nutrients and sediment from the proposed TMDL. I have not made this an issue for a couples pf reasons. First, I don't feel it is my position to try and direct what

might become a regulatory process. Second, my opposition to excluding these pollutants from a TMDL might be interpreted by some as being unsupportive of agricultural interests, which is definitely not the case. However, I am charged to work in cooperation with the Payette SWCD to try and protect and improve the condition of natural resources in Payette county. I have discussed this situation with the direct board members on several occasions, and offer my remaining comments with the condition of the district's natural resources in mind.

Response: Concerns noted

The assertion that DEQ has determined that aquatic vegetation is not impacting beneficial uses in the river (page-34 - Current Water Quality Impairment) is not well supported by other information contained in the text or the monitoring data included in the appendix. The text describes the river as slow moving, wide and shallow with little shading and high potential to allow photosynthesis to occur in aquatic plants. Data contained in the appendix shows that nutrients increase considerably as the river flows down the valley, and that exceedence of the EPA recommended criteria for total phosphorus and nitrite-nitrate as nitrogen is found with increasing frequency as this occurs. Exceedence of EPA recommended criteria for P increases from 6 to 60 percent of samples for data collected at the Black Canyon Dam and below the Payette WWTP, respectively. A similar comparison for NO_2-NO_3 shows and increase in exceedence from zero to 41 percent of the samples taken. For total P, the average of all samples taken below the Payette WWTP (0.125 mg/l) exceeds the EPA recommended criteria, while the average for NO_2-NO_3 at the same location (0.3 mg/l) matches the criteria for that pollutant. Single measurements show that total P at four times and NO_2-NO_3 at more than three times the EPA criteria.

Response: The EPA recommendations are recommendationswhich are not included in the state water quality standards.. Since it was not demonstrated that nutrients were impairing beneficial uses, the State of Idaho Water Quality Standards were not exceeded.

Consideration of these facts, coupled with your observation that above normal flows may have impacted the ability for aquatic vegetation to become established during the limited DO and chlorophyll *a* monitoring conducted, lend little credibility to the determination that nutrients are not impacting beneficial uses. River flows have not only been above normal during the course of this monitoring, they have been at record levels. Also, previous studies mentioned in the report seem to support the concept that nutrients are impacting beneficial uses.

Response: It is speculated that nuisance aquatic vegetation growth may occur at lower historical flows. However, there has never been any demonstration that aquatic vegetation has ever impaired beneficial uses.

Recently, I reviewed a report published by USGS in cooperation with Idaho DEQ entitled *Water-Quality Conditions of the Lower Boise River, Ada and Canyon Counties, Idaho, May 1994 Through February 1997* (Mullins, William H., Water Resources Investigations Report 98-4111, 1998). This report (see attached copy) includes data concerning nutrient and sediment loading in the Boise River, based on recently completed monitoring. Calculation of pollutant loads can also be made for the Lower Payette River using the data provided in the appendix of the sub-basin assessment (see attached spreadsheet). Comparison of the average total P load in the Payette River below the Payette WWTP to the median total P load measures in the Boise River near Parma shows that the Payette River is carrying more than half again as much total P as the Boise River. A similar comparison for total N (TKN plus NO_2-NO_3) shows the Payette is carrying about 90% of the N load carried by the Boise. Comparison of sediment loads shows the Payette to be carrying 610 tons/day while the Boise River carries 299 tons/day - less than half of the sediment load carried by the Payette. It is my understanding that the TMDL developed for the Lower Boise River includes both nutrient and sediment components. In light of these observations and considering the likelihood that reduction of loading of these pollutants will be a required component of any TMDL developed on the Snake River, I recommend that they should also be considered as components of the TMDL for the Lower Payette River.

Response: The TMDL developed for the lower Boise River did not include an allocation for nutrients, but will be deferred until completion of the TMDL for Brownlee Reservoir. It was not demonstrated that nutrients or sediments are impairing beneficial uses, or exceeding State of Idaho Water Quality Standards.

Gem Soil and Water Conservation District, April 6, 1999

The Gem Soil & Water Conservation District would like to comment on the Lower Payette River Sub-Basin Assessment submitted by the Idaho Division of Environmental Quality. The supervisors know that the river is vital to the area and would like to continue to maintain and improve the quality of the water as it goes through our district. We will continue to encourage the use of Best Management Practices on farms, ranches, and urban areas to keep pollutants from reaching the river.

The Sub-Basin Assessment states that the Lower Payette River is presently meeting state standards for nutrients and sediment, and that they are not pollutants of concern for any beneficial uses (page 25 table 4). The existence of nuisance aquatic growth is the state standard for listing nutrients as pollutants of concern. Monitoring data in the assessment does not indicate Dissolved Oxygen depletion below the state water quality standard to support algae growth. (Page 32, 2.6.1, Historical Data, third paragraph). Therefore, the District supports the Assessment as it is written and does not support the addition of nutrients and sediment to the TMDL.

Response: Comments noted

The District recognizes that there is a potential problem with the level of phosphorus entering the Snake River from the Payette River. Although it meets state standards at this time, we should work to reduce the level in the future. We work voluntarily with the farmers in our area to apply BMP's and will continue to educate all residents to produce phosphorus in the river.

Response: It is recommended that a watershed management plan be developed to address nutrients and sediments.

Continued monitoring on the river is imperative. We support the Assessment conclusion that "during the implementation phase of TMDL, an in-depth monitoring plan will have to be developed to determine the effectiveness of the TMDL on the Lower Payette River." If nutrients and sediment are added to the TMDL as pollutants of concern, the Gem SWCD would like the improvements made from the present to the time of the TMDL documented so that they will be recognized by the courts, DEQ, EPA, or whoever makes the assessment, as progress achieved by the users of the river and the agricultural community.

Response: A TMDL effectiveness monitoring plan will be developed and incorporated into the implementation plan. If a watershed management plan is developed for sediments and nutrients, a monitoring plan should also be developed.

The Gem SWCD recognizes the level of bacteria as a concern on the river. The Assessment states that there were some violations that exceeded the primary contact and secondary contact recreation levels. (Page 36) Bacteria can come from various sources. Therefore, the board would like to see additional testing done to establish the source so the problem can be solved.

Response: With both the 1996, 1997 and 1999 in-river bacteria evaluations, along with IDA 's drain monitoring, sufficient data will be available to determine bacteria source and transportation in the area. In conclusion, the Gem SWCD supports the final draft of the Lower Payette River Sub-Basin Assessment as it is written and submitted in February 1999.

Randy Phelan- April 7, 1999

I believe that the Lower Payette River Sub-basin Assessment contains conflicting data and DEQ's determination that nutrients are not impacting the beneficial uses (page 34) is inconclusive because the pheriphyton samples have not been evaluated (page 34).

Response: Although pheriphyton analysis was not completed, enough information was collected to determine that nutrients were not impairing beneficial uses. There are no established State of Idaho protocols that would be able to demonstrate beneficial use support utilizing pheriphyton data.

The State of Idaho narrative standard states that "surface waters of the state shall be free from excess nutrients that can cause nuisance aquatic growth impairing designated protected beneficial uses (page 32). This standard is rather subjective. Noxious algae growth may not be present, but the slime growth is present on the rocks of the lower portion of the Payette.

Response: It was never demonstrated that nutrients were impairing beneficial uses, or that State of Idaho Water Quality Standards were exceeded. It is speculated that nuisance aquatic vegetation growth may occur at lower historical flows. However, there has never been any demonstration that aquatic vegetation has ever impaired beneficial uses.

The EPA Quality Criteria for Water recommends that there be less than .1mg/l of phosphorus and less than .3mg/l for nitrates.

Response: It is speculated that nuisance aquatic vegetation growth may occur at lower historical flows. However, there has never been any demonstration that aquatic vegetation has ever impaired beneficial uses.

Appendix A data shows that the 1997 & 1998 overall data inherits .05 mg/l of Total Phosphorus upstream of the Black Canyon Dam and exports .125 mg/l of Total Phosphorus to the Snake River. This is an increase of .075mg/l through the 38.5 mile stretch from the dam to the Snake River. We are exporting .025 mg/l above the EPA Quality Criteria of .1mg/l. Historical data also shows that there have been exceedences of the EPA Criteria (page 32). Myers 1997 data shows the lower Payette River contributing between 15-25% of the total yearly, Total Phosphorus load to the snake River (page 34). With only two samples the 1997 and 1998 Dissolve Oxygen monitoring is inconclusive to determine if supersaturation is occurring (Appendix A, DO graph). Even though there is no recent documentation of DO depletion, nutrient concentrations are at levels that may cause nuisance aquatic growth. Above normal flow may have impacted the ability of aquatic vegetation to become established (page 33).

Response: The Snake-Brownlee TMDL will be completed by 2001. Reduction targets for nutrients may have to be addressed at that time for the lower Payette River.

Studies completed by the Payette SWCD and Mike Ingham in 1992 and 1996 respectively, indicate that total phosphorus was associated with high sediment loads (page 33). Historic and present water quality information demonstrates that primary and secondary contact recreation are not fully supported due to the exceedence of bacteria standards and sediment (page 27, 2.38).

Response: The impairment to primary and secondary contact recreation by sediments was a typo error and

has been removed. There is no indication that sediments are impairing these uses. It is stated in Section 2.8, that sediment and bacteria are somewhat correlated, and that sediment should be addressed as a linkage to bacteria.

Bacteria are easily transported with both organic and inorganic material. Sampling results from the lower Payette River area indicate a general relationship between fecal coliform and suspended sediments. The survivability of bacteria in water is limited and can be affected by a variety of conditions including sunlight, available food, nutrients, and water temperatures (page 37). Since monitoring showed that bacteria was high. Does it not follow that nutrients and sediment may also be a concern?

Response: It is recognized that sediment is a link between it and other pollutants of concern, Section 2.8.

The Sub-Basin Assessment has conflicting data, will a red flag be raised when the Payette River is exporting phosphorus into the Snake River at a level above the EPA criteria?

Response: The Snake-Brownlee TMDL will be completed by 2001. Reduction targets for nutrients may have to be addresseded at that time for the lower Payette River.

From: Mark Limbaugh, Payette Water District #65, January 27, 1999

I appreciate the opportunity to comment on your draft Lower Payette River Sub-Basin Assessment. I noted the following problems or suggestions to the draft document:

Page 8 Para 3: The first sentence mentions "low flows" as an "extreme" condition noted as occurring during the past 10 years on the Lower Payette River. You should mention that these flows, noted as "lowest flow on record" and "seven day-ten year minimum flow" were recorded at the USGS Payette gage, if that is where they were recorded. You should also note the frequency of these flows during the ten-year period referenced.

Response: The adjective "extreme" has been removed. As a reference to the seven day ten year low flow, it will be referenced this was recorded at Payette, Idaho (USGS Gage). It is already referenced these are the "extremes" for the period of record.

Page 8, Para 6: The "Nobel" canal is actually the Noble Canal. Also, you should mention the Enterprise, Bilbrey, and Letha irrigation ditches as other diversions on the south side of the river.

Response: Misspelling of Noble Canal is noted, and will be changed. A reference to the Enterprise and Bilbrey Canals are noted in the mass-balance spreadsheets, but will be added to the schematic. Letah ditch can not be located in the Water master's Report, Payette Water District #65. Many of the Ditches and Canals may originate from the 7 Mile Slough. It is difficult to determine which ditch is Letha Ditch, or if it originates from the Payette River or from the 7 Mile Slough. A map location and a average cfs withdrawal would be helpful in showing this ditches origin. Not all ditches, canals, and pumps are shown (too numerous). The schematic and the mass-balance limited withdrawals to 20 cfs or greater.

Page 21, Para 5: I suggest the following paragraph be used to replace Paragraph 5:

" It is speculated that reduction of water temperature in the Lower Payette River will not greatly influence the maintenance of a viable trout population. Mountain Whitefish appear to be thriving and maintaining a viable, and an assorted age class, population, even though temperature standards for cold water biota are exceeded throughout the system."

Response: As the paragraph reads, the most likely influence of the lack of a viable trout population is due to lack of access to historic spawning areas. This relates to the habitat alteration. This will not influence the development of the TMDL since habitat alteration is not addressed in the State of Idaho Water Quality Standards and is not a pollutant subject to TMDL development. The paragraph referenced will not be changed.

Page 27, Para 1: "2.1.7 Historic Presents of Man" should read "presence" of man.

Response: Noted and changed.

Page 27, Para 5: In the second sentence, the word "were" should be "where".

Response: Noted and changed.

Page 36, Para 5: The third sentence should include the word "hour" after "Twenty four".

Response: Noted and changed.

Page 38, Para 6: I suggest the following paragraph be used to replace Paragraph 6 in its entirety: "Based on these results, DEQ has determined nutrients are not impacting the beneficial used, namely cold water biota, in the Lower Payette River." The reason for this change, in my opinion, is that there is currently no peer-reviewed data to prove that current levels of nutrient loading from the Lower Payette River impact beneficial uses in the Lower Snake River at Brownlee Reservoir. Also, Idaho Power data and modeling efforts have not been peer-reviewed and should not be used anywhere in the Sub-Basin assessment for the Lower Payette River.

Response: Reference to the Lower Snake-Brownlee TMDL will remain. Since this is the only available data to determine impacts to the Snake River and Brownlee, it will be noted. If future monitoring or data evaluation determine there are no impacts to the Lower Snake or Brownlee Reservoir from the lower Payette River it will be indicated in the respecived Sub-Basin Assessments.

Page 40, Para 2: I suggest this paragraph be eliminated, due to the fact that it is irrelevant to the discussion of "Sources" of temperatures in the Lower Payette River. Sources were identified in the first paragraph as "solar radiation input, thermal modification (industrial) and/or geothermal input." Discussion of "possible reasons high temperatures occur in the Lower Payette River" in paragraph 2 is irrelevant in that the authority for temperature input regulation by a TMDL rests within the NPDES permitting system, which does not include the "reasons" in this paragraph.

Response: Since all these referenced increases to the availability of solar radiation, the statement will remain. Irrigation water return does increase the amount of surface area exposed to solar radiation. As water is "spread" across fields for irrigation, increased exposure to solar radiation does occur. #2, and #3 all increase the exposure to solar radiation. The water originating from Black Canyon Dam demonstrates that solar radiation on the reservoir has increased water temperature to the extent that exceedences of State Water Quality Standards for temperature occur before input from areas below the dam.

Page 45, para 3: In the second sentence, "low flows" are mentioned as not allowing sediment to be carried out of basin and is affecting water depths in the river, thus affecting in-river temperatures. As I have stated before, flow modification is not a pollutant, is not regulated by the TMDL as a point source, and the definition of "low flow" is vague in the paragraph. I suggest that "low flows"

be described as a stressor only if there is a definitive flow level for water quality impairment, complete with data to support this assertion, or not listed at all as a stressor if this data is incomplete or nonexistent.

Response: Reference to low flows has been removed.

Page 47: I suggest possibly mentioning effluent trading as an option being studied in assisting point sources with current and future NPDES permit requirements.

Response: Effluent trading will be addressed in the implementation plan, if applicable.

Again, thank you for the opportunity to comment in this Sub-Basin assessment fir the Lower Payette River. I look forward to visiting with you about these comments and continuing to assist DEQ in their efforts to draft a TMDL on the Lower Payette River.

From: Calude Bruce, Payette Soil and Water Conservation District, April 15, 1999

The Board of Supervisors of the Payette Soil and Water Conservation District has reviewed the Lower Payette River Sub-Basin Assessment. We have comments as to the content of the assessment and to it's affect on the drafting of the TMDL document. Most importantly, we have comments on it's eventual influence on the TMDL implementation plan as it relates to the mission and goals of the Payette Soil and Water conservation District.

After careful consideration, the Board has these observations on the Lower Payette River Sub-Basin Assessment document:

The data contained in the report covers a limited time frame and scope. The data are valid for the time period, but generally the time period spanned is too short to reflect a true picture of the river's dynamics.

Response: It is agreed the SBA and TMDL is developed with limited data. But the available data does indicate the present conditions of the lower Payette River. It is agreed the system is dynamic, and conditions can change based on available flows and water use. A review of historical data and current data, indicates contact recreation as the only impaired beneficial use..

The appendix tables show that, compared to EPA recommendations, 60% of the samples taken nearest the mouth of the river were high in phosphorus and 40% were high in nitrogen. Nutrient reduction in the river is an essential part of the goals listed in the Payette SWCD's long-range plans.

Response: The EPA recommendations are recommendations which are not included in the state water quality standards.. Since it was not demonstrated that nutrients were impairing beneficial uses, the State of Idaho Water Quality Standards were not exceeded. It is recommended that a watershed management plan be developed to address nutrients and the associated sediments.

The augmented flows for Salmon recovery may be influencing temperature, dissolved oxygen, and chlorophyll and production data, as well as creating a dilution effect for measured pollutants.

Response: The possible effects of fish flow augmentation are stated in Section 2.6.1.

Sediment reduction is being considered in other comparable river systems and is also part of the goals listed in this district's long-range plans. It was not the scope of this SBA-TMDL to determine what were the impacts from the flow augmentation in the lower Payette River. If water quality degrades after the flow augmentation is complete, the data will be available to determine what the overall impacts to water quality were

Response: The 1994 303(d) list did not list sediments as a pollution of concern. There is no compelling evidence that sediments are impairing beneficial uses in the lower Payette River. Turbidity data collected during the 1997 and 1998, did not indicate suspended sediments were at levels that would impair sight feeding capability of fisheries. Sediment should be addressed in a watershed management plan..

The assessment does not allow for the "no net increase" concept that has been described in the past. To address this concept, the TMDL implementation document should also as least address nutrient and sediment issues.

Response: No Net Increase should be addressed in the watershed management plan.

The Payette Soil and Water Conservation District, for the above reasons and in consideration of our mission to conserve and protect the natural resources of Payette County, has voted to go on record in stating that we feel the Sub-Basin Assessment is incomplete and inconclusive. The Board feels that there are too many unanswered questions involved to exclude nutrients and sediment from the TMDL. Also, the Lower Snake/Brownlee TMDL is very likely to affect the load allocation assigned to the Payette River.

Response: Comments noted. The Snake-Brownlee TMDL will be completed by 2001. Reduction targets for nutrients may have to be addressed at that time for the lower Payette River.

The Payette SWCD Supervisors are unanimous in our opinion that a pro-active approach toward improving water quality must be taken. The goals set by this district dictate that we take this position. All members of the Payette Soil and Water Conservation District Board of Supervisors feel that the uncontroversial approach provided by the assessment document is unwise considering the long-term risks created by failing to address nutrients and sediment. Therefore, we recommend that the appropriate action be taken through the Lower Payette River Watershed Advisory Group to address these issued.

Response: It is recommended that the local Soil Conservation Districts take an active role in developing a watershed management plan and to seek funding to address issues addressed in the watershed management plan.

We would appreciate hearing any comments you might have concerning our interpretation of the information contained in the Sub-Basin Assessment. Thank you for the opportunity to provide our viewpoint.

Response: Thank you for your comments.

Comments Received on Final Draft

Laurie Mann
USEPA - Region 10

Comments 1-6 below must be addressed prior to approval of the Lower Payette River TMDL. Each comment is followed by a "discussion" that gives ideas and recommendations (not requirements) for the way the comment can be addressed.

Bacteria

1. Loading Capacity. A loading capacity needs to be clearly defined for the water body.

   Discussion: It appears that 50/100 ml was used as an in-stream target. Please consider expressing the loading capacity, load allocations, wasteload allocations and margin of safety in equivalent units (e.g. concentration). As written, it is difficult to compare the sum of the allocations (in units of CFU/sec) to a loading capacity in units of CFU/ml (see also comments 8 below.)

Response: All target or loading allocations have been established in CFU/sec

2. Load Allocations. The load allocations need to be clearly defined for the water body.

   Discussion: If the "target loads" in Table 11 represent the load allocations, they should be clearly identified as such.

Response: Target loads in previous documents have been redefined as Loading Allocations.

3. Wasteload Allocations. The wasteload allocations need to be clearly defined for the point sources discharging to the water body. If allocations are not made for the point sources, the allocations for those facilities will be zero.

   Discussion: The wasteload allocation for each of the WWTPs will eventually be incorporated into NPDES permits, and is typically calculated using either water quality standards or performance levels as a basis. The "target levels" for Fruitland and Payette WWTP in Appendix Table 6 appear to be based on performance. It the TMDL is intended to allow a discharge/load from the Emmett and New Plymouth WWTP's, these facilities need to be included in the appropriate spreadsheet calculations in Appendix F and receive a wasteload allocation.

Response: Wasteload allocations have been defined for point sources.

It is recommended that CAFOs be specifically discussed in Section 4.4.2, and that a wasteload allocation of zero be given to all confined feeding operations that meet the federal definition of a CAFO. The list of CAFO's and CFAs in Table 8 will quickly be out of date; therefore, giving a sector wide wasteload allocation of zero will be more meaningful than giving a zero wasteload allocation to those CAFOs/CFAs that are currently known.

Response: CAFOs have been given a zero (0) discharge wasteload allocation.

4. Reasonable Assurance. Approval of this TMDL will be based, in part, upon reasonable assurance that non-point source reductions will occur. Reasonable assurance can be provided by documentation in the TMDL or in separate documents, of the following elements:
   a. Documentation of existing implementation commitments within the watershed, such as currently funded BMP's and other restoration projects, letters of commitment from landowners, local ordinances, etc., and

   b. Commitment is provided to:

      - develop an implementation plan within a specified period of time, and
      - include a monitoring program in the implementation plan which evaluates both 1) implementation of BMPs and other needed control actions, and 2) trends in relevant water quality parameters, and
      - seek funding for the implementation plan, and

   c. The process for revising the TMDL is explained.

Response: DEQ believes that the Reasonable Assurance outlined in this document fulfills the requirements under the Clean Water Act. Further activity as request will be completed under the Implementation Plan.

5. Attainment of Water Quality Criteria. Since no loading capacity was developed, it is difficult to assess whether the attainment of the allocations would lead to the attainment of the water quality criteria. There is no clear link between the criteria, the target loads, percent reductions required, and resultant in-stream criteria. It appears, that this should be present within the Tables of Appendix F, however, these loads and reductions do not seem to be consistent with those displayed in Table 11.

Response: Changes to all Tables have been made. Calculations have been shown that will demonstrate achievement of the State of Idaho Water Quality Standard for Primary and Secondary Contact Recreation.

6. Geometric Mean Criteria. Please explain why the geometric mean criteria was utilized (see also comment #1). Will attainment of this criteria also lead to the attainment of the other two criteria? If it would not, the TMDL would not be approveable.

Response: *The Geometric criteria is the most stringent of the three criteria outlined in the document. If the geometric criteria is achieved, water quality standards will be met.*

Comments 7 - 11 do not need to be addressed in order for the TMDL to be approved. Addressing these comments, however, will make the TMDL easier to understand and easier to implement.

7. Bacteria Standard Revision Process. Please briefly explain the revision of the bacteria standard, what the purpose standard is, when it will become effective, and how the transition to the new standards will effect this TMDL. If any E. Coli data are available, it would also be useful to include discussion of how the data compares to the new standard.

Response: *E.coli data is provided in Appendix C. The new E. Coli standard is currently proceeding through the public review process. It is expected the Idaho Legislature will address the proposed changes during the 2000 Session. Not enough information is currently available to compare E. Coli information to the proposed rule changes.*

8. Table 11.
   a. Table 11 indicates a target load in excess of the current load at LPR-001 and LPR-002. The increase allowed under this TMDL should be reflected as a negative reduction in the last two columns of the table. This allowed increase appears to be inconsistent with the information provided in the top line of Table 7, Appendix F which indicates that the spreadsheet calculations started at a target level of 33 CFU/100ml (the current level in the river at LPR-002). If upstream sources are allowed to increase their load, this increase needs to be accounted for in Table 7, Appendix F.

Response: *Modification to the Tables have been made. Loading allocation and capacity loads have been adjusted to take in reductions for bacteria along the entire reach.*

   b. Since the upstream target is expressed in CFU/100ml, it would be helpful if a column were added to Table 11 which showed the target in stream concentration at each river station. Alternatively, an attached table provides an example format that may be useful for this TMDL, as it includes point and non-point sources, and allow for expression of concentration and load.

Response: *All loading analysis are now in CFU/sec to reduce confusion. Appendix F does show the expected load achieved, and the bacteria level that would correspond with that load.*

   c. The loads expressed in Table 11 and those calculated in Appendix F appear to differ by several orders of magnitude. Percent reductions noted in the two locations also appear to differ.

Response: *Loading allocation have been adjusted, and those load allocation found in Appendix F, should correspond with the calculations found in Section 4.0.*

9. Margin of Safety. The relationship between the 84% reduction calculated in Appendix F, Table 10 for the mouth of the Payette River and the average percent reduction 79% in Table 11 is unclear. Instead of considering this difference as a MOS, my inclination (without additional information) would be to conclude that a 79% reduction throughout the basin would not meet the 84% reduction needed to attain water quality criteria. If these two reductions are displaying two separate things, they should not be used for comparison purposes in defining MOS. (The discrepancy may actually stem from the fact that the numbers in Table 11 do not appear to be consistent with those calculated in Appendix F - see comment 8c above.)

Response: *A new reduction targets (%) have been calculated (84%). Margin of safety is not represented by the expected die off of bacteria from the up-river stations to the confluence with the Snake River.*

If August represents the critical condition, its use may provide a MOS for the other months but not August. Since the TMDL is required to be written to attain standards at critical conditions, the MOS must also apply during that critical condition.

Response: *See above response.*

The text, p.48, indicates that the 2% die-off rate was used since it was the rate determined for the Boise River, a river system very similar to the Lower Payette River. There is no indication provided in this description which suggests that this is a conservative estimate.

Response: *It would be expected that the die off rate would be greater than 2%. The 2% die off rate is calculated under ideal condition for bacteria survival. However, the reference to this die off rate being conservative has been removed.*

10. Tributary Concentrations. From data presented in Table 12, p.47 and Appendix F, Tables 7-10, it appears that there currently are exceedences of the water quality criteria in many of the drains which are tributaries to the Lower Payette River and that many of these exceedences are still projected to occur under the TMDL. It is my recommendation that these be dealt with in the current TMDL so that another TMDL will not need to be written in the future. However, if this is not done, the data should be considered during the next 303(d) listing cycle and the tributaries which exceed the criteria added to Idaho's 2000 303(d) list.

Response: *The State of Idaho does not believe the man-made conveyances are subject to criteria for primary and secondary contact recreation. However, new load allocations will*

achieve both criteria for primary and secondary contact recreation.

11. Waste Water Treatment Plants. Appendix E should include a summary of the bacteria concentration that is typically discharged from each plant. Lagoon retention time is not typically an effective way to reducing bacteria levels, as is stated on page 39.

Response: Tables in Section 4.0 now show the current discharge from the municipal WWTPs under current conditions, along with expected loading under both the most stringent and less stringent.

Ron Brooks
Idaho Soil Conservation Commission

I believe there needs to be more discussion in the text about the nutrient concentrations measured in 1996, 1997, 1998. At present, these data are neither discussed in the text nor referenced as being in the Appendix. After reviewing these data, it is my opinion that the measured nutrient concentrations provide stronger evidence that nutrients are impacting beneficial uses than does the rationale used in the document (DO and Chlorophyll a monitoring) to conclude nutrients are not impacting beneficial uses.

Response: More discussion of the nutrient data has been incorporated into Section 2.6.

On page 33 you state "...nutrient concentrations are at levels that may cause nuisance aquatic growth." You also provide EPA's recommended criteria for total Phosphorus and Nitrates, concentrations that if exceeded, may cause excessive or nuisance aquatic growth. According to the data in the Appendix, 61 samples from LPR-001 to LPR-008 contained Phosphorus concentrations exceeding the 0.1 mg/L criteria, with the majority occurring from LPR-004 to LPR-008. On 29 occasions, the nitrates criteria of 0.3 mg/L was exceeded, the majority of which occurred from LPR-007 to LPR-008.

I believe it is safe to assume that if there is nuisance aquatic growth, then there would also be impairment of beneficial uses; at a minimum an impairment of primary and secondary contact recreation. I also believe these data provide strong evidence that the nutrient concentrations measured from 1996-1998 were at levels that may cause nuisance aquatic growth, at least in portions of the river. Unfortunately, this growth could not occur and impairment of beneficial uses could not be shown due to the record flow conditions during much of the sampling period. However, under normal flow conditions, I think impairment of beneficial uses caused by excessive nutrients would be quite easy to document on the Lower Payette River. Therefore, I think serious consideration needs to be given to the flow conditions under which the monitoring was completed, especially when determining whether or not the beneficial uses have been impaired, as these conditions do not accurately represent the effects that pollutants of concern have under normal conditions on the Lower Payette River.

I hope these comments are useful. I realize that nutrients will have to be addressed under a load allocation once the Brownlee TMDL is finished. However, I think we can be further along in meeting the Brownlee allocation if we include a load allocation now for nutrients in the Lower Payette TMDL.

Response

1. *The subbasin assessment was prepared using the best available information. This information indicated that nutrients are not currently impairing beneficial uses in the Lower Payette River. However, data from the Idaho Power Company show the lower Payette River contributes between 15-25% of the annual total phosphorus load to the lower Snake River. In-reservoir modeling of Brownlee Reservoir has indicated nutrient and algae loads (phytoplankton) have degraded the water quality. Input from the Snake River, to Brownlee Reservoir has been shown to cause depressed DO concentrations resulting in fish kills during low water years. The completion of the lower Snake River and Brownlee Reservoir TMDL is currently scheduled for the year 2001. Load reductions for nutrients in the Lower Payette River will be evaluated at that time. The Lower Payette River will continue to be listed on the federal Clean Water Act §303(d) list for nutrients. A proactive approach utilizing a watershed management plan for pollutants not addressed by the TMDL as well as ongoing implementation will place the lower Payette River in a favorable position for the subsequent load allocations which could be imposed from the Lower Snake-Brownlee Reservoir TMDL in December 2001.*

Ron Brooks
Idaho Soil Conservation
(2nd letter with comment corrections?)

I believe discussion of the in-river concentrations measured for nutrients from September 1996 through October 1998 needs to be added to the text. These data are in the Appendix, but not mentioned in the text. Perhaps giving at least the ranges measured for total-P and NO_2-NO_3 would be appropriate, much like what was done for the 1976 nutrient data discussed on page 34.

Response: More discussion of the nutrient data has been incorporated into Section 2.6.

Page 26, section 2.2, fourth paragraph. "A narrative criteria prohibits ambient concentrations of certain pollutants which may impair beneficial uses." My interpretation of this statement, in conjunction with the narrative standards for nutrients, "Surface waters of the state shall be free from excess nutrients that can cause visible slime growth or nuisance aquatic growth impairing designated or protected beneficial uses..", is different from what has been presented in past meetings concerning nutrients. The rationale used to conclude a TMDL is not needed for nutrients because it was not "demonstrated" or "proven" that nutrients are impairing the beneficial uses of the Lower Payette. The statement on page 26 and the standard for nutrients imply that proof of impairment of beneficial uses is not required in order to exceed narrative State of Idaho Water Quality Standards. These

statements imply there could be violation of narrative standards if pollutant concentrations are such that there "may" or "can" be impairment of beneficial uses. I believe that the data shows that nutrients are at such concentrations in the Lower Payette. Please provide clarification.

Response

See response #1.

Executive Summary, page 3, first paragraph. "It is also recommended that nutrients be removed as a pollutant of concern for the Lower Payette River". In light of the fact that 60 percent of the samples for total-P and 41 percent of the samples for NO_2-NO_3 at the mouth of the Lower Payette River exceeded EPA's recommended criteria for nutrients and the fact that the WAG voted to support a Watershed Management Plan calling for a voluntary 10% reduction in nutrients, I do not feel removing nutrients as a listed pollutant of concern is justified. As stated on page 36, "...nutrient concentrations are at levels that can cause nuisance aquatic growth." I believe there is ample evidence to show nutrients are a concern on the Lower Payette River.

Response

We have removed the sentence referenced on page 3 of the Executive Summary.

Claude Bruce
Payette Soil and Water Conservation District

It is our mission to provide local leadership on the conservation and protection of Payette County's natural resources. The PSWCD has and continues to set objective and proactive goals to address the water quality concerns we feel are valid on the Lower Payette River. In light of this, the PSWCD unanimously feels that a TMDL for nutrients is warranted on the Lower Payette River. We believe that the conclusions made in this document concerning nutrients are inconsistent with our interpretation of the data in the appendix and our existing goals for nutrient reduction on the Lower Payette.

Response

See response #1

Michael A Raymond
USDA Natural Resource Conservation Service

Idaho's water quality standard for nutrients as provided on page 34 of the document states that "surface waters of the state shall be free from excess nutrients that can cause visible slime growths or nuisance aquatic growth impairing designated or protected beneficial uses...". This standard says nothing about dissolved oxygen or chlorophyll-*a* concentrations, nor does it link the determination

of the effects of nutrients on beneficial uses to these components, at excessive levels. On page 36, the document states that "nutrient concentrations are at levels that can cause nuisance aquatic growth". It seems to me that this statements supports the concept that the state water quality standard for nutrients had been exceeded on the Lower Payette River. With nutrients at these levels, all that is needed is the right combination of conditions for impairment of beneficial uses to occur. Failure to address nutrients as part of the TMDL simply supports continued ignorance of this situation.

Response

See response #1

2. *The data available and the monitoring performed by DEQ during the development of the subbasin assessment showed no evidence of visible slime growths or nuisance aquatic growth which would impair any of the beneficial uses in the Payette River. With that in mind, the DEQ performed 24 hour diurnal monitoring during two water years to determine whether algal productivity was significant enough to cause a "crash" in the dissolved oxygen concentrations at night. While the dissolved oxygen concentrations dropped at night due to algal respiration, the concentrations remained above 6 mg/L, the water quality standard for cold water biota.*

   In summary, impairment of the beneficial uses in the lower Payette River is due to several factors.

   - *Cold water biota, i.e., a self sustaining trout population, is limited by warm temperatures, lack of adequate habitat, and flow alteration. Dams and diversion structures also interfere with migration patterns of trout species to historic spawning areas.*

   - *Primary contact recreation is limited due to levels of fecal coliform bacteria which exceed water quality standards in some sections of the river.*

My original comments concerning the sub-basin assessment (SBA) dated March 12, 1999 are contained in the appendix of the report. I feel that these comments remain valid, and since they are published in the document I will not restate them. However, I will take this opportunity to reply to some of the responses to my comments, as I have not had that opportunity provided to date.

Concerning the summary and explanation of data contained in the appendix of the document: The analysis of any data is of little value unless it is explained. This is especially true for the layman who attempts to interpret it.

Response: *More discussion of the nutrient data has been incorporated into Section 2.6.*

Concerning the aesthetics of the river: Once again, please let me know if there is a more formal process required to notify DEQ of a complaint regarding the river's aesthetics. Thank

You.

Response

Other forms of subjective analysis suggested by the DEQ has been scrutinized heavily and criticized a great deal in the past. There are no immediate plans to survey the public about the aesthetic qualities of the lower Payette River.

Concerning the "general relationship between fecal coliform and sediments": I reviewed the *Lower Payette River Agriculture Irrigation Water Return and Ground Water Evaluation"* (Ingham, 1996) and found no mention of a correlation between these variables. Please let me know if I somehow overlooked something.

Response:

Concerning my remaining comments: Thank you for your responses. My concern regarding the exclusion of nutrients from the TMDL is stated earlier in this letter.

Scott Brown
Idaho Conservation League

Nutrients

Information presented in the subbasin assessment makes the case that nutrients are a very real problem in the lower Payette River and yet, a nutrient TMDL is not proposed.

See response #1

It does not appear that DEQ has even attempted to determine compliance with Idaho's narrative nutrient standard.

The data available and the monitoring performed by DEQ during the development of the subbasin assessment showed no evidence of visible slime growths or nuisance aquatic growth which would impair any of the beneficial uses in the Payette River. With that in mind, the DEQ performed 24 hour diurnal monitoring during two water years to determine whether algal productivity was significant enough to cause a "crash" in the dissolved oxygen concentrations at night. While the dissolved oxygen concentrations dropped at night due to algal respiration, the concentrations remained above 6 mg/L, the water quality standard for cold water biota.

A post-Brownlee reopener clause would be appropriate.

Agreed. This will be incorporated into the Executive Summary.

Aesthetics

Other forms of subjective analysis suggested by the DEQ has been scrutinized heavily and criticized a great deal in the past. There are no immediate plans to survey the public about the aesthetic qualities of the lower Payette River.

Temperature

The subbasin assessment makes it clear that high water temperatures are exceeding state water quality standards and are likely to be impairing beneficial uses. However, no TMDL is proposed.

DEQ is currently reviewing the water quality standards for temperature statewide. Warm water temperatures coming into the watershed from Black Canyon Reservoir which exceed the maximum daily standard for cold water biota (from August 1 through September 26, 1999 in 25% of samples) make this problem very difficult to resolve within the scope of this project. Other factors which exacerbate the already warm water temperatures are irrigation return flows and diversions, modification of the river channel which prevents the establishment of an appropriate pool-riffle ratio, removal of riparian vegetation (shading) and the river's lack of access to the historic

floodplain which would provide cooler groundwater storage and recharge. With the above factors in mind, the DEQ will not attempt to allocate loads for temperature in the lower Payette River at this time.

Habitat and Flow

The DEQ has suggested that difficult issues such as impairments due to degraded habitat and flow conditions, will be addressed at the implementation stage and, therefore, do not need to be addressed in the TMDLs themselves. ICL strongly disagrees.

With reference to the 1998 Federal Advisory Committee (FACA) Report, it must be pointed out that the committee is advisory in purpose. Referring to the approval letter from the EPA to the Oregon Department of Environmental Quality, May 4, 1999, for the TMDL for the Sucker-Grayback TMDL, it states, "Neither flow modification nor habitat modification are identified as pollutants under §304(a)(2)(D) of the Clean Water Act. Therefore, EPA is taking no action to approve or disapprove the TMDLs submitted for flow modification or habitat modification." During the course of the implementation planning, the stakeholders in the watershed may determine that habitat improvements or changes in flow regimes released from Black Canyon Reservoir are appropriate measures to assist in the attainment of full support of beneficial uses.

Wild Fish

A more thorough analysis of spawning conditions and the status of various wild fish species in the lower Payette River is necessary.

We agree that minimal fisheries information exists for the lower Payette River. However, the limited information that exists indicates that there is not a self sustaining trout population. The physical characteristics of the river which include warm water temperatures, lack of adequate habitat, and flow alteration appear to be likely reasons for the lack of a self sustaining trout population. Certainly, dams and diversion structures interfere with migration patterns of trout species to historic spawning areas thus limiting their ability to successfully reproduce. Lack of gravel recruitment from the upstream impoundment also limits available substrate to either cobble or fine material in the stream channel. With these factors in mind, it would appear that even though fisheries data is limited, there is a good understanding as to why spawning by trout species in the main stem of the lower Payette River is not a supported beneficial use.

Sediment

Sediment is not a listed pollutant for the lower Payette River. However, the subbasin assessment indicates that sediment inputs are related to the other pollutants listed for the river. The implementation plan developed for the watershed will initially address bacterial contamination, and reductions required for this pollutant will be beneficial in reducing sediment loads. Upon completion of the lower Snake River-Brownlee Reservoir TMDL, assigned reductions in nutrient loads will also reduce sediment. Additionally, during the implementation phase of this project

additional monitoring will enhance our understanding of sediment in the river and whether or not it plays a role in impairment of beneficial uses.