Lower Payette Total Maximum Daily Load Implementation Plan and Addendum to the Lower Payette River Subbasin Basin Assessment and Total Maximum Daily Load

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Acknowledgements
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 Lower Payette WAG has been active in the evaluation of water quality data, development of the subbasin assessment and TMDL and in the development of this document.

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Executive Summary

The lower Payette River is located in the southwestern portion of Idaho. The total basin area is approximately 2,000,000 acres, or 3240 mi^2. The area of concern for this TMDL implementation is the lower Payette River area (River Mile 38.5 to River Mile 0). Approximately 380,000 acres of irrigated and non-irrigated lands are located in this area.

The 1994 э303(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 exceedances 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 the Black Canyon Dam has greatly altered the amount and type of sediment in the lower Payette River originating from the upper watershed.

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 the Black Canyon Reservoir. Uplands are mainly used for open grazing of cattle and sheep. Land ownership 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. However, many areas surrounding the existing urbanized areas are undergoing rapid development from irrigated agricultural land to suburban/urban land uses. With this type change in land use, the type, quantity, and frequency of pollutant trains may be greatly altered.

Nutrients have not been shown to cause impairment to the beneficial uses in this waterbody at this time. However, evaluation of data to determine if nutrients are impairing beneficial uses concluded they are not, under current flow conditions. It has however been determined that the lower Payette River is a source of nutrients to the lower Snake River. Targets set in the draft Snake River Hells Canyon TMDL call for a phosphorus load of no greater that 0.07 parts per million (ppm) at the mouth of the lower Payette River. Based on this initial nutrient target, point sources and nonpoint sources would need to reduce outputs by 30% over existing loads.

In the past, fecal coliform (fecal coli) bacteria levels exceeded the water quality standards for both primary and secondary contact recreation. Increasing levels were noted from Black Canyon Dam to the Snake River, with exceedance of the water quality standards from River Mile twenty-five to the confluence. Overall fecal coli reduction of 84% would have been needed to achieve the previous water quality standard.

However in April 2000, the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02) were revised in relationship to bacteria. The water quality standards now reference Escherichia Coli (E.coli) bacteria as the new standard for primary and secondary recreation. The revised water quality standard for primary recreation uses to be met indicates that E.coli bacteria must not exceed 406 E.coli per 100 milliliters (ml) for any given sample or 126 E.coli per 100 ml based on a geometric mean. The geometric mean is based on five (5) samples taken every three (3) to five (5) days within a 30-day consecutive period. The water quality standard indicates that for secondary recreational uses to be met E.coli must not exceed 576 E.coli per 100 ml for a single sample or 126 E.coli per 100 ml based on a geometric mean. As with the primary recreation standard, the secondary standard indicates that the geometric mean is based on five (5) samples taken every three (3) to five (5) days within a 30-day consecutive period.

The Idaho Department of Environmental Quality conducted bacteria monitoring on the Lower Payette in August of 2001 using a variety of E.coli test methods to determine the cross correlation between varying methods. At the time the monitoring was conducted the Environmental Protection Agency had approved only two of the three monitoring methods for use in testing for E.coli. Since then the third method has been approved and is the preferred method by the Idaho Department of Environmental Quality for E.coli sample analysis. However, the monitoring results as shown in Figure 2 indicate varied results

The TMDL implementation plan for the Lower Payette River sets forth those activities necessary to achieve the targets of the TMDL. Additional monitoring was conducted in August 2002 to try and quantify results from the August 2001 E.coli monitoring. The results shown in Figure 3 closely match the results from the modified M-Tec methods of 2001. Based on the 2002 results, it is anticipated that the present level of bacteria will need to be reduced from 14 to 44 percent at monitoring stations LPR-005 to LPR-008 to achieve the primary and secondary water quality standards. Further monitoring beyond 2002 may be necessary to determine if specific targets are appropriate. These targets may be adjusted and the TMDL implementation plan revised accordingly.

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. The lower Payette River (River mile 0 to 75) (Table 1) is located in the hydrologic unit code (HUC) #17050122 (4th field). Figure 1 shows the land use and area impacted by this implementation plan. 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.

Table 1. WATERSHED ASSESSMENT

Lower Payette River	
Segment Identifier:	SWB-340 WQLSEG # 2689 PRNS # 689.00 HUC# 17050122
Pollutants of Concern:	E.coli Bacteria, Phosphorus*, Mercury[1],Sediment[1], Temperature, Pesticides[1]
Beneficial Uses Affected:	Primary Contact Recreation Secondary Contact Recreation
Known Sources:	**Point Sources**: Emmett WWTP Fruitland WWTP New Plymouth WWTP Payette WWTP CAFOs **Nonpoint Sources**: Stormwater Agricultural Return Urban-Suburban-Rural Septic Systems

[1]Pollutant of concern addressed in this implementation plan based on work completed for the draft Snake River – Hells Canyon TMDL.

Hydrology

The lower Payette River is the dominant hydrologic feature in the implementation 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.

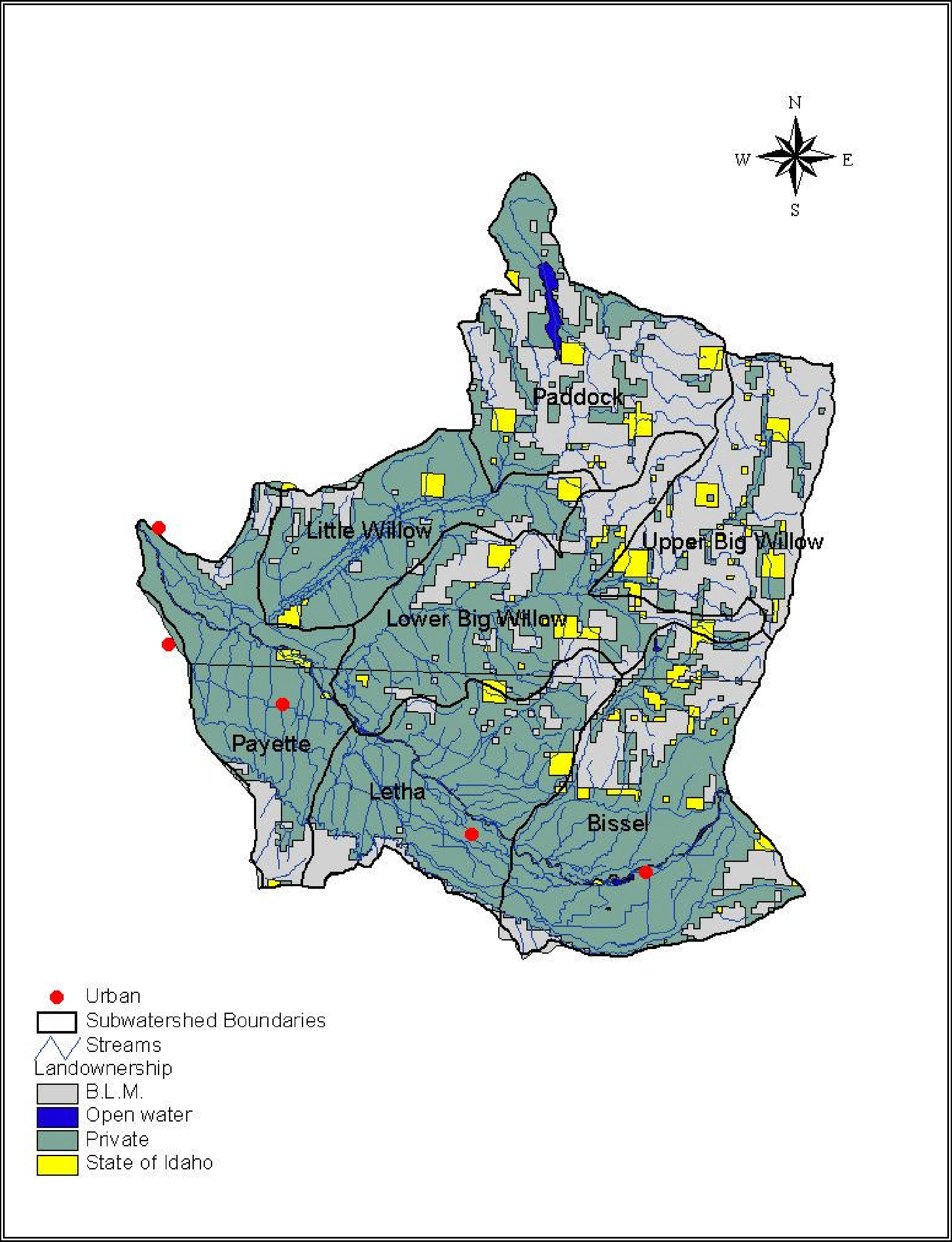
Flows are governed by snow pack melt, precipitation events, reservoir storage, flood control, irrigation water demand and fish flow augmentations. Three major impoundments, outside the basin assessment area, are used to regulate flows. The Lower Payette Canal (Payette Slough) services agricultural areas between Payette and Weiser, Idaho. Return flows are diverted into the Snake River or the Weiser River.

The 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. Water diversion averages 1,200 cfs, or about 500,000-acre feet annually (Water District #65, 1997). 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 western section of the valley is primarily dominated by irrigation water return drains (AS≅ Series Drains), that drain agricultural lands south to north. These drains either followed natural ephemeral streams or were constructed. 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 dominant drainage conveyances

Figure 1. Land Ownership in the Lower Payette River Watershed



Climate

The lower Payette River is located in a semi-arid area. Precipitation is usually less than 20 inches/year throughout the 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).

Geology

The upper Payette River drains much of the highland areas of the Boise Mountains in west central Idaho. Cretaceous granitic intrusive of the Idaho Batholith dominates much of this area. However, in the vicinity of Black Canyon Reservoir the Payette River transects younger Miocene basalt lava flows. 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, most of the lower Payette River and its tributaries, below Black Canyon Dam 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 River channel, floodplain and tributaries.

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. Current morphology of the river's lower section is at a mature stage of development with well-developed meanders and a broad floodplain.

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. The lower Payette River was resurveyed by IDFG in the summer and fall of 1997. Based on a comparison of 1974 to 1997 data the number of cold water, salmonids, were documented to be higher in the 1997 study than in 1974.

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 have 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.

Warm water game fish including catfish, bass and crappie, were found to be more numerous in the lower sections along with non-game species of carp, dace, Redside shiners, suckers and Northern Pike Minnow. Unidentified species of sculpin, a cool-cold water species, were found in the upper six miles of the segment.

Current Land Use

Since the 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 agriculture. In the upper portion of the valley, furrowed crops are located in the Emmett Bench area, while orchards and pasture dominant the river bottom area and valley side hills. Near New Plymouth and Fruitland, the dominant agricultural use is furrowed croplands. 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. The majority of the land in this area is public land, managed by the Bureau of Land Management (BLM). Grazing occurs all season long, with winter-feeding and calving areas located in the lower valleys. Some sparse forested areas are also located in the higher elevation, but silviculture is not a major land use.

Concentrated animal feeding operations (CAFOs) and concentrated feeding areas (AFOs) can be found in all areas of the lower Payette and Emmett Valleys. These facilities are either dairy or cattle feeding/finishing operations.

Four urban areas are located within the valley. These include 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 very rapid and steady growth with new developments both in and out of established municipalities. 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 including migratory and resident waterfowl and numerous species of non-game birds. Many upland game species can be found in the surrounding foothills.

Recreational use of the river area is diverse. Activities include but are not limited to swimming, canoeing, floating, fishing, bird watching, picnicking, and hunting. Many of these activities occur throughout much of the year.

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. Other important economic factors include wood products, light industrial, retail sales and governmental services. Lower property values and the local population willingness to commute greater distances have contributed to the overall growth in both counties.

Urban-Suburban Areas

Within the TMDL project area are four municipalities with individual municipal WWTPs. Each of these facilities has some data for loads to the lower Payette River. However nonpoint/point source information regarding stormwater runoff into drains and its subsequent load contribution from urban-suburban sources is lacking. 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. Additionally, within the impact area for the city of Emmett, Fruitland, New Plymouth, and Payette new developments are required to store and treat stormwater within the boundaries of each newly developed subdivision. For the most part the zero discharge associated with this type of stormwater treatment will provide the protection necessary to protect surface waters from increased biological loading and other pollutants.

Adaptive Management

The goal of the Clean Water Act and the associated rules for Idaho is that water quality standards shall be met or that all feasible steps will be taken towards achieving the highest water quality attainable. This is a long-term goal particularly where non-point sources are a primary concern. To achieve this goal, implementation must commence as soon as possible.

For point sources, it is the initial expectations that sources will meet their specific waste load allocations in five years or sooner if feasible. During this time frame, each source will prepare a facilities plan that will investigate alternatives for meeting allocations. If the facilities plan documents that achieving waste load allocations within the 5-year time frame is not feasible, the source may request an extension. The Director of IDEQ may then consider the request.

For nonpoint sources, the IDEQ also expects that BMPs associated with individual voluntary conservation plans will be implemented as soon as possible. The IDEQ recognizes, however, that it may take some period of time, several years to several decades, to fully develop and implement effective management practices. The IDEQ also recognizes that it may take additional time after implementation has been accomplished before the best management practices become fully effective in reducing and controlling pollution. In addition, the IDEQ recognizes that technology for controlling nonpoint source pollution is, in many cases, in the development stages and will likely take one or more iterations to develop effective techniques. The adaptive management process or feed back loop for implementation provides the flexibility necessary to identify and evaluate best management practices and, accordingly, modify individual implementation or conservation plans to reflect revised or new management practices. It is possible that after application of all reasonable best management practices, some associated TMDL targets may not be achieved as originally established. Nevertheless, it is the expectation that nonpoint sources make a good faith effort to achieving their respective load allocations in the shortest practicable time.

The IDEQ also recognizes that expedited implementation will be socially and economically challenging. Further, there is a desire to minimize any economic impacts as much as possible consistent with protecting water quality and beneficial uses. The IDEQ further recognizes that, despite the best and most sincere efforts, natural events beyond the control of humans may interfere with or delay attainment of the TMDL and/or its associated targets. Such events could be, but are not limited to floods, fire, insect infestation, and drought. If a non-point source that is covered by the TMDL complies with its site specific or individual implementation plan, it will be considered in compliance with the TMDL.

The implementation of TMDLs and the associated conservation plans are enforceable under the applicable provisions of the water quality standards for point and nonpoint sources by the IDEQ, and other state agencies and local governments. However, it is envisioned that sufficient initiative exists on the part of the local stakeholders to achieve water quality goals with minimal enforcement. Should the need for additional effort emerge, it is expected that the responsible agency will work with land managers to overcome impediments to progress through seeking grant funds and supporting stakeholder requests for grants to fund data, evaluations and implementation testing or evaluation of point and nonpoint source controls. Enforcement may be necessary in instances of insufficient action toward progress which under Idaho Code §58.01.02.350.02(a) may cause an imminent and substantial danger to public health or environment. This could occur first through direct intervention from state or local land management agencies, and secondarily through IDEQ. The latter may be based on departmental orders to implement management goals leading to water quality standards.

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. Both primary contact recreation and secondary contact recreation are designated beneficial uses for the lower Payette River (IDAPA 16.02.2140.01.mm) and unlike some criteria such as temperature, are seasonally limited. At the time the TMDL was developed current water quality information, for fecal coli bacteria, demonstrated exceedances of water quality standards. This was also supported by data collected by DEQ in August 2001 that was analyzed for both fecal and E-coli bacteria. As a result the Lower Payette River Subbasin Assessment and Total Maximum Daily Load report was written.

However in April 2000, the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02) were revised in relationship to bacteria. The water quality standards now reference Escherichia Coli (E.coli) bacteria as the new standard for primary and secondary recreation. The revised water quality standard for primary recreation uses to be met indicates that E.coli bacteria must not exceed 406 E.coli per 100 milliliters (ml) for any given sample or 126 E.coli per 100 ml based on a geometric mean. The geometric mean is based on five (5) samples taken every three (3) to five (5) days within a 30-day consecutive period. The water quality standard indicates that for secondary recreational uses to be met E.coli must not exceed 576 E.coli per 100 ml for a single sample or 126 E.coli per 100 ml based on a geometric mean. As with the primary recreation standard, the secondary standard indicates that the geometric mean is based on five (5) samples taken every three (3) to five (5) days within a 30-day consecutive period.

Bacteria

E.coli Basics and Water Quality

E.coli is the abbreviated name of the bacterium in the family Enterobacteriaceae named Escherichia Coli which occur in all warm blooded animals. Approximately 0.1% of the total bacteria within an adult's intestine is represented by E.coli. The presence of E.coli and other kinds of bacteria within our intestines are necessary for us to develop and operate properly, and for us to remain healthy. Humans depend in part upon E.coli bacteria for our source of vitamin K and B-complex vitamins. However, certain strains of E.coli bacteria can be harmful to humans. These bad strains of E.coli can produce Vero-toxins. When Vero-toxins are produced they represent proteins which may cause severe damage to the cells that line the intestine. If the damage is severe the human body looses water and salt, blood vessels may be damaged, and hemorrhaging may occur. In very severe cases another syndrome is involved which is called hemolytic uremic syndrome (HUS), which is characterized by kidney failure and the loss of red blood cells. HUS may also cause permanent kidney damage.

Thus the existence of E.coli in monitoring samples above the water quality standards is of public health concern and can contribute to the spread of disease in humans, domestic livestock and wildlife.

Criteria/Standard

At the time the TMDL was developed the State of Idaho had established fecal coliform bacteria criteria to determine support status of the beneficial uses primary and secondary contact recreation. The lower Payette River was to be 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 and included the following criteria for fecal coliform:

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 was:

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.

In April 2000, the State of Idaho revised the water quality standards to establish criteria for E.coli to determine support status of the beneficial uses for primary and secondary recreation. As with the previous standard, the Lower Payette River is to be protected for both primary and secondary contact recreation. Additionally, the revised primary and secondary standards do not include a designated time period similar in nature to the old fecal coliform standard. The criteria for E.coli is as follows:

a) 406/100 ml at any time; or
b) 126/100 ml based on a geometric mean.

The standard for secondary contact recreation indicates:

a) 576/100 ml at any time; or
b) 126/100 ml based on a geometric mean.

The geometric mean is calculated based on five (5) samples where an individual sample is taken every three (3) to five (5) days within a 30-day consecutive period.

For the purposes of the Lower Payette TMDL Implementation Plan, E-coli bacteria will be hereby used as a surrogate indication of bacteriological water quality within the subbasin. As such, all future monitoring within the Lower Payette River down stream of the Black Canyon Dam associated with the Lower Payette River TMDL Implementation Plan will be collected in relationship to and for E-coli bacteria analysis.

E-coli analysis was conducted in August 2002 to help quantify E-coli loads for the Lower Payette River. Results for the analysis are listed in Figure 3. It should however be noted that one station, LPR-007 was sampled 6 times while all other stations were only sampled 5 times. This was due to a significant increase in the bacteria count that occurred on August 14, 2002 (Table 2). A Grubbs Test for outlying observations was conducted for the August 14, 2002 sample. Based on the Grubbs analysis, rejection of the sample is most likely warranted. A possible explanation for the high E-coli count could be that a sample of fecal matter was collected in the raw water sample causing the significant increase. Further water quality analysis conducted August 26, 2002 resulted in a 62 E-coli per 100 ml at LPR-007. Additionally, a review of the trip blank data from all sampling dates would indicate that the sample bottles were properly disinfected and that they were most likely not the source of contamination.

Table 2. August 2002 E-coli Monitoring Data

Station	Date	Total Coliform	E-Coli	Flow (cfs)
LPR-001	8/01/02	820	10	1500
	8/05/02	1,200	15	1500
	8/09/02	1,200	4	1450
	8/14/02	800	7	1600
	8/19/02	540	1	2000
	8/26/02	NA	NA	NA
	Geometric Mean	**874**[3]	**5**[3]	**1599**[1]
Lpr-002	8/01/02	4,800	7	
	8/05/02	5,600	20	
	8/09/02	5,600	36	
	8/14/02	3,700	12	
	8/19/02	6,500	9	
	8/26/02	NA	NA	
	Geometric Mean	**5,419**[3]	**14**[3]	**1259**[2]
Lpr-003	8/01/02	>4,800	67	850
	8/05/02	5,600	30	850
	8/09/02	5,600	44	800
	8/14/02	3,700	42	925
	8/19/02	6,500	24	1225
	8/26/02	NA	NA	NA
	Geometric Mean	**5,149**[3]	**39**[3]	**919**[1]
Lpr-004	8/01/02	>4,800	77	
	8/05/02	>9,600	120	
	8/09/02	8,700	57	
	8/14/02	12,000	86	
	8/19/02	13,000	68	
	8/26/02	NA	NA	
	Geometric Mean	**9,104**[3]	**79**[3]	**949**[2]
Lpr-005	8/01/02	>4,800	220	
	8/05/02	>9,600	120	
	8/09/02	>12,000	140	
	8/14/02	41,000	130	
	8/19/02	17,000	91	
	8/26/02	NA	NA	
	Geometric Mean	**13,097**[3]	**134**[3]	**979**[2]
LPR-007	8/01/02	>4,800	170	
	8/05/02	>9,600	160	
	8/09/02	12,000	130	
	8/14/02	>240,000	31,000	
	8/19/02	13,000	120	
	8/26/02	15,000	62	
	Geometric Mean	**17,675**[3] **9,208**[4]	**421**[3] **121**[4]	**1,009**[2]
LPR-008	8/01/02	>4,800	160	950

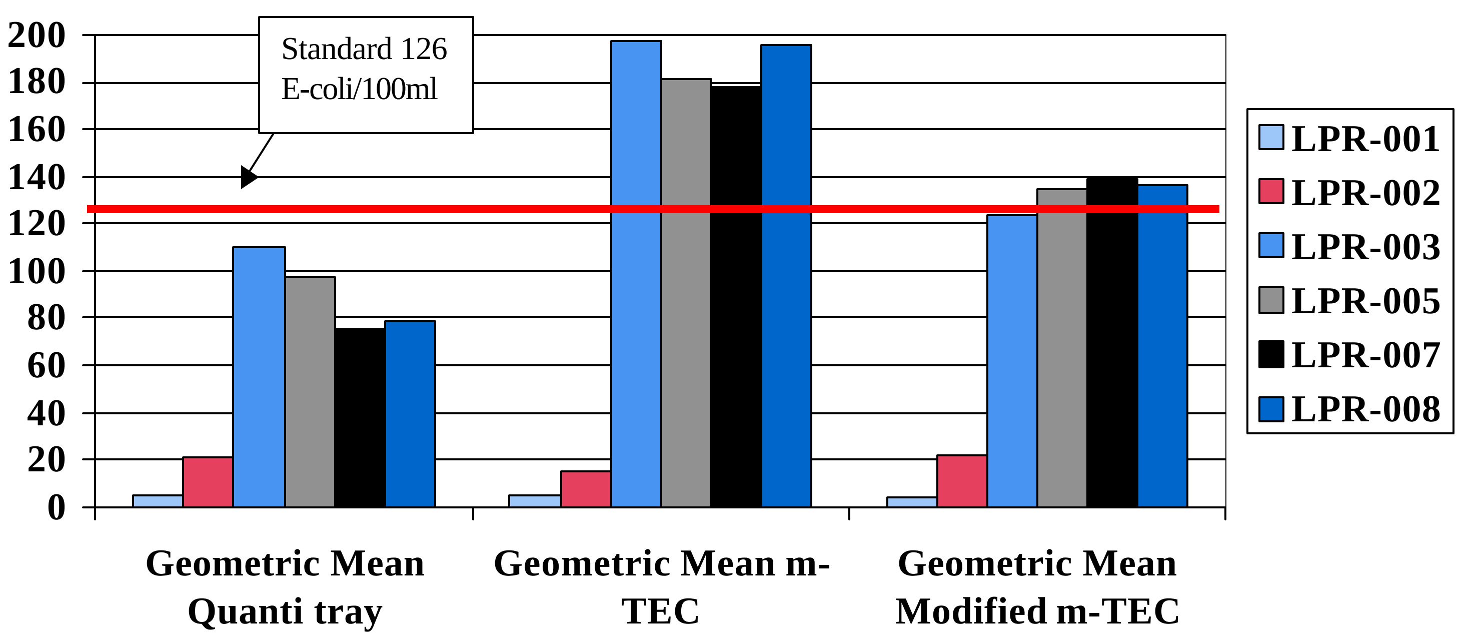
Station	Date	Total Coliform	E-Coli	Flow (cfs)
	8/05/02	>9,600	150	975
	8/09/02	>12,000	280	900
	8/14/02	21,000	310	1,025
	8/19/02	17,000	110	1,425
	8/26/02	NA	NA	NA
	Geometric Mean	**11,457**[3]	**187**[3]	**1,040**[1]

[1]Actual Flow Taken From USGS Gauge Graphs
[2]Estimated Flow in CFS
[3]Geometric Mean Including August 14, 2002 Monitoring Sampling
[4]Geometric Mean for LPR-007 without August 14, 2002 and with August 26, 2002 Monitoring Sample

Monitoring Data

Historic USGS and BOR (USGS and BOR STORET Retrieval, 1996) data indicated the fecal coliform bacteria counts in violation of water quality standards for both primary and secondary contact recreation. This was further documented in 1996 and 1997 with several violations of the state primary and secondary standard from the Letha Bridge to the Snake River. However, E-coli data collected in August 2001 is much less clear as shown in Figure 2. This is primarily due to the fact that varying test methods were used which sometimes result in differences in analytical results even for the same sample. These differences can be seen in Figure 2, which represent the varied analytical techniques, used in 2001. However, test results from August 2002 (Figure 3) closely match the test results from the Modified m-Tec methods. As such, the August 2002 sampling results were utilized in the loading analysis. Additionally, an additional station LPR-004 was sampled in 2002, but was not sampled in 2001.

Figure 2. August 2001 E-coli Analysis



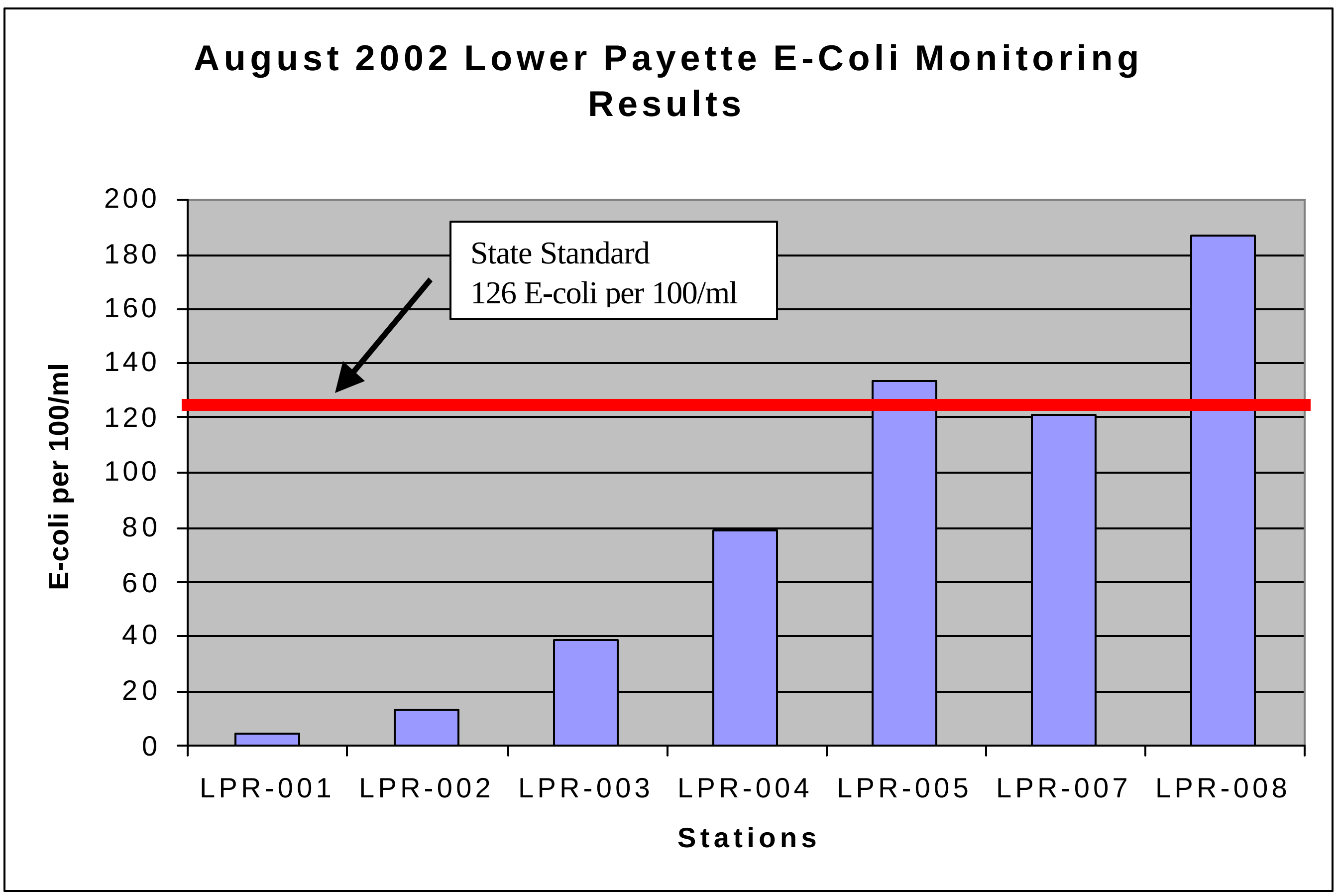
Transport

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. Additionally, unlike many inorganic contaminants (phosphorous, nitrates, etc.) E.coli bacteria are most likely not uniformly distributed through the water column and samples taken even a few minutes apart may show significantly different results. As such, it is difficult to quantify bacteria load reduction as part of the TMDL implementation plan.

Potential Bacteria 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 and the fact they do not have a direct discharge to the Lower Payette River. The three other WWTPs all disinfect their effluent to assist with the reduction of microorganisms. CAFOs or AFOs are point sources that can generate large amounts of animal waste, and if not properly managed, are sources of bacteria.
Faulty septic systems, wildlife, sludge disposal, industrial land application, animal waste land application, stormwater, or other non-discrete sources can also contribute to bacterial contamination.

Figure 3. August 2002 E-coli Monitoring



Point Sources

In the last few years, the WWTPs in Emmett, Fruitland and Payette have completed upgrades for facilities to provide secondary treatment of wastewater 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 four WWTPs were recently issued new NPDES permits from the EPA. While each facility is to monitor for a number of pollutants including E.coli and phosphorus, only E.coli limits were included in each of the permits.

In 1995, a Memorandum of Understanding (MOU) between the EPA, DEQ and Idaho State Department of Agriculture (ISDA) was signed to provide ISDA 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 should reduce the occurrence of discharges to surface waters and reduce impacts to ground water.

Bacteria Loading Analysis and Load Reduction

Data for Bacteria Load Determination

Bacteria results from the monitoring conducted in August 2001 were used to calculate in river geometric means with the month of August appearing to be the most critical for bacteria loading to the lower Payette River. Flow was determined from the BOR and USGS gage sites and from flow data obtained from the ISDA drain and tributary monitoring conducted in 1996-98 (Campbell, 1997b), and DEQ 1992-93 (Ingham. 1996). 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 was <u>assumed</u> the bacteria levels are uniform throughout the water column.

Based on data collected in August 2001 the lower Payette River is not meeting water quality standards for both primary and secondary contact recreation for the months of May through September (IDAPA 16.01.02, 250.01). While three sampling methods were used in the August 2001 only two of the three methods were at the time of the monitoring approved methods by the EPA. Of the two approved methods (Modified m-TEC, m-TEC), both methods show water quality violations from monitoring stations LPR-005 through LPR-008. The August 2002 water quality monitoring verified that water quality violations occur from LPR-005 downstream to the confluence of the Snake River. Additionally, the August 2001 m-TEC method showed a violation at LPR-003. However, no violations were noted in the 2002 sampling and as such no E-coli bacteria reductions were calculated for this station. The August 2002 monitoring results were subsequently used to calculate the necessary load reductions. Based on the 2002 monitoring, present bacteria levels would need to be reduced by 33% at LPR-008 to achieve water quality standards of 126 colonies per 100 ml. However, this figure does not include a margin of safety as required in a TMDL. 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.

Loading Calculations

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

Colony Forming Units/sec = Colony Forming Units/100 ml*Flow(cfs)*28.32(l/cf)*10(100 ml/l)

This formula provides the number of organisms passing a certain point in one second. As an example: Station LPR-002 has an average bacteria level of 14 Colony Forming Unit/100 ml, and a flow of 1259 cfs. Using the above formula, the calculated Colony Forming Unit/second is 4.99*E+06 Colony Forming Unit/sec*. Additionally, as a more conservative approach, no die-off rate was applied to the data.

Load Reductions

To achieve the load capacity of 3.71E+07 Colony Forming Unit/sec (without a margin of safety) at the confluence of the lower Payette River and the Snake River, an overall load reduction between 6 to 33% of the present load will need to occur at each of the monitoring stations below LPR-005. Table 3 shows the actual bacterial limits that will need to be met at each of the monitoring locations.

Table 3. E-Coli Load Capacity for the Lower Payette River.

River Station	Flow cfs	Measured Level Colony Forming Unit/100ml [2]	Measured Load Colony Forming Unit/sec	In-Stream Criteria Colony Forming Unit/100ml [3]	Load Capacity Colony Forming Unit/sec	% Load Reduction To Meet Criteria[2] Colony Forming Unit/sec
LPR-001	1599	5	2.26 E+06	126	5.71 E+07	-NA
LPR-002	1259[1]	14	4.99 E+06	126	4.49 E+07	-NA
LPR-003	919	39	1.02 E+07	126	3.28 E+07	-NA
LPR-004	949[1]	79	2.12 E+07	126	3.39 E+07	-NA
LPR-005	979[1]	134	3.72 E+07	126	3.49 E+07	6%
LPR-007	1009[1]	121	3.46 E+07	126	3.60 E+07	-NA
LPR-008	1040	187	5.51 E+07	126	3.71 E+07	33%

[1] Estimated Flows
[2] % Load Reduction Necessary of Measured Load

Margin of Safety

Margin of safety (MOS) will be based on work completed as part of the original TMDL. As such, the 17.4% MOS from the original TMDL will be applied at each of the monitoring stations along the Lower Payette River. If instream criteria of 104 Colony Forming Units (82.6% of 126) can be maintained at each monitoring station, then both the load and margin of safety should be met.

Wasteload Allocation

For the Lower Payette River the wasteload allocation is set at the most stringent discharge limitations under the current NPDES permits (126 Colony Forming Unit/100ml). Each permit was recently revised and data to calculate the wasteload allocation was based on sampling results from April 2002. Flow information from the original TMDL for the wastewater treatment plants was also used. The overall contribution by the municipal wastewater treatment plants (WWTP) is minimal, with an over all contribution of approximately 0.004% of the total load to the river. Further reductions, or total elimination from the NPDES permitted facilities would have no impact to the overall load reduction goals.

Confined animal feeding operations (CAFOs) or animal feeding operations (AFOs) are 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).

Load Allocation

Non-point sources (NPS) are the major contributor to the bacteria load to the lower Payette River. Water quality monitoring indicates no violations of the water quality standards occur prior to the monitoring station LPR-004. It is therefore assumed that sources upstream of monitoring station LPR-004 will either maintain or reduce nonpoint sources of bacteria in order to continue meeting state water quality standards as outlined on the State of Idaho's Policy for No-Net Increase (PM98-2) at monitoring stations LPR-001 through LPR-004.

Data was available from the ISDA for a number of drains within the Lower Payette River subbasin. The data indicated individual samples greater than 406 E-coli per 100 ml. However, subsequent data were not collected in a manner that would allow for the calculation of a geometric mean as indicated in IDAPA 58.01.02.251. As such, the data was not utilized in the development of the implementation plan.

Table 4 indicates the current load allocation at each of the six monitoring stations and the reductions necessary (including the MOS) that will be necessary to protect water quality within the Lower Payette River down stream of the Black Canyon Dam. This is based on an E-coli bacteria level of 104 E-coli per 100 ml.

Table 4. E.coli Load Allocation

River Station	Name	Current Load	Calculated Allocation w/ MOS	% Reduction Required Above Present Bacteria Levels
LPR-001	Black Canyon Dam (River Mile 35)	2.26E+06	4.74E+07	**NA**
LPR-002	Below Emmett Wastewater Treatment Plan (River Mile 29.5)	4.99E+06	3.71E+07	**NA**
LPR-003	Letha Bridge (River Mile 25)	1.02E+07	2.71E+07	**NA**
LPR-004	Falk Bridge (River Mile 18)	2.12E+07	2.80E+07	**NA**
LPR-005	Blacks Bridge (River Mile 12.8)	3.72E+07	2.89E+05	**22%**

River Station	Name	Current Load	Calculated Allocation w/ MOS	% Reduction Required Above Present Bacteria Levels
LPR-007	Highway 95 Bridge (River Mile 4.1)	3.46E+07	2.97E+07	**14%**
LPR-008	Below Payette Wastewater Treatment Plant (River Mile 0.5)	5.51 E+07	3.07E+07	**44%**

Phosphorus Loading Analysis and Load Reduction

Based on the information in the Lower Payette River Subbasin Assessment and Total Maximum Daily Load, nutrients have not been shown to be causing impairment to the beneficial uses in the Lower Payette River. However, data analyzed as part of the Snake River-Hells Canyon TMDL indicates that 1,565 lbs/day of phosphorus are being delivered to the mouth of the Payette River based on an average flow and average concentration from May through September annually. Data presented in the draft Snake River -Hells Canyon Total Maximum Daily Load also indicates that phosphorus levels routinely exceed the proposed 0.07-ppm target throughout much of the calendar year, but must meet the target from May through September annually. This equates to 1,096 lbs/day target at an average flow and concentration and will require that all nonpoint and point sources reduce existing levels of phosphorus by 30% to meet this target.

Pesticides

The Oxbow Reservoir segment of the Snake River-Hells Canyon TMDL is listed for pesticides, specifically DDT (1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane) and Dieldrin. Fish containing high levels of pesticides can pose a threat to predatory wildlife. Because of the risk presented to wildlife and the potential human health concerns, DDT was banned in 1973 in the United States, except or public health emergencies and the use of Dieldrin was phased out between 1974 and 1987. Both t-DDT and Dieldrin have been subsequently detected in water column and sediment samples at the mouth of the Lower Payette River.

The current load allocation for t-DDT and Dieldrin has been set at zero for the Snake River-Hells Canyon TMDL with the current loading of these pesticides to be considered as background from legacy sources. The legacy application load allocation for the upstream Snake River segment which encompasses the confluence of the Payette River have been set at 0.31 kg/year and 0.88 kg/year respectively. The Snake River-Hells Canyon TMDL recommends that a watershed-based approach be employed to identify potential sources of these pesticides and to implement prudent measures to remove or reduce the transport and availability of these sources. In the Lower Payette, the monitored reduction of phosphorus and sediment from implemented best management practices will function as an indicator of reduction in transport and delivery for these pesticides. Additionally, load allocations for pesticides do not vary seasonally and will be applied year-round. Critical condition, when the majority of transport is projected to occur is April through October, encompassing the spring runoff and summer irrigation season.

Sediment

The upstream Snake River segment (river mile 409-335), the Brownlee Reservoir segment, and the Oxbow Reservoir segment were listed for sediment. Water quality standards indicate that sediment shall not exceed quantities that impair designated beneficial uses. Data from 1995-1996 and 2000 combined with average flow indicates that the Payette River delivers 303,989 lbs/day to the Snake River. The Snake River-Hells Canyon TMDL calculated a 50-mg/l target load in order to restore beneficial uses. This equates to a 653,737 lbs/day load at the confluence of the Payette and Snake Rivers. As such, no additional load reduction is necessary to meet the 50-mg/l target.

Mercury

Mercury was not recognized in the Lower Payette River Subbasin Assessment and Total Maximum Daily Load as a pollutant impairing beneficial uses. However, the Snake River-Hells Canyon is listed from river mile 409 to 188 for mercury. Available data indicates that mercury concentration in fish tissues exceeds targets established in the Snake River-Hells Canyon TMDL. Potential sources of mercury include natural source in the Weiser and Owyhee Basins and anthropogenic sources associated with mercurial seed treatment, sewage sludge and wastewater treatment facilities, landfills, mining, and air deposition.

Additionally, the Snake River-Hells Canyon TMDL indicates that water column data is not available to allow for an assessment of the use support status of aquatic life. As such, a load was not calculated for the Snake River-Hells Canyon TMDL and the mercury TMDL has been rescheduled until 2006 in order to collect additional data to better determine the sources and extent of mercury contamination.

Temperature

The state of Idaho has established temperature standards to protect cold water biota and salmonid spawning based on a one time sampling event and/or a daily average. For cold water biota, the standard is 22ºC or less with a daily average no greater than 19ºC. For salmonid spawning, the standard is a maximum of 13ºC or less with a maximum daily average of 9ºC. Monitoring data collected throughout the Lower Payette reach below the Black Canyon Dam routinely demonstrates temperature exceedances during the critical period from March 15th to July 15th. The Lower Payette River Subbasin Assessment and Total Maximum Daily Load recognized that waters coming out of the Black Canyon Dam routinely exceeded the state water quality standards of 19ºC. Since the Black Canyon Dam is a man made structure the requirements under 40 CFR 131.10(g)(3)(4)(5) were applied and include:

- States may remove a designated use which is not an existing use, as defined in §131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is not feasible because:
  - ❖ (3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
  - ❖ (4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a manner that would result in the attainment of the use; or
  - ❖ (5) Physical conditions related to the natural features of the water body, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attainment of aquatic life protection uses.

As part of the Snake River-Hells Canyon TMDL, the State of Oregon's water quality standards in relationship to temperature are stricter that Idaho's. As such, Oregon's standards apply of 17.8ºC apply to the mainstem of the Snake River. The Snake River-Hells Canyon TMDL recognized that natural atmospheric and non-quantifiable influences preclude the attainment of the 17.8ºC target. The Snake River-Hells Canyon TMDL also recognized that anthropogenic influences should not elevate water temperature from June through September by more than 0.14ºC.

An analysis of available data collected by the ISDA for the Lower Payette River (Table 5) indicates that water returning to the Lower Payette River through agricultural drains and canals is cooler than the existing river temperature. The following mixing formula was used to calculate the impacts to water inflows on the temperature.

$$T_j= ((Q_1T_1 + Q_2T_2)/Q_1+Q_2)$$

T_J = Temperature below junction
Q_1 = Initial flow
T_1 = Initial temperature
Q_2 = Change in flow
T_2 = Change in temperature

The mixing equation indicates that if the impacts from solar radiation are discounted, water entering the Snake River below the city of Payette would meet the 17.8ºC target (Table 6). As such, it was determined that anthropogenic sources are not impacting water temperatures in such a fashion to elevate temperature greater than 0.14ºC. As such additional reductions related to temperature will not be required. However, it is well recognized that many of the best management practices associated with sediment and nutrient removal can have a positive impact on temperature when fully developed.

Table 5. Lower Payette Temperature Data

Station	Diversion/Return	River Temperature	Inflow Temp
LPR-001		**19.7**	
	Plaza		17.6
	Mesa		17.1
	Big 4		18.3
	Ground Water		10
LPR-002		**20.3**	
	Pioneer		17
	Beacon		16.7
	Tunnel #7		18.2
	Ground Water		10
LPR-003		**19.6**	
	Silverleaf		19
	Sand Hollow		18.8
	7 Mile Slough		19.6
	County Line		20.5
	Ground Water		10
LPR-004		**19.5**	
	Bissel Creek		16.5
	S-2		17.4
	S-3		20.6
	Ground Water		10
LPR-005		**19.5**	
	S-5		18.6

Station	Diversion/Return	River Temperature	Inflow Temp
	S-10		17.9
	S-12		17.8
	S-13		16.9
	S-14		17
	S-15		18.2
	Willow Creek		23.5
	49er Slough		20.7
	Ground Water		10
LPR-007		**20.8**	
	49er Slough		20.7
	Ground Water		10
LPR-008		**20.8**	

Table 6. Predicted Temperature Based on Mixing Equation

Station	River Temperature	Predicted temperature
LPR-001	19.7	NA
LPR-002	20.3	18.9
LPR-003	19.6	18.4
LPR-004	19.5	18.1
LPR-005	19.5	17.6
LPR-007	20.8	17.7
LPR-008	20.8	17.6

Dissolved Oxygen

Dissolved oxygen was recognized in the Snake River-Hells Canyon TMDL to be a limiting factor from river mile 335 to 285. This reach of the river is downstream of the confluence of the Payette and Snake Rivers and as such no load allocation was developed for the Payette system. However, it is well recognized that many of the best management practices associated with sediment and nutrient removal that have and will be implemented within the various subwatershed in the Lower Payette region can have a positive impact on the dissolved oxygen content when fully developed.

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 cannot be achieved by upgrades of the point sources alone. Current NPDES permits should be sufficient for dairies and feedlot operations. CAFOs and AFOs are not required to monitor and are allowed to discharge wastewater only under certain infrequent climatic conditions (EPA, 1996). The state has responsibility under э401 of the CWA to provide water quality certification. Under this authority, the state reviews the projects to determine applicability to local water quality issues.

Non-Point Sources

Under §319 of the Clean Water Act, each state is required to develop and submit a nonpoint source management plan. The Idaho §319 Nonpoint Source Management Program Plan (IDEQ, 1999a):

- Identifies programs to achieve implementation of best management practices (BMPs);
- Includes a schedule for program milestones;
- Certified by the State Attorney General;
- Identifies available funding sources; and
- Describes non-regulatory and regulatory approaches the state will take to abate nonpoint pollution sources.

The State of Idaho's §319 Nonpoint Source Management Program Plan (IDEQ, 1999a) was revised and approved by the Environmental Protection Agency (EPA) in December 1999 and included the nine-key elements as outlined by the EPA. These included:

1. Explicit short and long-term goals, objectives and strategies to protect surface and ground water.
2. Strong working partnerships and collaboration with appropriate state, tribal, regional, and local entities, private sector groups, citizen groups, and Federal agencies.
3. A balanced approach that emphasized both statewide nonpoint source programs and on-the-ground management of individual watersheds where waters are impaired or threatened.
4. The State program (a) abates known water quality impairments resulting from nonpoint source pollution, and (b) prevents significant threats to water quality from present and future activities.
5. An identification of waters and watersheds impaired or threatened by nonpoint source pollution and a process to progressively address these waters.
6. The State reviews, upgrades, and implements all program components required by э319 of the Clean Water Act and establishes flexible, targeted, interactive approaches to achieve and maintain beneficial uses of waters as expeditiously as practicable.
7. Identification of Federal lands and objectives which are not managed consistently with State program objectives.
8. Efficient and effective management and implementation of the State's nonpoint source program, including necessary financial management.
9. A feedback loop whereby the State reviews, evaluates, and revises its nonpoint source assessment and its management program at least every five years.

For further information on the nonpoint source management program a copy of the State of Idaho §319 Nonpoint Source Management Program Plan (IDEQ, 1999a) can be obtained from the IDEQ.

The State of Idaho uses a non-regulatory approach to control agricultural nonpoint sources. However, regulatory authority can be found in the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02.350.01 through 58.01.02.350.03). IDAPA 58.01.02.054.07 refers to the Idaho Agricultural Pollution Abatement Plan (IDEQ, IDL, SCC, 1991), which provides direction to the agricultural community and includes a list of approved BMPs. A portion of the Idaho Agricultural Pollution Abatement Plan (IDEQ, IDL, SCC, 1991) outlines responsible agencies or elected groups, such as the soil conservation districts, necessary to address nonpoint source pollution problems. For agricultural activity, the Payette and Gem Soil and Water Conservation Districts in cooperation with the Soil Conservation Commission will assist landowners in developing and implementing BMPs to abate nonpoint pollution. This effort to reduce all pollutants of concern toward the water quality standards is expected to continue for the long-term and may take as much as 20-years or more to complete.

The Idaho Water Quality Standards and Wastewater Treatment Requirements specify that if water quality standards are not being met, even with the use of BMPs, the state may request that the designated agency evaluate and/or modify the BMPs to protect beneficial uses. The Idaho Water Quality Standards and Wastewater Treatment Requirements also provides that the state may seek injunctive relief for those situations that may be determined to be an imminent and substantial danger to public health or environment (IDAPA 58.01.02.350.02(a)).

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.

Agricultural Implementation Components

The agricultural component of the Lower Payette River Implementation Plan outlines an approach for meeting the requirements for pollution reduction as set forth in the Lower Payette River Subbasin Assessment and Total Maximum Daily Load.

The goal of the Payette Soil and Water Conservation District (SWCD), Gem Soil and Water Conservation District (SWCD), and their technical support agencies is to restore the designated beneficial use of primary contact recreation to full support.

The objective of this portion of the implementation plan is to provide a framework to reduce the amount of bacteria entering the Lower Payette River (Figure 4) from agriculture. Table 7 outlines the general land use within each subwatershed. Agriculture is categorized as a non-point source of pollutants, and as such any implementation efforts are completed on a voluntary basis. This plan does not address bacteria reduction for non-point sources other than agriculture. Potential agricultural sources of bacteria include livestock grazing, concentrated livestock feeding areas and field application of manure on irrigated cropland. Pollutant reductions will be achieved through application of Best Management Practices (BMPs) and Resource Management Systems (RMS).

Figure 4. Agricultural Land Use in the Lower Payette River Watershed

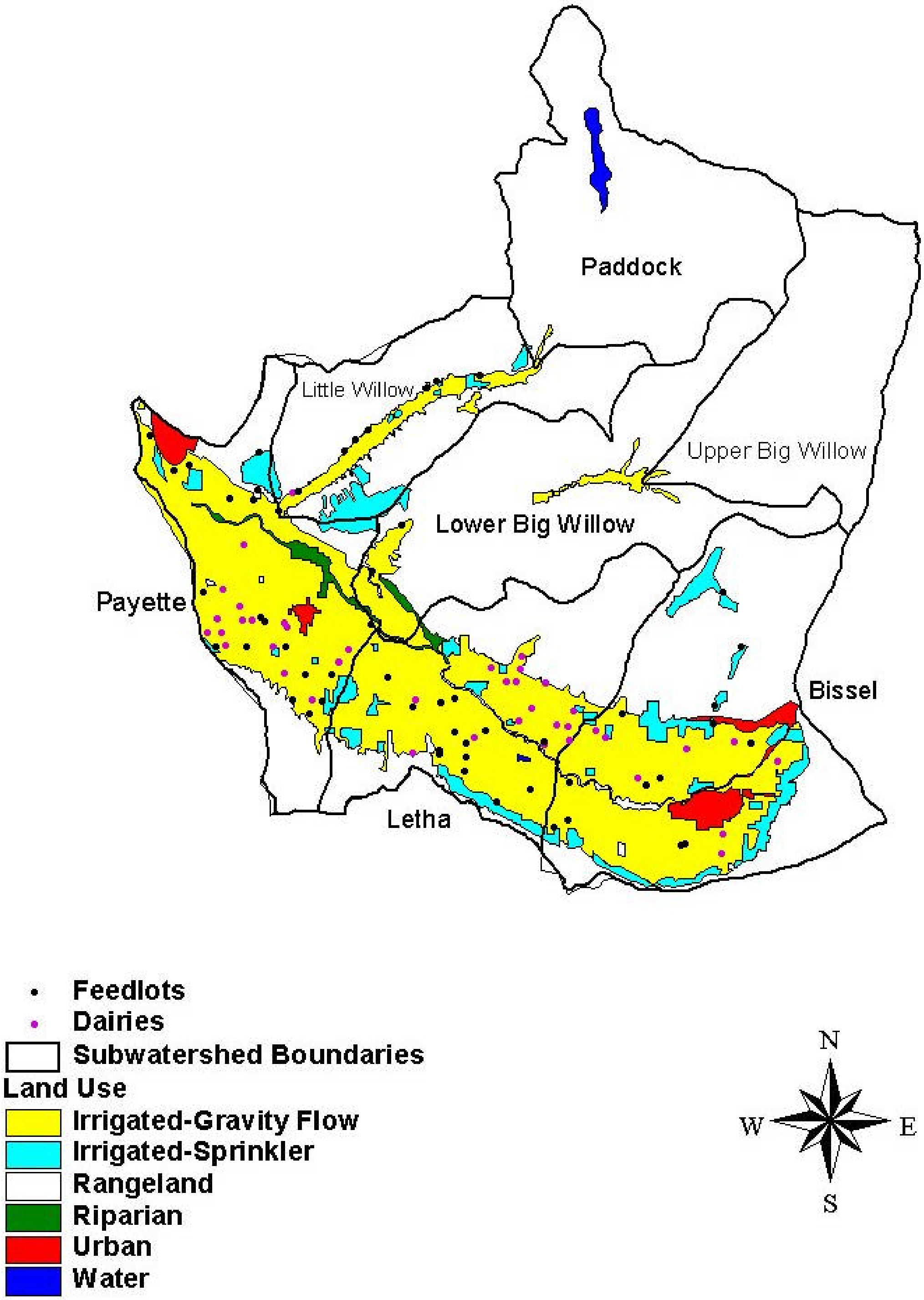


Table 7. Land Use by Subwatershed

Land Use	Unit	Subwatershed							Totals
		Payette	Letha	Bissel	Lower Big Willow	Upper Big Willow	Little Willow	Paddock	
Irrigated Cropland, Gravity	Acre	27,940	25,368	25,275	4,578	116	4,094	148	**87,516**
Irrigated Cropland, Sprinkler	Acre	1,554	2,747	6,492	192	0	2,661	18	**13,664**
Rangeland	Acre	12,741	23,194	38,926	53,642	43,353	32,593	55,648	**260,097**
Riparian	Acre	1,235	332	--	490	--	--	--	**2,057**
Urban	Acre	1,618	--	3,166	0	0	0	0	**4,784**
Dairies	Each	16	17	8	0	0	1	0	**42**
Feedlots	Each	19	14	13	2	0	8	0	**56**

The Payette and Gem SWCDs have a long history of proactive involvement in agriculture with addressing water quality issues and concerns. Both Districts have demonstrated their effectiveness in integrating state and federal funding programs for the implementation of local water quality solutions. In the past ten years, over 5,000 critical acres in Gem and Payette Counties have been involved in State and Federal cost-share programs to implement BMPs.

Past and Present Implementation Efforts

In Payette County, there have been two water quality projects implemented in priority areas in the Payette subwatershed. These priority areas utilized funding from the Idaho Water Quality Program for Agriculture (IWQPA) and the Environmental Quality Incentives Program (EQIP). These funds assisted landowners with addressing water quality concerns in a 13,000-acre area between Fruitland and New Plymouth on the south side of the Payette River. These programs provided cost-share assistance to landowners to help offset the costs of installing BMPs. There are currently numerous new contracts being implemented on 500 acres within the priority area. The Payette Natural Resources Conservation Service (NRCS) Field Office is currently working to complete conservation plans and contracts on additional irrigated cropland and dairies/feedlots within this area. Agriculture producers outside this priority area also participate in various other State and Federal programs to implement BMPs, however the funding is more limited and competitive.

In Gem County there have been 29 EQIP contracts funded in the Lower Payette TMDL area. These EQIP contracts were approved from 1997 through 2002. Twelve of these EQIP contracts were approved under the EQIP Western Emmett Bench Conservation Priority Area (CPA) from 2000 through 2002. This CPA is located on the west bench north of the Payette River and below the Emmett Irrigation Canal, covering Sand Hollow Creek and Bissel Creek subwatersheds. All 29 EQIP contracts cover a total of 2,315.1 acres that are planned to a Resource Management System (RMS), addressing the natural resource concerns of soil, water, air, plants, and animals. The following is a breakdown of the EQIP contract areas, 791.6 acres conversion from surface irrigation systems to sprinkler irrigation systems, 1099.5 acres of surface irrigation system upgrade, 314 acres of sprinkler irrigation system upgrade, and 110 acres of animal waste systems located on 2 dairies. There is also one Wetland Reserve Program (WRP) contract that covers 118.0 acres 3 mile west of

Emmett adjacent to the Payette River. The purpose of the WRP and contract is to restore wetlands that were lost in the past to agriculture activities. There is one Flood Easement contract that covers 46.2 acres located adjacent to the Payette River and Bissel Creek. The purpose of this contract is to restore wetlands and protect them from future flood events. There is also 3 IWQPA contract that covers 200 acres north of Emmett on the south side of the Payette River. The IWQPA contracts address the conversion of surface irrigation systems to sprinkler irrigation systems, feedlot animal waste storage facilities, and fencing. Currently under the Farm Security and Rural Investment Act (Farm Bill) the EQIP, WRP and other conservation programs will continue to be funded through 2007, where additional conservation contract will be funded and BMPs implemented.

Conservation Planning

Landowners/operators who participate in State or Federal cost-share programs must first develop a conservation plan. The NRCS, ISCC, and local Conservation Districts provide technical assistance for the development of conservation plans. Each plan consists of a complete inventory and evaluation of all resource concerns that exist on a given operation. A full assessment of crop rotation, tillage operations, irrigation water management, nutrient management, and waste storage and handling is completed in order to evaluate a benchmark condition and then evaluate several alternative BMP packages to best solve the resource concerns. Each plan must have BMPs to address all the resource concerns related to soil, water, air, plants, and animals.

Implementation Time Frame

The average annual combined funding available to Gem and Payette Counties over the past five years has been approximately $420,000. This figure is the funding that has been available through both State and Federal cost-share programs delivered by the NRCS and the ISCC. Yearly funding levels do fluctuate. If future funding levels remain consistent with the past, the installation of the BMPs outlined in this plan would take approximately 15 years. The LP-WAG will support evaluating the progress of implementation efforts every 3-5 years. This would allow the LP-WAG to document implementation success or adjust implementation efforts if determined necessary.

Agricultural Monitoring and Evaluation

ISDA along with the ISCC, Idaho Association of Soil Conservation Districts (IASCD), and the Lower Payette Watershed Advisory Group will develop a water quality monitoring plan that will allow trend analysis of water quality and gauge progress toward meeting the TMDL load reductions. The proper time to revisit the subwatershed for evaluation of water quality improvements will be decided through joint agency cooperation, data review, and BMP implementation evaluation. This could be based on a number of factors including percent of critical acres treated, number of major contributors treated, or a specific time interval.

Critical Areas

The most likely potential agricultural sources of bacteria are concentrated livestock feeding operations (Dairies, Feedlots), uncontrolled livestock access to surface waters, surface runoff from irrigated pastureland adjacent to waterways, and potential runoff from land application of animal waste.

There are 56 feedlots and 42 dairies located within the Lower Payette Watershed. There are approximately 10,000 acres of pastureland, most of which parallels the Payette River along the floodplain corridor from Emmett to Payette.

By July 2001 all of the Dairies in Idaho were required to have completed Nutrient Management Plans, a State requirement under the authority of the ISDA. These plans called for each dairy to have adequate waste storage and handling facilities to accommodate a 25-year, 24-hour storm event. In addition, a nutrient budget for proper waste application on cropland balanced to meet crop needs yet timed and incorporated to prevent surface runoff is required on the land owned by the dairy. Feedlots in Idaho were recently placed under similar requirements under the authority of ISDA. They are scheduled to have Nutrient Management Plans by 2005.

It is important to mention that faulty septic systems, urban storm water runoff, and wildlife such as waterfowl and other birds may also be significant non-point source contributors to bacteria loading in the Lower Payette. Because of this, it is difficult to determine how much bacteria reduction can be attained by agriculture when there is no way of knowing how much bacteria agriculture is actually contributing. A recent E.coli DNA study conducted on the Lower Boise River showed that livestock (cows, horses, sheep, pigs) were the fourth greatest species found in the Lower Boise River behind waterfowl/birds, dogs, and humans (Draft, Lower Boise River Implementation Plan for Agriculture, 2001). However, the DNA analysis could not and was not designed to quantify the actual percentage of each individual species. To make any conclusions in regards to the DNA analysis other than the fact that certain species were present while others were absent is going beyond the bounds of the study.

Implementation Priority

Bacteria treatment priorities for all the subwatersheds are presented in Table 8. The prioritization of these subwatersheds is based on long-term irrigation return drain monitoring data (Kirk Campbell, ISDA, 1996-1998), in-river monitoring (Mike Ingham, IDEQ, 1996-1998) and the land uses existing in each subwatershed. Please refer back to Table 7 for acreage descriptions of each land use in each subwatershed.

Table 8. Agricultural Treatment Priorities

Subwatershed	Priority	Reason
Payette	High	16 dairies, 19 feedlots, high bacteria loading in drain monitoring data, predominately surface irrigated cropland, and significant pastureland adjacent to River and return drains.
Letha	High	17 dairies, 14 feedlots, high bacteria loading in drain monitoring data, predominately surface irrigated cropland, and significant pastureland adjacent to River and return drains.
Bissel	High	Eight dairies, 13 feedlots, high bacteria loading in drain monitoring data, predominately surface irrigated cropland, and significant pastureland adjacent to River and return drains.
Little Willow	Medium	One dairy, Eight feedlots, predominately rangeland with surface irrigated cropland and pastureland in bottoms along Little Willow Creek.
Lower Big Willow	Low	No dairies, two feedlots, almost entirely rangeland with limited surface irrigated cropland and pastureland adjacent to Big Willow Creek.
Upper Big Willow	Low	No dairies or feedlots, predominately rangeland with very little surface irrigated cropland.
Paddock	Low	No dairies or feedlots, predominately rangeland with very little surface irrigated cropland.

Treatment

Agricultural conservation and bacteria control practices are typically referred to as Best Management Practices (BMPs). These BMPs are nationally derived systems of component practices that are used alone or in combination to control, reduce, or prevent bacteria or other pollutants from entering water bodies. Many of the BMPs that will be utilized to contain or decrease bacteria loading into the Payette River are also effective BMPs in addressing other pollutants of concern such as sediment and/or nutrients. Sediment and nutrient reduction into the Payette River has been the focus of implementation efforts by the Payette and Gem SWCDs for many years. In light of the Lower Snake-Hells Canyon TMDL, additional BMPs focusing on nutrient control have been included as part of this document.

Animal Feeding Operations and Confined Animal Feeding Operations

An animal feeding operation (AFO) is defined in Federal Code (40 CFR 122.23) as a facility that meets the following criteria:

1) Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and
2) Crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

A confined animal feeding operation is defined generally as an AFO that:
1) Confines more than 1,000 animal units (AU): or
2) Confines between 301 to 1,000 AU and discharges pollutants:
    - Into waters of the U.S. through a man-made ditch, flushing system, or similar man-made device; or
    - Directly into waters of the U.S. that originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

As of July 1, 2001, all dairy facilities in Idaho have completed Nutrient Management Plans. Because of this, all the dairies in the Lower Payette Watershed are considered treated or have plans in place to address bacteria and nutrient concerns. Each of these Nutrient Management Plans will be verified by ISDA to ensure that adequate treatment is addressed in each plan and periodic soil testing will be required in order to ensure proper waste application on cropland is being done according to a nutrient budget. Beef cattle operations are scheduled to have Nutrient Management Plans completed by January 1, 2005.

Payette Subwatershed

Analysis of the monitoring data from selected irrigation return drains shows that the Payette subwatershed is the highest priority for treatment to control bacteria loading. In order to reach an overall E.coli bacteria reduction of 33% (without a margin of safety) at the confluence with the Snake River, the E.coli bacteria load being contributed from non-point sources in the Payette subwatershed would need to be reduced by 22% at LPR-005, 14% at LPR-007, and 44% at LPR-008. There are three treatment units in the Payette subwatershed, which are the greatest potential contributors of bacteria to the Lower Payette River from agricultural sources. Other treatment units exist in the subwatershed, however they are not considered a high priority or a significant source of bacteria loading to the Payette River.

Treatment Unit 1-Surface Irrigated Pasture

There are approximately 3,600 acres of surface irrigated pasture in the Payette subwatershed. There is roughly six miles of the Payette River that flows through predominately pastureland that is within the riparian corridor of the river. Table 9 shows different BMPs for pastureland with associated costs based on the level of treatment. The amount of acres treated with each BMP are estimates of what could be attainable or realistic treatment given the assumption that some of the BMPs are not appropriate for all of the acres within the treatment unit. Costs for BMPs were taken from current cost lists used for State and Federal agricultural cost-share programs. These costs represent the average rate to install each BMP.

Table 9. Payette Subwatershed Treatment Unit 1 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Sprinkler Irrigation	Acre	$650	1,000	$650,000	High
Irrigation Water Management	Acre	$5	3,600	$18,000	High
Prescribed Grazing	Acre	$8	3,600	$28,800	Medium
Use Exclusion	Acre	$14	70	$980	High
Fencing	Linear Foot	$1.30	63,360	$82,370	Medium
Basin Irrigation	Acre	$500	500	$250,000	High
Livestock Water-trough	Each	$775	54	$41,850	Medium
Total				**$1,072,000**	

Treatment Unit 2-Animal Feeding Operations

There are 19 total confined beef cattle feeding operations in the Payette subwatershed with 14 of them directly adjacent or in close proximity to irrigation return drains or other waterways. The greatest risk with confined feeding operations is the possibility of direct discharge of animal waste into a water body. The treatment is to have adequate waste storage structures (ponds, concrete structures) and adequate barriers (berms, dikes, concrete walls) to prevent animal waste from leaving the facility during a surface runoff event. Current engineering criteria for animal waste systems requires that the components of the system be sized to contain the amount of runoff that would be expected during a 25-year, 24-hour storm event. Table 10 shows BMPs and associated costs for animal feeding operations.

Table 10. Payette Subwatershed Treatment Unit 2 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Waste Management System	each	$66,667	14	$933,340	High
Nutrient Management	acre	$5	3,600	$18,000	High
Total				**$951,340**	

Treatment Unit 3-Irrigation Return Drains

There are approximately 11.3 linear miles of irrigation return drains that flow through pastureland in the Payette subwatershed. The greatest potential agricultural source of bacteria to these drains is direct discharge of animal waste due to unimpeded livestock access. Table 11 shows BMPs and associated costs to address livestock access to irrigation return drains. Many BMPs that could be used to address bacteria concerns in drains may not simply be practical. Since drains also serve as an outlet for ground water, burying them with pipelines is not recommended for long distances. They are also excavated periodically which makes establishing perennial vegetation on the banks and in the channel very difficult.

Table 11. Payette Subwatershed Treatment Unit 3 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Use Exclusion	Acre	$14	110	$1,540	High
Fencing	Linear Foot	$1.30	120,000	$156,000	Medium
Total				**$157,540**	

Letha Subwatershed

Analysis of the drain monitoring data shows that the Letha subwatershed is the second highest priority for implementation efforts to control bacteria. In order to reach an overall E.coli bacteria reduction of 44% at the confluence with the Snake River, the load being contributed from non-point sources in the Letha subwatershed would need to be held at present levels with a no net increase in bacteria from any source within the watershed. There are three treatment units in the Letha subwatershed, which are the greatest potential contributors of bacteria to the Lower Payette River from agricultural sources. Other treatment units exist in the subwatershed, however they are not considered a high priority or a significant source of bacteria loading to the Payette River.

Treatment Unit 1-Surface Irrigated Pasture

There are approximately 3,500 acres of surface irrigated pasture in the Letha subwatershed. There is roughly nine miles of the Payette River that flows through predominately pastureland that is within the riparian corridor of the river. Table 12 shows different BMPs for pastureland with associated costs based on the level of treatment. The amount of acres treated with each BMP are estimates of what could be attainable or realistic treatment given the assumption that some of the BMPs are not appropriate for all of the acres within the treatment unit. Costs for BMPs were taken from current cost lists used for State and Federal agricultural cost-share programs. These costs represent the average rate to install each BMP.

Table 12. Letha Subwatershed Treatment Unit 1 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Sprinkler Irrigation	Acre	$650	800	$520,000	High
Irrigation Water Management	Acre	$5	3,500	$17,500	High
Prescribed Grazing	Acre	$8	3,500	$28,000	Medium
Use Exclusion	Acre	$14	120	$1,680	High
Fencing	Linear Foot	$1.30	95,040	$123,550	Medium
Basin Irrigation	Acre	$500	500	$250,000	High
Livestock Water-trough	Each	$775	70	$54,250	Medium
Total				**$994,980**	

Treatment Unit 2-Animal Feeding Operations

There are 14 total feedlots in the Letha subwatershed, with nine of them directly adjacent or in close proximity to irrigation return drains or other waterways. The greatest risk with confined feeding operations is the possibility of direct discharge of animal waste into a water body. The treatment is to have adequate waste storage structures (ponds, concrete structures) and adequate barriers (berms, dikes, concrete walls) to prevent animal waste from leaving the facility during a surface runoff event. Current engineering criteria for animal waste systems requires that the components of the system be sized to contain the amount of runoff that would be expected during a 25-year, 24-hour storm event. Table 13 shows BMPs and associated costs for animal feeding operations.

Table 13. Letha Subwatershed Unit 2 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Waste Management System	each	$66,667	9	$600,000	High
Nutrient Management	acre	$5	3,500	$17,500	High
Total				**$617,500**	

Treatment Unit 3-Irrigation Return Drains
There are approximately 21.5 linear miles of irrigation return drains that flow through pastureland in the Letha subwatershed. The greatest potential agricultural source of bacteria to these drains is direct discharge of animal waste due to unimpeded livestock access. Table 14 shows BMPs and associated costs to address livestock access to irrigation return drains. Many BMPs that could be used to address bacteria concerns in drains may not simply be practical. Since drains also serve as an outlet for ground water, burying them with pipelines is not recommended for long distances. They are also excavated periodically which makes establishing perennial vegetation on the banks and in the channel very difficult.

Table 14 Letha Subwatershed Unit 3 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Use Exclusion	Acre	$14	208	$2,910	High
Fencing	Linear Foot	$1.30	227,040	$295,150	Medium
Total				**$298,060**	

Bissel Subwatershed

Analysis of the drain monitoring data shows that the Bissel subwatershed is the third highest priority for implementation efforts to control bacteria. In order to reach an overall E.coli bacteria reduction of 31% at the confluence of the Snake River, the load being contributed by non-point sources in the Bissel Subwatershed must be held at the present levels with a no-net increase at LPR-001, LPR-002 and LPR-003. There are approximately 3,000 acres of surface irrigated pasture in the Bissel subwatershed. There is roughly 13 miles of the Payette River that flows through predominately pastureland that is within the riparian corridor of the river. Table 15 shows different BMPs for pastureland with associated costs based on the level of treatment. The amount of acres treated with each BMP are estimates of what could be attainable or realistic treatment given the assumption that some of the BMPs are not appropriate for all of the acres within the treatment unit. Costs for BMPs were taken from current cost lists used for State and Federal agricultural cost-share programs. These costs represent the average rate to install each BMP.

Table 15. Bissel Subwatershed Treatment Unit 1 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Sprinkler Irrigation	Acre	$650	800	$520,000	High
Irrigation Water Management	Acre	$5	3,000	$15,000	High
Prescribed Grazing	Acre	$8	3,000	$24,000	Medium
Use Exclusion	Acre	$14	126	$1,765	High
Fencing	Linear Foot	$1.30	105,600	$137,280	Medium
Basin Irrigation	Acre	$500	500	$250,000	High
Livestock Water-trough	Each	$775	60	$46,500	Medium
Total				**$994,545**	

Treatment Unit 2-Animal Feeding Operations
There are 13 total feedlots in the Bissel subwatershed, with nine of them directly adjacent or in close proximity to irrigation return drains or other waterways. The greatest potential risk with confined feeding operations is the possibility of direct discharge of animal waste into a water body. The treatment is to have adequate waste storage structures (ponds, concrete structures) and adequate barriers (berms, dikes, concrete walls) to prevent animal waste from leaving the facility during a surface runoff event. Current engineering criteria for animal waste systems requires that the components of the system be sized to contain the amount of runoff that would be expected during a 25-year, 24-hour storm event. Table 16 shows BMPs and associated costs for animal feeding operations.

Table 16. Bissel Subwatershed Treatment Unit 2 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Waste Management System	each	$66,667	9	$600,000	High
Nutrient Management	acre	$5	3,000	$15,000	High
Total				**$615,000**	

Treatment Unit 3-Irrigation Return Drains
There are approximately 22.5 linear miles of irrigation return drains that flow through pastureland in the Bissel subwatershed. The greatest potential agricultural source of bacteria to these drains is direct discharge of animal waste due to unimpeded livestock access. Table 17 shows BMPs and associated costs to address livestock access to irrigation return drains. Many BMPs that could be used to address bacteria concerns in drains may not simply be practical. Since drains also serve as an outlet for ground water, burying them with pipelines is not recommended for long distances. They are also excavated periodically which makes establishing perennial vegetation on the banks and in the channel very difficult.

Table 17. Bissel Subwatershed Treatment Unit 3 BMPs and Associated Costs

Best Management Practice	Units	Cost/Unit	Units Treated	Total Cost	Bacteria Control Effectiveness
Use Exclusion	Acre	$14	220	$3,080	High
Fencing	Linear Foot	$1.30	237,600	$308,880	Medium
Total				**$311,960**	

Little Willow Subwatershed

Although there is no data available to determine the bacteria contribution from Little Willow Creek, there are eight feedlots in the Subwatershed that are potential sources of pollution and need treatment. All of these feedlots are adjacent or in close proximity to Little Willow Creek or irrigation return drains.

Lower Big Willow, Upper Big Willow, and Paddock Subwatersheds

These subwatersheds are predominately rangeland with very little concentrated livestock operations or surface irrigated cropland or pasture. It is unlikely that agricultural activities in these subwatersheds are a significant contributor to bacteria loading in the Payette River.

Operation, Maintenance, and Replacement

Participants will be required to maintain the installed BMPs for the life of their voluntary water quality contract. The water quality contract will outline the responsibility of the participant regarding operation and maintenance (O&M) for each BMP. The Payette and Gem Soil and Water Conservation Districts, the NRCS and ISCC will provide technical assistance for the installation of BMPs.

Payette and Gem SWCD, NRCS, ISCC and the applicable participant will make inspections of the installed BMPs during the life of the water quality contract on an annual basis. The intent is to develop a system of BMPs that will protect water quality and is socially and economically feasible to the participant. By accomplishing this objective, it is intended that the BMPs will become a part of the participant's farming operation and will continue to be operated and maintained after the water quality contract expires.

Agricultural Funding and Development

The ISCC and the ISDA have reviewed all available drain and river monitoring data and land use within the Lower Payette watershed with respect to agricultural activities. As such, the following subwatersheds are listed in priority order for the development and implementation of conservation plans as well as, to the extent practicable, for funding priority through the various funding sources. To the extent possible, all agricultural projects will be implemented in a phased approach using the priorities listed below and implementing best management practices on tier 1 acreage prior to treating other lands within the same watershed.

1. Payette;
2. Letha;
3. Bissel;
4. Little Willow;
5. Lower Big Willow;
6. Upper Big Willow; and
7. Paddock.

Private Agricultural - Tasks

Task 1: Develop water quality plan and water quality contracts on 66% of Treatment Unit 1 through 3 Lands for private agriculture lands
Milestone 1: October 2011
Responsible Agency: Payette and Gem Soil and Water Conservation Districts, Idaho Soil Conservation Commission and Natural Resources Conservation Service

Task 2: Start implementing water quality contracts on private agriculture lands
Milestone 2: Ongoing
Responsible Agency: Private land Owners

Task 3: Develop water quality plan and water quality contracts on remainder of Treatment Unit 1 through 3 Lands for private agriculture lands
Milestone 3: October 2015-2020
Responsible Agency: Payette and Gem Soil and Water Conservation Districts, Idaho Soil Conservation Commission and Natural Resources Conservation Service

Task 4: Continue implementing water quality contracts on private agriculture lands
Milestone 4: Ongoing
Responsible Agency: Payette and Gem Soil and Water Conservation Districts, Idaho Soil Conservation Commission and Natural Resources Conservation Service

Task 5: Perform annual status review on BMPs installed on private agricultural land
Milestone 5: In association with individual water quality contracts
Responsible Agency: Payette and Gem Soil and Water Conservation Districts and Idaho Soil Conservation Commission

Urban/Suburban Nonpoint Source Pollution

The make up of the lower Payette River valley has changed dramatically in the past 20-years. Rural areas associated with the communities of Emmett, Payette, Fruitland, Letha and New Plymouth are being subdivided into more urbanized areas. With the existing urban and suburban areas along with the new development comes the opportunity for increased nonpoint source pollution primarily associated with stormwater runoff and individual subsurface sewage systems (septic tanks). Pollutants can include but are not limited to nutrients, bacteria, sediment, metals, oil and grease to name but a few.

Initial goals and objectives to help meet the reductions outlined in this implementation plan include:

- City and county governments are encouraged to adopt the BMPs listed in the State of Idaho - Catalog of Storm Water Best Management Practices as an ordinance.

- City and county governments are encouraged to develop and implement a local storm water management program.

- Municipalities throughout Payette and Gem County are encouraged to develop and implement design strategies that are source-control oriented (i.e., on-site detention/retention programs, zero-discharge, minimizing directly connected impervious areas, site fingerprinting, etc.).

- County governments are encouraged to develop and implement erosion and sediment control ordinances targeting suspended solids that can cause many problems associated with water quality and may act as transport mechanisms for all types of pollutants.

- City and county governments are encouraged to adopt a "No Net Increase in Bacteria and Phosphorus." This would give local planning and zoning authorities the opportunities to ensure that changes in land use will not have potential to increase loading of bacteria or nutrients to the Lower Payette River.

- Municipalities will be encouraged to set aside and maintain sensitive lands that possess intact riparian vegetation, "classified" wetlands, steep slopes, and areas of high erodible soil types. When intact riparian vegetation and wetlands are radically altered, they lose their function as natural collection, filtering and storage systems. However, if they are left in tact, the natural landscape provides for the above mentioned beneficial functions.

- Municipalities will be encourage to review existing stormwater drainage systems to ensure that these systems do not include illicit discharges.

- Municipalities will be encouraged to focus stormwater implementation efforts related to:
    1. Source control measures to minimize or eliminate pollutant impacts to stormwater runoff;
    2. Improvements of existing transportation corridors to encourage unobstructed low velocity movement of stormwater and discourage ponding;
    3. Improvement of sedimentation or other passive treatment mechanisms immediately prior to discharge into surface waters;
    4. Emplacement of modular stormwater treatment systems in those locations for which diversion/sedimentation is not possible prior to discharge to surface waters;
    5. Develop and implement public education/outreach and pollution prevention on the impacts of stormwater through the development of BMP fact sheets such as: Household pet waste collection, illegal dumping, landscaping and lawn care, pest control, parking lot and street cleaning, septic system controls, and alternate environmentally friendly/safe products.
    6. Encourage public involvement and participation through such programs as: storm water stenciling, stream cleanup and monitoring, volunteer monitoring, wetlands planting, Adopt-A-Stream programs, attitude surveys, and community hotlines.

Stormwater Best Management Practices

A variety of BMPs are available to reduce pollutants from storm water runoff associated with construction activities as well as for post construction activities. Tables 18 lists a variety of construction BMPs, Table 19 lists a variety of post-construction BMPs along with a range of expected effectiveness, and Table 20 lists the potential associated costs, activities, and schedule for BMP maintenance. A more thorough description of these BMPs can be found in the EPA publication National Menu of Best Management Practices for Storm Water Phase II. This document can be found on the EPA website at *http://www.epa.gov/npdes/menuofbmps/menu.htm*.

The IDEQ has also published the "Environmental Planning Tools and Techniques – Linking Land use to Water Quality Through Community-based decision Making. The document can provide valuable insights into alternative source control measures and includes a discussion on both (1) watershed planning source control measures and (2) site design treatment measures. The document also includes model ordinances for an open space subdivision model and site disturbance model.

Table 18. Construction BMPs

BMP	Component Practice
Runoff Control	Land grading, permanent diversions, preserving natural vegetation, check dams, filter berms, grass-line channels, riprap and construction entrances. Construction entrance BMPs are generally associated with sediment rack that allow for sediment to fall from vehicles and be trapped on site prior to vehicles leaving a construction site.
Erosion Control	Chemical stabilization with polymers, mulching, permanent seeding, sodding, soil roughening, geotextile installation, gradient terraces, soil retention, temporary slope drains, and vegetated buffers.
Sediment Control	Diversion dikes, silt fences, brush barriers, sediment basins and rock dams, sediment filters and sediment chambers, sediment traps, and inlet protection.

Table 19. Post Construction BMPs and Associated Removal Rates

BMP	TSS	Total P	Total N	Nitrate-Nitrogen	Metals	Bacteria	Ammonia
Dry Retention Ponds	61%	19%	31%		26-54%		
Wet Ponds	67%	48%	31%	24%	24-73%	65%	
Infiltration Basin	75%	60-70%	55-60%		85-90%	90%	
Infiltration Trench	75%	60-70%	55-60%		85-90%	90%	
Porous Paving	82-95%	65%	80-85%		98-99%		
Bioretention		65-87%	49%				92%
Sand Filter	87%	51%	44%	-13%	34-80%	55%	
Peat/Sand Filter	66%	51%	47%	225	26-75%		
Compost Filter System	85-95%	4-41%		-34 to –95%	44-88%		
Multi-Chambered Treatment Train	83-98%	80-84%		14%	65-100%		
Shallow Marsh	83±51%	43±40%	26±49%		36-85%	76%	
ED Wetland	69%	39%	56%		-80 to 63%		
Pond/Wetland System	71±35%	56±35%	19±29%		0-57%		
Submerged Gravel Wetland	83%	64%	19%		21-83%	78%	
Grassed Swale	81%	29%	38%		14-55%	-50%	
75’ Filter Strip	54%	-27%		-27%			
150’ Filter Strip	84%	40%		20%			
Catch Basin	32-97%						
Swirl Separators	21-52%	17%		5%			

BMP	TSS	Total P	Total N	Nitrate-Nitrogen	Metals	Bacteria	Ammonia
Alum Injection	95-99%	37-95%	52-70%		50-90%	99%	25%
Buffer Zones	63-89%	8-78%	17-99%				

Table 20. Urban BMP Maintenance Costs, Activities, and Schedules

Type of Practice	Management Practice	Annual Maintenance Cost (% of Construction Cost)	Maintenance Cost for a "Typical" Application	Maintenance Activity	Schedule
Detention / Retention Practices	Ponds / Wetlands	3-6%	$3,000 to $6,000	• Cleaning and removal of debris after major storm events • Harvest vegetation when a 50% reduction in the original open water surface area occurs • Repair of embankment and side slopes • Repair of control structure	Annual or as needed
				• Removal of accumulated sediment forebays or sediment storage areas when 60% of the original volume is lost	5-year cycle
				• Removal of accumulated sediment from main cells of pond once 50% of the original volume is lost	20-year cycle
	Dry Ponds	1%	$1,200	See above	
	Wetlands	2%	$3,800	See above	
Infiltration Facilities	Infiltration Trench	5% - 20%	$2,300 to $9,000	• Cleaning and removal of debris after major storm events • Mowing and maintenance of upland vegetated areas • Sediment clean-out • Repair or replacing of stone aggregate	Annual or as needed
				• Removal of accumulated sediment forebays or sediment storage areas when 50% of the original volume is lost	4-year cycle

Type of Practice	Management Practice	Annual Maintenance Cost (% of Construction Cost)	Maintenance Cost for a "Typical" Application	Maintenance Activity	Schedule
	Infiltration Basin	1% - 10%	$150 - $1,500	• Cleaning and removal of debris after major storm events • Mowing and maintenance of upland vegetated areas • Sediment clean-out	Annual or as needed
				• Removal of accumulated sediment forebays or sediment storage areas when 50% of the original volume is lost	4-year cycle
Filtration Practices	Sand Filters	11% - 13%	$2,200	• Removal of trash and debris from control opening • Repair leaks from the sedimentation chamber or deterioration of structural components • Removal of the top few inches of sand, and cultivation of the surface, when filter bed is clogged	Annual or as needed
				• Clean out of accumulated sediment from filter bed chamber once depth exceeds approximately ½ inch, or when the filter layer will no longer draw down within 24-hours • Clean out of accumulated sediment from sedimentation chamber once depth exceeds 12-inches	3 to 5-year cycle
	Dry Swales, Grassed Channels, Biofilters	5% - 7%	$200 to $2,000	• Mowing and litter/debris removal • Stabilization of eroded side slopes and bottom • Nutrient and pesticide management • Dethatching swale bottom and removal of thatching • Discing or aeration of swale bottom	Annual or as needed

Type of Practice	Management Practice	Annual Maintenance Cost (% of Construction Cost)	Maintenance Cost for a "Typical" Application	Maintenance Activity	Schedule
				• Scraping swale bottom and removal of sediment to restoe original cross section and infiltration rate • Seeding or sodding to restore ground cover (use proper erosion and sediment control)	5-year cycle
	Filter Strip	$320/acre (maintained)	$1,000	• Mowing and litter/debris removal • Nutrient and pesticide use management • Aeration of soil on the filter strip • Repair of eroded or sparse grass areas	Annual or as needed
	Bioretention	5% - 7%	$3,000 to $4,000	• Repair of erosion areas • Mulching of void areas • Removal and replacement of all dead and diseased vegetation	Biannual or as needed
				• Removal of mulch and application of a new layer	Annual

Municipal Separate Storm Sewer Systems

Polluted stormwater runoff is often transported and released to municipal separate storm sewer systems (MS4s) and ultimately discharged to local rivers and streams with little or no treatment. Operators and officials of small MS4s should endeavor to design programs to reduce the discharge of pollutants to the "maximum extent practicable", protect water quality, and satisfy the appropriate water quality requirements of the clean water act. Cities within the watershed should implement the following actions in order to minimize the impacts of stormwater runoff:

1. Distribute educational materials and perform outreach to inform citizens about the impacts of polluted stormwater runoff may have on water quality;
2. Provide opportunities for citizen participation in program development and implementation, including effectively publicizing public hearings and/or encourage citizen representation on a stormwater management panel;
3. Develop and implement a plan to detect and eliminate illicit discharges to the storm sewer system (includes developing a system map and informing the community about hazards associated with illegal discharges and improper waste disposal;
4. Develop, implement and enforce an erosion and sediment control program for construction activities that disturb one (1) or more acres of land (controls could include silt fences and temporary stormwater detention ponds);
5. Develop, implement, and enforce a program to address discharges of post-construction

stormwater runoff for new developments and redevelopment areas;
6. Develop and implement a program with the goal of preventing or reducing pollutant runoff from municipal operations.

Each of the above mentioned elements are further discussed in detail in the following sections.

Public Education and Outreach

Having an informed and knowledgeable community will be crucial in the success of any storm water program. An informed and knowledgeable public generally is more apt to support and understand the reasons why it is necessary and important to minimize impacts due to storm water along with getting increased compliance by those individuals impacted. To satisfy the requirements of a minimum program the regulated MS4 will need to:

- Implement a public education program to distribute educational materials or conduct outreach activities regarding the impacts on local waterbodies and the steps necessary to reduce impacts from stormwater; and
- Determine appropriate BMPs and measurable goals.

In developing this aspect of the program the MS4 may wish to look at forming partnerships with other government entities. In many instances, the local MS4 is encouraged to review and modify an existing program instead of trying to develop a program on its own. Additionally, the MS4 should review and modify existing stormwater information from federal, state, or local governments and make these materials relevant to local situations. Lastly, the MS4 should use an appropriate mix of local strategies to address various viewpoints and concerns from area residents.

Public Participation/Involvement

Past efforts have shown that the public can provide valuable input and assistance when given the right opportunity. An involved public can provide broader public support for controversial decisions, shorten the time necessary to implement various measures, provide a broad base of expertise and economic basis, and act as a conduit to other programs involved in stormwater management. However, there may be challenges in recruiting individuals to serve or be involved with stormwater management. Local officials will have to develop creative measures to target all public sectors. This would include going beyond the most common method of recruitment, which is using the local newspaper. The community may have to use radio or television spots, telephone notification, mass mailings, distribution of flyers, door-to-door visits, or neighborhood newsletters.

Once public participation has been garnered the participants may looks at the following types activities as possible practices to implement. These include, but are not limited to:

- Volunteer water quality monitoring;
- Volunteer speakers;
- Storm drain stenciling;
- Community clean-up days;
- Citizen watch groups, or
- Adopt-A-Storm Drain program.

Illicit Discharge Detection and Elimination

Illicit discharges are any discharge to an MS4 that is not composed entirely of stormwater. However, two major exceptions exist to this definition. These include discharges from NPDES permitted facilities and fire-fighting activities. Sources of illicit discharge can include but are not limited to:

- Sanitary wastewater;

- Effluent from septic tanks;
- Car wash wastewater;
- Improper oil disposal;
- Radiator flushing disposal;
- Laundry wastewater;
- Spills from transportation corridors; and
- Improper disposal of auto and household chemicals.

Illicit discharges may enter the system through either direct connections (i.e., wastewater piping either mistakenly or deliberately connected to storm water) or indirect connections (i.e., infiltration into the system from cracked sanitary systems, spills collected by drain outlets, etc.). The result is untreated discharges that may contribute high levels of pollutants including bacteria, viruses, nutrients, toxic substances, or solvents to name but a few. Pollutant discharges from illicit discharge may cause significant degradation to receiving waters and potentially threaten aquatic, wildlife or human health.

The stormwater plan must include five (5) steps to address illicit connections:

1. Development of a stormwater system map – The map is necessary to demonstrate a basic awareness of all intakes and discharges of the system. The map must also show the locations of all outfalls and the names and location of all waters (Waters of the United States) that receive the discharges.
2. Development of a regulatory and enforcement process to prohibit non-stormwater discharges into the MS4;
3. Development of a plan to detect and address non-stormwater discharges including illicit discharges – This plan is the primary component in controlling non-stormwater discharges and should include:
   - Screening to prioritize areas with the highest likelihood of illicit connections,
   - Method of determining where the illicit source is located,
   - Notification and correction procedure to correct illicit connections, and
   - Process to document all actions taken to eliminate the illicit connection.

Construction Site Runoff Control

Polluted stormwater runoff from construction sites may often flow to MS4 and ultimately be discharged into local rivers and streams. Sediment is generally considered the greatest pollutant of concern. Sediment runoff rates may typically be 10 to 20 times greater than agricultural runoff and 1,000 to 2,000 times greater than forestland runoff. However, phosphorus, nitrogen, pesticides, oil and grease along with other types of wastes may also be carried in stormwater.

The Phase II final rules requires the operator of an MS4 to develop, implement and enforce a program to reduce pollutants from stormwater runoff when construction activities result in land disturbance of greater than or equal to one acre. The program will need to include the following six provisions:

1. Ordinance or other regulatory mechanism requiring the implementation of proper controls on sediment and other wastes;
2. Procedures that consider potential water quality impacts as part of the site plan review process;
3. Inspection and enforcement procedures;
4. Establishment of sanctions to ensure compliance;
5. Procedure for the submittal and review of information from the public; and
6. Method for determining the appropriate BMPs and measurable goals.

Urban/Suburban Stormwater- Recommended Tasks

Task 1: Develop and distribute stormwater brochures
Milestone 1: Within 1 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 2: Notice of public meetings in different print media
Milestone 2: Within 1 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 3: Establishment of community group
Milestone 3: Within 1 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 4: Complete stormwater sewer or discharge map
Milestone 4: Within 1 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 5: Complete construction site ordinance
Milestone 5: Within 1 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 6: Complete procedures for the submittal and review of information submitted by the public
Milestone 6: Within 1 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 7: Complete stormwater stenciling using local volunteers
Milestone 7: Within 2 years of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Payette, Fruitland, and New Plymouth

Task 8: Final recommendation of community group
Milestone 8: Within 2 years of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 9: Development of radio or television public service announcements
Milestone 9: Within 2 years of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 10: Development of regulatory mechanism
Milestone 10: Within 2 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 11: Development of inspection procedures
Milestone 11: Within 2 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 13: Inspection of 50% of all relevant construction activities
Milestone 13: Within 2 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 14: Involve 5% of the community in volunteer clean-up efforts

Milestone 14: Within 3 years of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 15: Correct 50% of all illicit connections
Milestone 15: Within 3 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 16: Inspection of 90% of all relevant construction activities
Milestone 16: Within 3 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 17: Establish citizen watch groups
Milestone 17: Within 4 years of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 18: Correct 80% of all illicit connections
Milestone 18: Within 4 year of formal announcement of Phase II status
Responsible Agency: Cities of Emmett, Fruitland, New Plymouth, and Payette

Task 19: Development of a "No Net Increase" ordinance
Milestone 19: Year 1
Responsible Agency: Cities of Emmett, Payette, Fruitland, New Plymouth, Gem and Payette Counties

General Monitoring

Under Idaho Code §39-3621, the designated agencies, in cooperation with the appropriate land management agency and the Department of Environmental Quality shall ensure that best management practices are monitored for their effect on water quality. Whenever possible and to the extent practical the designated land management agencies should coordinate monitoring efforts to minimize individual expenses and maximize data collection. This effort should include the adoption and use of the same monitoring protocols whenever possible.

As the state designated agency for water quality, the IDEQ will continue to utilize the BURP monitoring and Waterbody Assessment process to determine overall improvements to the subbasins and to determine when all beneficial uses and water quality standards are being fully attained. All monitoring should follow documents procedures in the monitoring feedback loop process. This process calls for:

1. Onsite implementation of BMPs or modification of land management practices;
2. Water quality monitoring to determine BMP effectiveness;
3. Evaluation of BMP effectiveness against original criteria; and
4. Repeat steps 1-3 until beneficial uses are restored or water quality standards met.

Funding for effectiveness monitoring can be both time consuming and expensive with the cost of the monitoring in some cases exceeding the best management practice implementation cost. While IDEQ will continue to fund its BURP monitoring program, IDEQ does not have available funding for individual best management effectiveness monitoring. As such, the ISCC in conjunction with the ISDA will be responsible for developing, funding and implementing a best management practices monitoring plan for Lower Payette River watersheds as outlined in the Agricultural Pollution Abatement Plan (IDEQ, IDL, SCC, 1991) monitoring feedback loop process. Coincidentally, the Bureau of Land Management and the Idaho Department of Lands will also need to develop, fund and implement monitoring plans to ensure that installed best management practices or revisions to resource uses will be able to achieve the desired water quality benefits.

Private Monitoring

Data are the foundation of the IDEQ assessment processes as outlined in the Waterbody Assessment Guidance. This process was designed primarily to assess BURP data, but IDEQ also considers existing and readily available data from other sources. The data used in the assessment process may be from other agencies, institutions, commercial interests, interest groups, or individuals and may relate to the existence, support status, or associated criteria for the beneficial uses in a water body.

IDEQ uses a multi-layered approach to provide consistent weighting and consideration of various types of data. The data must pass scientific rigor concerning the extent that scientific methods are used to collect and analyze data and encompass quality assurance, quality control, training, level of expertise, and other protocols. In certain instances, staff from IDEQ is available to provide training in relation to data collection and equipment calibration.

IDEQ categorizes data into three levels of scientific rigor with more weight given to data with a higher level of scientific rigor. Data must be relevant as well as scientifically rigorous to be incorporated into the assessment process. Data relevance concerns data type and the data's association with beneficial uses, water quality criteria, or causes of impairment. Additionally, IDEQ considers data representation information, such as when and where sampling occurred. If predictive modeling is used, IDEQ also examines calibration factors. The description, examples, and incorporation of data tiers are listed in Table 21.

Table 21. Tiered Data Collection

Level	Scientific Rigor	Relevance	Example	How Used
I	• Quantitative. • Parameters measured. • In-stream focus. • Established monitoring plan with QA/QC and defined protocols. • >30 hours of supervised training. • Samples processed in EPA-certified lab or by professional taxonomist.	• Data relates to either water quality standard(s) or beneficial use. • 5 years old. • Data relates to a named water body (GIS, latitude and longitude or map location provided).	• Ph.D. or masters thesis. • Published or printed studies or reports. • Published predictive models. • U.S. EPA EMAP.	• Data may be used in 303(d) listing or de-listing, 305(b) reports, subbasin assessments, or TMDLs.
II	• Qualitative or semi-quantitative in nature. • May have a monitoring plan. • No QA/QC provided for within plan. • Protocols may or may not be defined. • Parameters rated. • Field staff may not be trained: Lab may not be certified.	• Data may relate to a watershed. • Not water body specific. • Data >5 years old. • Data may relate to other agency guidelines or objectives.	• Environmental assessments. • PFC. • IDL CWE. • Most citizen monitoring. • Models with documentation.	• 305(b) reports. • May be used for subbasin assessments or TMDLs when data adds to overall assessment quality.

Level	Scientific Rigor	Relevance	Example	How Used
	• Taxonomist may not be a professional.			
III	• May be qualitative in nature. • Parameters evaluated. • Field staff have little to no training. • No documented monitoring plan. • No QA/QC. • Anecdotal in nature.	• Not specific to water quality standards or beneficial uses. • Location not specific. • Data 10 years old.	• Non-specific reports or studies. • Newspaper articles. • Simple models without any documentation.	• Planning for future monitoring. • Hold for further investigations.

In any event, when data is collected, it shall be collected using standard protocols and technical references such as, but not limited to the following documents:

- IDEQ Beneficial Use Reconnaissance Manual and
- Standard Methods for the Examination of Water and Wastewater.

TMDL Data Tracking

The IDEQ through a contract with HDR Inc. developed an Access 97/2000 database to track the implementation of individual projects within the Cascade watershed in relationship to TMDLs. This database was recently revised to allow for the inclusion of site specific monitoring data which may be collected by IDEQ, other agencies, cities or municipalities or through private monitoring efforts. The IDEQ will be responsible for collecting information from each of the designated agencies in order to populate the database. The database may also be used to prioritize potential projects for funding, as the database is equipped calculate the unit cost per pollutant and then displays the projects from least to most expensive. Additionally, the database as will also provide useful information for the development of subsequent implementation progress reports.

Funding of Best Management Practices

Costs estimates relative to each of the designated agency responsibilities need to be estimated as individual water quality plan for private agricultural lands, grazing management plans for state lands, or water quality restoration plans for federal land are completed. As always, funding issues and the availability of funding to implement best management practices is of concern. Much of the available funds that can be used to implement this plan are available annually on a first-come first-serve basis or through a competitive review and ranking process. Chapter Four of the Idaho Nonpoint Source Management Plan (IDEQ, 1999a) contains a fairly substantial listing of potentially available funding sources and cooperating agencies for use in the implementation of best management practices and includes several of the programs which could possibly be used as potential implementation funding sources:

- *§104(b)(3)...Tribal and State Wetland Protection Grant, EPA*
  This program provides financial assistance to state, tribal, and local government agencies to develop new wetland protection programs or refine and improve existing programs. All projects must clearly demonstrate a direct link to improving an applicant’s ability to protect, restore or manage its wetland resources.

- *§319 (h)...Nonpoint Source Grants, EPA/IDEQ*
  This program provides financial assistance for the implementation of best management practices to abate nonpoint source pollution. The IDEQ manages the NPS program. All projects must demonstrate the applicant's ability to abate NPS pollution through the implementation of BMPs.

- *Aquatic Ecosystem Restoration, CoE*
  Section 206 of the Water Resources Development Act of 1996, provides financial assistance for aquatic and associated riparian and wetland ecosystem restoration and protection projects that will improve the quality of the environment. There is no requirement for an aquatic ecosystem project to be linked to a Corp of Engineers project. The program does require that a non-federal interest provide 35% of construction costs, including all lands, easements, right-of-ways and necessary relocations. The program also requires that 100% of the operation, maintenance, replacement, and rehabilitation be borne by the non-federal interest. The program limits the amount of federal assistance to $5 million for any single project.

- *Challenge Cost-share Program, BLM*
  This program provides 50% cost-share monies on fish, wildlife, and riparian enhancement projects to non-federal entities.

- *Conservation Operations Program (CO-01), NRCS*
  The CO-01 program provides technical assistance to individuals and groups of landowners for the purpose of establishing a link between water quality and the implementation of conservation practices. The NRCS technical assistance provides farmers and ranchers with information and detailed plans necessary to conserve their natural resources and improve water quality.

- *Conservation Research and Education, NRCS*
  The Conservation Research and Education program was created through the 1996 Farm Bill and is administered by the National Natural Resources Conservation Foundation. The purpose of the program is to fund research and educational activities related to conservation on private lands through public-private partnerships.

- *Conservation Reserve Program (CRP), NRCS*
  The CRP program provides a financial incentive to landowners for the protection of highly erodible and environmentally sensitive lands with grass, trees, and other long-term cover. This program is designed to remove those lands from agricultural tillage and return them to a more stable cover. This program holds promise for nonpoint source control since its aim is highly erodible lands.

- *Conservation Technical Assistance (CTA), NRCS*
  Technical assistance for the application of BMPs is provided to cooperators of soil conservation districts by the NRCS. Preparation and application of conservation plans is the main form of technical assistance. Assistance can include the interpretation of soil, plant, water, and other physical conditions needed to determine the proper BMPs. The CTA program also provides financial assistance in implementing BMPs described in the conservation plan.

- *Environmental Quality Incentives Program (EQIP), NRCS*
  EQIP is a program based on the 1996 Farm Bill legislation and combines the functions of the Agricultural Conservation Program, Water Quality Incentives Programs, Great Plains Conservation Program, and the Colorado River Basin Salinity Control Program. EQIP offers technical assistance, and cost share monies to landowners for the establishment of a five to ten year conservation agreement activities such as manure management, pest management, and erosion control. This program gives special consideration to contracts in those areas where agricultural improvements will help meet water quality objectives.

- *Environmental Restoration, CoE*
  Section 1135 of the Water Resources Development Act of 1986 provides for modifying the structure, operation, or connected influences or impacts from a Corp of Engineer project to restore fish and wildlife habitat. The project must result in the implementation or change from existing conditions, and the project benefits must be associated primarily with restoring historic fish and wildlife resources. Though recreation cannot be the primary reason for the modification, an increase in recreation may be one measure of value in the improvement to fish and wildlife resources. The program requires a non-federal sponsor which can include public agencies, private interest groups, and large national nonprofit organizations such as Ducks Unlimited or the Nature Conservancy. Operation and maintenance associated with the project modifications are the responsibility of the non-federal sponsor. Planning studies, detailed design, and construction are cost shared at a 75% federal and 25% non-federal rate. No more than $5 million in federal funds may be spent at a single location.

- *Farm Services Agency Direct Loan Program, FSA*
  This program provides loans to farmers and ranchers who are unable to obtain financing from commercial credit sources. Loans from this program can be used to purchase or improve pollution abatement structures.

- *Hydrologic Unit Areas* (HUAs), *NRCS*
  The NRCS is responsible for the HUA water quality projects. The purpose of these projects is to accelerate technical and cost-share assistance to farmers and ranchers in addressing agricultural nonpoint source pollution.

- *Idaho Riparian Tax Credit (RTC) (Idaho Code §63-3024B), Interagency State Tax Commission*
  The purpose of RTC program is to provide a public and private partnership for the improvement, repair, and rehabilitation of forest, range, and farm lands. Through tax incentives, landowners are encouraged to fence, set aside, or otherwise improve lands to enhance riparian health.

- *Idaho Water Resources Board Financial Programs, IDWR*
  The Idaho Water Resources Board Financial Program assists local governments, water and homeowner associations, non-profit water companies, and canal and irrigation companies with funding for water system infrastructure projects. The various types of projects that can be funded include: public drinking water systems, irrigation systems, drainage or flood control, ground water recharge, and water project engineering, planning and design. Funds are made available through loans, grants, bonds, and a revolving development account.

- *National Conservation Buffer Initiative, NRCS*
  The National Conservation Buffer Initiative program provides cost-share funds in an effort to use grasses and trees as conservation buffers to protect and enhance riparian resources on farms. This program will be an integral part of TMDL/WRAS implementation planning to ensure land management practices are moved away from streams and riparian areas.

- *Planning Assistance, CoE*
  Section 22 of the Water Resources Development Act of 1974 authorizes the Corp of Engineers to assist local governments and agencies, including Indian Tribes, in preparing comprehensive plans for the development, utilization and conservation of water and related resources. Total costs for projects cannot exceed $1 million in a single year and are cost-shared at a 50% federal and 50% non-federal rate.

- *Range Improvement Fund - 8100, BLM*
  This program focuses on improving rangeland management conditions, including the implementation of best management practices. A portion of the money to operate the program comes from the grazing fees paid by permittees.

- *Small Watersheds* (PL-566), *NRCS*
  The Small Watersheds program authorizes the NRCS to cooperate in planning and implementing efforts to improve soil and water conservation. The program provides for technical and financial assistance for water quality improvement projects, upstream flood control projects, and water conservation projects.

- *Partners for Wildlife (Partners), USFWS*
  The Partners for Wildlife program is implemented by the U.S. Fish and Wildlife Service and designed to restore and enhance fish and wildlife habitat on private lands through public/private partnerships. Emphasis is on restoration of riparian areas, wetlands, and native plant communities.

- *Pheasants Forever*
  Pheasants Forever can provide up to 100 percent cost-share for pheasant and other upland game projects, which establish, maintain, or enhance wildlife habitat.

- *Resource Conservation and Development (RC&D), NRCS*
  Through locally sponsored areas, the RC&D program assists communities with economic opportunities through the wise use and development of natural resources by providing technical and financial assistance. Program assistance is available to address problems including water management for conservation, utilization and quality, and water quality through the control of nonpoint source pollution.

- *Resource Conservation and Rangeland Development Program (RCRDP), SCC*
  The RCRDP program provides grants for the improvement of rangeland and riparian areas, and loans for the development and implementation of conservation improvements.

- *State Agricultural Water Quality Program (SAWQP), (1980-1999); Water Quality Cost-Share Program for Agriculture, SCC/ISDA*
  SAWQP was the primary state planning and implementation program from 1980 through 1999. The state replaced SAWQP in 1999 with a new agricultural water quality incentive program, under the direction of the SCC as the designated agency for agriculture and grazing, which focuses more directly on implementation of agricultural TMDL plans. Where appropriate, state and federal incentive programs are integrated through the scoping process in the planning phase to maximize nonpoint source water quality protection for agricultural activities (see Introduction-Historical and Chapter 2).

- *State Revolving Fund (SRF), IDEQ*
  The IDEQ Grant and Loan Program administers the State Revolving Fund. The purpose of the program is to provide a perpetually revolving source of low interest loans to municipalities for design and construction of sewage collection and treatment facilities to correct public health hazards or abate

pollution. State Revolving Loan funds are also used to support the Source Water Assessment Program. The Grant and Loan Program uses a priority rating form to rank all projects primarily on the basis of public health, compliance, and affordability. Additional points are awarded to projects that have completed a source water assessment and are maintaining a protection area around their source.

At this time, IDEQ is reviewing the SRF program for its ability to provide for an expanded role in addressing NPS pollution.

- *Stewardship Incentives Program (SIP), IDL*
  SIP provides technical and financial assistance to encourage non-industrial private landowners to keep their lands and natural resources productive and healthy. Qualifying land includes rural lands with existing tree cover or land suitable for growing trees. Eligible landowners must have an approved Forest Stewardship Plan and own less than 1,000 acres.

- *Wetlands Reserve Program (WRP), NRCS*
  WRP was established to help landowners work toward the goal of "no net loss" of wetlands. This program provides landowners the opportunity to establish 30-year or permanent conservation easements, and cost-share agreements for landowners willing to provide wetlands restoration.

- *Wildlife Habitat Incentive Program (WHIP), NRCS*
  WHIP was established to help landowners improve habitat on private lands by providing cost-share monies for upland wildlife, wetland wildlife, endangered species, fisheries, and other wildlife. Additionally, cost share agreements developed under WHIP require a minimum 10-year contract.

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.

The IDEQ developed a TMDL guidance document (IDEQ, 1999c) for the preparation of TMDLs. In the document IDEQ addresses the need for reasonable assurance and the document states that

> "EPA coined the phrase reasonable assurance in its April 1991 guidance document on TMDLs: *Guidance for Water Quality-based Decisions: The TMDL Process.* Reasonable assurance applies only to situations in which load reductions necessary to meet the load capacity for a particular pollutant are split among both point and non-point sources. The Clean Water Act provides for certain control through enforcement of point sources, but leaves non-point source control to states through largely incentive based mechanisms. Therefore EPA feels assured point source load reductions will happen, and are inclined, in mixed source situations, to require all necessary reduction in a pollutants load come from the point sources alone, unless there are reasonable assurances that the non-point sources reduction will indeed be achieved.

Idaho has an EPA approved Nonpoint Source Management Plan which includes certification by the attorney general that adequate authorities exist to implement the plan. Idaho's water quality rules (IDAPA 16.01.02.350) state that current best management practices will be evaluated and modified by the appropriate designated agencies if found to be inadequate to protect water quality. In addition, if necessary, injunctive or other judicial relief may be sought against the operator of a nonpoint source activity in accordance with the

DEQ Director's authorities provided by Idaho Code 39-108. The DEQ believes these provide all the assurance that is reasonable and necessary for any mixed source TMDL." Additionally, if it is found that water quality standards cannot be or are not met, site-specific water quality standards may need to be developed as set forth in the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02.275.01).

Through the development of this Implementation Plan, the IDEQ and the other cooperating agencies believe that the Plan includes the necessary provisions to meet the reasonable assurance needs and provided that funding is available these actions can be implemented. In particular, the Plan has described:
- The actions that will be implemented to achieve the TMDL;
- The responsible party who must undertake the management measures or control actions;
- The variety of actions that may be taken to meet the load allocation;
- When those actions will be implemented;
- The schedule for completion of milestones;
- The monitoring necessary to ensure the goals and objectives of the Plan are met; and
- The ramifications of failing to meet the goals and objectives of the TMDL.

The revised Idaho Nonpoint Source Management Program Plan provides that best management practices should be reviewed via the nonpoint source feedback loop process. Since the expected long-term results based on the application of best management practices related to bacteria reduction have not been widely studied in Idaho it is difficult to predict when all applicable water quality standards and beneficial uses will be met.

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Glossary of Terms and Acronyms

Aquifer - A water-bearing bed or stratum of permeable rock, sand, or gravel capable of yielding considerable quantities of water to wells or springs.

Antidegradation - A Federal regulation requiring the States to protect high quality waters. Water Quality Standards may be lowered to allow important social or economic development only after adequate public participation. In all instances, the existing beneficial uses must be maintained.

Aquatic - Growing, living, or frequenting water.

Assimilative Capacity - An estimate of the amount of pollutants that can be discharged to a water body and still meet the state water quality standards. It is the equivalent of the Loading Capacity, which is the equivalent of the TMDL for the water body.

Bedload - Sand, silt, gravel, or soil and rock detritus carried by a stream on or immediately above (3") its bed.

Beneficial Use - Any of the various uses which may be made of the water of an area, including, but not limited to, domestic water supplies, industrial water supplies, agricultural water supplies, navigation, recreation in and on the water, wildlife habitat, and aesthetics.

Beneficial Use Reconnaissance Project (BURP) – The common protocol utilized by IDEQ to collect statewide water quality data in surface waters of the state of Idaho.

Best Management Practice (BMP) - A measure determined to be the most effective, practical means of preventing or reducing pollution inputs from point or nonpoint sources in order to achieve water quality goals.

Biomass - The weight of biological matter. Standing crop is the amount of biomass (e.g., fish or algae) in a body of water at a given time. Often measured in terms of grams per square meter of surface.

Biota - All plant and animal species occurring in a specified area.

Coliform bacteria - A group of bacteria predominantly inhabiting the intestines of man and animal but also found in soil. While harmless themselves, coliform bacteria are commonly used as indicators of the possible presence of pathogenic organisms. Usually expressed in coliform forming units per 100 ml water.

Critical Areas - Areas identified by the commission based on recommendations from local entities producing significant nonpoint source pollution impacts or areas deemed necessary for protection or improvement for the attainment or support of beneficial uses.

Designated Beneficial Use or Designated Use - Those beneficial uses assigned to identified waters in Idaho Department of Health and Welfare Rules, Title 1, Chapter 2, "Water Quality Standards and Wastewater Treatment Requirements:, Sections 110. through 160. and 299., whether or not the uses are being attained.

Erosion - The wearing away of areas of the earth's surface by water, wind, ice, and other forces.

Existing Beneficial Use or Existing Use - Those beneficial uses actually attained in waters on or after November 28, 1975, whether or not they are designated for those waters in Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58).

Exotic Species - Non-native or introduced species.

Feedback Loop - A component of a watershed management plan strategy that provides for accountability on targeted watershed goals.

Flow - The water that passes a given point in some time increment.

Groundwater - Water found beneath the soil's surface; saturates the stratum at which it is located; often connected to surface water.

Habitat - A specific type of place that is occupied by an organism, a population or a community.

Headwater - The origin or beginning of a stream.

Hydrologic basin - The area of land drained by a river system, a reach of a river and its tributaries in that reach, a closed basin, or a group of streams forming a drainage area. There are six basins described in the Nutrient management Act (NMA) for Idaho -- Panhandle, Clearwater, Salmon, Southwest, Upper Snake, and the Bear Basins.

Hydrologic cycle - The circular flow or cycling of water from the atmosphere to the earth (precipitation) and back to the atmosphere (evaporation and plant transpiration). Runoff, surface water, groundwater, and water infiltrated in soils are all part of the hydrologic cycle.

Intermittent Waters – A stream, reach, or waterbody which has a period of zero (0) flow for at least one (1) week during most years. Where flow records are available, a stream with a 7Q2 hydrologically-based flow of less than one-tenth (0.1) cfs is considered intermittent. Streams with natural perennial pools containing significant aquatic life uses are not intermittent.

Irrigation Water Management (IWM) - IWM involves providing the correct amount of water at the right times to optimize crop yields, while at the same time protecting the environment from excess surface runoff. Irrigation water management includes techniques to manage irrigation system hardware for peak uniformity and efficiency as well as irrigation scheduling and soil moisture-monitoring methods.

LA - Load Allocation for nonpoint sources.

Limiting - A chemical or physical condition that determines the growth potential of an organism, can result in less than maximum or complete inhibition of growth, typically results in less than maximum growth rates.

Load Allocation - The amount of pollutant that nonpoint sources can release to a water body.

Loading - The quantity of a substance entering a receiving stream, usually expressed in pounds (kilograms) per day or tons per month. Loading is calculated from flow (discharge) and concentration.

Loading Capacity - A mechanism for determining how much pollutant a water body can safely assimilate without violating state water quality standards. It is also the equivalent of a TMDL.

Macro invertebrates - Aquatic insects, worms, clams, snails, and other animals visible without aid of a microscope, that may be associated with or live on substrates such as sediments and macrophytes. They supply a major portion of fish diets and consume detritus and algae.

Macrophytes - Rooted and floating aquatic plants, commonly referred to as water weeds. These plants may flower and bear seed. Some forms, such as duckweed and coontail (*Ceratophyllum*), are free-floating forms without roots in the sediment.

Margin of safety (MOS) - An implicit or explicit component of water quality modeling that accounts for the uncertainty about the relationship between the pollutant loads and the quality of the receiving water body. This accounts for any lack of knowledge concerning the relationship between pollutant loads and the water quality of the receiving water body. It is a required component of a TMDL and is normally incorporated into the conservative assumptions used to develop the TMDL (generally within the calculations or models) and is approved by the EPA either individually or in State/EPA agreements. Thus, the TMDL = LC = WLA + LA + MOS.

National Pollution Discharge Elimination System (NPDES) - A national program from the Clean Water Act for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcement permits, and imposing and enforcing pretreatment requirements.

Nonpoint Source - A geographical area on which pollutants are deposited or dissolved or suspended in water applied to or incident on that area, the resultant mixture being discharged into the waters of the state. Nonpoint source activities include, but are not limited to irrigated and nonirrigated lands used for grazing, crop production and silviculture; log storage or rafting; construction sites; recreation sites; and septic tank disposal fields.

Participant - Individual agricultural owner, operator, partnership, private corporation, conservation district, irrigation district, canal company, or other agricultural or grazing interest approved by the commission for cost-sharing in an eligible project area; or an individual agriculture owner or operator, partnership, or private corporation approved by a project sponsor in an eligible project area.

Project Sponsor - A conservation district, irrigation district, canal company or other agriculture or grazing interest as determined appropriate by the commission that enters into a water quality project agreement with the commission.

Reach - A continuous unbroken stretch of river.

Riparian vegetation - Vegetation that is associated with aquatic (streams, rivers, lakes) habitats.

Runoff - The portion of rainfall, melted snow, or irrigation water that flows across the surface or through underground zones and eventually runs into streams.

Sediment - Bottom material in a body of water that has been deposited after the formation of the basin. It originates from remains of aquatic organism, chemical precipitation of dissolved minerals, and erosion of surrounding lands.

Sub-watershed - Smaller geographic management areas within a watershed delineated for purposes of addressing site specific situations.

Threatened species - A species, determined by the U.S. Fish and Wildlife Service, which are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

TMDL - Total Maximum Daily Load. TMDL = LA + WLA + MOS. A TMDL is the equivalent of the Loading Capacity which is the equivalent of the assimilative capacity of a water body.

Total suspended solids (TSS) - The material retained on a 45 micron filter after filtration

Tributary - A stream feeding into a larger stream or lake.

Waste Load Allocation - The portion of receiving water's loading capacity that is allocated to one of its existing or further point sources of pollution. It specifies how much pollutant each point source can release to a water body.

Water Pollution - Any alteration of the physical, thermal, chemical, biological, or radioactive properties of any waters of the state, or the discharge of any pollutant into the waters of the state, which will or is likely to create a nuisance or to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to fish and wildlife, or to domestic, commercial, industrial, recreational, aesthetic, or other beneficial uses.

Water Quality Contract - The legal document executed byt he commission or the project sponsor identifying terms and conditions between the commission or the project sponsor and an individual cost-share participant.

Water Quality Management Plan - A state or area-wide waste treatment plan developed and updated in accordance with the provisions of the Clean Water Act.

Water Quality Limited Segment (WQLS) - Any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards.

Water Quality Plan - The plan developed cooperatively by the participant, technical agency and the commission or project sponsor which identifies the critical areas and nonpoint sources of water pollution on the participant's operation and sets forth BMPs that may reduce water quality pollution from these critical areas and sources.

Water table - The upper surface of groundwater; below this point, the soil is saturated with water.

Watershed - A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation. The whole geographic region contributing to a water body.

WLA - Wasteload Allocation for point sources.

Useful Conversion Factors

1 meter = 3.821 feet

1 hectare = 0.4047 acre

$^{o}C = (^{o}F - 32)/1.8$