Bruneau River Watershed

Agricultural TMDL Implementation Plan

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1.0 Executive Summary

Subwatershed: Bruneau River Watershed
Total Scope: 57,857 acres
Agricultural Scope: 9,614 acres
Agricultural Critical Acres Scope: 3,308 acres

Location: South/southeast from CJ Strike Reservoir, covering the Bruneau Valley and the upland portions to the east and west of the Bruneau River; includes Bruneau River downstream from Hot Creek and the land area within Bruneau Watershed

Elevation: 3,523 feet near Loveridge Gulch headwater to 2,455 feet at CJ Strike Reservoir.

Priority Subwatershed: High

Cooperating Agricultural Agencies: Bruneau River Soil Conservation District (BRSCD)
Natural Resources Conservation Service (NRCS)
Idaho Association of Soil Conservation Districts (IASCD)
Idaho Soil Conservation Commission (ISCC)

Land Ownership:

Owner	Acres	Percent of Bruneau River Watershed
BLM	32,122	55%
Private	17,213	30%
Military Reserve	6,944	12%
State of Idaho	1,578	3%
TOTAL	**57,857**	**100%**

Agricultural Land Use:

Irrigation Method	Acres	Percent of Bruneau River Watershed
Sprinkler Irrigated Cropland/Pasture	6,306	11%
Surface Irrigated Cropland/Pasture	3,308	6%
CAFO/AFO	N/A	N/A
TOTAL	**9,614**	**17%**

Major Agricultural Products: Livestock and dairy products, alfalfa and clover for hay, sugar beets, winter and spring wheat, sweet and field corn, barley, potatoes, and mint

TMDL Objectives: The Idaho Soil Conservation Commission (ISCC) has prepared this plan to implement the Total Maximum Daily Load (TMDL) for the Bruneau River Subbasin. The overall objective of the TMDL is to achieve water quality that will support appropriate designated uses for the Bruneau River, Jacks Creek (including Sugar Valley Wash), Clover Creek, and Three Creek. For the Bruneau River the TMDL established instream targets for total phosporus (TP). The targets are to be attained within the Bruneau River from Hot Creek to the mouth of the river at CJ Strike Reservoir. The TP targets were developed to reduce the impact from excessive plant (algae) growth in the river which helps to maintain sufficient levels of dissolved oxygen for aquatic biota. The designated beneficial uses on the river include cold water biota, salmonid spawning, and both primary and secondary contact recreation.

The targets established in the TMDL for TP is a monthly average not to exceed .05 mg/L and a daily maximum not to exceed .08 mg/L. Recent sampling conducted by IDEQ in the lower reaches of the Bruneau River yielded a maximum sample of 0.2 mg/L and an annual average of 0.08 mg/L for 14 total samples collected during the 2000 irrigation season.

Implementation Plan: This Implementation Plan identifies best management practices (BMPs) and prioritizes agricultural lands in the Bruneau Watershed for BMP implementation to achieve the TMDL objectives within the Bruneau River Subbasin. Proposed BMPs include, but are not limited to, sprinkler irrigation systems, surge irrigation systems, drip irrigation systems, sediment basins, filter strips, polyacrylamide (PAM) application, irrigation water management[1], pest management, nutrient management, conservation tillage, critical area plantings, livestock watering facilities, fencing, riparian buffers, and livestock grazing management. These component practices as well as others not listed in this document are outlined in the Agricultural Pollution Abatement Plan (APAP) housed with the Idaho Soil Conservation Commission.

BMP implementation on private land is voluntary and will not be required for all landowners or all of the acreage within the watershed. Only those combinations of BMPs that are necessary for water quality improvements and feasible to individual participants will be voluntarily implemented. The Bruneau SCD and the Idaho Association of Soil Conservation Districts will assist producers who choose to develop a water quality or conservation plan suitable to their current operation. Plans that are developed in conjunction with any cost-share programs will be under contract to ensure that cost-share funding received by the producer will be used to achieve water quality and conservation benefits on the applicable land unit. The TMDL targets for the Bruneau River will be emphasized with each producer during the planning process, and each plan will emphasize reducing nonpoint source pollution to help achieve the TMDL.

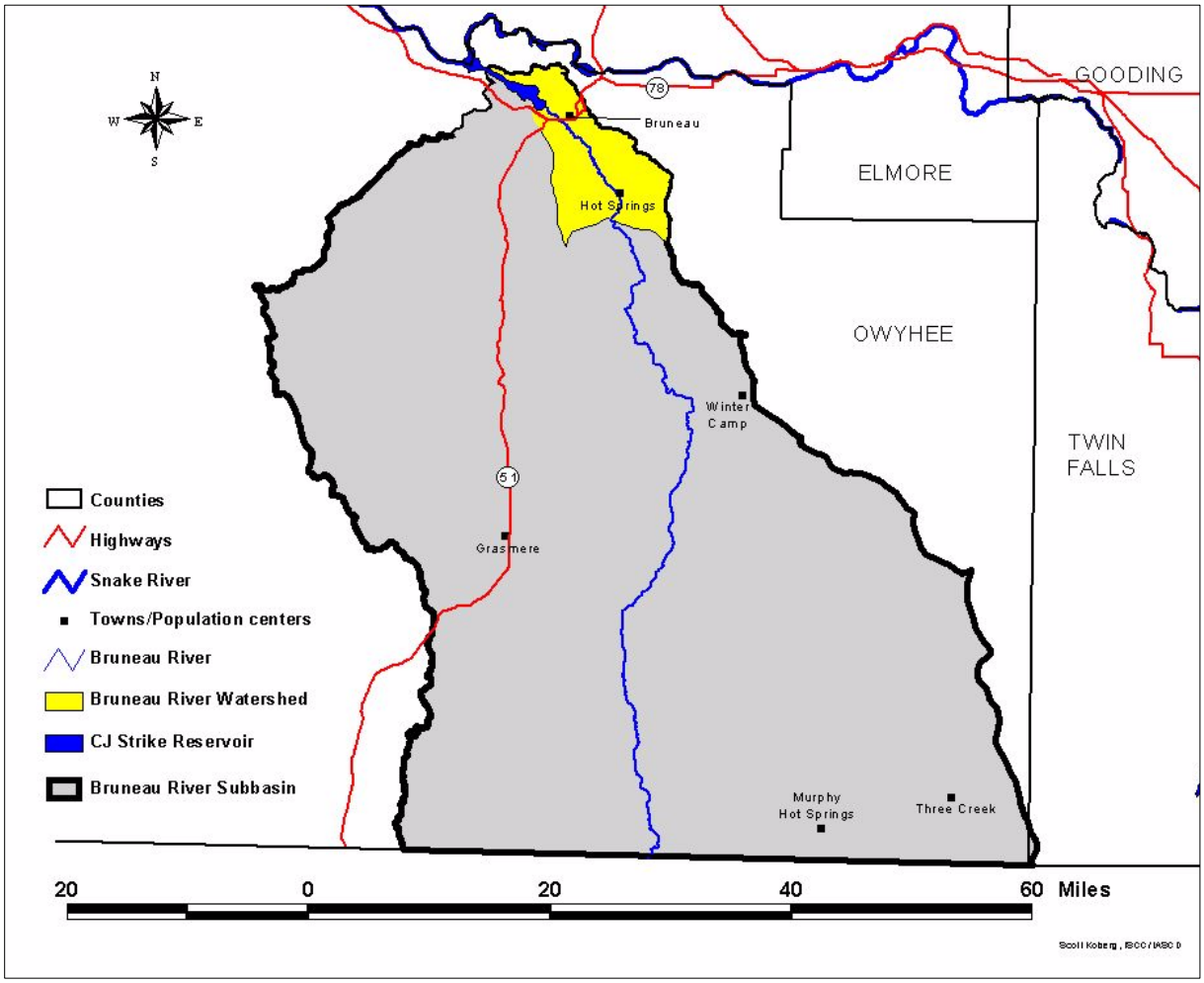
Three BMP installation alternatives are evaluated in this plan for each of the four different agricultural land use types (Treatment Units) within the Bruneau River Watershed. Estimated costs to install BMPs on lands identified for treatment are: Alternative 1 - $3,280,800, Alternative 2 - $2,153,900; and Alternative 3 - $1,234,650. If BMP implementation at the moderate (alternative 2) level was to occur only on surface irrigated agricultural land and CAFO/AFO units, and not on sprinkler irrigated agricultural land, the total cost would be $1,828,600. These cost estimates do not include costs of acquiring necessary real property interests and permits, or annual operation and maintenance costs.

[1] **Irrigation Water Management (IWM) involves providing the correct amount of water at the right times to optimize crop yield, while at the same time protecting the environment from excess surface runoff and deep percolation. 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.**

2.0 Introduction

The Bruneau River Watershed encompasses 57,857 acres. It includes the Bruneau River downstream from Hot Creek, as well as a portion of land to the north and east of CJ Strike Reservoir. The river flows in a northwesterly direction from the Hot Creek confluence and through Bruneau Valley before entering CJ Strike Reservoir northwest from the junction between Highway 78 and Highway 51.

Figure 1. Bruneau River Watershed Location



This implementation plan will address the nonpoint agricultural sources of nutrients (primarily phosphorus) that impact the 303(d) listed segment of the Bruneau River. Within this plan the following elements are identified: pollutant problems within the Bruneau River Watershed, potential sources of those pollutants, priority areas for treatment, and Best Management Practices (BMPs) that, when applied, will have the greatest effect on improving water quality.

The costs to install BMPs on agricultural lands are estimated in this plan to provide the local community, government agencies, and watershed stakeholders some perspective on the economic demands of meeting the TMDL goals. Availability of cost-share funds to agricultural producers within the Bruneau Watershed will be necessary for the success of this plan and the reduction of pollutants necessary to meet the TMDL requirements in the Bruneau River. Sources of available funding for the installation of BMPs on private agricultural land are outlined in Appendix 2.

It is recommended that landowners within the Bruneau Watershed contact the Bruneau River Soil Conservation District (BRSCD), Natural Resources Conservation Service (NRCS), or Idaho Association of Conservation Districts (IASCD) to help determine the need to address water quality and other natural resource concerns on their land. This plan is not intended to identify which specific BMPs are appropriate for specific properties, but rather provides a watershed approach for addressing water quality problems attributed to runoff from private agricultural lands.

3.0 Watershed Characterization

This section describes watershed characteristics that affect the types, locations, and effectiveness of BMPs proposed in this implementation. These characteristics include soils, climate, surface hydrology, demographics and economics, ground water hydrology, land ownership, and land use in the Bruneau Watershed.

3.1 Soils

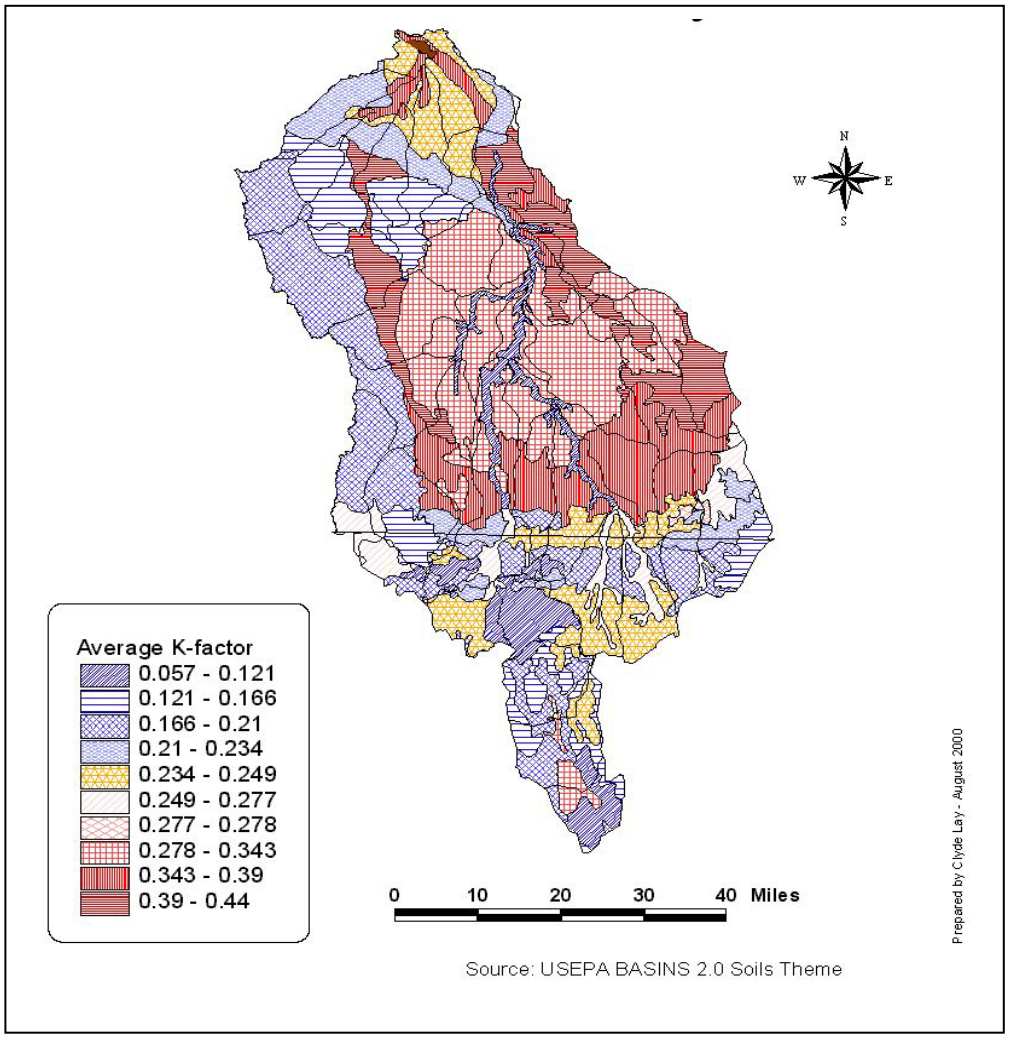
There are three major soil associations within the irrigated portion of the Bruneau Watershed (USDA, 1991).

- *Bram-Mazuma-Grandview:* Somewhat poorly drained and moderately well drained soils on low stream terraces
- *Typic Torriorthents-Mazuma-Vanderhoff:* Well drained to excessively drained soils on dissected terraces
- *Royal-Buko-Davey:* Well drained and somewhat excessively drained soils on dissected terraces

Soil "K Factor" classes help determine the erodibility potential of soils. The higher the K-Factor rating, the greater the potential for erosion. In Figure 2, K-Factor classes are identified for the entire Bruneau Subbasin. Bruneau Watershed in the northeastern portion of the figure has K-factors ranging from 0.21 to 0.39, although the majority of the irrigated portion of the watershed located along the Bruneau River corridor falls within the 0.234 to 0.39 range.

In addition to K-Factor classes, soil slope classes provide another indication of erosion potential. As with K-Factor classes, the greater the percentage of slope, the greater the potential for erosion (Figure 3). The Bruneau Watershed, again in the northeastern portion of the figure, exhibits a variety of slopes; however, the majority of irrigated land within the watershed falls between 0-2% slope.

Figure 2. Bruneau Subbasin K Factor Classes



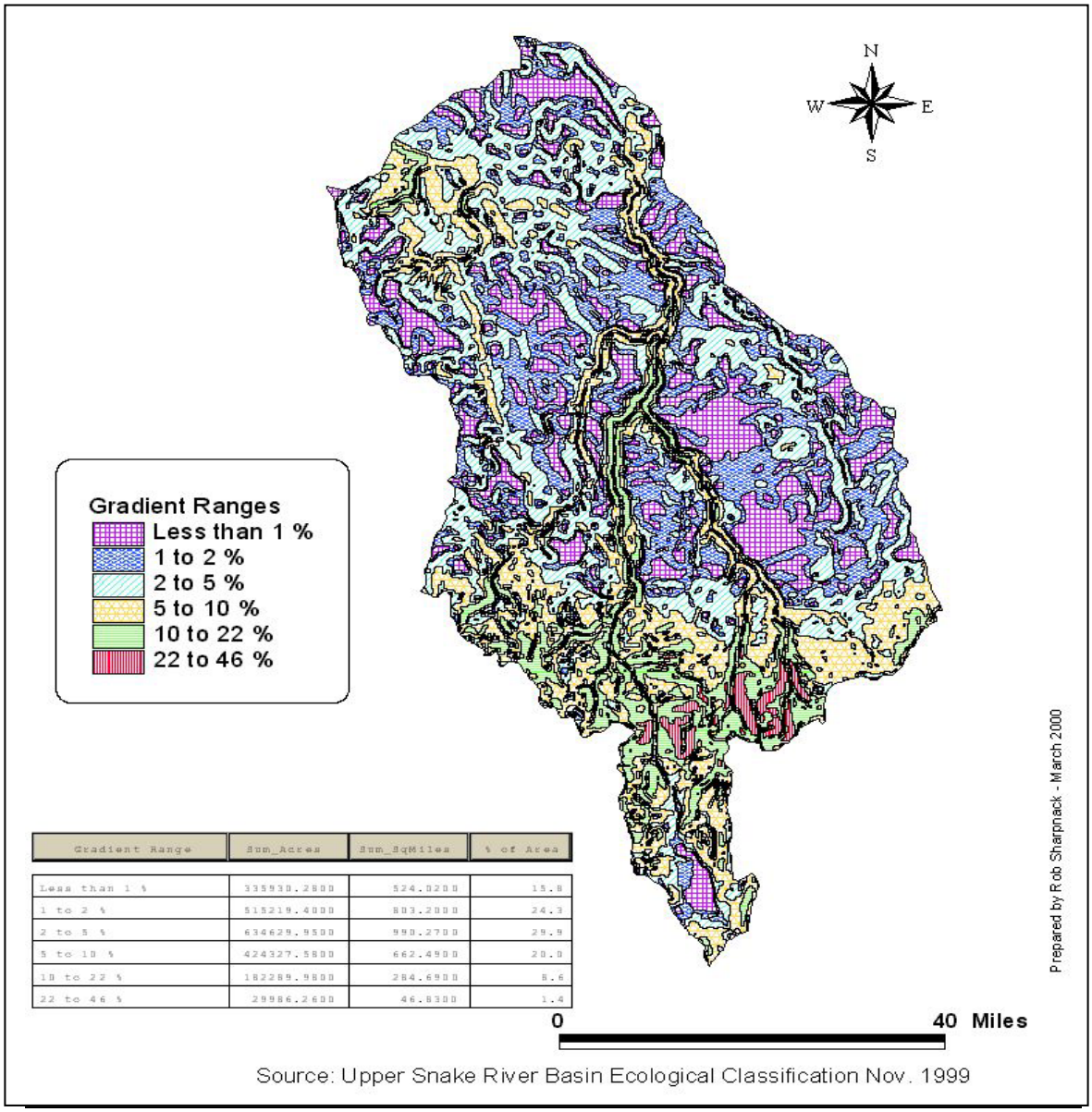
3.2 Climate

Climate in this area is characterized by cool, moist winters and hot, dry summers. The average daily maximum temperature during the summer in nearby Grandview, Idaho is 87.0°Fahrenheit, while the average daily minimum temperature during the winter is 22.0°Fahrenheit. Temperatures as warm as 110.0°Fahrenheit have been recorded at Grand View (USDA, 1991).

Long term average annual precipitation for Grandview is 7.10 inches. Approximately 47 percent of the yearly precipitation occurs during the period from November through March. Average precipitation during the April to September growing season is less than 4 inches, and extended periods without precipitation occur annually during the summer months USDA, 1991).

The average consecutive frost-free period (above 32 degrees) is 140 days, based on the Grandview long-term climatic data station. A probability analysis of the data shows 8 years in 10 will have a frost-free season of at least 118 days for this area. The average last frost (32 degrees) in the spring is around May 8 and the average first frost (32 degrees) in the fall is around September 25 (USDA, 1991).

Figure 3. Bruneau Subbasin Watershed Slope Classes



Gradient Range	Sum_Acres	Sum_SqMiles	% of Area
Less than 1 %	335930.2800	524.8200	15.8
1 to 2 %	515219.4000	803.2000	24.3
2 to 5 %	634629.9500	990.2700	29.9
5 to 10 %	424327.5800	662.4900	20.0
10 to 22 %	182289.9800	284.6900	8.6
22 to 46 %	29986.2600	46.8300	1.4

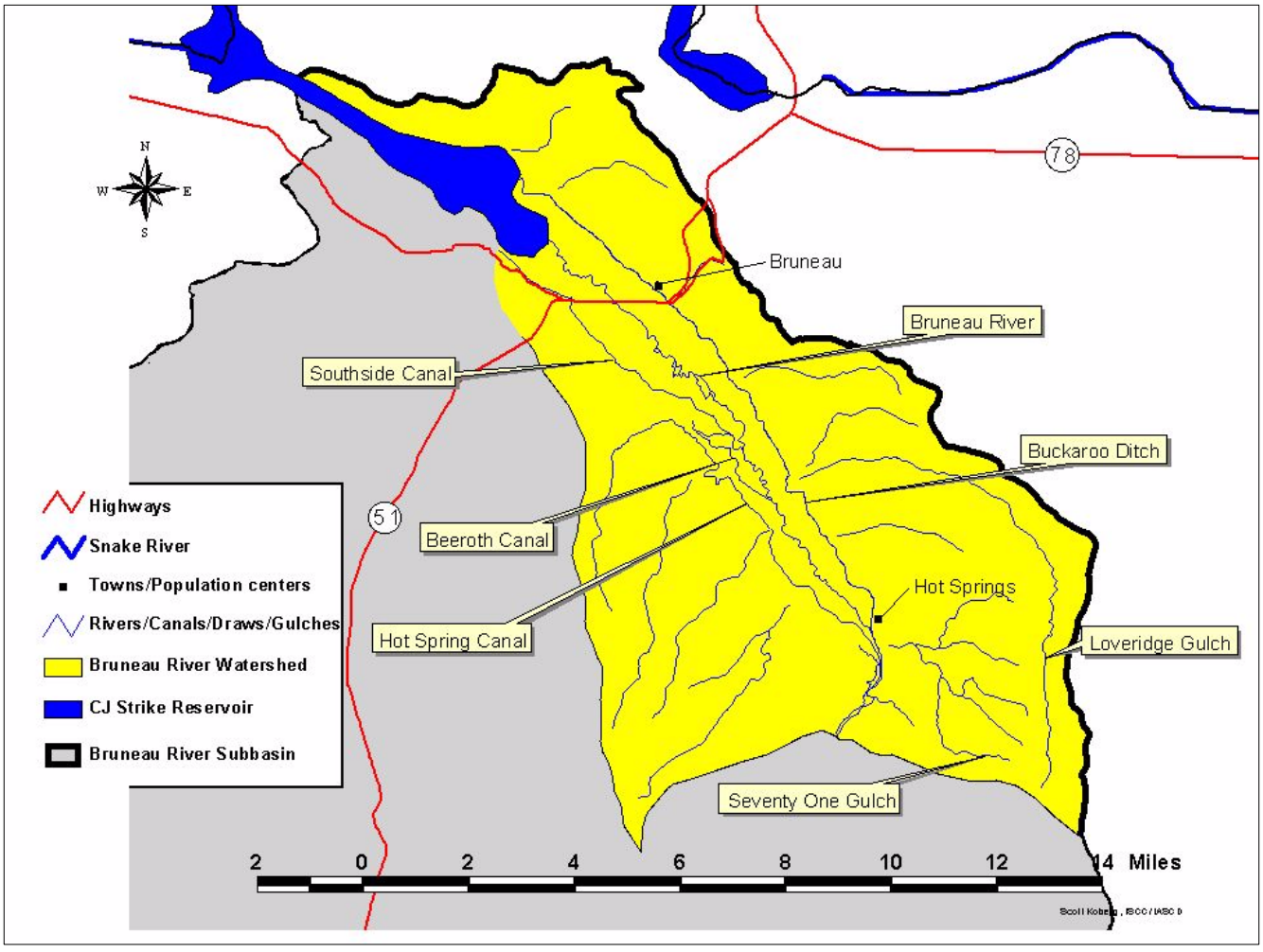
3.3 Surface Hydrology

Approximately 1.5 miles downstream from the Hot Creek/Bruneau River confluence, irrigation water is diverted from the river into Hot Springs Canal at Harris Dam. The first diversion within the 303(d) listed segment, Hot Springs Canal continues to run nearly parallel along the south side of the Bruneau River for approximately 6 miles, allowing for surface irrigation of the agricultural land that lies between the canal and the river. Tow other diversions, Beeroth Canal and Southside Canal, complete the surface irrigation system on the river's south side and allow for surface irrigated land within the entire stretch of the 303(d) listed segment.

Less that ½ mile downstream from Harris Dam is Buckaroo Dam, which is used to divert irrigation water into Buckaroo Ditch on the north side of the river. Buckaroo Ditch follows parallel to the river on the north side until its confluence with CJ Strike Reservoir. It is the primary source of surface irrigation water to users on the north side of the Bruneau Valley in addition to providing an irrigation source to the town of Bruneau.

The are no perennial streams or creeks that enter the Bruneau River downstream from its confluence with Hot Creek. A number of small gulches and washes, in addition to wastewater return flows from canals and springs, are the only potential sources of water entering the 14.4 mile long 303(d) listed segment of the river.

Figure 4. Surface Hydrology



3.4 Ground Water Hydrology

There are at least fifteen different springs in the irrigated portion of the Bruneau Watershed, the majority of which are warm or hot springs. In addition, all of the irrigated land in the watershed lies within the Bruneau-Grandview aquifer in which the depth to groundwater was estimated at 100 feet in the spring of 1980 (IDEQ, 2000). The water used for irrigation of cropland is often pumped from the ground at temperatures much warmer than normal surface water temperatures. According to IDEQ, one local farmer indicated that his well water that was used for irrigation surfaced at over 100°F.

3.5 Demographics and Economics

The following is an excerpt from *Bruneau Subbasin Assessment and Total Maximum Daily Loads of the 303(d) Water Bodies:*

> The population in Owyhee County was about 8,392 in 1990 (www.idoc.state.id.us 2000) and was estimated at 10,227 in 1998. The majority of the county population lives outside of the subbasin. For example, in 1998, the Homedale and Marsing populations were estimated at 3,311, most other towns were too small to be listed. The Bruneau SCD, which covers most of the subbasin, estimates the population of the district at 2,000 full time residents (McBride 2000). The largest municipality in the subbasin is the town of Bruneau. Other small towns include Grassmere, Three Creek, and Murphy Hot Springs (Figure 12). The underlying foundation for economic activity in the area is agriculture, which is mainly derived from ranching and farming.
>
> Most of the initial agricultural activity in the area was ranching and grazing. Decreed surface water rights for irrigation in the Bruneau area began in 1875, while decreed stock watering rights began in 1860.

The Bruneau Valley area in which the irrigated portion of the Bruneau Watershed is located is primarily south of Bruneau and contains only one other small settlement, Hot Springs. The population within the Bruneau Watershed is very small (under 400 residents) and consists mostly of farmers and ranchers and their families in a rural setting.

Table 1. 2001 Agricultural Data for the Bruneau Watershed

Inventory: Farms & Cropland	Bruneau River Watershed
Total # of Farms (FSA Tracts)	52
Total Acres of Farms	9,614
Average Farm Size (acres)	184.9

3.6 Land Ownership and Land Use

The majority of land (55%) within the Bruneau Watershed is owned by the Bureau of Land Management (BLM) and typically operates as rangeland. The irrigated portion of Bruneau River Watershed falls within the privately owned and operated land within the watershed and covers 30% of the total watershed acreage (Table 2). All of the private land, however, is not divided into Farm Service Agency (FSA) tracts. Consequently, there is a large portion of land (7,599 acres) that is not included in an agricultural category in this plan.

Sprinkler irrigated cropland and pasture is by far the largest agricultural use within the irrigated portion at 6,306 acres, while surface irrigated cropland and pasture is a distant second at 3,308 acres. There are also a number of Confined Animal Feeding Operations (CAFOs) and Animal Feeding Operations (AFOs) within the irrigated portion, although their combined acreage is unknown (Table 3).

Table 2. Land Ownership

Owner	Acres	Percent of Bruneau River Watershed
BLM	32,122	55%
Private	17,213	30%
Military Reserve	6,944	12%
State of Idaho	1,578	3%
TOTAL	**209,265**	**100%**

Figure 5. Land Ownership

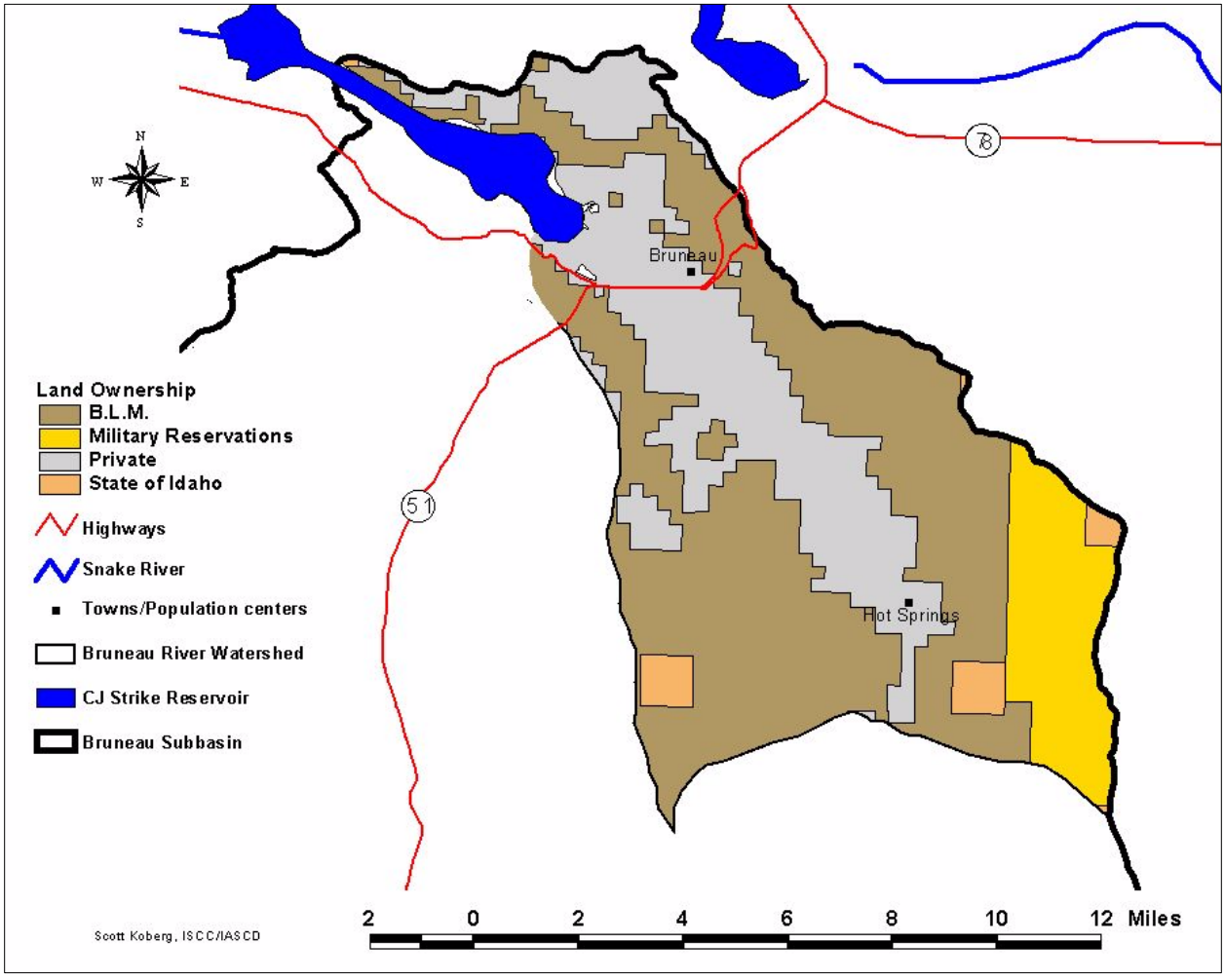


Table 3. Agricultural Land Use

Irrigation Method	Acres	Percent of Bruneau River Watershed
Sprinkler Irrigated Cropland/Pasture	3,308	11%
Surface Irrigated Cropland/Pasture	6,306	6%
CAFO/AFO	N/A	N/A
TOTAL	**9,614**	**17%**

4.0 Treatment Units

This section presents information on the individual agricultural land uses within the Bruneau River Watershed. Each land use is divided into one or more Treatment Units (TUs) (Figure 7). The TUs describe areas with similar use, management, soils, productivity, resource concerns, and treatment needs. The TUs not only provide a method for delineating and describing land use but are also used in evaluating land use impacts to water quality and in the formulation of alternatives for addressing the identified problems.

- **Treatment Unit #1 – Surface Irrigated Cropland and Pasture: 3,308 acres**

  Surface irrigation occurs on sandy loam and loam soils on slopes from 0-3%. Typical cropping sequence is alfalfa seed or hay, row crops, and grain. Row crops include potatoes, sugar beets, mint, and corn. Surface irrigation for pastures occurs on the same soil types. Pastures are typically grazed throughout much of the season (Spring-Fall) with little re-growth allowed in the Fall. Pastures and some cropland fields are used for feeding areas for large herds of livestock during the winter. Irrigation wastewater and runoff from storm events typically enters the Bruneau River.

- **Treatment Unit #2 – Sprinkler Irrigated Cropland and Pasture: 6,306 acres**

  This unit is occurs throughout the watershed, but is primarily located on the lowlands and terraces to the west of Bruneau Valley. Typical cropping sequence is alfalfa seed or hay, row crops, and grain. Row crops include potatoes, sugar beets, mint, and corn. With the exception of fields that have above average runoff rates for typical sprinkler systems, this area has little or no impact on Bruneau River water quality due to high irrigation efficiencies.

- **Treatment Unit #3 – CAFO/AFO**

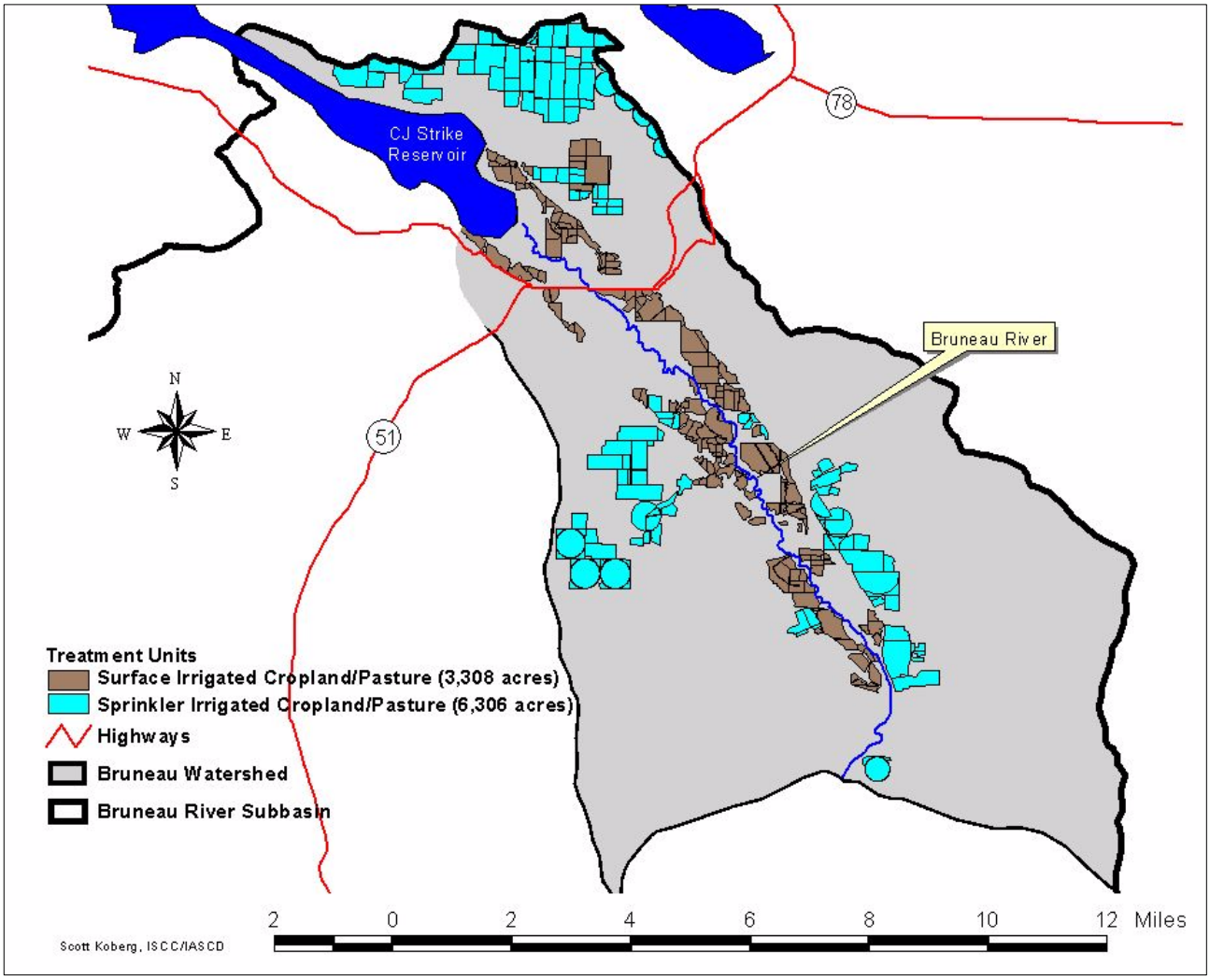
  Feedlots are typically smaller than average farm fields in land area and are generally occupied by cattle during the winter and spring months (November through April), with most located near farmsteads or in feedlots. Idaho dairies have already been required to meet the current state standards set by ISDA for dairies which includes completion of a certified Nutrient Management Plan for all facilities. Idaho feedlots will be required to meet similar requirements by the year 2005. Both types of regulation by the ISDA require facilities to eliminate runoff up to a 25 year, 24 hour storm events as well as average 5-year runoff rates from the feeding and milking facilities.

Table 4. Acres of TUs within Bruneau River Watershed

Treatment Units	Acres
Treatment Unit 1	3,308
Treatment Unit 2	6,306
Treatment Unit 3	N/A
TOTAL	**9,614**

(Koberg, 2001)

Figure 6. Treatment Units



5.0 TMDL Objectives

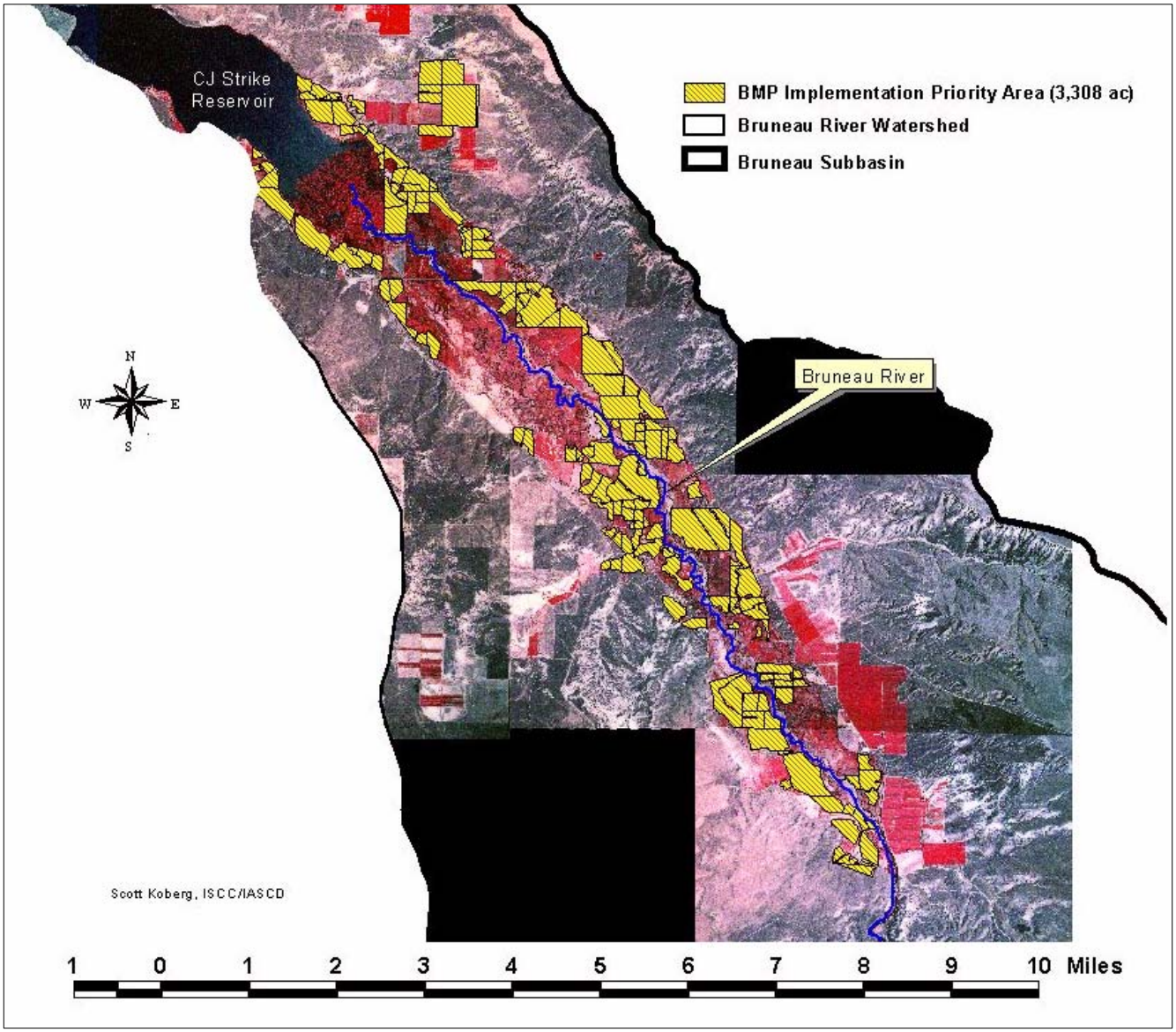
The overall objective of the TMDL is to achieve water quality that will support appropriate designated within the Bruneau Subbasin, including the Bruneau River. To support the designated beneficial uses in the Bruneau River (cold water biota, salmonid spawning, primary contact recreation, and secondary contact recreation), the TMDL established targets for total phosphorus (TP).

The TMDL process recognizes that the targets and load reductions established in the Subbasin Assessment may be revised as additional data is collected, as understanding of water quality in the Bruneau River improves, and as state water quality standards adapt to reflect new developments. Water quality monitoring in the river has occurred since completion of the TMDL, and will continue to occur on a periodic basis. Any new information or data collected for this stream segment that indicate a discrepancy with the TMDL allocation and current conditions or trends should be used to make adjustments to this implementation plan accordingly.

Agricultural sources of nutrients (TP) include runoff from surface irrigated cropland and pastures, animal feedlots and/or dairies, and livestock grazing on or near the Bruneau River. BMPs can be implemented to address the following:

- Irrigation induced erosion
- Irrigation wastewater delivery to receiving Bruneau River
- Lack of adequate vegetation adjacent to waterways necessary for reducing sediment, nutrients, and bacteria from wastewater runoff
- Animal feedlots in and adjacent to waterways potentially delivering excess sediment, nutrients, and bacteria

Figure 7. Bruneau River Watershed Priority Area



5.1 Aquatic Life Uses – Phosphorus Objectives

The phosphorus (TP) load allocation established for Bruneau River, according to the Bruneau TMDL Subbasin Assessment, requires a 38% reduction in TP. This is based on a 0.08 mg/L annual average measured by IDEQ in the Bruneau River during the year 2000, and the subsequent reduction required to achieve the monthly average target of 0.05 mg/L (Table 6).

Table 5. Phosphorus Reductions Required to Meet Load Allocation

Name	Monthly Average mg/L (current)	Monthly Average mg/L (allocation)	Percent Reduction Required to Meet TMDL	Single Sample Maximum mg/L (current)	Single Sample Maximum mg/L (allocation)	Percent Reduction Required to Meet TMDL
Bruneau River	**0.08**	**0.05**	**38%**	**0.2**	**0.08**	**60%**

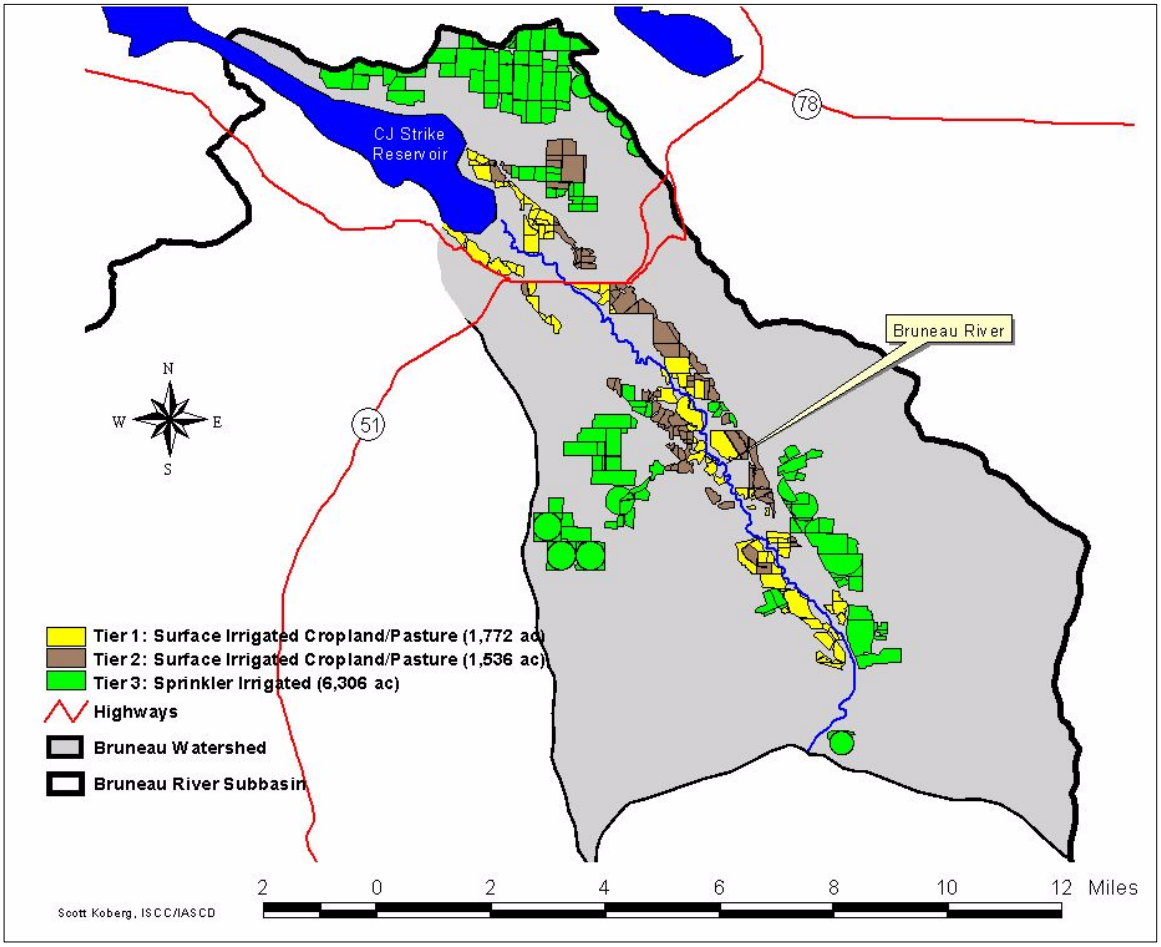
6.0 Identification of Critical Acres

An initial watershed inventory was completed to determine the land areas that affect the Bruneau River. Aerial photos, topographic maps and field investigations were all utilized to determine the land areas that likely have the greatest impact on the water quality in the river.

Land treatment though BMP installation will be pursued in three tiers. Surface irrigated agricultural land that drains directly into the Bruneau River is included in Tier 1. Tier 1 lands have the most immediate impact on water quality in the river due to their proximity to the river and access to the riparian area. In addition to the Tier 1 surface irrigated agricultural land, all CAFOs and AFOs within the irrigated portion of the watershed are considered high priority for BMP implementation due to their potential phosphorus and bacteria contributions to the river.

Unlike Tier 1 lands, Tier 2 includes surface irrigated lands that are not directly adjacent to the Bruneau River, and the wastewater from Tier 2 acreage has the potential to be reused by Tier 1 acreage before entering the river. Tier 3 acreage includes all sprinkler irrigated agricultural land within Bruneau Watershed and is located in various areas of the irrigated portion. In terms of BMP implementation Tier 1 is high priority, Tier 2 is medium priority, and Tier 3 is low priority (Figure 8).

Figure 8. Location of Critical Acres



Critical Acres within each Treatment Unit:

Treatment Unit 1	1,772 acres of Tier 1 surface irrigated cropland/pasture 1,536 acres of Tier 2 surface irrigated cropland/pasture
Treatment Unit 2	6,306 acres of Tier 3 sprinkler irrigated agricultural land
Treatment Unit 3	CAFO/AFO (unknown units)

7.0 Implementation Plan BMPs

Agricultural conservation and soil erosion practices are typically referred to as Best Management Practices (BMPs). These practices are nationally derived systems to control, reduce, or prevent soil (and particulate phosphorus) erosion and sedimentation on agricultural landuses (APAP, 1991). BMPs are selected to reduce irrigation-induced and streambank erosion, contain and filter sediment, nutrients, and bacteria from irrigation wastewater, contain and properly dispose of animal wastes, and reduce leaching of nutrients and pesticides. Wide scale adoption and implementation of these BMPs will improve the quality of surface waters in the project area and reduce pollutant loading to the Bruneau River.

Tables 6 through 9 provide the types of voluntary BMPs that are available to producers within the watershed that will improve site specific wastewater quality with proper design, installation, and/or implementation based on applicable NRCS standards and specifications. Only those combinations of BMPs necessary for water quality improvements, which are feasible to the participant, will be voluntarily implemented.

BMPs include, but are not limited, to the following:

Table 6. Treatment Unit 1: Surface Irrigated Cropland

Agro-Tillage	Conservation Cropping Sequence
Conservation Tillage	Cover and Green Manure Crop
Filter Strips	Grassed Waterway
Surge Irrigation System	Sprinkler Irrigation System
Tailwater Recovery System	Irrigation Water Management
Straw Mulching	Nutrient Management
Pest Management	Sediment Basin
Underground Outlet	Chiseling and Subsoiling
Waste Utilization	Channel Vegetation
Drip Irrigation System	PAM
Irrigation Water Conveyance	

Table 7. Treatment Unit 1: Surface Irrigated Pasture

Fencing	Stream channel stabilization
Heavy use area protection	Offsite watering
Filter strips	Waste Utilization
Spring water development	Waste Storage System
Irrigation systems	Nutrient Management
Pasture and Hayland Planting	Planned Grazing System
Livestock Watering Facility	Pasture and Hayland Management
Irrigation Water Management	Pest Management

Table 8. Treatment Unit 2: Sprinkler Irrigated Agricultural Land

Agro-Tillage	Conservation Cropping Sequence
Conservation Tillage	Cover and Green Manure Crop
Irrigation Water Management	Nutrient Management
Straw Mulching	Pest Management
Chiseling and Subsoiling	Waste Utilization
Channel Vegetation	Filter strips

Table 9. Treatment Unit 3: CAFO/AFO

Waste Management System	Heavy use area protection
Filter strips	Livestock Watering Facility
Nutrient Management	Fencing

7.1 Example Description of Alternatives for Surface Irrigated Cropland

Procedure: Conduct resource inventory/site assessment, evaluate data, develop site specific BMP alternatives

SITE SPECIFIC BMP Alternative #1 ($800/ acre)	SITE SPECIFIC BMP Alternative #2 ($500/ acre)	SITE SPECIFIC BMP Alternative #3 ($250/ acre)
Sprinkler Irrigation System	Irrigation Water Management	Irrigation Water Management
Irrigation Water Mgmt.	Surface Irrigation System	Concrete Ditch
Nutrient Management	Gated Pipe	Filter Strip
Pest Management	Tail Water Recovery System	PAM
Conservation Crop Rotation	Nutrient Management	Sediment Basin
	Pest Management	Nutrient Management
	Conservation Crop Rotation	Pest Management
		Conservation Crop Rotation

7.2 Example Description of Alternatives for Surface Irrigated Pasture

Procedure: Conduct resource inventory/site assessment, evaluate data, develop site specific BMP alternatives

SITE SPECIFIC BMP Alternative #1 ($500/ acre)	SITE SPECIFIC BMP Alternative #2 ($400/ acre)	SITE SPECIFIC BMP Alternative #3 ($300/ acre)
Fencing	Fencing	Fencing
Planned Grazing System	Planned Grazing System	Pasture & Hayland Mgmt.
Pasture & Hayland Management	Pasture & Hayland Management	Nutrient Management.
Nutrient Management	Nutrient Management	Livestock Watering Facility
Heavy Use Area Protection	Pest Management	Irrigation Water Management
Pest Management	Livestock Watering Facility	Pest Management
Livestock Watering Facility	Irrigation Water Management	Filter Strip
Irrigation Water Management	Gated Pipe	
Gated Pipe		

7.3 Example Description of Alternatives for Sprinkler Irrigated Agricultural Land

Procedure: Conduct resource inventory/site assessment, evaluate data, develop site specific BMP alternatives

SITE SPECIFIC BMP Alternative #1 ($100/ acre)	SITE SPECIFIC BMP Alternative #2 ($50/ acre)	SITE SPECIFIC BMP Alternative #3 ($25/ acre)
Nutrient Management	Nutrient Management	Nutrient Management
Irrigation Water Management	Irrigation Water Management	Irrigation Water Management
Pest Management	Pest Management	Pest Management
Filter strips	Filter strips	
Conservation Crop Rotation		

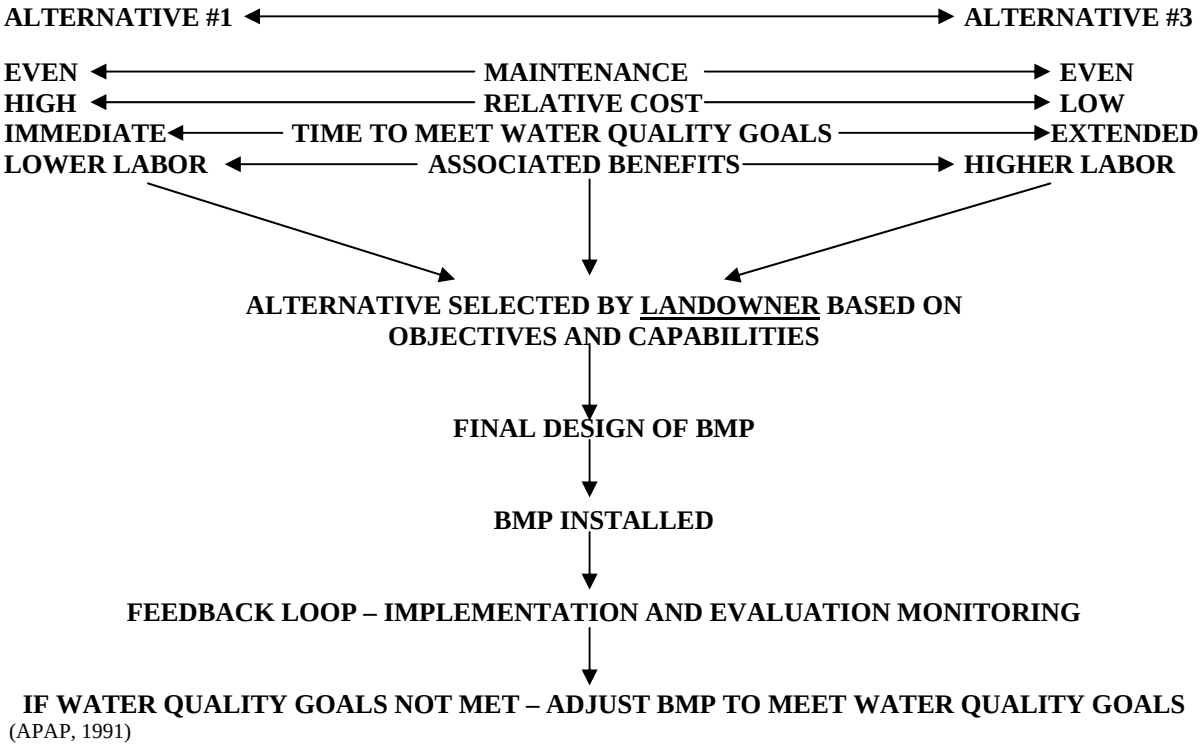
7.4 Example Description of Alternatives for CAFO/AFO

Procedure: Conduct resource inventory/site assessment, evaluate data, develop site specific BMP alternatives

SITE SPECIFIC BMP Alternative #1 ($50,000/ each)	SITE SPECIFIC BMP Alternative #2 ($35,000/ each)	SITE SPECIFIC BMP Alternative #3 ($25,000/ each)
Nutrient Management	Waste Management System	Waste Management System
Heavy Use Area Protection	Nutrient Management	Nutrient Management
Livestock Watering Facility	Livestock Watering Facility	Filter strips
Filter strips	Filter strips	Heavy Use Area Protection
Waste Management System	Heavy Use Area Protection	
Dike		

7.5 Graphic Comparison of BMP Selection and Implementation Process

The site specific BMP Alternative is chosen based on a variety of factors, but typically reflect the producer's objectives in conjunction with the resource concerns identified by the assisting agency. The following flow chart provides a graphic representation of selection process and some comparisons between Alternative #1(high cost), Alternative #2 (moderate cost), and Alternative #3 (low cost) for the various treatment units. The chart applies to each of the three treatment units identified in sections 7.1 through 7.3.



(APAP, 1991)

7.6 BMP Costs

Due to the variability in agriculture, these prices per acre are best professional judgement. With changes in technology, land ownership, crops, agricultural commodities, landuse, and public perception, these costs and acres will change.

Lower cost BMPs are usually temporary in nature and do not address underlying issues relating to irrigation systems and irrigation water management. The yearly maintenance and labor cost of Alternative 3 BMPs are higher than similar yearly costs for Alternative 1 BMPs.

7.7 Feedback Loop

The feedback loop is a process used to evaluate and refine installed BMPs. Implementing the feedback loop to modify BMPs until water quality standards are met results in full voluntary compliance with the standards (APAP, 1991). The feedback loop occurs in four steps:

1. The process begins by developing water quality criteria to protect the identified beneficial uses of the water resource.
2. The existing water quality as compared to the water quality criteria established in Step 1, is the basis for developing or modifying BMPs.
3. The BMP is implemented on-site and evaluated for technical adequacy of design and installation.
4. The effectiveness of the BMP in achieving the criteria established in Step 1 is evaluated by comparison to water quality monitoring data. If the established criteria are achieved the BMP is adequate as designed, installed and maintained. If not, the BMP is modified and the process of the feedback loop continues.

8.0 Program of Implementation

The Bruneau River Soil Conservation District has selected land treatment through application of a combination of BMPs including improved irrigation systems, nutrient, bacteria, and sediment control systems, and management practices. There are currently no sources of funding available for cost-share assistance specifically within the Bruneau River Watershed priority area. While there are a handful of federal and state site-specific programs available to interested participants on a farm by farm basis, the Bruneau Watershed has yet to be selected as a priority area with its own specific project area. Should funding become available for use specifically in the watershed, the implementation of BMPs and distribution of incentive payments will be focused within the privately owned, irrigated portion of the watershed.

8.1 Installation and Financing

Landowners can enter into voluntary water quality contracts or cost-share contracts with the Bruneau SCD (once project area funding becomes available) in order to reduce out of pocket expenses for BMP implementation. In lieu of a contract, a water quality plan or conservation plan can be developed that describes the objectives of the producer and provides site-specific BMP implementation information. NRCS, IASCD, and the Bruneau SCD will provide the same level of technical assistance to producers during the development of a conservation plan or water quality plan regardless of the producer's intent to pursue or not pursue cost-share assistance.

The USDA Natural Resources Conservation Service (NRCS) is the technical agency that will assist the Idaho Association of Soil Conservation Districts (IASCD) and Bruneau SCD in developing water quality plans and designs. BMPs will be installed according to standards and specifications contained in the NRCS Field Office Technical Guide. Where cost-share incentives are contracted through a state or federal program, NRCS and IASCD will assist Bruneau SCD with certification of installed BMPs, filing payment applications, completing annual status reviews on contracts, annual development of an average cost list, and will provide any needed follow-up assistance such as that required for contract modification.

Producers who choose to enter into a cost share contract with the SCD, IASCD, or NRCS will be responsible for installing the BMPs according to a schedule determined within their contract. Any needed land rights, easements or permits necessary for construction and inspection will be the sole responsibility of the participant. Each participant will also be required to make their own arrangements for financing their share of installation costs.

Table 10. Estimated BMP Cost Summary for TU 1, Tier 1 (Surface Irrigated Cropland/Pasture: 1,772 acres)

ALTERNATIVE		ACRES	TOTAL COST
Alternative 1	$650/AC	1772	$ 1,151,800
Alternative 2	$450/AC	1772	$ 797,400
Alternative 3	$275/AC	1772	$ 443,000

Table 11. Estimated BMP Cost Summary for TU 1, Tier 2 (Surface Irrigated Cropland/Pasture: 1,536 acres)

ALTERNATIVE		ACRES	TOTAL COSTS
Alternative 1	$650/AC	1536	$ 998,400
Alternative 2	$450/AC	1536	$ 691,200
Alternative 3	$275/AC	1536	$ 384,000

Table 12. Estimated BMP Cost Summary for TU 2, Tier 3 (Sprinkler Irrigated: 6,306 acres)

ALTERNATIVE		ACRES	TOTAL COSTS
Alternative 1	$100/AC	6,306	$ 630,600
Alternative 2	$50/AC	6,306	$ 315,300
Alternative 3	$25/AC	6,306	$ 157,650

Table 13. Estimated BMP Cost Summary for TU 3, (CAFO/AFO: 10? Units)

ALTERNATIVE		UNITS	TOTAL COSTS
Alternative 1	$50,000/each	10	$ 500,000
Alternative 2	$35,000/each	10	$ 350,000
Alternative 3	$25,000/each	10	$ 250,000

8.2 Operation, Maintenance, and Replacement

Participants who install BMPs in conjunction with a state or federal cost-share incentive program will be responsible for maintaining the installed BMPs for the life of their contract. The contract will outline the responsibility of the participant regarding operation and Maintenance (O&M) for each BMP. Landowners are encouraged to maintain installed BMPs after the contract expires. Participants who install BMPs on their own or without the benefit of a cost-share incentive program are not under contract to maintain the BMPs. If the BMPs are installed in response to a conservation plan completed with them by the assisting agencies, landowners are encouraged to maintain the BMPs and incorporate them into their annual operations. It is not required, however, unless they are under contract.

Inspections of BMPs installed in conjunction with a cost-share incentive program will be made on an annual basis by Bruneau SCD, NRCS, IASCD, and the participant. The intent is to develop a system of BMPs that will protect water quality and is socially and economically feasible to the participant.

8.3 Water Quality Monitoring

During development of the Bruneau Subbasin TMDL, IDEQ conducted monitoring in Bruneau River during the 2000 irrigation season. The Idaho State Department of Agriculture has conducted monitoring within the Subbasin in the past, and will likely add the Bruneau River to its sites in the future. Most samples collected by the various agencies occur on a bimonthly basis throughout the irrigation season (April - October) and on a monthly basis throughout the rest of the year (winter). Data parameters measured typically include DO (dissolved oxygen), temperature, % saturation, conductivity, TDS (total dissolved solids) pH, discharge (cfs), TSS (total suspended solids), TVS (total volatile solids), nitrate/nitrite, TP (total phosphorus), OP (dissolved ortho-phosphorus), fecal coliform, and E-coli.

ISDA along with the ISCC and the Idaho Association of Soil Conservation Districts (ISACD) 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 Bruneau River 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.

9.0 References

U. S. Department of the Agriculture, Soil Conservation Service (Natural Resources Conservation Service). 1991. *Soil Survey of Elmore County Area, Idaho.*

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