Clover Creek Watershed

Agricultural TMDL Implementation Plan

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1.0 Executive Summary

Subwatershed: Clover Creek Watershed
Total Scope: 185,345 acres
Agricultural Scope: 9,210 acres
Agricultural Critical Acres Scope: 1,719 acres

Location: South/southeast from Bruneau River confluence with southern boundary extending south to Three Creek and the eastern boundary coinciding with the Bruneau Subbasin boundary; includes the following subwatersheds: Clover Creek, East Fork Bruneau River, and Buck Flat Draw

Elevation: 5,864 near the Grassy Hills in Buck Flat Draw subwatershed to 3,022 feet at the confluence with the Bruneau River

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 Clover Creek Watershed
BLM	165,818	89%
Private	9,210	5%
State of Idaho	10,317	6%
TOTAL	**185,345**	**100%**

Major Agricultural Products: Livestock and dairy products

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 Clover Creek the TMDL established an instream targets for bacteria (E. coli). The target is to be attained within Clover Creek from the confluence of 71 Draw and Clover Creek to the mouth of Clover Creek at the Bruneau River. The purpose of the bacteria target is to protect human health and risks related to secondary contact recreation.

The E. coli target for secondary contact recreation requires a maximum geometric mean no greater than 126 cfu/100 mL based on a minimum of five samples taken over a thirty-day period (IDAPA 16.10.02.250.01.a) or a single sample no greater than 576 cfu/100mL.

Recent sampling conducted by IDEQ near the mouth of Clover Creek yielded a maximum sample of 6900 cfu/100mL on December 21, 2001. While this is well above the target TMDL allocation, it was not representative of the typical values reported during the thirteen month, fifteen sample monitoring stretch. In fact, the average of the other 14 samples was 26.3 cfu/100mL, and no other single sample came close to exceeding the single sample target of 576 cfu/100mL. This may be an indication that there was insufficient data to support a bacteria TMDL on Clover Creek, and lends support to the concept of using an iterative process for TMDL implementation. As data continues to be collected in Clover Creek, it will be important to remain flexible with implementation strategies and recognize improvements in water quality and land management as the bacteria targets are achieved.

Implementation Plan: This Implementation Plan identifies best management practices (BMPs) for use on private agricultural lands in Clover Creek Watershed that will help achieve the TMDL objectives within the Bruneau River Subbasin. Proposed BMPs include, but are not limited to, irrigation water management[1], pest management, nutrient management, 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.

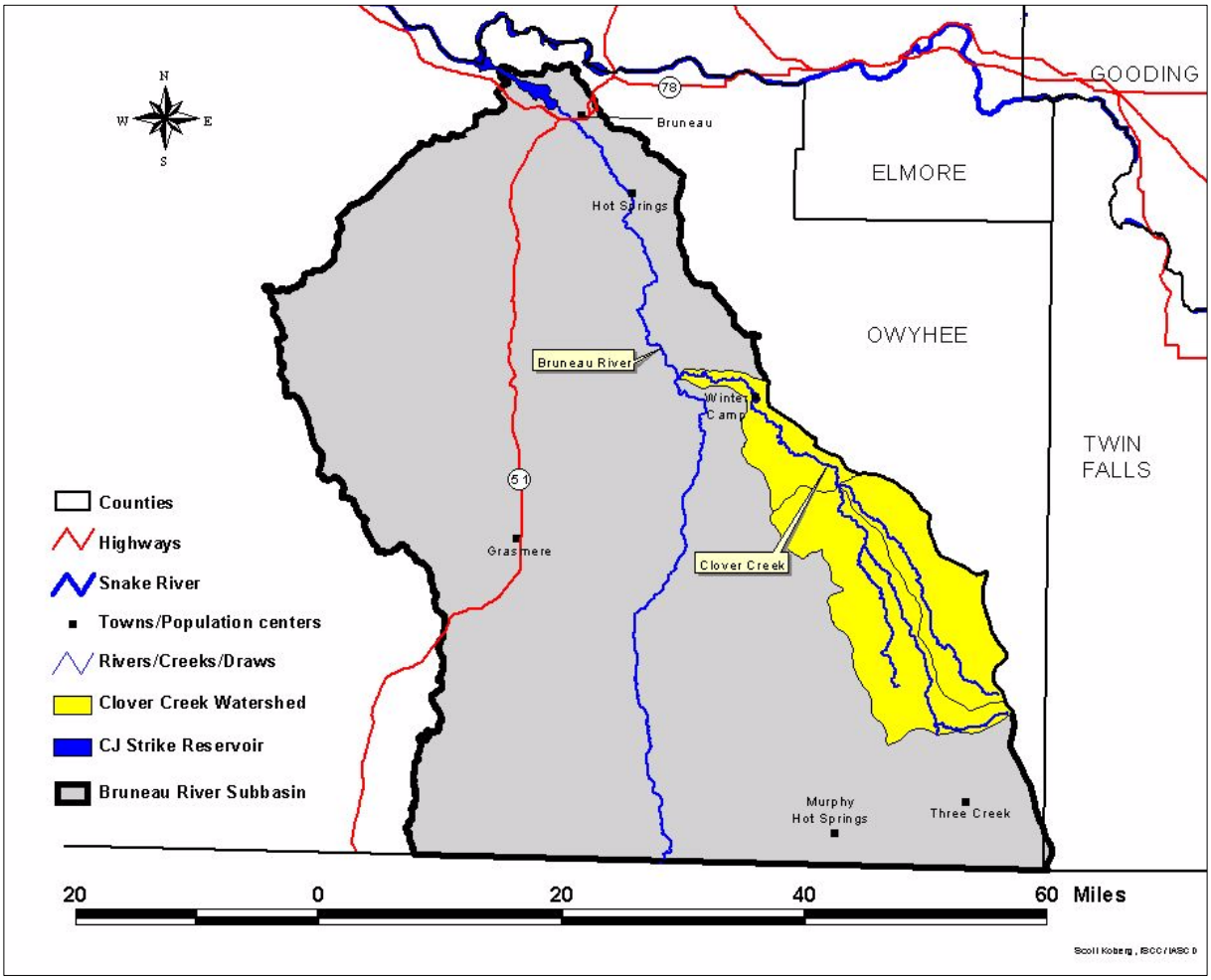
BMP implementation on private land is voluntary and will not be required for all landowners or all of the private acreage within the watershed. Only those combinations of BMPs that are necessary for water quality improvements and feasible to individual participants will be voluntarily implemented. The Bruneau River 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 Clover Creek will be emphasized with each producer during the planning process, and each plan will emphasize reducing nonpoint source pollution to help achieve the TMDL.

[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 Clover Creek Watershed encompasses 185,345 acres. It includes Clover Creek subwatershed, East Fork Bruneau River subwatershed, and Buck Flat Draw subwatershed. Clover Creek flows in a northwesterly direction from the confluence of Big Flat Creek, Three Creek, and Deadwood Creek and is joined by 71 Draw, Juniper Draw, and Buck Flat Draw before entering the Bruneau River near Winter Camp.

Figure 1. Clover Creek Watershed Location



This implementation plan will address the privately owned and operated nonpoint agricultural sources of bacteria that impact Clover Creek. Within this plan the following elements are identified: pollutant problems within Clover Creek Watershed, potential sources of those pollutants, 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 Clover Creek Watershed will increase the potential success of this plan and the reduction of pollutants necessary to meet the TMDL requirements in Clover Creek. Sources of available funding for the installation of BMPs on private agricultural land are outlined in Appendix 2.

It is recommended that landowners within Clover Creek 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. Portions of this plan identify specific BMPs for specific properties; however, it is not intended that this plan replace the more intensive and site specific planning that occurs during the conservation planning process.

3.0 Watershed Characterization

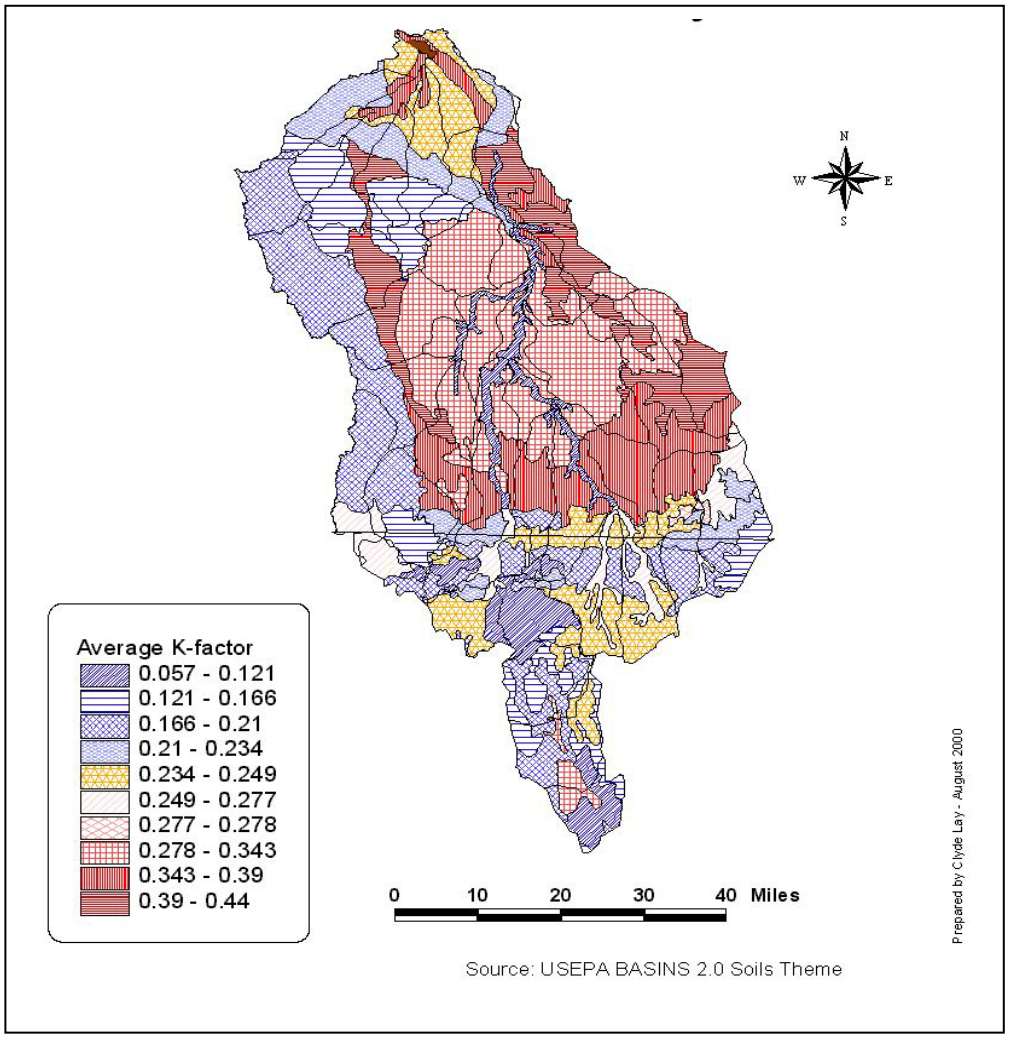
This section describes watershed characteristics that affect the types, locations, and effectiveness of BMPs proposed in this implementation plan. These characteristics include soils, climate, surface hydrology, demographics and economics, land ownership, and land use in Clover Creek Watershed.

3.1 Soils

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. Clover Creek Watershed in the central eastern portion of the figure has K-factors ranging widely from 0.057 to 0.44, although the majority of the private land falls within the 0.343 to 0.44 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). Clover Creek Watershed, again in the central eastern portion of the figure, exhibits a wide range of slopes; however, the majority of private land within the watershed falls between 0-5% slope.

Figure 2. Bruneau Subbasin K Factor Classes



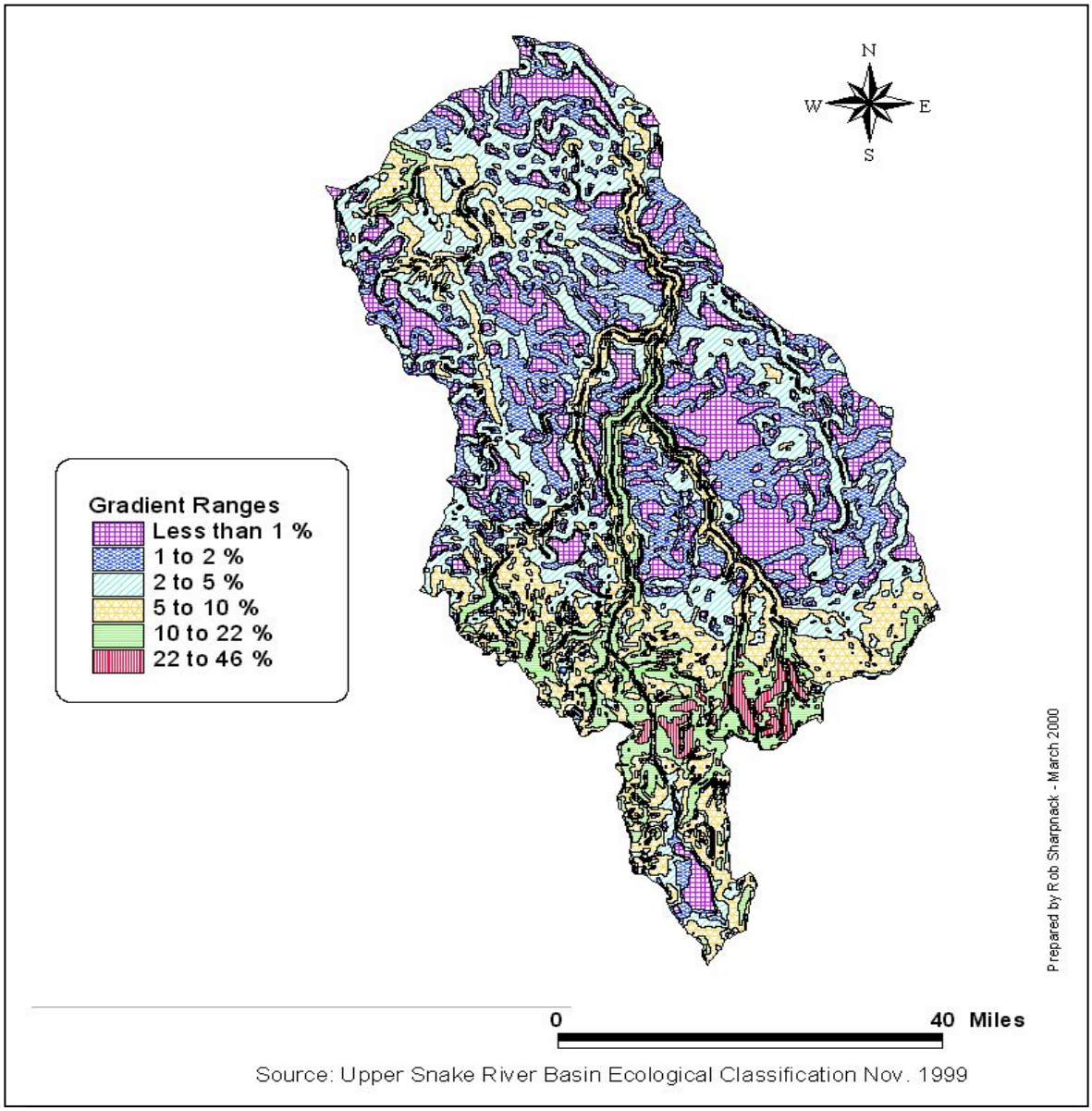
3.2 Climate *(Grandview is the nearest station available for climatic data)*

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

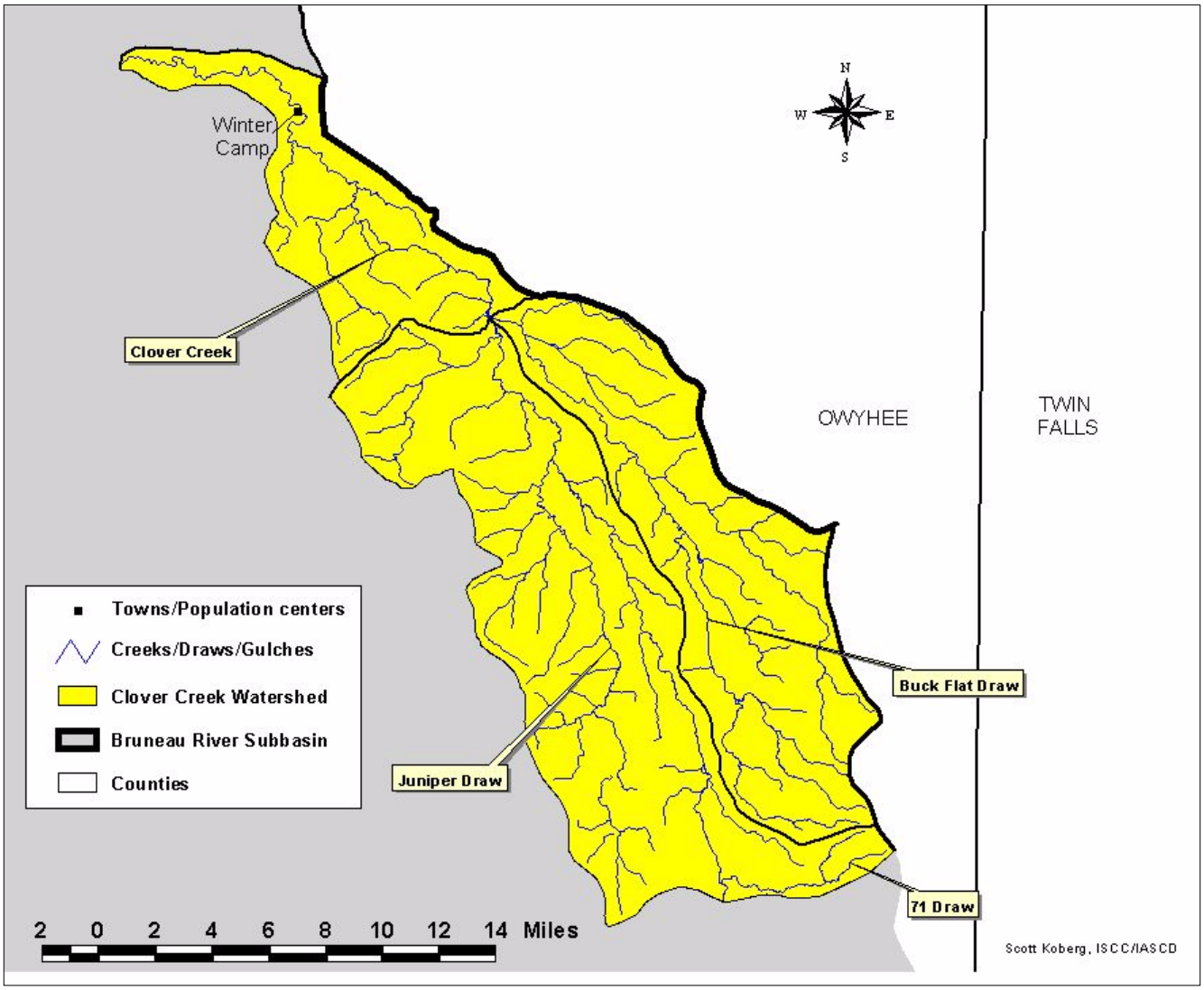


3.3 Surface Hydrology

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

> Clover Creek, also known as the East Fork Bruneau River, is one of the perennial tributaries to the Bruneau River. Clover Creek is fed by three creeks (Big Flat Creek, Deadwood Creek and Three Creek). The headwaters of Clover Creek are the confluence of those three creeks. Clover Creek flows for over [52 miles] from the headwater confluence to the mouth at the Bruneau River. The overall slope of the river is 0.8 percent. The result of such a gentle overall slope can be seen in the very sinuous sections of the river whenever the canyon bottom widens to any degree.

Figure 4. Surface Hydrology



3.4 Demographics and Economics

The Clover Creek Watershed does not contain any towns or cities. While Winter Camp appears on maps as a town, there is no town center or population center to indicate a town. The population within Clover Creek Watershed is extremely small (about sixteen total parcels of private land with only five parcels directly impacting Clover Creek itself) and consists of farmers and ranchers and their families in a rural setting.

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 River 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 Grasmere, 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.

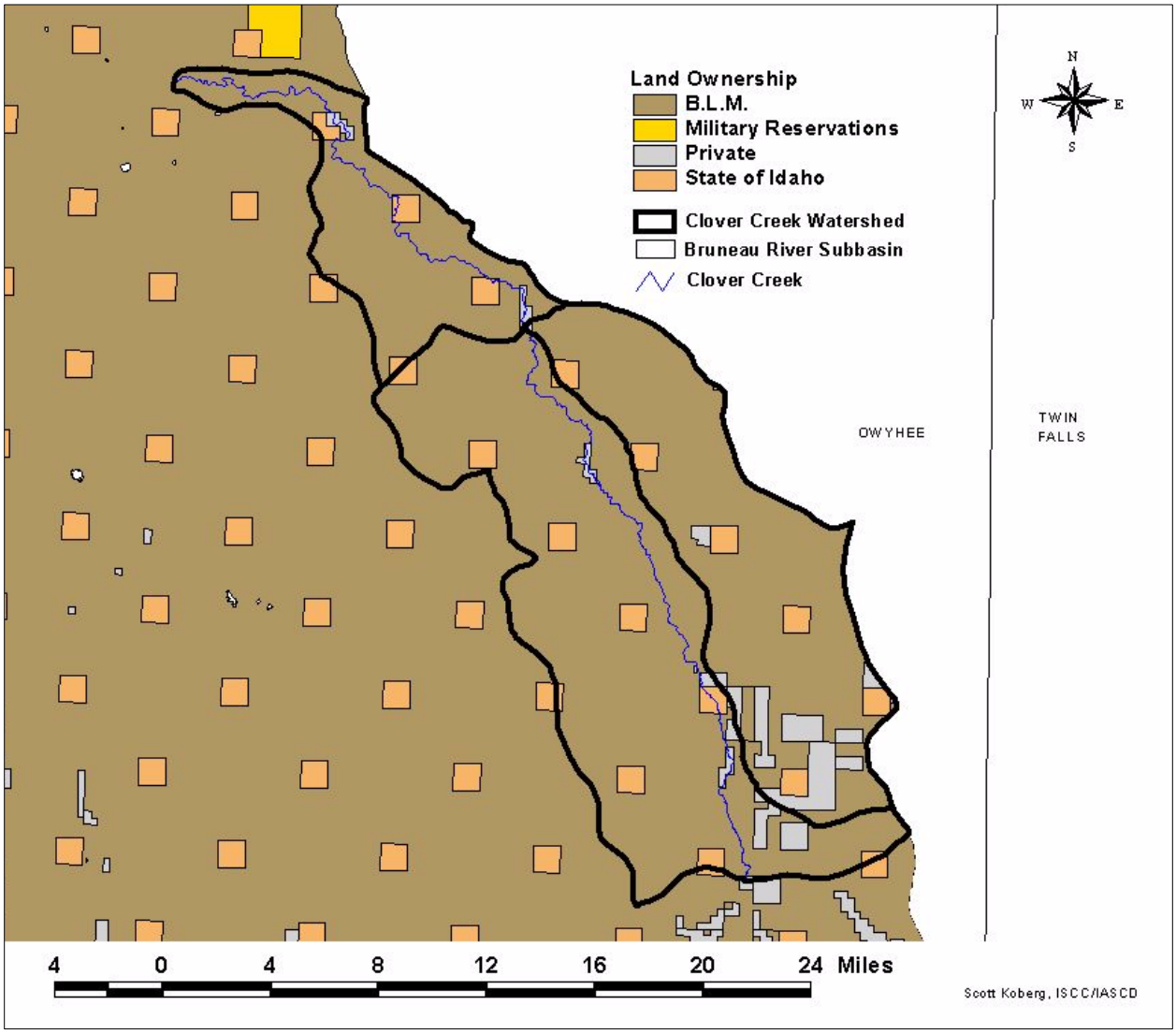
3.5 Land Ownership and Land Use

The majority of land (89%) within Clover Creek Watershed is owned and managed by the Bureau of Land Management (BLM) and operates as rangeland. The privately owned and operated land within the watershed covers only 5% of the total watershed acreage (Table 1), while the high priority private land adjacent to Clover Creek itself consists of less than 1% of the total watershed acreage. The privately owned land on the creek consists mainly of riparian pasture for livestock grazing in addition to some irrigated pasture off the creek where the width of the canyon allows for less confined grazing areas.

Table 1. Land Ownership

Owner	Acres	Percent of Clover Creek Watershed
BLM	165,818	89%
Private	9,210	5%
State of Idaho	10,317	6%
TOTAL	**185,345**	**100%**

Figure 5. Land Ownership



While the total stream length of Clover Creek is approximately 52 miles, there are only 8.42 stream miles (16%) contained within the five private parcels along the length of the creek. State managed land along Clover Creek includes just 3.66 miles (7%) within four parcels, while BLM manages the vast majority of land adjacent to the creek covering approximately 40.0 stream miles and 77% of the total stream length.

Table 2. Private Parcel Data for Clover Creek Watershed

Inventory: Private Agriculture/Grazing	Clover Creek Watershed
Total # of Private Parcels	**16**
Total Acres of Private Parcels	9,210
Average Size (acres)	575.6
Total # of Private Parcels adjacent to Clover Creek	**5**
Total Acres of Private Parcels	1,719
Average Size (acres)	343.8

4.0 TMDL Objectives

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

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 Clover Creek improves, and as state water quality standards adapt to reflect new developments. Water quality monitoring in Clover Creek 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 bacteria include runoff from surface irrigated pastures, rainfall runoff from non-irrigated riparian pastures, and livestock watering on Clover Creek and its tributaries. BMPs can be implemented to address the following:

- Unlimited livestock access to Clover Creek for watering
- Lack of adequate off-stream livestock watering facilities
- Lack of adequate forage adjacent to Clover Creek from long term grazing
- Damage to riparian vegetation from prolonged livestock access

4.1 Recreational Uses – Bacteria Objectives

According to the Bruneau TMDL Subbasin Assessment, the bacteria (E. coli) reduction target in Clover Creek is approximately 76%. This is based on a geometric mean of 528 cfu/100mL measured by IDEQ in Clover Creek during the year 2000, and the subsequent reduction required to achieve the geomean target of 126 cfu/100mL for secondary contact recreation. It is important to recognize, however, that the geomean criteria for E. coli requires that five samples are taken during a 30 day period, and the geomean for Clover Creek during the year 2000 was derived using only three samples (Table 3).

Table 3. E. coli Reductions Required to Meet Load Allocation

Name	Secondary Geo-Mean CFU/100 ml (current)	Secondary Geo-mean CFU/100 ml (allocation)	Percent Reduction Required to Meet TMDL	Single Sample Maximum CFU/100 ml (current)	Single Sample Maximum CFU/100 ml (allocation)	Percent Reduction Required to Meet TMDL
Clover Creek	**528**	**126**	**76%**	**2100**	**576**	**73%**

5.0 Private Parcel Inventory

On four of the five parcels of deeded land within the 303(d) listed segment of Clover Creek, a riparian evaluation and general resource inventory was conducted during the summer of 2002. Since the four parcels that received inventories included approximately 8.01 stream miles and 1,396 acres, 95% of the privately owned stream length was evaluated along with 81% of the total private acreage on the creek.

The objectives of the inventories included:

- Determining landowner goals and management strategies for their deeded parcel
- Evaluating current riparian conditions related to management of livestock on each parcel
- Identifying areas of potential concern along the stream segment regarding excessive livestock access and possible contribution to current bacteria loading
- Recording the physical channel characteristics of the creek and categorizing the channel type, substrates, stability, and sinuosity of the stream segment within each deeded parcel of private land
- Developing basic recommendations and future management strategies to help each landowner achieve his/her objectives while minimizing contribution to bacteria loading in Clover Creek
- Producing a product that provides a baseline evaluation and inventory tool to monitor future progress toward achieving goals and management strategies

The methods used to achieve these objectives varied slightly between each of the four evaluated parcels; however, the basic strategy remained unchanged. On each private parcel, the evaluating team walked the length of the stream segment within the property boundaries. Often, the hydrology and vegetation was such that access to the channel was continuous. In some locations, points o f access to the channel were more limited due to riparian vegetation that required the team to duck in and out from the channel to the uplands. Each time the team determined a stopping point a digital photo (often two --- one upstream, one down) was taken, a GPS waypoint was recorded, and pertinent information regarding the site (i.e. identified livestock access points, condition and types of riparian vegetation, substrate types, channel characteristics, general hydrology/sinuosity, evidence of beaver dams, etc.) was recorded in a log.

Additionally, PFC evaluation sheets, Rosgen channel type classification guides, Wolman pebble count tallies, and general team observations were recorded throughout each segment. In each of the four parcels, the evaluation continued into a short segment of BLM land adjacent to (typically upstream from) the private property for purposes of comparison in management and general stream condition.

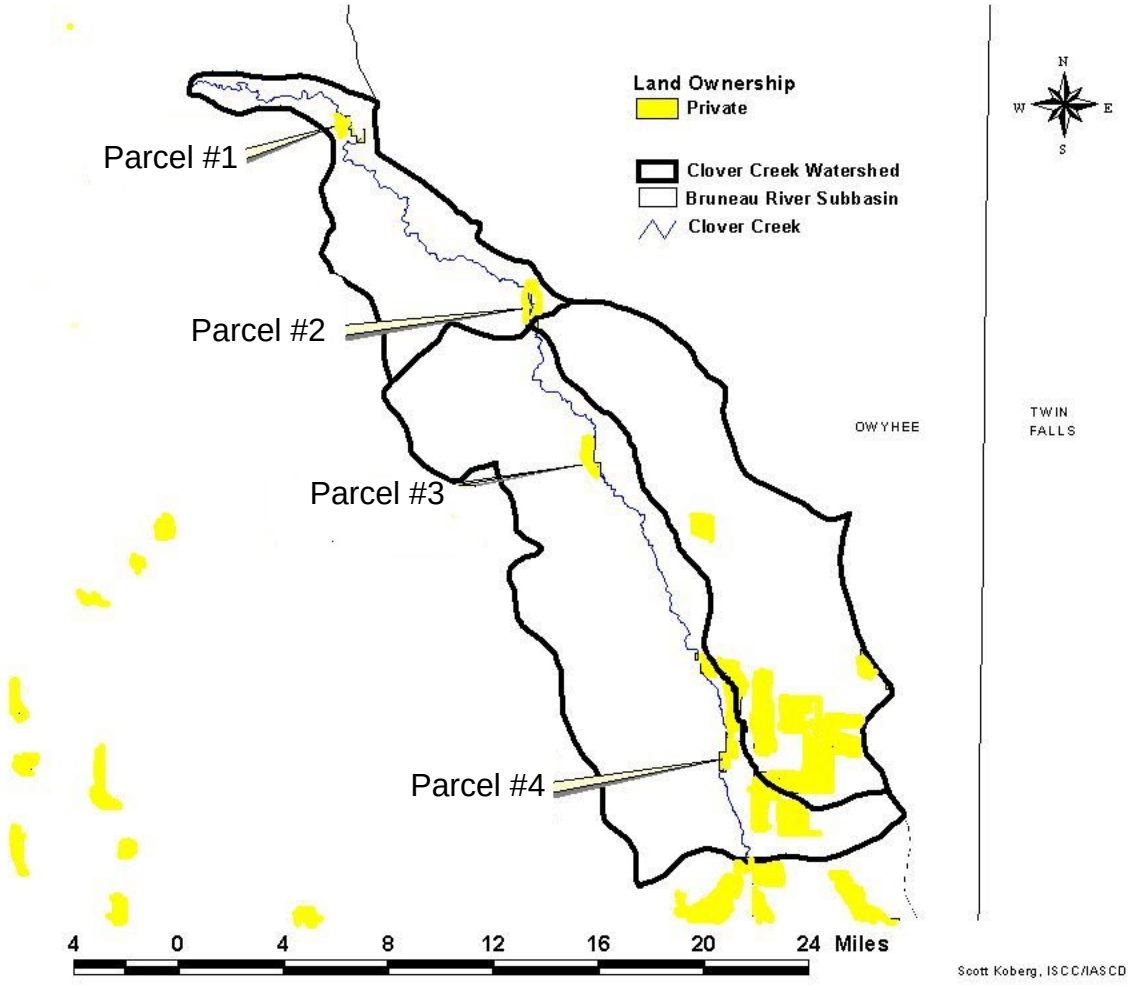


Figure 6. Private Parcel Inventory Locations

The riparian area physical characterization report (with each of the 113 waypoints, 217 photos, maps, evaluation sheets, and recommendations for each of the four parcels) can be obtained from David Ferguson, Idaho Soil Conservation Commission. For the purposes of this implementation plan, a brief summary of each of the evaluated segments is provided along with some of the identified recommendations for each stream reach. Using the identified recommendations and the cumulative data from the inventories, the Bruneau River SCD and the Idaho Association of Soil Conservation Districts can begin developing conservation plans with interested landowners on the 303(d) listed segment of Clover Creek. Through the conservation planning process, additional site specific BMPs may be identified to improve the grazing operation and reduce potential contribution of bacteria to the creek.

5.1 Parcel #1

Two stream reaches were assessed within Parcel #1 upstream from the upper limit of the reservoir and downstream from the reservoir check dam. Stream assessment was completed by Ervin Cowley (BLM), David F. Ferguson (ISCC), and Duane Lafayette (IASCD) with the landowner attending. A total of fifty-two photos were recorded at the twenty-eight different GPS waypoints.

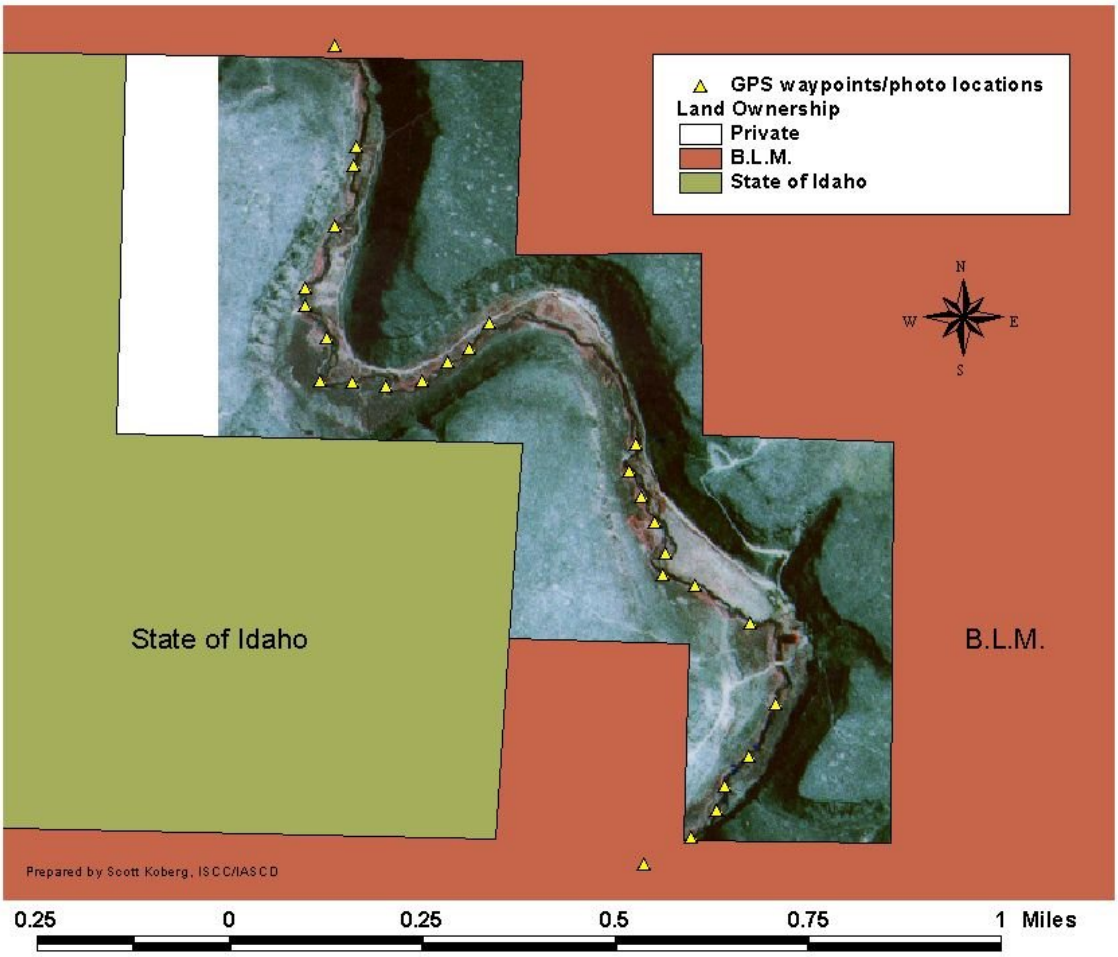


Figure 7. Parcel #1

Background

- There exist at least 3 species of willow in this parcel: whiplash (salix lasiandra), peach-leaf (salix amygdaloides), and sandbar or coyote willow (salix exigua).
- The dominant wetland/riparian herbaceous species seems to be baltic rush or wire grass (juncus balticus) and spikerush (eleocharis palustris), and both are found throughout the length of this parcel. This species appears to be providing most of the current bank stability.
- A species of bulrush, likely common three square (scirpus americanus), is also present in various portions of the parcel; and one or two plants of nebraska sedge (carex nebrascensis) were identified.
- Historical use, primarily pre-1900 horse grazing and post 1900 channel alteration, has impacted channel and vegetative characteristics throughout the parcel.
- Water availability is limited due to upstream irrigation, and is limiting maintenance and recovery of vegetative species in the riparian area.

Upstream reach

The reach within the parcel from the upstream property boundary to the road crossing (no bridge) was considered functional-at-risk due to the following reasons:

–Channel is in transition from a Rosgen F to a C, where some point bars are beginning to be formed, but the entrenchment ratio is mostly less than 2.
–Channel is still over-widened and shallow, where bankfull ratio is typically greater than 12.
–The vegetative species indicate adequate soil moisture but the quantity of stabilizing species is not adequate, much less than a typical 85% needed for good stability in this setting. The herbaceous species present are mostly baltic rush, a colonizer.
–Peach-leaf and coyote/sandbar willows are present and should be adequate for good regeneration, if adequate water supply is available after seedlings are established. The past low water years seems to be limiting willow regeneration.
–Bank sloughing is occurring, but is necessary for the development of a wider floodplain within and below the historical floodplain, now abandoned.

Downstream reach

The lower reach assessed, from the reservoir check dam to the downstream property boundary was considered to be at functional-at-risk, but nearly at proper functioning, due to the following reasons:

–Channel is still in transition from pre and post 1900 uses.
–The vegetative species indicate adequate soil moisture but the quantity of stabilizing species is not quite adequate, less than a typical 85% needed for good stability in this setting. The herbaceous species present are mostly baltic rush, a colonizer, with some upland species still mixed in.
–Peach-leaf and coyote/sandbar willows are present and should be adequate for good regeneration, if adequate water supply is available after seedlings are established. The past low water years seems to be limiting willow regeneration.
–Only one outside bank seemed to be cutting into the terrace wall, where no vegetation was growing (waypoint 26), but will be limited due the canyon wall and bedrock.
–In comparison, this reach has progressed farther than the upper reach, but still has some channel narrowing to occur and willow species to become more dominant, such as the peach-leaf willow.

Conclusions and Recommenations

Though both reaches have been assessed as functional-at-risk, the current grazing management does not seem to be having a significant impact on riparian conditions. The stream channel and vegetation is still adjusting to pre and post 1900 impacts, and is slowly recovering due to limited water availability. Ground water is available, but floodplain development is slow. Regeneration of the willow species will continue to occur slowly until some higher precipitation years occur, back-to-back, providing enough moisture for the peach-leaf and whiplash willows to become more dominant.

- Winter (Oct. – Apr.) use by livestock should be monitored by the landowner to ensure that any willow utilization during this period is kept to a minimum. While mineral supplements may reduce willow use, landowner may need to consider culling out any livestock who are repeat offenders with regard to willow utilization.
- Although fencing does not appear to be a necessity for livestock management within the stream segment on this parcel, the landowner should continue to maintain upland watering facilities, feed away from the stream if possible, and maintain salt licks in the nearby uplands.
- From late spring through October, where just a few renegade livestock may have substantial impact on such few willows, landowner should maintain a livestock-free riparian area.

5.2 Parcel #2

Three stream reaches were assessed within Parcel #2 upstream from Clover Crossing road, the meadow pasture, and the chimney pasture. Stream assessment was completed byDavid F. Ferguson (ISCC), Duane Lafayette (IASCD), Scott Koberg (IASCD), and Kert Young (NRCS) with a landowner attending. A Proper Functioning Condition (PFC) worksheet was utilized to describe the current physical condition, although due to the lack of an interdisciplinary team providing the assessment, an official PFC rating was not provided. A total of sixty-nine photos were recorded at the thirty-nine different GPS waypoints.

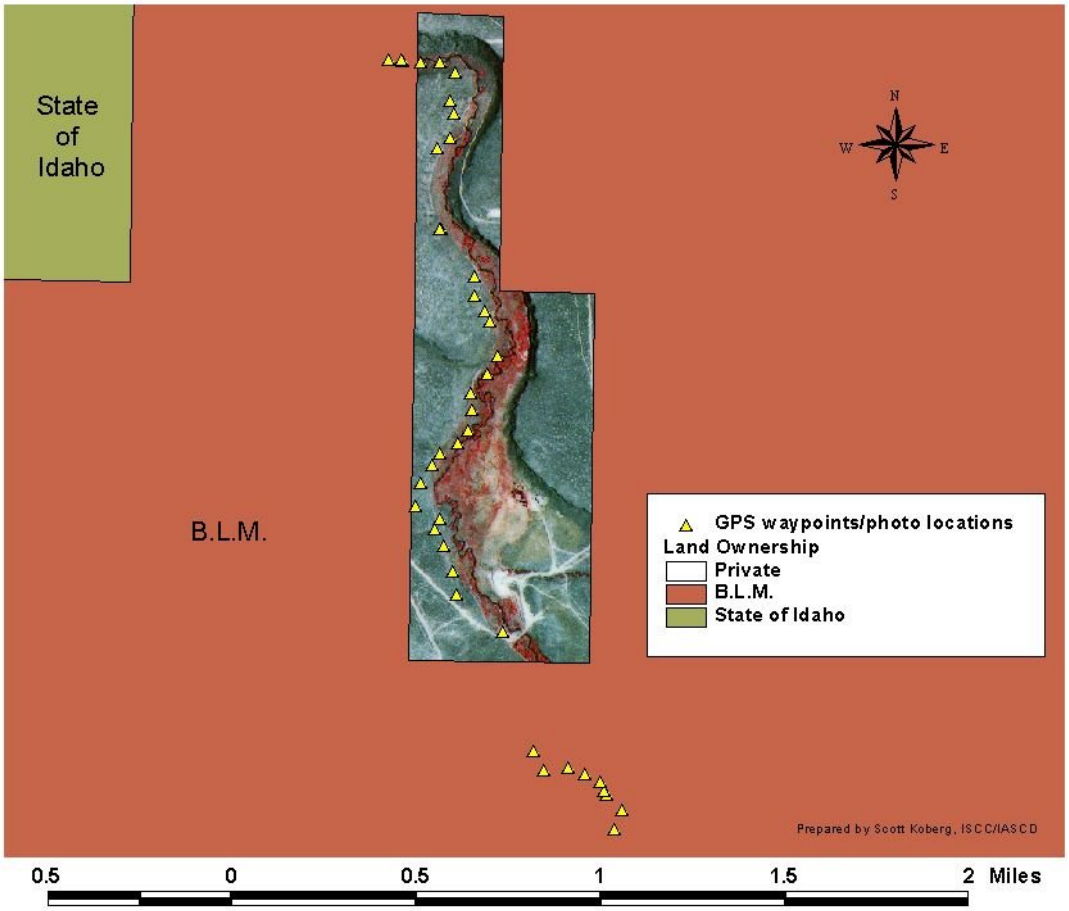


Figure 8. Parcel #2

Background

- The primary adjacent landuse is grazing and pastureland.
- There exists a sufficient amount of woody vegetative species throughout the riparian area for a segment of this type.
- From the upper diversion to the bridge the physical structure of the channel is good, while the second diversion at the bridge causes an in-channel reservoir upstream. One inactive beaver dam exists near the upper end of the in-channel reservoir
- Two smaller inactive beaver dams exist within the meadow pasture but are not affecting hydrology.
- Intermediate flows exist in the creek within this parcel, where ground water recharge may be affected.
- Stream is mostly entrenched in the upper portion of the meadow pasture, but less towards the lower portion. The chimney pasture stream gradient is steeper and displays less sinuousity.
- Bank stability is poor and compaction problems are evident within the meadow pasture.

All reaches (upstream, meadow pasture, and chimney pasture)

The entire private parcel stream reach was assessed from the BLM land upstream to the downstream property boundary fence line and included the following records and observations:

–The season long use by livestock (bulls) is having the greatest impact on woody species and bank stability within the lower portion of the meadow pasture.
–Water availability is limited in the lower portion of the meadow pasture as compared to the upper portion, likely due to irrigation water influences.
–Some gully erosion is occurring from irrigated pasture wastewater return to the creek.
–The floodplain in the meadow pasture is still be expanding and livestock access is influencing channel development.
–The entire reach from the bridge to the lower property boundary has over-widened channels, with stream depths less than desired.
–In the upper portion of the meadow pasture, mineral supplements and seasonal grazing have reduced woody species utilization.
–There exists the potential of an oxbow being formed in the near future at waypoint 36, potentially, increasing the stream gradient.

Conclusions and Recommendations

- Where bank stability is a significant problem within the meadow pasture, season long grazing should be adjusted to seasonal grazing with the use of cross-fencing and/or stream-side fencing to allow for livestock rotation within the riparian and adjacent pastureland area.
- Where there is an extensive amount and diversity in vegetative species, there is no need for plantings to enhance bank stability. Grazing adjustments will likely allow for rapid growth where water is readily available to herbaceous and woody species.
- Gradient control does not seem necessary within the area, so it is not recommended that in-stream structures, which would likely cause further bank erosion, be installed.
- While the stream channel is still adjusting to past incisement (head cutting), and where the floodplain is still increasing, bank erosion must still occur to compensate for the current entrenchment. Thus, bank stability may still limited by hydrologic factors even where grazing adjustments are being made.
- Where livestock have numerous water access points to the creek, bacterial contamination is of greater potential. Off-site water facilities, fencing, and hardened crossings should be considered to reduce the number of access points to the creek.
- Within the chimney pasture, woody species utilization should be reduced through grazing timing adjustments, allowing for regeneration. This will help with narrowing stream channel, thus increasing riparian area inward, along with floodplain.

5.3 Parcel #3

Three stream reaches were assessed within Parcel #3 the upstream pasture (which includes some BLM land), the middle horse pasture, and the downstream portion to the property boundary. Stream assessment was completed by David F. Ferguson (ISCC) and Duane Lafayette (IASCD). A Proper Functioning Condition (PFC) worksheet was utilized to describe the current physical condition, although due to the lack of an interdisciplinary team providing the assessment, an official PFC rating was not provided. A total of sixty-one photos were recorded at the twenty-nine different GPS waypoints.

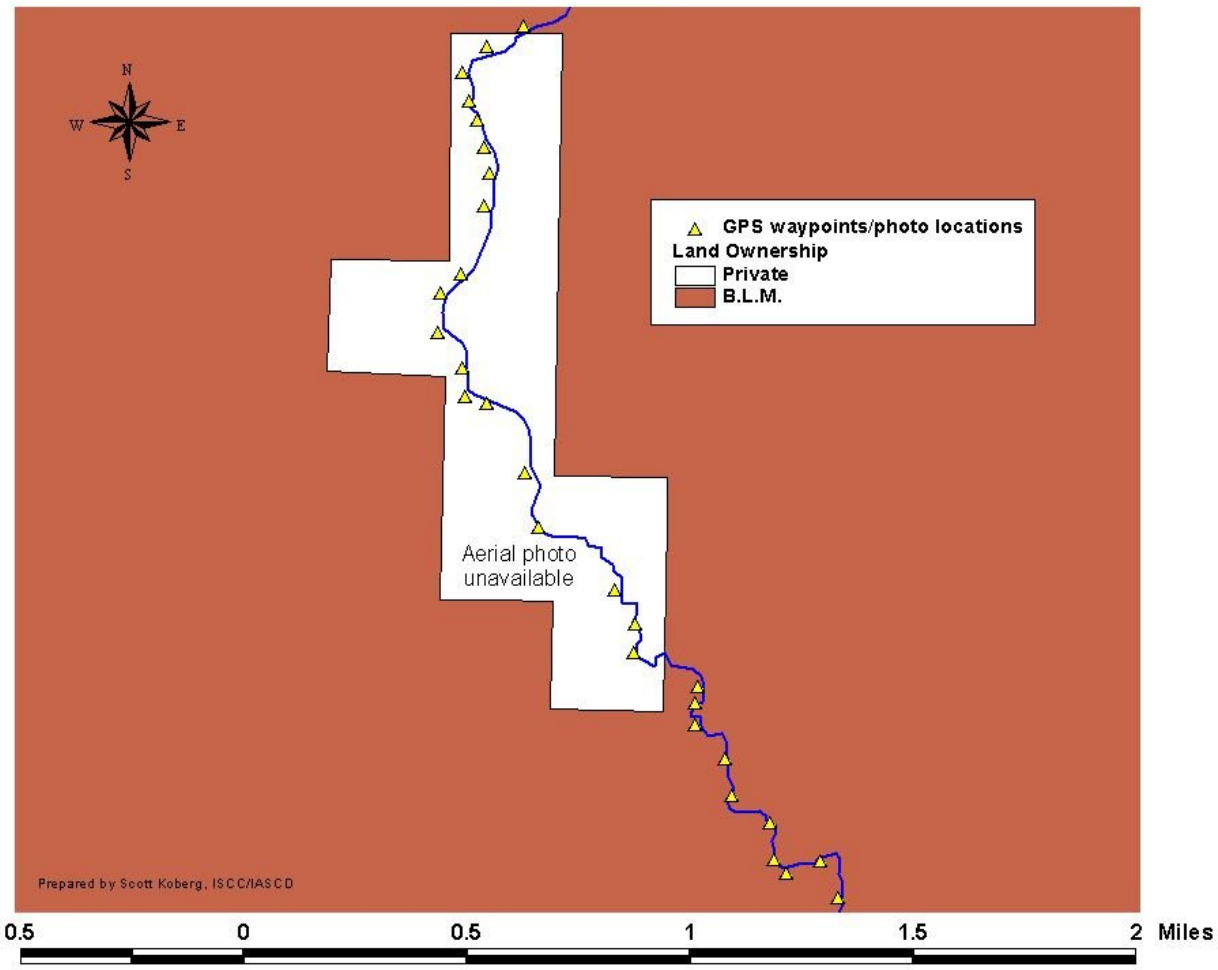


Figure 9. Parcel #3

Background

- The adjacent landuse is livestock grazing.
- A variety of riparian vegetative species exists throughout this parcel, including: coyote willow (salix exigua), spike rush (eleocharis palustris), peach leaf willow (salix amygdaloides), water birch, nebraska sedge (carex nebrascensis), an unknown sedge (carex), and wild rose.
- Channel stability is provided by the spike rush, roots of live woody vegetation, and the cobble/boulder substrate.
- Historical use, primarily pre-1900 horse grazing and post 1900 channel alteration, has impacted channel and vegetative characteristics throughout the parcel.
- Upstream irrigation water use periodically limits stream flow through this parcel.

Upstream reach

The reach within the parcel from upstream property boundary to the horse pasture fence line included the following records and observations:

–Channel is a C3 Rosgen type, but includes some bedrock and gravels.
–Channel is still over-widened and shallow, where bankfull width/depth ratio is typically greater than 12, but the spike rush and coyote willow are narrowing the channel.
–The vegetative species indicate adequate soil moisture but the quantity of stabilizing species is not adequate, much less than the typical 85% needed for good stability in this setting. The herbaceous species present are mostly spike rush, a colonizer.
–Peach-leaf and coyote/sandbar willows are present and, in time, will provide more stability and channel definition.
–Grazing management, where woody species are being slightly over-utilized, should be adjusted to ensure good vigor and regeneration success.
–Where there is a well-developed floodplain, very little bank erosion or sloughing is occurring.

Middle reach

The reach within the parcel that included the fenced horse pasture included the following records and observations:

–Channel is still in transition from pre and post 1900 uses, where it is more entrenched, with limited floodplain access below the abandoned historic floodplain.
–The vegetative species indicate adequate soil moisture but the quantity of stabilizing species is not quite adequate, less than the typical 85% needed for good stability in this setting. The herbaceous species present are mostly spike rush, a colonizer. Some water sedge (type unknown) is also present in small, thick patches.
–Coyote/sandbar and peach leaf willows are present, with little utilization occurring.
–In comparison to the upper reach, less floodplain development has occurred, especially below the confluence with Juniper draw.

Downstream reach

The reach within the parcel from the horse pasture to the lower property boundary included the following records and observations:

–Channel is less entrenched than the middle reach, where there exists a wider floodplain.
–The vegetative species indicate adequate soil moisture but the quantity of stabilizing species is not quite adequate, less than the typical 85% needed for good stability in this setting. The herbaceous species present are mostly spike rush, a colonizer. Some water sedge (type unknown) is also present in small, thick patches.
–Coyote/sandbar and peach leaf willows are present, with little utilization occurring.
–Spike rush, coyote willow and other riparian species are less abundant in this reach compared with upper and middle reaches which have more non-riparian species on the stream banks.

Conclusions and Recommendations

Though the entire reach assessed is fairly stable due to the cobble substrate and spike rush species, the current grazing management does have some impact on woody species. The stream channel and vegetation is still adjusting to pre and post 1900 impacts in the middle reach (horse pasture), but vegetative species are becoming well established throughout the parcel to provide moderate bank stability. An increase in woody species, such as peach leaf willow and water sedges is desirable. Livestock grazing near the riparian area should be carefully monitored to minimize willow utilization.

- Winter (Oct. – Apr.) use by livestock should be monitored by the landowner to ensure that any willow utilization during this period is kept to a minimum. While mineral supplements may reduce willow use, landowner may need to consider culling out any livestock who are repeat offenders with regard to willow utilization.
- Although additional fencing does not appear to be a necessity for livestock management within the stream segment on this parcel, the landowner is encouraged to install additional upland watering facilities, feed away from the stream, and maintain salt licks on the adjacent uplands
- Landowner is encouraged to install watering facilities or develop any adequate springs within the horse pasture to reduce stream use for watering and relieve horses from biting insects within the riparian area.

5.3 Parcel #4

Two stream reaches were assessed within Parcel #4 the lower pasture (Doe Flat) and the upper pasture (Buck Flat). Stream assessment was completed byDavid F. Ferguson (ISCC), Duane Lafayette (IASCD), and Scott Koberg (IASCD). A Proper Functioning Condition (PFC) worksheet was utilized to describe the current physical condition, although due to the lack of an interdisciplinary team providing the assessment, an official PFC rating was not provided. A total of thirty-five photos were recorded at the seventeen different GPS waypoints.

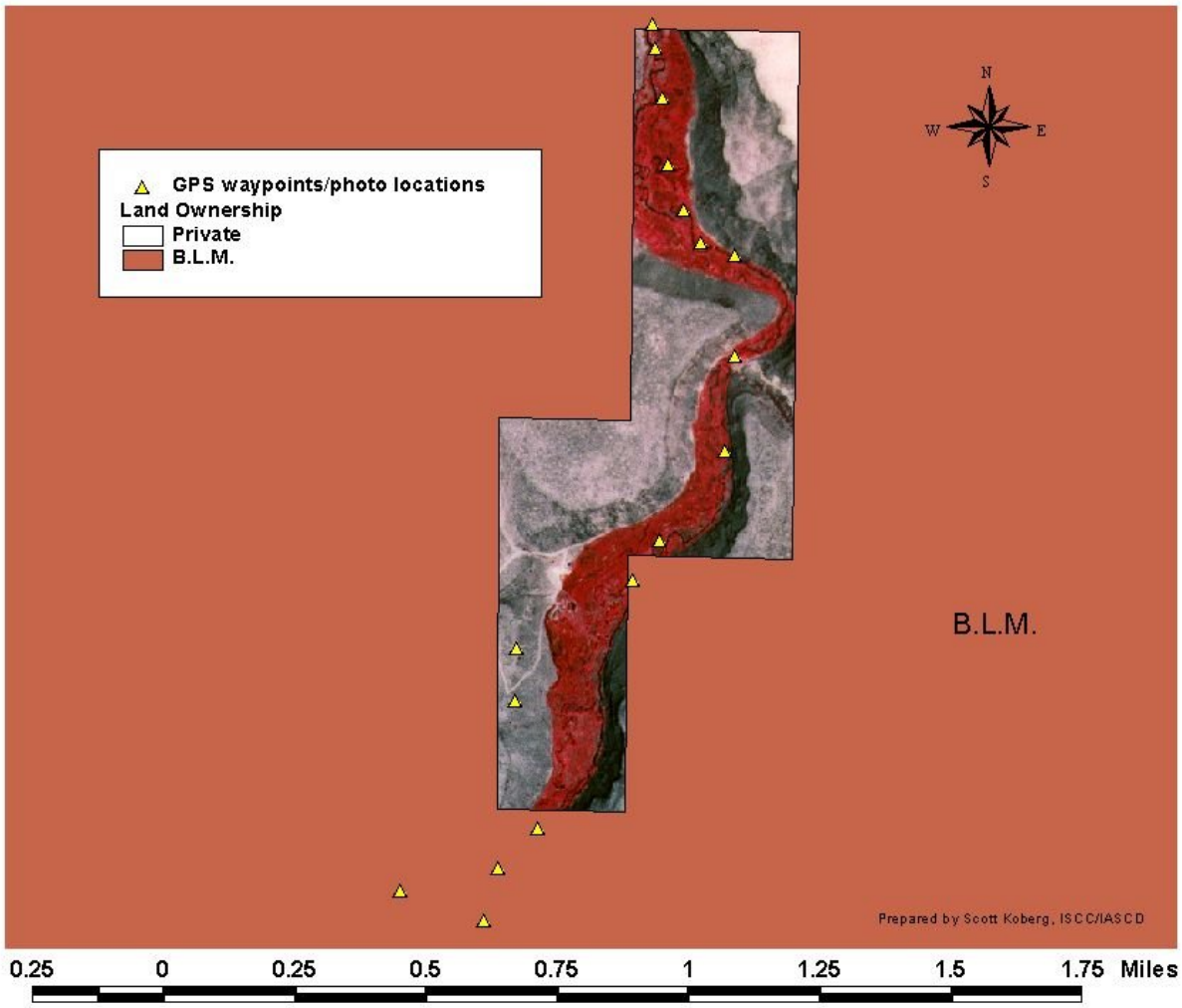


Figure 10. Parcel #4

Background

- The adjacent landuse is livestock grazing, primarily cattle.
- There exist multiple riparian vegetative species throughout this parcel, including: coyote willow (salix exigua), peach leaf willow (salix amygdaloides), yellow willow (salix lutea), whiplash willow (salix lasiandra), spike rush (eleocharis palustris) and a sort of water sedge (carex, type unidentified). In addition, other species such as wild rose, dogwood, and other unidentified were present.
- Channel stability is provided by the spike rush, roots of live woody vegetation, and the cobble/boulder substrate.
- Historical use has impacted the channel sinuosity in order to increase pasture area, and has caused the channel to shift to the east side of the narrow valley.
- Two diversions are used to deliver irrigation water to adjacent pastures that are operated throughout the growing season, maintaining and increasing vegetative growth.

Upstream reach

The upper pasture was assessed from just above the narrow canyon section to the upper property boundary and included the following records and observations:

–The stream channel had been straightened many years ago, which causes a higher entrenchment than the lower pasture reach, though willows are more dominant here and are providing stability, along with more cobble/boulder substrate.
–From the lower end to near and upstream of the corrals, there exists slightly more bank instability. Only one actively eroding outside bend is excessive and is considered a problem by the owner. This is at the downstream end of the channelized section within the upper pasture.
–The vegetative species indicate adequate soil moisture and the quantity of stabilizing species is higher than the lower pastures, though is some locations (more downstream), rushes and some bank erosion is more evident.
–In comparison to the lower pasture, less floodplain is available but the willow community is providing a great amount of stability and shading, increasing as one travels upstream, where 100% canopy cover at the upper property boundary.

Downstream reach

The lower pasture was assessed from the lower property boundary just downstream from an old fence line (to be replaced and moved to the actual property line)to the lower end of the upper pasture just upstream from the narrow canyon section, and included the following records and observations:

–Channel is a C4 Rosgen type, but includes some cobble.
–Channel is still over-widened downstream of the old fence line but only for a very short section. The majority of the reach has a bankfull width/depth ratio of greater than 12, moderate to low entrenchment,with adequate floodplain to dissipate energy.
–The vegetative species indicate adequate soil moisture, a fair quantity of stabilizer species, but less than what will likely occur given time and similar management. The herbaceous species present are mostly a spike rush, a colonizer.
–Multiple willow species are present are present and becoming the dominate.
–Little bank erosion or sloughing is occurring, where there is a good stability from vegetation, though still developing and adequate floodplain.
–Some livestock water access points exist, but do not seem to effect stability.

Conclusions and Recommendations

The entire reach assessed is fairly stable, due to the willow community, cobble substrate, and spike rush species. The current grazing management does not seem to have any significant impact on the woody species or channel shape. The willow community is becoming dominant throughout both reaches. An increase in woody species and sedges where spike rush is dominant is desirable, which does seem to be occurring.

- Potentially install one or two watering troughs within the upper riparian pasture to reduce in-stream water use (primarily for bacterial concerns). Some bank instability occurs with most every entry point.
- Though bank erosion is excessive at the one location within the upper pasture, stability may come within a few years, without much more bank erosion, where the stabilizing species are migrating downstream into that section. Some willow planting may quicken stability. Any improper channel alteration would likely cause down cutting, potentially lowering the water table within the upper pasture above this point. A gradient change is likely causing the bank erosion, where stream gradient is less at this point than upstream within the channelized section.
- Maintain existing forage in the pastures, which if reduced by excessive willow growth in the pastures, might place additional willow use within the riparian area.

6.0 BMPs for Pasture

Table 4 provides the types of voluntary BMPs that are available to producers within the watershed that will improve site specific water 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 4. Pasture BMPs

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

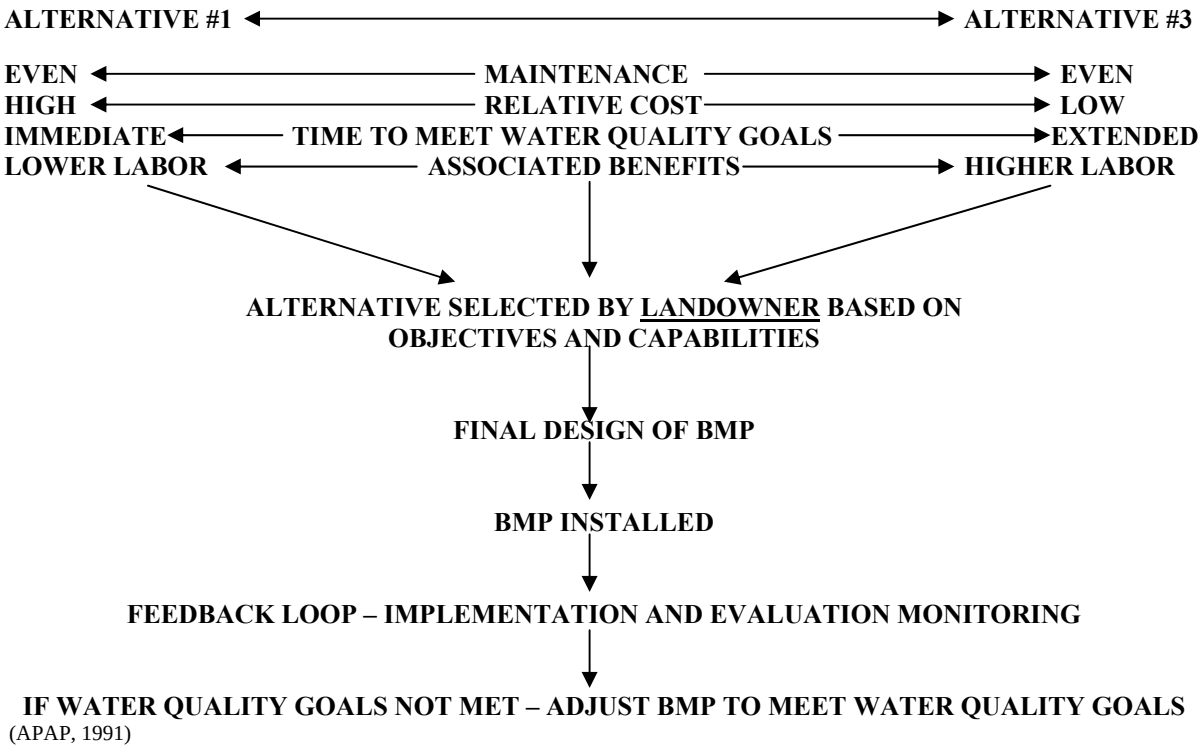
6.1 Example Description of Alternatives for Surface Irrigated Pasture

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 Planned Grazing System Pasture & Hayland Management Nutrient Management Heavy Use Area Protection Pest Management Livestock Watering Facility Irrigation Water Management Gated Pipe	Fencing Planned Grazing System Pasture & Hayland Management Nutrient Management Pest Management Livestock Watering Facility Irrigation Water Management Gated Pipe	Fencing Pasture & Hayland Mgmt. Nutrient Management. Livestock Watering Facility Irrigation Water Management Pest Management Filter Strip

6.2 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).



(APAP, 1991)

6.3 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.

7.0 Program of Implementation

The Bruneau River Soil Conservation District has selected land treatment through application of a combination of site specific BMPs for the privately owned pasture and grazing land on Clover Creek. There are currently no sources of funding available for cost-share assistance specifically within the Clover Creek watershed. While there are a handful of federal and state site-specific programs available to interested participants on a farm by farm basis, Clover Creek has yet to be selected as a priority area. Due to the very few number of owners within the 303(d) listed segment, it may be best for the individual owners to pursue cost-share assistance on their own.

7.1 Installation and Financing

Landowners can enter into voluntary water quality contracts or cost-share contracts with the Bruneau River SCD (once 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 River 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 producers 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 River 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.

7.2 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.

7.3 Water Quality Monitoring

IDEQ recently collected water quality samples on Clover Creek from July of 2001 through January of 2002 to record progress toward achievement of the bacteria TMDL. In order to determine if the standard is being achieved, however, five samples for E. coli must be collected within a thirty day period. Idaho State Department of Agriculture (ISDA) along with the Bruneau River SCD and IASCD 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 Clover Creek for evaluation of water quality improvements will be decided through joint agency cooperation, data review, and BMP implementation evaluation.

8.0 References

Ferguson, David F., Idaho Soil Conservation Commission. 2002. *Clover & Three Creek Riparian Assessment – Physical Characterization of Riparian Area and Stream Channels*

Idaho Department of Environmental Quality, 2000. *Bruneau Subbasin Assessment and Total Maximum Daily Loads of the 303(d) Water Bodies.*

Idaho Department of Health & Welfare Division of Environmental Quality, Idaho Department of Lands, and Idaho Soil Conservation Commission 1991. *Idaho Agricultural Pollution Abatement Plan (APAP).*

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