Three Creek Watershed

Agricultural TMDL Implementation Plan

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1.0 Executive Summary

Subwatershed: Three Creek Watershed
Total Scope: 88,800 acres (Idaho only)
Agricultural Scope: 19,492 acres
Agricultural Critical Acres Scope: 5,239 acres

Location: Southeastern portion of Owyhee County extending from confluence of Big Flat Creek, Deadwood Creek, and Three Creek with southern boundary at the Idaho/Nevada border and the eastern boundary coinciding with the Bruneau Subbasin boundary; includes the following subwatersheds: Big Flat Creek and Deadwood Creek

Elevation: 7,711 feet at the Owyhee County/Twin Falls County border near the Idaho/Nevada state line to 5,249 feet at the confluence of Three Creek with Big Flat Creek and Deadwood Creek

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 Three Creek Watershed
BLM	65,594	74%
Private	19,492	22%
State of Idaho	3,714	4%
TOTAL	**88,800**	**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 Three Creek the TMDL established a sediment bed load target for percent surface fines. The target is to be attained within Three Creek from the Idaho/Nevada state line to its confluence with Big Flat Creek and Deadwood Creek. The purpose of the bed load target is to protect cold water biota and salmonid spawning uses in the Three Creek.

The bed load target in Three Creek requires a maximum sediment bed load of 165.04 kg/day. Recent sampling conducted by IDEQ in Three Creek yielded a current sediment bed load figure of 537.51 kg/day. As data continues to be collected in Three Creek, it will be important to remain flexible with implementation strategies and recognize improvements in water quality and land management as progress is made toward the bed load target. It is also important to recognize the true feasibility of achieving the bed load target as more data is collected, and use an iterative process for TMDL implementation if such a target is not achievable due to the geology and hydrology of the watershed.

Implementation Plan: This Implementation Plan identifies best management practices (BMPs) for use on private agricultural lands in Three 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

[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.**

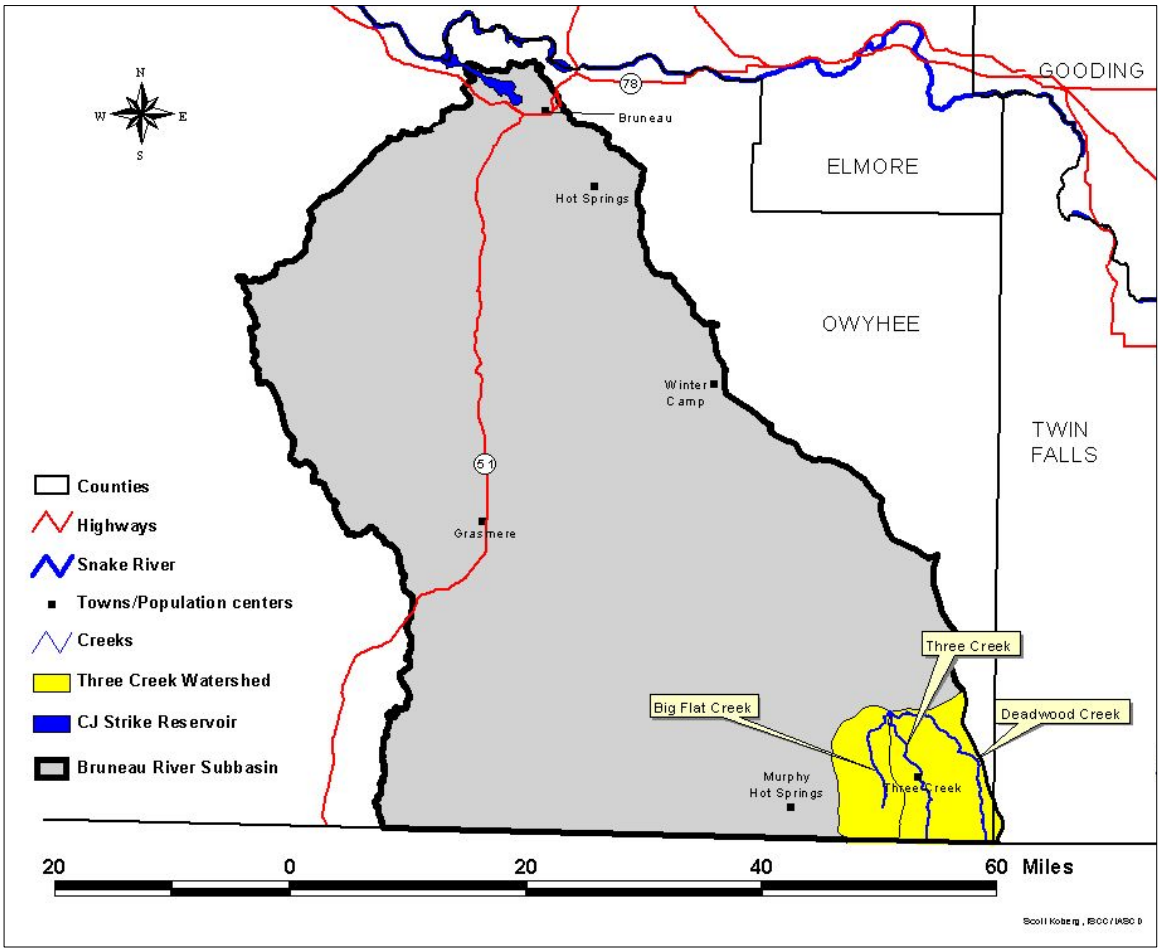
management, critical area plantings, livestock watering facilities, fencing, riparian buffers, and livestock grazing management. These component practices as well as others not listed in this document are outlined in the Agricultural Pollution Abatement Plan (APAP) housed with the Idaho Soil Conservation 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 Three 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.

2.0 Introduction

The Three Creek Watershed encompasses 88,800 acres. It includes Big Flat Creek subwatershed and Deadwood Creek subwatershed. Three Creek flows in a northwesterly direction from the Idaho/Nevada border to its confluence with Big Flat Creek and Deadwood Creek at the headwaters of Clover Creek, north of the town of Three Creek.

Figure 1. Three Creek Watershed Location



This implementation plan will address the privately owned and operated agricultural land directly adjacent to Three Creek. Within this plan the following elements are identified: the percent surface fines problem within Three Creek, potential impact of the private land on the percent surface fines TMDL, and Best Management Practices (BMPs) that, when applied, will have the greatest effect on improving both water quality and streambank stability.

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 Three Creek Watershed will increase the potential success of this plan and the reduction of pollutants necessary to meet the TMDL requirements in Three 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 Three 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

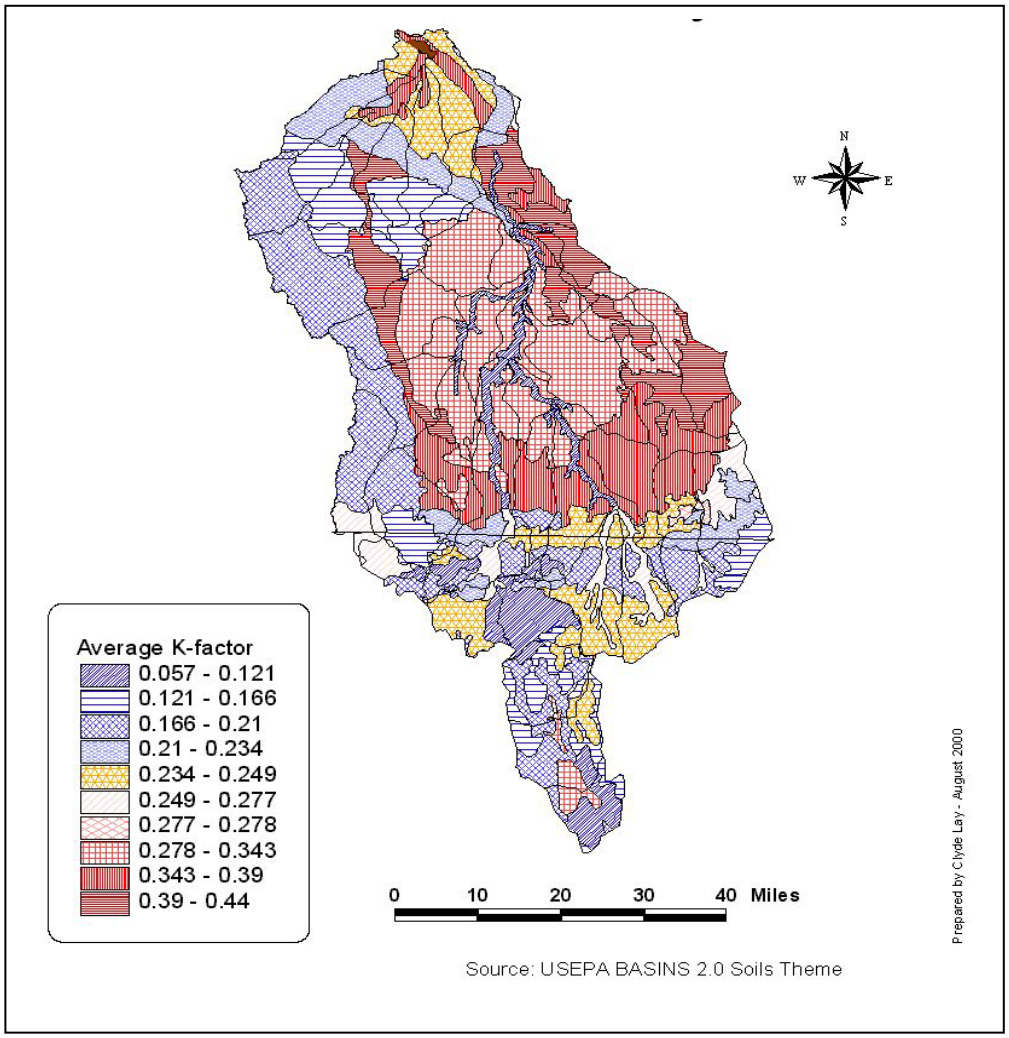
This section describes watershed characteristics that affect the types, locations, and effectiveness of BMPs proposed in this implementation plan. These characteristics include soils, climate, surface hydrology, demographics and economics, land ownership, and land use in Three Creek Watershed.

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. Three Creek Watershed in the southeastern portion of the figure has K-factors ranging from 0.21 to 0.39, although the private land adjacent to Three Creek itself falls within the 0.249 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). Three Creek Watershed, again in the southeastern portion of the figure, exhibits a wide range of slopes; however, the private land adjacent to Three Creek falls between 1-5% slope.

Figure 2. Bruneau Subbasin K Factor Classes



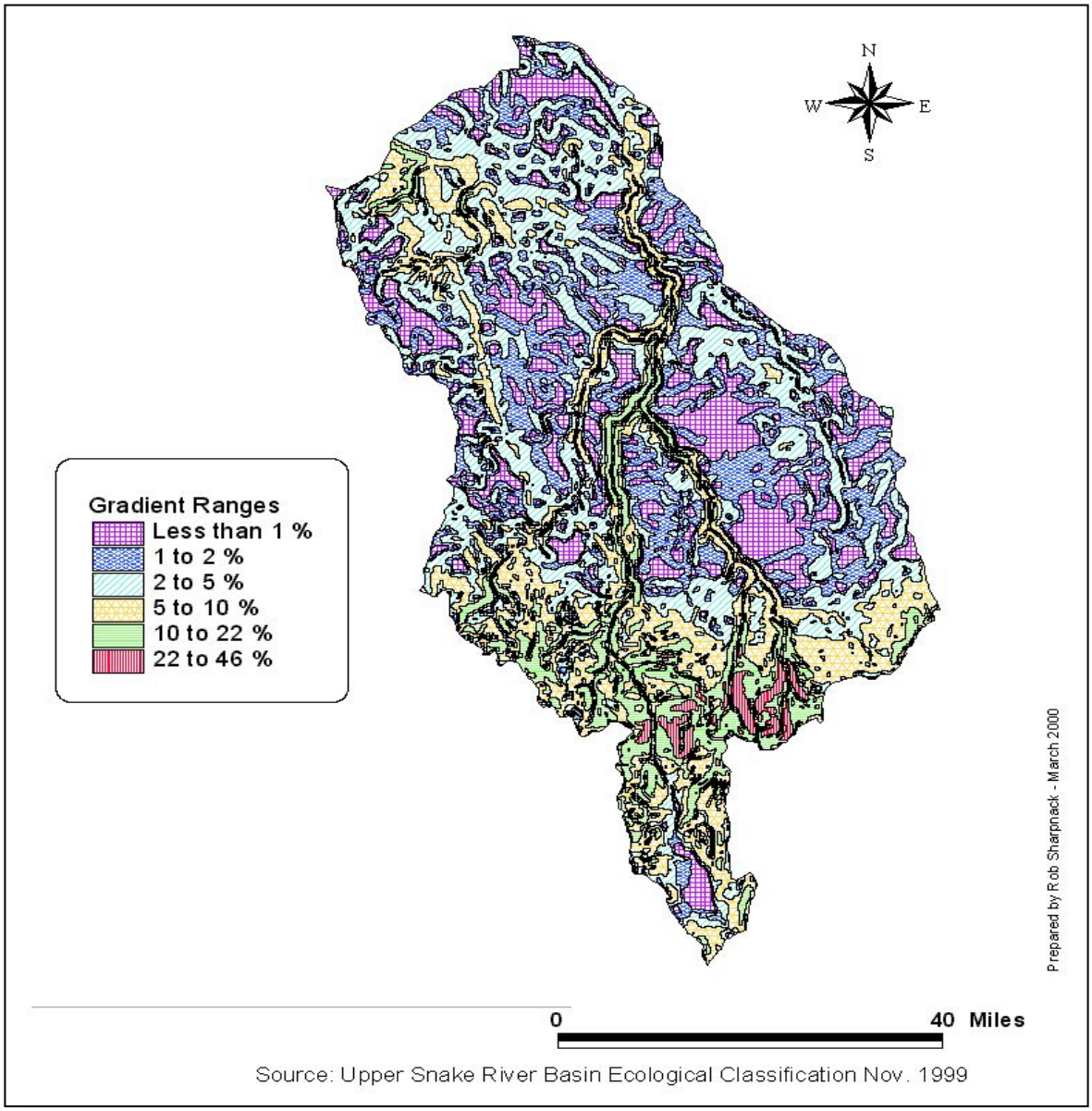
3.2 Climate *(Grandview is the nearest station available for climatic data)*

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

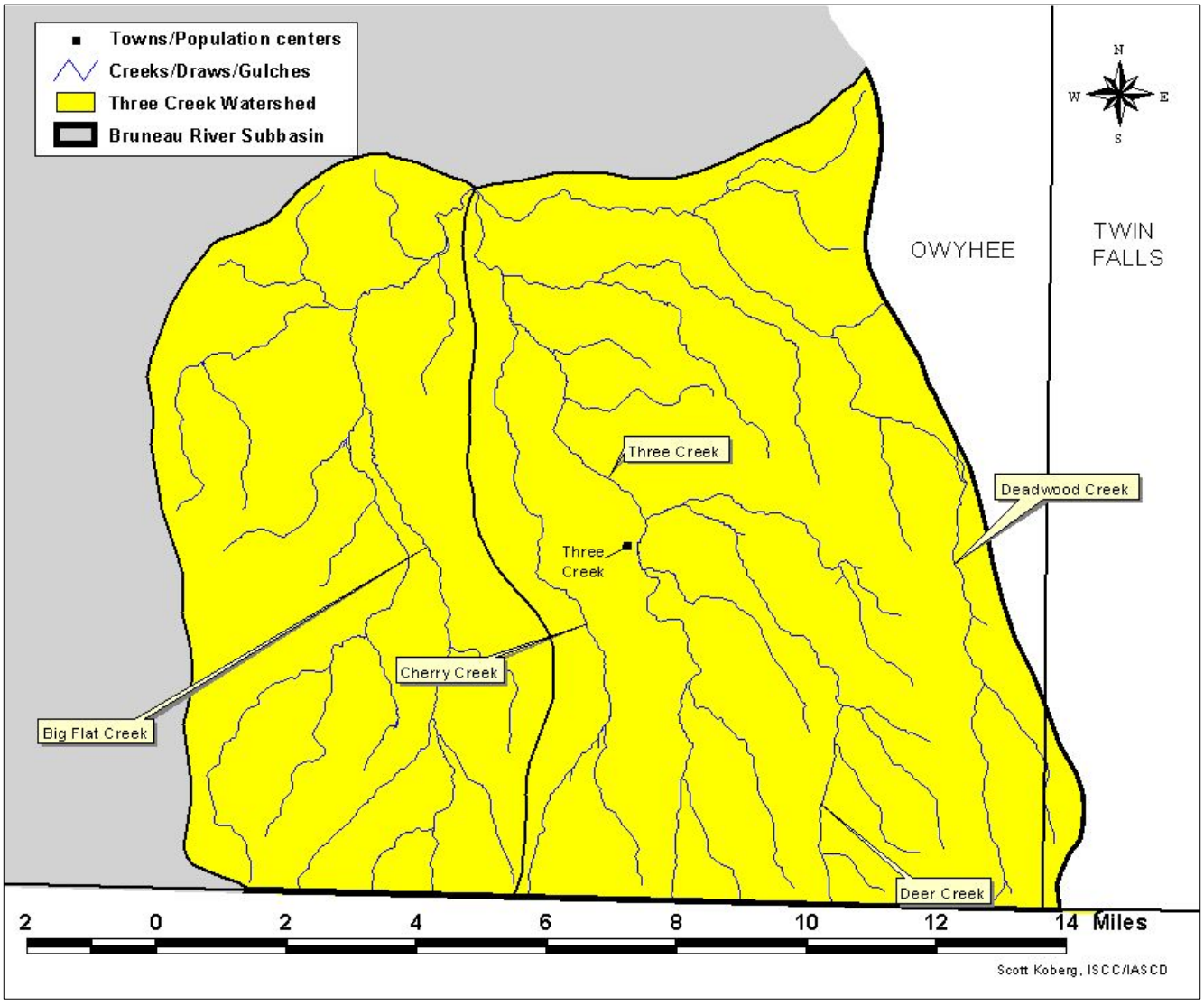


3.3 Surface Hydrology

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

> Three Creek is one of the perennial source streams for Clover Creek. It begins in Nevada at an elevation of approximately [6,558 feet]. From the source it flows north into Idaho and crosses the border at approximately [6,200 feet]. The total length of the stream in Idaho is [14.29 miles]. Three Creek flows through relatively steep canyons in the heeadwaters areas to somewhat broad agricultual valleys a it nears the town of Three Creek and the junction of Clover Creek. The agricultural lands in this area are dominated by pasturelands with some irrigated hay production

Figure 4. Surface Hydrology



3.4 Demographics and Economics

The Three Creek Watershed does not contain any towns or cities. While Three Creek appears on maps as a town, there is no town center or population center to indicate a town. The population within Three Creek Watershed is extremely small (thirty seven total parcels of private land with only six parcels directly impacting Three 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. 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.

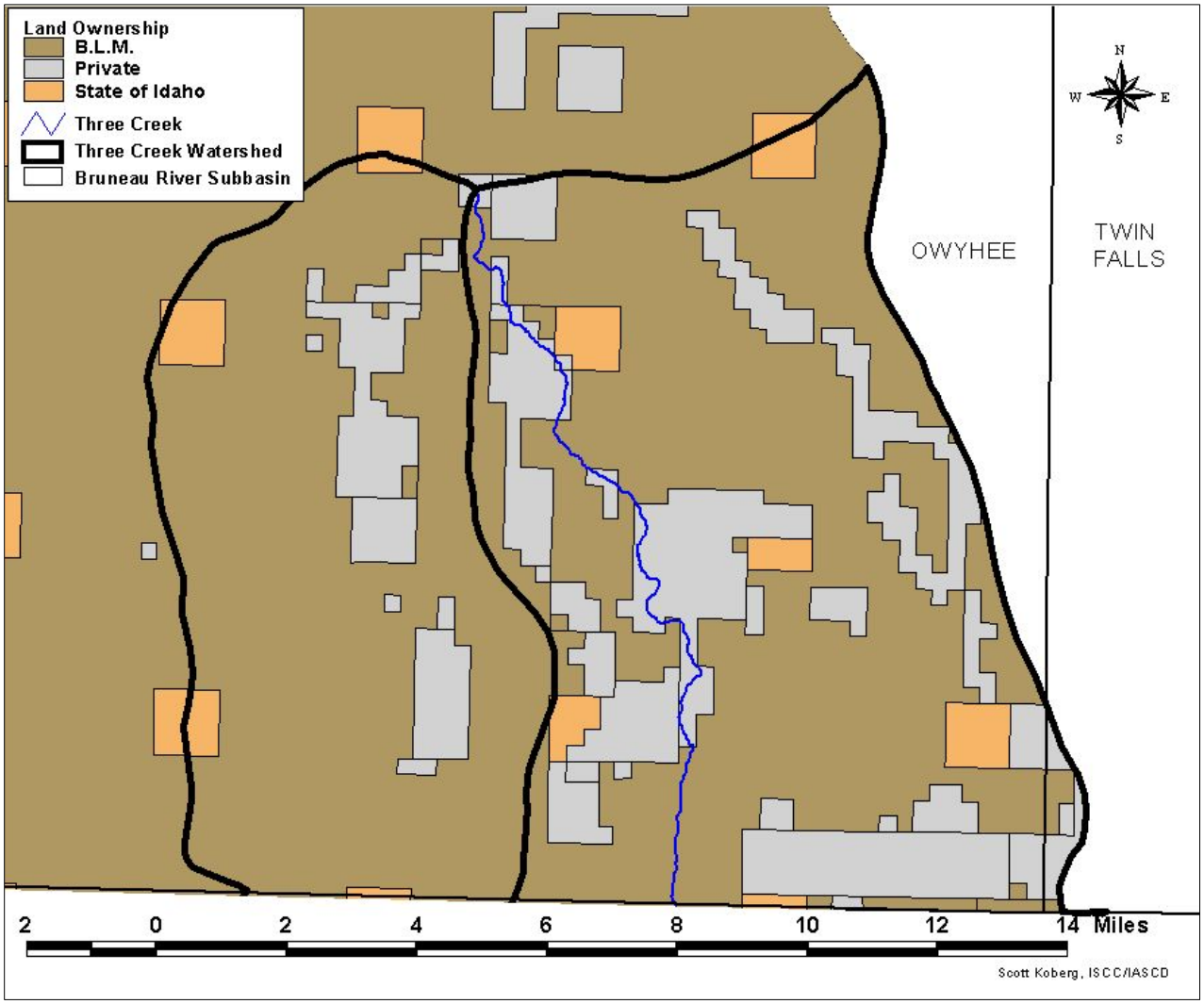
3.5 Land Ownership and Land Use

The majority of land (74%) within Three 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 approximately 22% of the total watershed acreage (Table 1), while the high priority private land adjacent to Three Creek itself consists of less than 6% 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 hayland and pasture off the creek where the width of the canyon allows for less confined grazing areas.

Table 1. Land Ownership

Owner	Acres	Percent of Three Creek Watershed
BLM	65,594	74%
Private	19,492	22%
State of Idaho	3,714	4%
TOTAL	**88,800**	**100%**

Figure 5. Land Ownership



While the total stream length of Three Creek in Idaho is approximately 14.29 miles, there are about 9.29 stream miles (65%) contained within the six private parcels along the length of the creek. The BLM manages the remaining land adjacent to the creek covering approximately 5.0 stream miles and 35% of the total stream length in Idaho.

Table 2. Private Parcel Data for Three Creek Watershed

Inventory: Private Agriculture/Grazing	Three Creek Watershed
Total # of Private Parcels	**37**
Total Acres of Private Parcels	19,492
Average Size (acres)	526.8
Total # of Private Parcels adjacent to Three Creek	**6**
Total Acres of Private Parcels	5,239
Average Size (acres)	873.2

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 Three Creek. To support the designated beneficial uses in Three Creek (cold water biota and secondary contact recreation), the TMDL established targets for bed load sediment.

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 and natural bed load condition in Three Creek improves, and as state water quality standards adapt to reflect new developments. Water quality monitoring in Three 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 sediment potentially contributing to the bed load in Three Creek include runoff from surface irrigated pastures and hayland, rainfall runoff from non-irrigated riparian pastures, and livestock watering on Three Creek that contributes to stream bank degradation. BMPs can be implemented to address the following:

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

4.1 Sediment Allocation and Objectives

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

> Surface fines are often increased with destabilization of banks and overgrazing. In low velocity streams, this sediment is often in the bedload form. In higher velocity streams the associated sediment is entrained in the water column as suspended sediment. However, much of this is also dependent upon the particle size. As particle size increases, the bedload component becomes more important than the suspended component. As substrate sedimentation increases the beneficial uses of a stream can be impaired through a reduction in food production and in the loss of trout habitats… IDEQ has assumed that the biota in the impaired stream should respond in a positive manner if the surface fines are reduced to levels found in similar streams with fully supported beneficial uses… The substrate surface fines target for Three Creek will be based on the measured substrate surface fines in Big Flat Creek plus a MOS [Margin of Safety]… bringing the target to 34 percent surface fines.

Table 3. Percent Bed Load Reduction Required to Meet Load Allocation

Name	Sediment Bed Load kg/day (current)	Sediment Bed Load kg/day (allocation)	Percent Reduction Required to Meet TMDL
Three Creek	**537.51**	**165.04**	**69%**

5.0 Private Parcel Inventory

On each of the six parcels of deeded land within the 303(d) listed segment of Three Creek, a riparian evaluation and general resource inventory was conducted during October 2002. The six parcels that received inventories included approximately 9.29 stream miles and 5294.3 acres, or about 6% of the entire Three Creek Watershed.

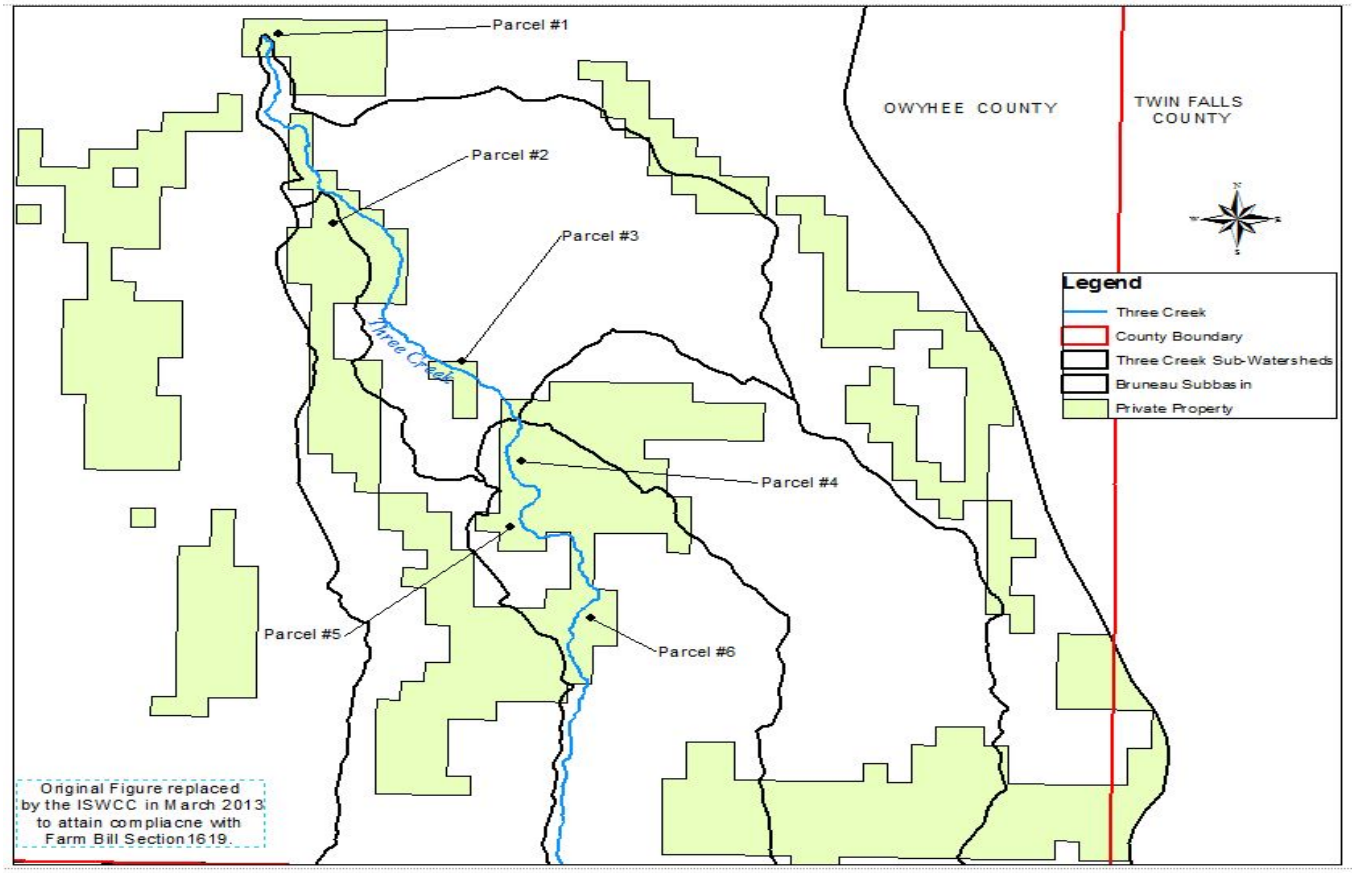
The objectives of the inventories included:

- 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 impact on stream channel substrate characteristics
- 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 impact to stream channel substrate characteristics
- 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 six 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 of 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.

Figure 6. Private Parcel Inventory Locations



Additionally, PFC evaluation sheets, Rosgen channel type classification guides, Wolman pebble count tallies, and general team observations were recorded throughout each segment. In five of the six 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.

The riparian area physical characterization report (with each of the 85 GPS waypoints, 166 photos, maps, evaluation sheets, and recommendations for each of the six 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 Three Creek. Through the conservation planning process, additional site specific BMPs may be identified to improve the grazing operation and reduce potential negative impacts on channel substrate characteristics in Three Creek.

5.1 Parcel #1

One stream reach was assessed within Parcel #1 from the confluence of Big Flat Creek, Three Creek, and Deadwood Creek (Clover Creek headwaters) to the upstream property boundary. Stream assessment was completed by David F. Ferguson (ISCC), Duane Lafayette (IASCD), and Scott Koberg (IASCD). A total of thirty photos were recorded at the thirteen different GPS waypoints.

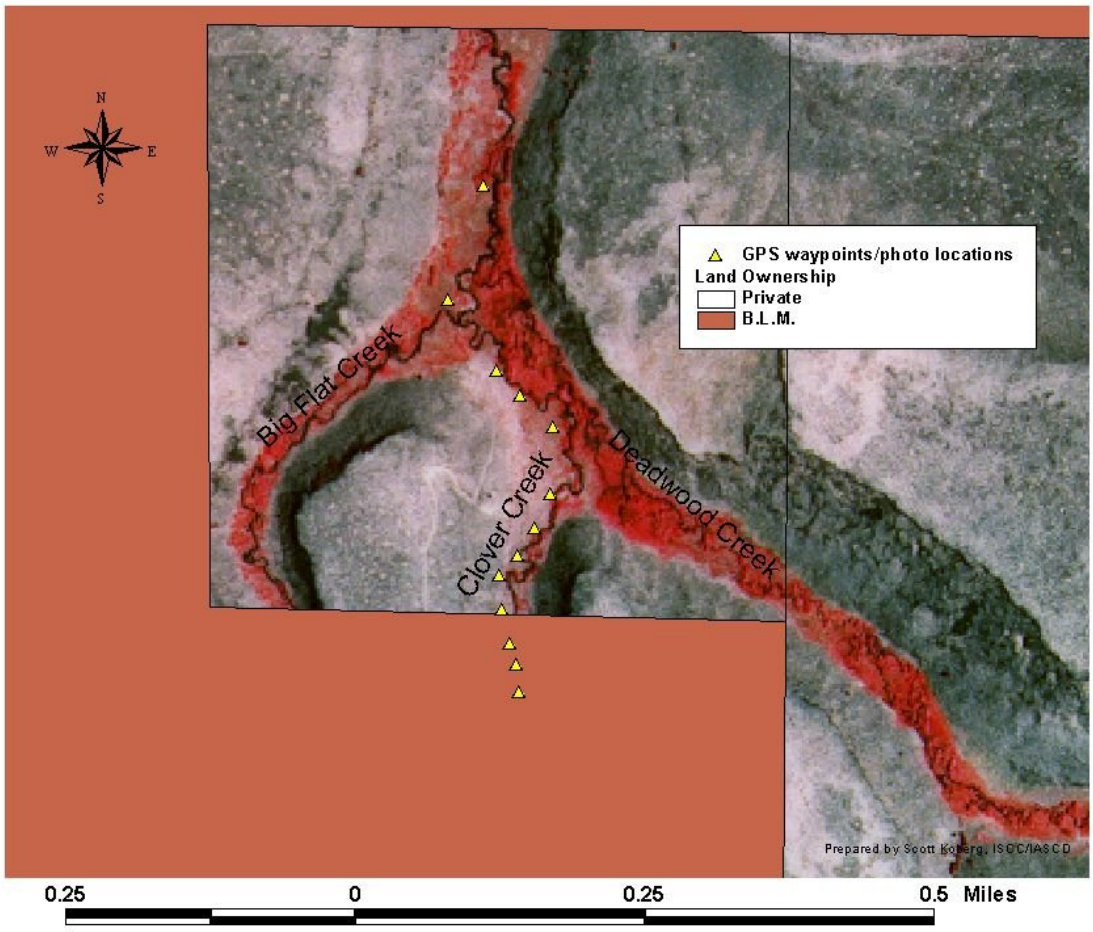


Figure 7. Parcel #1

Background

- The primary adjacent landuse is grazing
- There exists a great amount of woody vegetative species throughout the riparian area, primarily willow
- Channel stability is primarily provided by the roots of live woody vegetation, some herbaceous vegetation, and some cobble/boulder substrate

Reach Assessment Summary

- The inactive yet fairly stable beaver dam at waypoint 002 (near Big Flat confluence) is modifying hydrology and storing finer bedload material
- Above waypoint 002 (near Big Flat confluence), upstream from the effects of the beaver dam, channel stability is decreasing as evidenced by bare and sloughing banks

- Multiple stabilizing vegetative species are present (rush, threesquare, willows) and fairly vigorous, but are still increasing in quantity for proper bank stability; outside curves are creating some false banks, while point bars seem to be further developing
- Channels are still over widened in some locations but seem to be narrowing
- Although nearly adequate for withstanding moderate storm flows, floodplain development is still occurring
- Substrate (pebble count, thalweg near 400 ft.) indicated fine gravel 18%, medium gravel 14%, coarse gravel 34%, small cobble 24%, large cobble 7%, small boulder 2%, and medium boulder 1%

Conclusions and Recommenations

- The vegetative species, primarily the willow, should continue to be maintained and monitored by landowner for minimal livestock use throughout the grazing period
- Bank erosion, where likely still part of floodplain development, should be allowed to occur for adequate floodplain development where storm water velocities are withstood over most of the reach, and sediments are filtered out for floodplain for vegetative maintenance
- Beaver activity should be allowed to continue for further hydrologic modification, thus sub-irrigating adjacent vegetation for good forage
- Salt blocks, placed on the uplands, should be used to help keep riparian grazing to a minimum

5.2 Parcel #2

Two stream reaches were assessed within Parcel #2 from the downstream property boundary to the confluence of Cherry Creek, and from the confluence of Cherry Creek to the upstream horse pasture/parcel boundary. Stream assessment was completed by David F. Ferguson (ISCC), Duane Lafayette (IASCD), and Scott Koberg (IASCD). A total of forty-seven photos were recorded at the twenty-five different GPS waypoints.

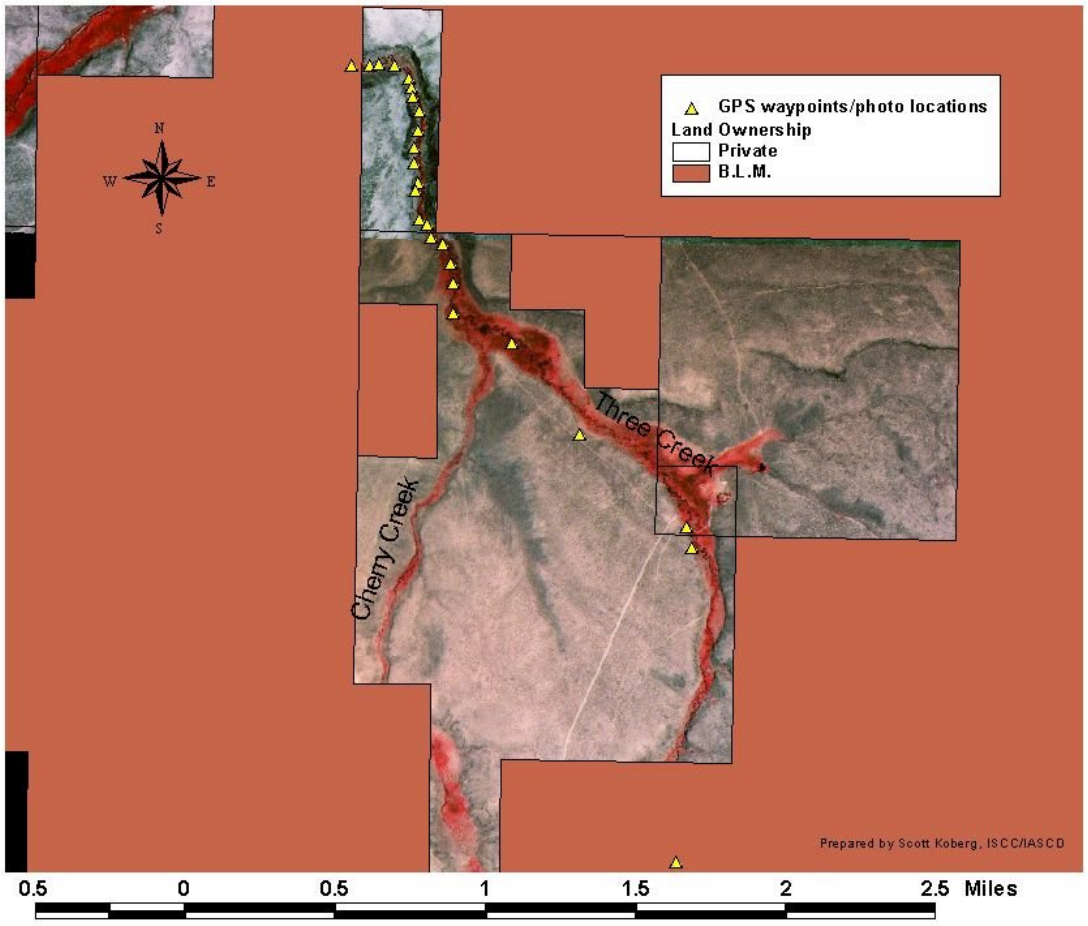


Figure 8. Parcel #2

Background

- The primary adjacent landuse is grazing
- There exists a great amount of woody vegetative species throughout the riparian area, primarily willow
- Multiple stabilizing vegetative species types are present (rush, threesquare, willows), but they are lacking in quantity necessary to stabilize outside bends (upland species in too great supply in floodplain/riparian area)

Reach Assessment Summary

- Excessive woody species utilization is occurring and vigor is poor in various locations of the reach
- Channels are over widened throughout most of this reach (not including horse pasture adjacent to state land) with slow floodplain development and excessive bank erosion

- Many vertical banks exist along with sloughing banks still rooted with upland species, but some stabilizers are beginning to establish on straight and outside bends
- From the horse pasture upstream, banks are mostly stable with more stabilizing species present, primarily willow
- Substrate (pebble count, thalweg near 400 ft.) indicated silt/clay 10%, sand 4%, fine gravel 18%, medium gravel 13%, coarse gravel 33%, small cobble 20%, and medium boulder 2%

Conclusions and Recommendations

- The vegetative species, primarily willow and water sedge (or threesquare), should be managed by the landowner to achieve a greater amount of streambank stability
- Floodplain development needs to continue, primarily on the inside bends of the channel, on the point bars, to narrow channel widths and slightly deepen
- Most of the channel stability and vegetative improvements can occur with a change in grazing management (timing and duration of livestock access) and likely without structural measures (such as fencing), but complementary alternatives include:
    - Salt blocks in the adjacent the uplands
    - Potential pasture fencing for intensive rotational grazing
    - Late spring grazing (considering available forage and vegetative growth period)
    - Avoid long-term grazing
    - Mineral supplements for livestock may enable later grazing without excessive harm to woody species
    - Watering facilities within riparian pastures but some distance from riparian areas

5.3 Parcel #3

One stream reach was assessed within Parcel # 3 from the downstream property boundary to the upstream property boundary. Stream assessment was completed by David F. Ferguson (ISCC), Duane Lafayette (IASCD), and Scott Koberg (IASCD). A total of fifteen photos were recorded at the eleven different GPS waypoints.

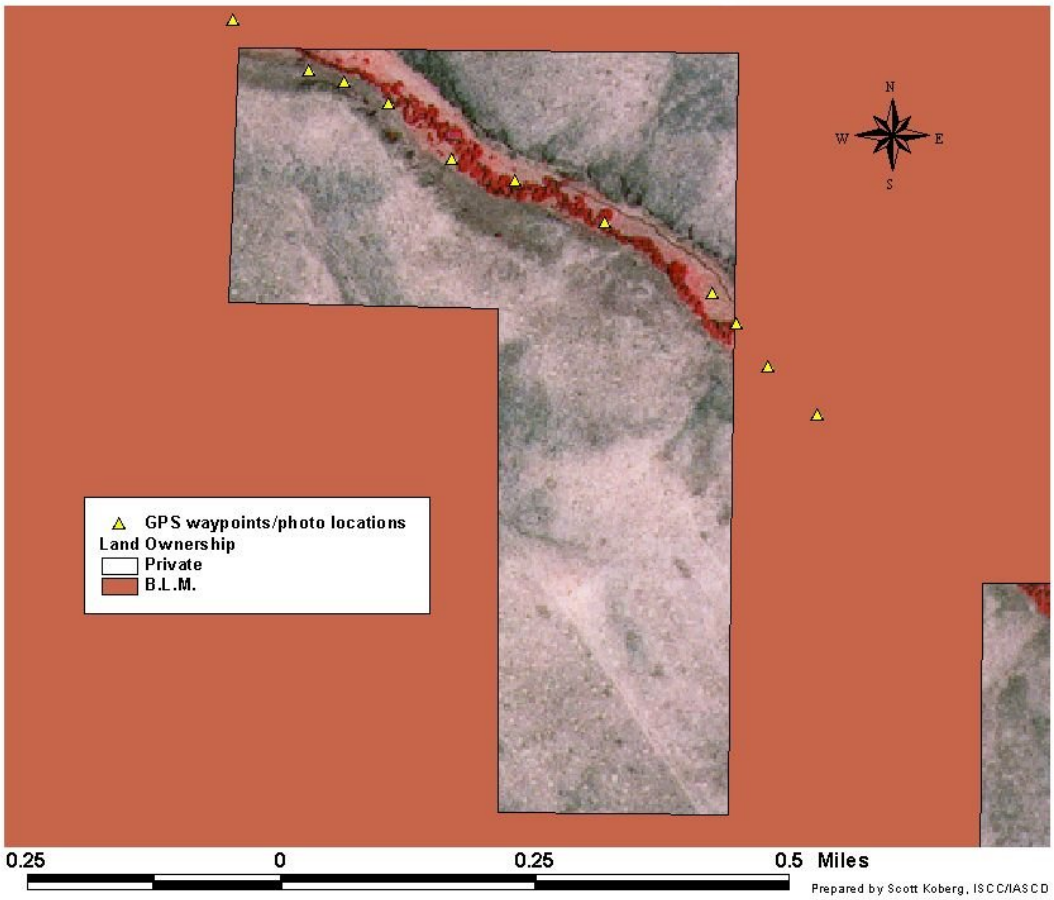


Figure 9. Parcel #3

Background

- The primary adjacent landuse is grazing
- There exists multiple stabilizing vegetative species (primarily willow) within the riparian area, but limited within new channel (old diversion ditch)
- Base flows enter newer channel at upstream property boundary and re-enter the natural channel at middle of reach within property, with flood flows able to enter both channels

Reach Assessment Summary

- New channel is still seeking a new floodplain so excessive bank erosion is still occurring with limited point bar development
- From the middle of the reach within the property to the downstream property boundary, the natural channel is largely stable, with willows dominating the stream and shading out herbaceous species
- There is over-utilization of willows and herbaceous species within the newer channel, where vigor is poor to fair
- The newer channel consists of the most bank erosion likely due to floodplain development in its early stages, lack of adequate stabilizer species, and bank trampling

Conclusions and Recommendations

- The vegetative species, primarily the willow, should continue to be maintained and monitored by the landowner for minimal livestock use throughout the grazing period
- Bank erosion within the newer channel, where likely still part of floodplain development, should be allowed to occur for adequate floodplain development where storm water velocities are withstood over most of the reach, and sediments are filtered out for floodplain for vegetative maintenance
- Salt blocks, placed on the uplands, should be used to help keep riparian grazing to a minimum
- Some fencing may be necessary to reduce livestock access and allow for vegetative species and floodplain development throughout the short length of the newer channel
- Further investigation may warrant returning the stream flow back into the old channel if a proper diversion can be constructed and the old channel can quickly adapt and withstand moderate flows
- Ground water seems to be adequate while currently maintaining vegetation in the old channel

5.4 Parcel #4

Two stream reaches were assessed within Parcel #4 from the downstream property boundary/confluence with Deer Creek to waypoint 057 (near southernmost farmstead), and from waypoint 057 to the upstream property boundary at Three Creek Road. Stream assessment was completed by David F. Ferguson (ISCC), Duane Lafayette (IASCD), and Scott Koberg (IASCD). A total of twenty-four photos were recorded at the thirteen different GPS waypoints.

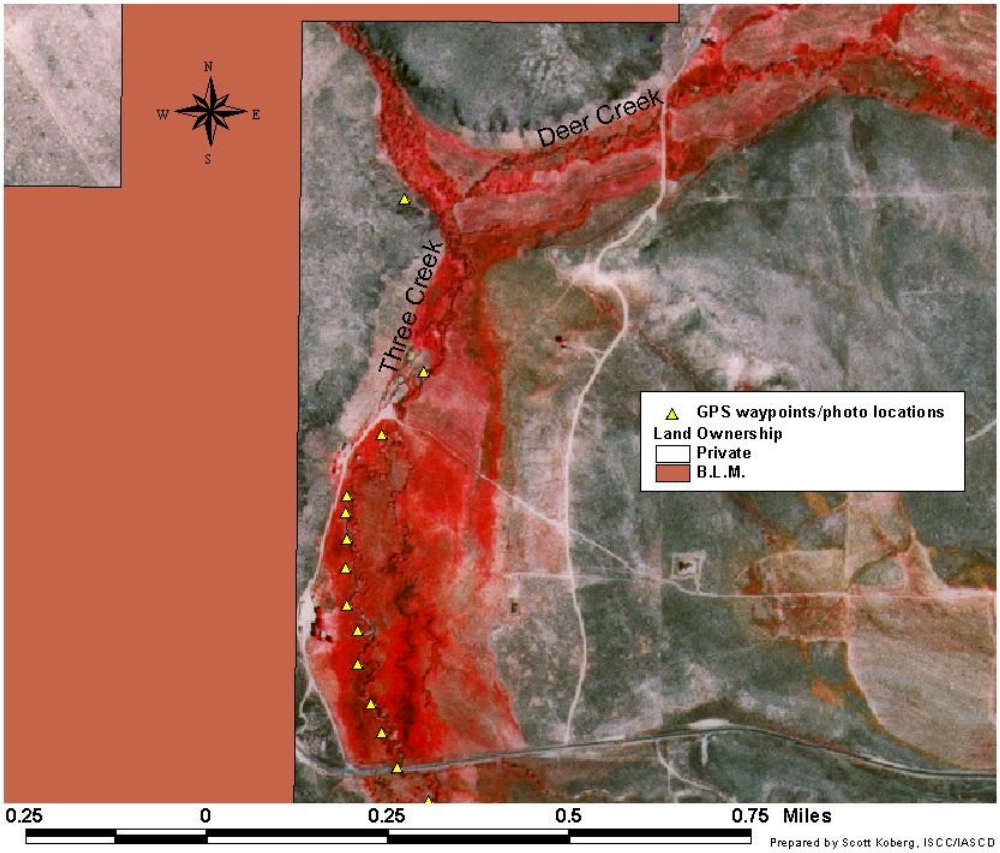


Figure 10. Parcel#4

Background

- The primary adjacent landuse is grazing
- There exists a great amount of woody vegetative species throughout the riparian area, primarily willow
- Multiple stabilizing vegetative species types are present (rush, threesquare, willows), but are lacking in quantity from the southern most homestead to Three Creek Road

Reach Assessment Summary

- From the furthest downstream waypoint to the southern most homestead, stability is excellent with very flat gradients near the confluence of Deer Creek exhibiting a wet meadow type riparian area
- Channel is not stable from the southern most homestead to Three Creek Road due to many erosive banks and a lack of adequate stabilizer species; floodplain development is further needed and occurring
- Point bars are becoming more defined just upstream from the highway and channel stability is improving

Conclusions and Recommendations

- The vegetative species, primarily willow and water sedge (or threesquare), should be maintained and monitored by the landowner for minimal livestock use throughout the grazing period to achieve a greater amount of streambank stability
- Floodplain development needs to continue, primarily from the southern most homestead to Three Creek Road
- Most of the channel stability and vegetative improvements can occur with a change in grazing management (timing and duration of livestock access) and likely without structural measures (such as additional fencing), but complementary alternatives include:
    - Salt blocks placed some distance from the stream
    - Late spring grazing (considering available forage and vegetative growth period)
    - Avoid long-term grazing
    - Mineral supplements for livestock may enable later grazing without excessive harm to woody species
    - Watering facilities within riparian pastures but some distance from riparian areas

5.5 Parcel #5

One stream reach was assessed within the Parcel #5 from the downstream property boundary at Three Creek Road to the upstream property boundary. Stream assessment was completed by David F. Ferguson (ISCC), Duane Lafayette (IASCD), and Scott Koberg (IASCD). A total of thirty-five photos were recorded at the twenty different GPS waypoints.

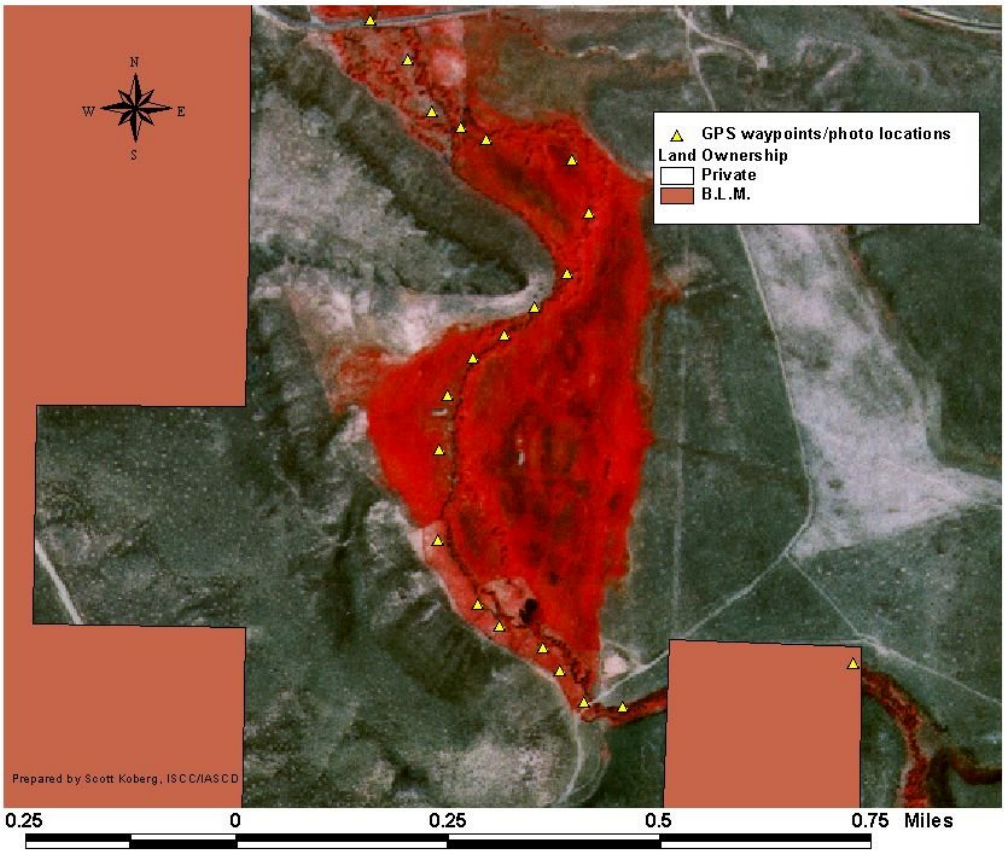


Figure 11. Parcel #5

Background

- The primary adjacent landuse is grazing, with some hay land
- There exists a great amount of woody vegetative species throughout the riparian area, primarily willow
- Multiple stabilizing vegetative species are present (rush, threesquare, willows), but are lacking in quantity from Three Creek Road to the haystack near the middle of the property, where stability decreases significantly

Reach Assessment Summary

- Livestock are having detrimental impact on the woody species with fall and winter grazing occurring throughout most of the reach within the hayland portion
- Near the old homestead in the upstream portion of the reach, streambank stability is very poor due to excessive livestock impacts
- Channel and floodplain development needs to continue throughout the reach due to an entrenched channel with little floodplain access
- The large, single beaver dam at the upstream property boundary seems active and stable, but may not withstand a moderate or larger storm event

Conclusions and Recommendations

- The vegetative species, primarily willow and water sedge (or threesquare) should be maintained and monitored by landowner for minimal livestock use throughout the grazing period, increasing streambank stability
- Floodplain development needs to continue, primarily from waypoint 066 (seventh from top in Figure 11) to 079 (fourth from bottom in Figure 11)
- Most of the channel stability and vegetative improvements can occur with a change in grazing management (timing and duration of livestock access), but complementary alternatives include:
    - Some cross fencing or riparian fencing from waypoint 066 to 079, possibly separating the hay land/pasture from riparian area
    - Salt blocks, placed on the uplands, should be used to help keep riparian grazing to a minimum
    - Late spring grazing (considering available forage and vegetative growth period)
    - Avoid long-term grazing
    - Mineral supplements for livestock may enable later grazing without excessive harm to woody species during grazing in fall and winter (within main pasture area from waypoint 066 to 079)
    - Watering facilities within riparian pastures but some distance from riparian areas

5.6 Parcel #6

One stream reach was assessed within Pa rcel #6from the downstream property boundary to the upstream property boundary. Stream assessment was completed by David F. Ferguson (ISCC), Duane Lafayette (IASCD), and Scott Koberg (IASCD). A total of fifteen photos were recorded at the four different GPS waypoints.

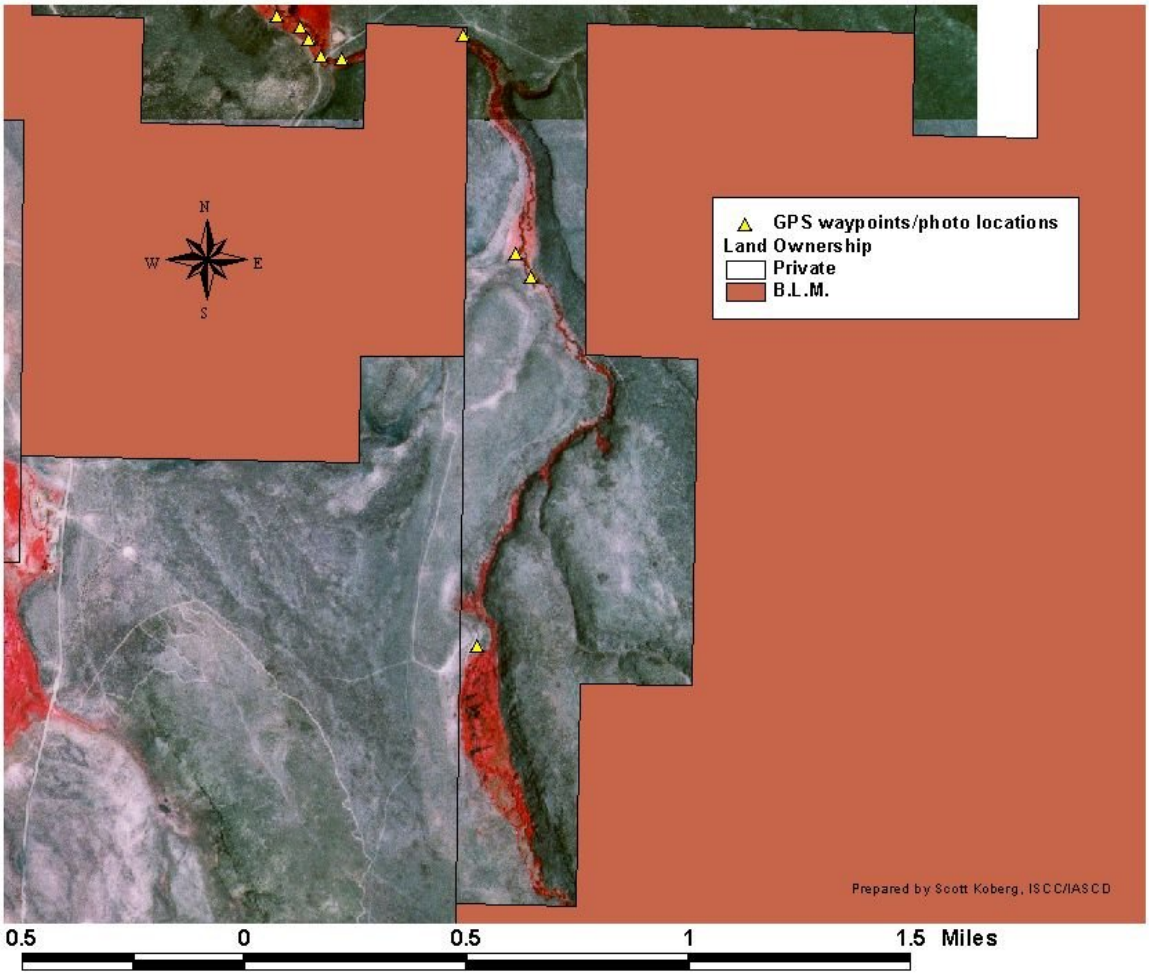


Figure 12. Parcel #6

Background

- The primary adjacent landuse is grazing
- There exists a great amount of woody vegetative species throughout the riparian area, primarily willow

Reach Assessment Summary

While this stream reach was primarily assessed in conjunction with parcel #5 (downstream), the following additional comment applies to parcel #6:

- Upstream from the large beaver dam at the downstream parcel (Blossom) property boundary, stability seems good, with livestock access only at few areas within the wider sections of the canyon

Conclusions and Recommendations

- Most of the channel stability and vegetative improvements can occur with a change in grazing management (timing and duration of livestock access) and likely without structural measures (such as fencing), but complementary alternatives include:
    - Salt blocks placed on the uplands should be used to keep riparian grazing to a minimum
    - Late spring grazing (considering available forage and vegetative growth period)
    - Avoid long-term grazing
    - Mineral supplements for livestock may enable later grazing without excessive harm to woody species during grazing in fall and winter
    - Watering facilities within riparian pastures but some distance from riparian areas

5.7 Three Creek Riparian Assessment Comments

At the Three Creek confluence with Big Flat Creek and Deadwood Creek, as well as the confluence with Deer Creek further upstream, meadow-like condition occur. At these locations, finer channel material is present due to slow velocities, low gradients, and the existence of beaver dams. With percent fines, water velocities and source material are the primary factors affecting substrate materials within areas susceptible to deposition. Stream channel shape also plays an important role on water velocity. A narrow stream channel increases water velocity, while velocity decreases as the channel widens. Bank erosion may add excessive fine material that can be deposited in areas where water velocities are too low to transport the material downstream. Some fine material, however, is necessary to build point bars along eroded portions of eroded channel and on floodplain areas to further allow for vegetative succession of riparian species.

The primary objectives to maintain diverse substrate material and continued floodplain development are to allow for floodplain development where its needed (channel types in transition), reduce excessive source material (excess bank erosion), and retain good channel shape (trapezoid) to allow base flows to transport finer material. Riparian area vegetation management, livestock management, and improved grazing management practices should allow these objectives to be met within the privately owned parcels. As the floodplain continues to establish, these management techniques may require adaptation to meet the changes in the creek itself. Low water years will allow for additional vegetation to establish given adequate ground water, but a number of significant storm flows will quicken the development of a wider floodplain and allow the channel to develop naturally: widening on the outside bends, and establishing stable point bars with adequate riparian vegetation on the inside bends, therefore increasing sinuosity and available floodplain.

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

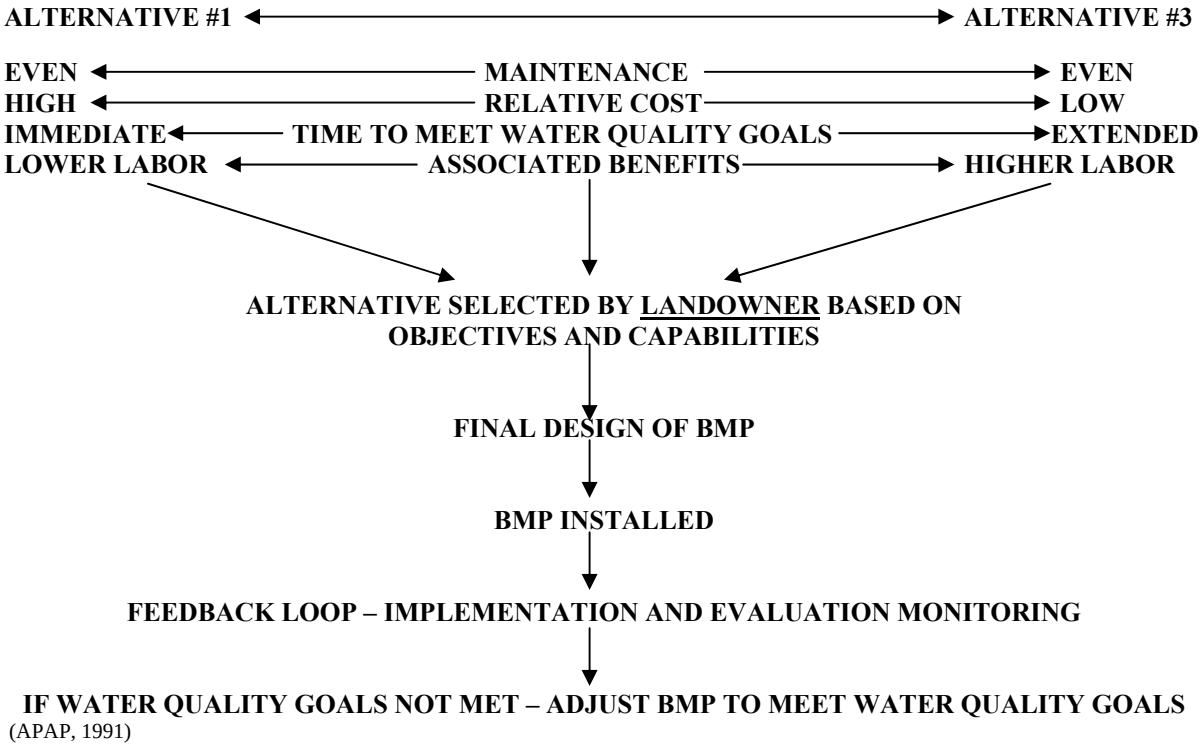
6.1 Example Description of Alternatives for Surface Irrigated Pasture

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, grazing, and hay land on Three Creek. There are currently no sources of funding available for cost-share assistance specifically within the Three Creek watershed. While there are a handful of federal and state site-specific programs available to interested participants on a farm by farm basis, Three 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

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 Three 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. *Three & 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.*