Daniels Watershed

Agricultural TMDL Implementation Plan

Developed for the

Idaho Department of Environmental Quality

Prepared by

Ben Evans, Steve Smith, Justin W. Krajewski, and Chris Banks

Idaho Soil Conservation Commission

Idaho Association of Soil Conservation Districts

In Cooperation with the

Oneida Soil and Water Conservation District

USDA-Natural Resources Conservation Service

2007

INTRODUCTION....3
PURPOSE....3
GOALS AND OBJECTIVES....3
BACKGROUND....3
PROJECT SETTING....3
LAND OWNERSHIP....5
LAND USE....5
PRIVATE LAND USE....5
ACCOMPLISHMENTS....7
SOIL EROSION REDUCTIONS....7
IDENTIFIED PROBLEMS....8
BENEFICIAL USE STATUS....8
POLLUTANTS OF CONCERN....8
WATER QUALITY MONITORING....8
CRITICAL AREAS....9
STREAM CORRIDORS AND RIPARIAN AREAS....9
NON-IRRIGATED HAY, PASTURE, AND CROP LANDS....11
GRAZED RANGE LANDS....12
ANIMAL FACILITIES....12
THREATENED AND ENDANGERED SPECIES....12
PROPOSED TREATMENT....13
ESTIMATED BMP IMPLEMENTATION COSTS....14
FUNDING....15
OUTREACH....16
MONITORING AND EVALUATION....16
FIELD LEVEL....16
WATERSHED LEVEL....16
IMPLEMENTATION ALTERNATIVES....17
DESCRIPTION OF ALTERNATIVES....17
ALTERNATIVE SELECTION....17
REFERENCES....18
APPENDIX A – WRIGHTS CREEK AGRICULTURAL TMDL IMPLEMENTATION PLAN....19
APPENDIX B – DAIRY CREEK AGRICULTURAL TMDL IMPLEMENTATION PLAN....23
APPENDIX C – LITTLE MALAD SPRING AGRICULTURAL TMDL IMPLEMENTATION PLAN....27
APPENDIX D – HILL CREEK AGRICULTURAL TMDL IMPLEMENTATION PLAN....31
APPENDIX E – INDIAN MILL CREEK AGRICULTURAL TMDL IMPLEMENTATION PLAN....35

Introduction

Purpose

The purpose of this plan is to recommend Best Management Practices (BMPs) that would improve or restore physical and biological functions of Wrights Creek, Dairy Creek, Hill Creek, and Little Malad Spring (Figure 1). This plan will build upon past conservation accomplishments made through the Dairy Creek, Wide Hollow, and Daniels State Agriculture Water Quality Program (SAWQP) projects. These past projects and future projects will help to restore beneficial uses in streams in the Daniels watershed. This plan outlines an adaptive management approach for developing conservation plans with private land owners. These conservation plans will recommend how and when BMPs will be installed in critical areas to meet Total Maximum Daily Load (TMDL) targets.

Goals and Objectives

The goal of this plan is to restore beneficial uses on §303(d) listed stream segments of Wrights Creek, Dairy Creek, Indian Mill Creek and the Little Malad River, (The boundaries for Little Malad River as stated on the §303(d) list range from "The Head Waters at the Malad Spring to the Malad River", we will refer to this tributary above Daniels Reservoir as the Little Malad Spring throughout the entire document), which are tributaries to the Daniels Reservoir. The objectives of this plan are to identify critical areas and to recommend BMPs for reducing sediment loading to receiving water bodies.

Background

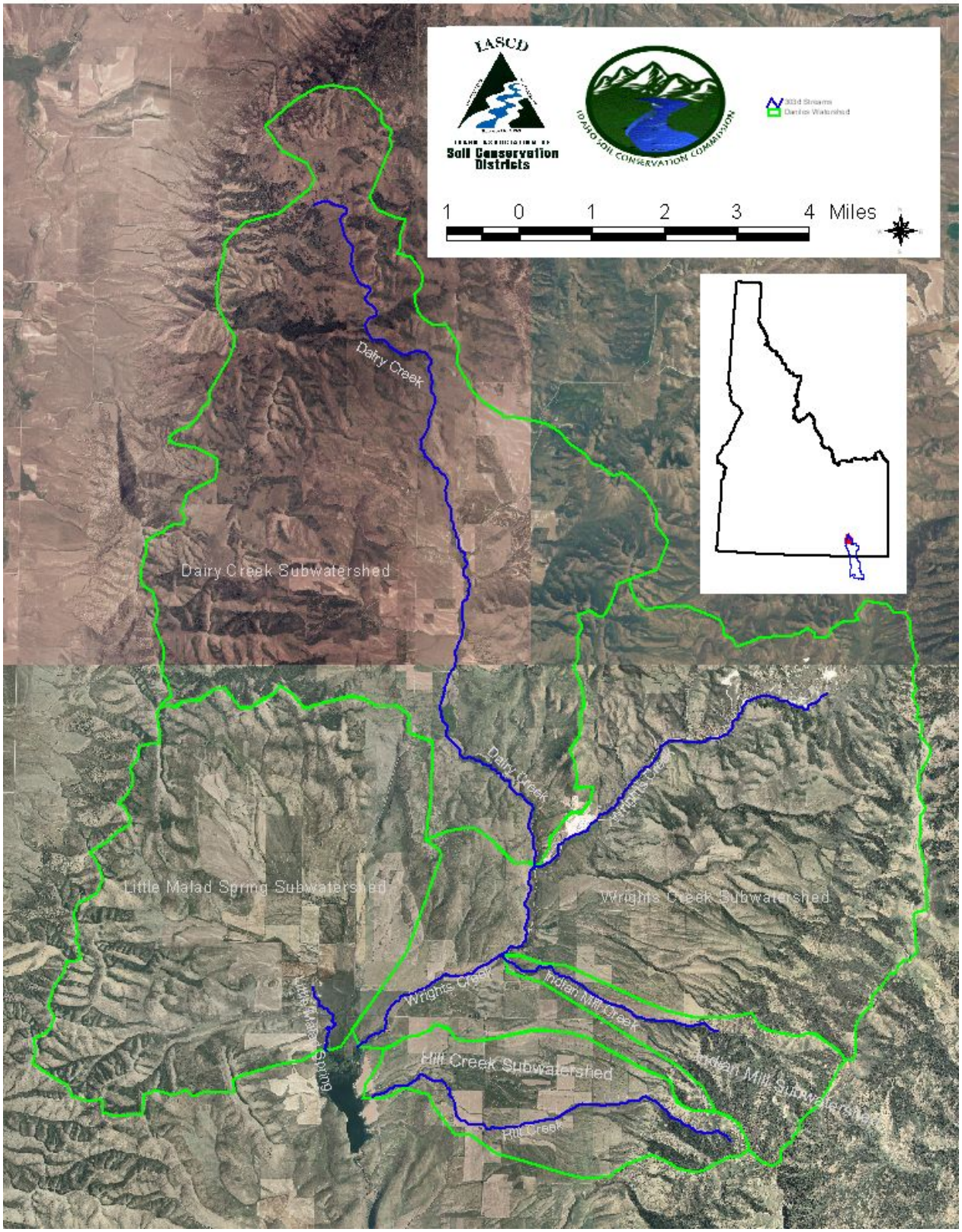
Project Setting

The Daniels watershed has been an area of concern for the Oneida Soil and Water Conservation District (Oneida SWCD) since the 1960s. In 1979, the Oneida SWCD sponsored the Idaho Cooperative Irrigation Study-Sedimentation of Daniels Reservoir (SCS, 1981) which investigated and quantified the impacts of soil erosion on Daniels Reservoir, the St. John Irrigation system, and the Little Malad Spring (Daniels Sub-Watershed Grant, NRCS 1993). This study showed within 13 years of the Daniels Reservoir being completed in 1967, 1,730 acre-feet of storage was lost to sediment. The study also figured that in 63 years the reservoir would be completely full.

The Daniels watershed covers 65,671 acres in the northern portion of the Lower Bear-Malad subbasin. The subwatersheds were delineated based upon the major tributary in the subwatershed for our planning purposes (Figure 1).

The climate in the watershed is moderately hot, dry summers followed by cold, moist winters. The summers provide a typical growing season of 90 days or less. However, frosts severe enough to damage grain can occur anytime during the growing season. Average annual precipitation measures 15 to 20 inches at the valley floor and 20 to 24 inches in the higher elevations. Most of this precipitation occurs from November to March in the form of snow. Snow pack is generally around 20 inches. Elevations range from 4,470 feet on the valley floor to 9,095 feet in adjacent mountains.

Figure 1. Daniels Watershed in the Lower Bear-Malad Subbasin



Land Ownership

Private lands encompass 65% or 42,470 acres of the watershed. In comparison, 35% (23,151 acres) of the watershed are public lands managed by Bureau of Land Management (BLM), Caribou-Targhee National Forest (CTNF), and the Idaho Department of Lands (IDL), shown in Table 1 and Figure 2.

Table 1. Land Ownership in the Daniels Watershed

Land Ownership	Indian Mill	Wrights Creek	Hill Creek	Little Malad Spring	Dairy Creek	Total Acres	Percent of Total
Private Land	770	11,561	3,022	9,796	17,321	42,470	65%
Public Land	1,732	8,864	1,123	4,607	6,825	23,151	35%
Total	2,502	20,425	4,145	14,403	24,196	65,671	100%

Land Use

Rangeland is the major land use with 36,805 acres or 56% of the watershed, shown in Table 2. In comparison, there are 27,958 acres or 43% of non-irrigated hay, pasture, and crop land. The non-irrigated hay, pasture, and crop lands lie between 4,470 to 6,500 feet elevation and rangeland is above 6,500 feet.

Table 2. Land Uses in the Daniels Watershed

Land Use	Acres	Percent of
Non-Irrigated Hay, Pasture, and Crop Land	27,958	43%
Range Land	36,805	56%
Riparian	308	<1%
Roads	523	<1%
Strip Mines	77	<1%
Total	65,671	100%

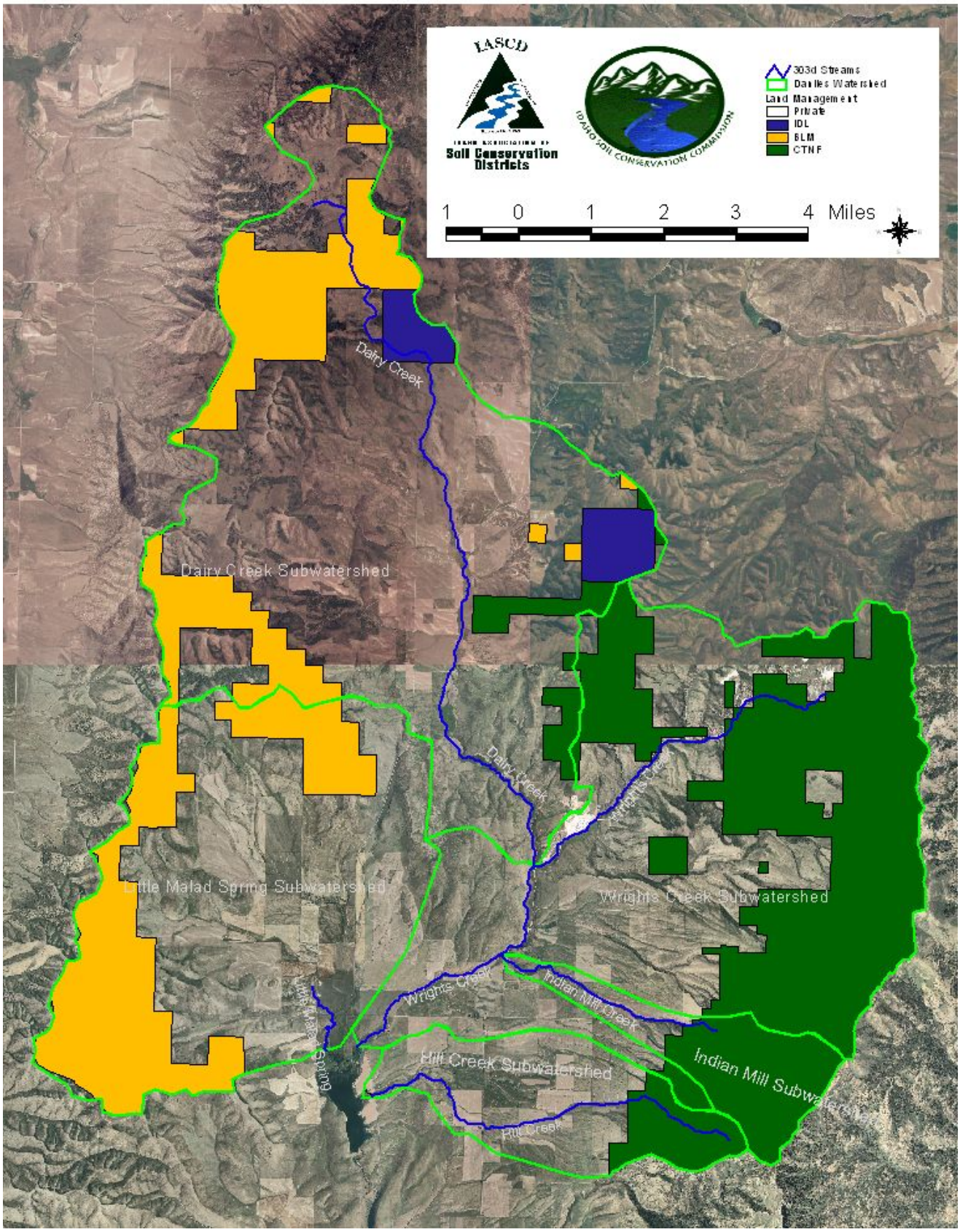
Private Land Use

Private land in the Daniels watershed accounts for 42,470 acres or 65% of the total acres in the watershed. Non-irrigated hay, pasture, and crop land is the major private land use with approximately 27,958 acres or 64%. Rangeland is the second largest land use covering nearly 14,512 acres. Roads, riparian, and strip mine areas cover about 1% of the private land use in the watershed. For the purposes of this plan, a farm or ranch is defined as any place which produced and sold or normally would have produced or sold $1,000 worth of agricultural products during the year (IASS, 1998 and NASS, 2002). Agricultural statistics for Oneida County are shown in Table 3.

Table 3. Agricultural Inventory Data for Oneida County

Agricultural Category	Oneida			
	1992	1997	2002	
Total Number of Farms	313	417	428	
Land in Farms (total acres)	271,143	276,387	363,152	
Land in Farms (average size)	866	663	848	
Land in Irrigated Farms (acres)	28,906	33,372	32,487	
Crop or Commodity				
	2002	2003	2004	2005
Wheat (acres)	42,000	38,600	38,100	-
Barley (acres)	11,200	10,000	6,200	-
Alfalfa Hay (acres)	33,300	33,700	33,700	-
Beef Cows (head)	26,160	25,100	21,200	21,700
Dairy Cows (head)	400	300	300	300

Figure 2. Land Ownership in the Daniels Watershed



Accomplishments

The Oneida SWCD addressed accelerated nonpoint source pollution in the Daniels watershed by implementing three State Agricultural Water Quality Program (SAWQP) projects namely Dairy Creek, Wide Hollow, and Daniels. These projects were delineated based on landowners that were willing to participate in the project. The completed BMP amounts from these three projects and their associated cost, as well as the USDA's Conservation Reserve Program (CRP) are shown in Table 4.

Table 4. Completed BMP Amounts and Costs in the Daniels Watershed

Best Management Practices	Units Treated	Cost-Share Funds	Participant Funds	Total Cost
Water & Sediment Basins	35,373 ft	$61,557	$21,439	$82,996
Water & Sediment Basins	155 each	$52,403	$17,466	$69,869
Chisel & Subsoiling	3,198 ac	$38,928	$21,146	$60,074
Conservation Tillage	5,430 ac	$83,001	$28,369	$111,370
Brush Management	750 ac	$9,814	$3,274	$13,088
Fence	33,970 ft	$30,786	$16,634	$47,421
Pipeline	600 ft	$675	$610	$1,285
Watering Facilities	1 ea	$600	$517	$1,117
Crop Residue	2,458 ac	$38,714	$10,069	$48,783
Pumping Plant	1 ea	$270	$3,125	$3,395
Structure for Water Control	1 ea	$375	$295	$670
Spring Developments	3 ea	$4,440	$1,479	$5,919
Long & Short Terraces	211,375 ft	$175,243	$48,992	$224,235
Pasture & Hayland Plantings	4,958 ac	$223,110	$74,370	$297,480
Grassed Waterway	22,200 ft	$29,138	$9,712	$38,850
Conservation Cover	180 ac	$2,700	$8,100	$10,800
Strip Cropping	415 ac	$2,490	$830	$3,320
Conservation Cover	434 ac	$20,982	$780	$21,762
Well, Trough, Pipeline, Fence	1 ea	$10,000	$10,000	$20,000
Riparian Forest Buffer	5 ac	$79,553	$7,955	$87,508
Conservation Cover	9,876 ac	$296,280	$296,280	$592,560
	Totals	$1,161,059	$581,442	$1,742,501

Soil Erosion Reductions

Implementation of BMPs on the Daniels watershed obtains 337,404 tons per year of soil savings for 85% reduction in average annual soil erosion as shown in Table 5.

Table 5. Soil Erosion Reductions from CRP and SAWQP Enrolled Acres

Land Treatment	Average Annual Soil Loss (Tons/Acre/Year)	CRP Acres	Annual Soil Loss (Tons/Year)
Before CRP	20	9,876	197,520
After CRP	1	9,876	9,876
Annual Soils Savings 187,644 Tons/Year			
Land Treatment	Average Annual Soil Loss (Tons/Acre/Year)	SAWQP Acres	Annual Soil Loss (Tons/Year)
Before SAWQP	20	9,984	199,680
After SAWQP	5	9,984	49,920
Annual Soils Savings 149,760 Tons/Year			

Identified Problems

The Oneida SWCD (2005) identified streambank modifications, over utilized pastures, sheet and rill erosion, classic and ephemeral gully erosion, and streambank erosion as problems in the watershed. They also identified critical erosion periods as spring rains and runoff and summer thunderstorms.

Beneficial Use Status

Beneficial uses are not fully supported for Wrights Creek, Dairy Creek and the Little Malad Spring (IDEQ, 2002). The Idaho Department of Environmental Quality (IDEQ) designated beneficial uses on rivers, creeks, lakes and reservoirs to meet the requirements of the Federal Clean Water Act. Wrights Creek, Dairy Creek, Indian Mill Creek, and the Little Malad Spring are listed on the State of Idaho's §303(d) list of water quality impaired water bodies (IDEQ, 1998). Hill Creek was also monitored; therefore it is included in this plan. However, Hill Creek is not a §303(d) listed stream.

Wrights Creek's beneficial uses are agriculture water supply, primary contact recreation, cold-water aquatic life, and salmonid spawning. Wrights Creek is listed for sediment from its headwaters to Daniels Reservoir, which is about 11 miles of which about 10 miles is on private land. Dairy Creek's beneficial uses are agriculture water supply and non-designated, which means the stream supports cold water aquatic life and secondary contact recreation. Dairy Creek is listed for unknown, from its headwaters to Wrights Creek, which is approximately 12 miles of which 9 miles are on private land. Little Malad Spring's beneficial uses are agriculture water supply, primary contact recreation, cold-water aquatic life, and salmonid spawning. Little Malad Spring is listed for sediment with about one mile on private land.

Pollutants of Concern

The subbasin assessment for Idaho's Bear River (IDEQ, 2002) specified that sediment was the pollutant of concern in Wrights Creek and the Little Malad Spring. Pollutants of concern for Dairy Creek are unknown. These pollutants degrade water quality and aquatic habitat in these streams.

Water Quality Monitoring

In 1981 and 1982, IDEQ monitored eight sites on four tributaries to Daniels Reservoir: Little Malad Spring, Wrights, Dairy, and Hill creeks. These data were collected prior to BMP implementation in the watershed. They concluded that their sampling was done at base flow conditions, fecal bacteria levels were below state standards, dissolved phosphorous levels were fairly high, inorganic nitrogen was fairly low, and no recommendations regarding sediment loading from dry cropland were made because of the low flows conditions (IDHW-DEQ, 1983).

In March 2005, IASCD and ISDA began monitoring water quality on Wrights, Dairy, Hill, and Indian Mill creeks and the Little Malad Spring. IASCD sampled the streams twice a month from April to October, and then once a month from November to March. Samples were analyzed for suspended sediment, phosphorus, and nitrogen.

The monitoring indicated that every stream, with the exception of the Little Malad Spring, exceeded IDEQ targets for suspended sediment and/or phosphorus. Hill and Wrights creeks had the poorest water quality above Daniels Reservoir. Hill Creek often had the highest concentrations of pollutants, while Wrights Creek consistently carried the highest loads of sediment and phosphorus. IASCD recommended that efforts be focused on Hill and Wrights Creeks for the greatest impact on water quality (Jenkins 2007).

Critical Areas

There are 23,742 critical acres in the watershed. Critical areas include: stream corridors and riparian areas with unstable streambanks and barriers to fish migration; non-irrigated hay, pasture, and crop lands with sheet/rill erosion and ephemeral gully erosion; range lands with sheet/rill erosion, ephemeral and classic gully erosion; and animal facilities with a lack of drinking water, inadequate waste storage, and runoff from corrals or pens. The critical acres are calculated by subtracting the amount of treated private acres from the total amount of private acres.

Table 6. Critical Areas in the Daniels Watershed

Land Use	Wrights Creek	Indian Mill Creek	Hill Creek	Little Malad River	Dairy Creek	Total Units	Percent of Total
Stream Corridor & Riparian Areas	65 ac	26 ac	60 ac	3 ac	28 ac	182 ac	1%
Non-Irrigated Crop & Pasture Lands	4,840 ac	457 ac	916 ac	2,306 ac	4,011 ac	12,530 ac	53%
Range Lands	2,726 ac	287 ac	21 ac	686 ac	7,310 ac	11,030 ac	46%
Animal Facilities	0	0	1 ea	2 ea	4 ea	7 ea	N/A
Total	7,631 ac	770 ac	997 ac	2,995 ac	11,349 ac	23,742 ac	100%

Stream Corridors and Riparian Areas

In 2005, ISCC, IASCD, and NRCS staff used the Stream Visual Assessment Protocol (SVAP) and the Streambank Erosion Condition Inventory (SECI) to assess 23 reaches on 18 miles of Little Malad Spring, Dairy, Wrights, and Indian Mill creeks. They found the majority of reaches had slight streambank erosion, high bank stability, and poor to fair habitat. Those results are shown in Table 6 and Figure 3.

Future implementation efforts should concentrate on four priority reaches, Dairy Creek (DC4) and Wrights (WC7, WC8, & WC11), that have about 75% of the streambank erosion. Another five reaches on Dairy (DC3, DC5, DC6, & DC7) and Little Malad Spring (LM1) Creeks are areas where minor management changes and BMPs could improve water quality and increase aquatic habitat substantially. Eight reaches on Wrights Creek (WC1, WC2, WC 3, WC4, WC9, WC10, WC12 & WC13) had slight to moderate erosion with fair habitat are medium priority because minor management changes with a few structures could improve aquatic habitat, but would take several years to achieve.

Table 7. Assessment Results on Dairy, Little Malad, Indian Mill, and Wrights Creeks

Stream Visual Assessment	➡ 27% or 5.0 miles were in good condition ➡ 22% or 4.0 miles were in fair condition ➡ 51% or 9.3 miles were in poor condition
Streambank Stability	➡ 89% or 16.3 miles with streambank stability ≥ 80% TMDL target ➡ 11% or 2.0 miles with streambank stability < 80% TMDL target
Streambank Erosion Condition	➡ 83% or 15.2 miles had slight erosion ➡ 17% or 3.1 miles had moderate erosion ➡ 0% or no miles had severe erosion

Figure 3. Daniels Watershed Assessed Reaches SVAP Ratings

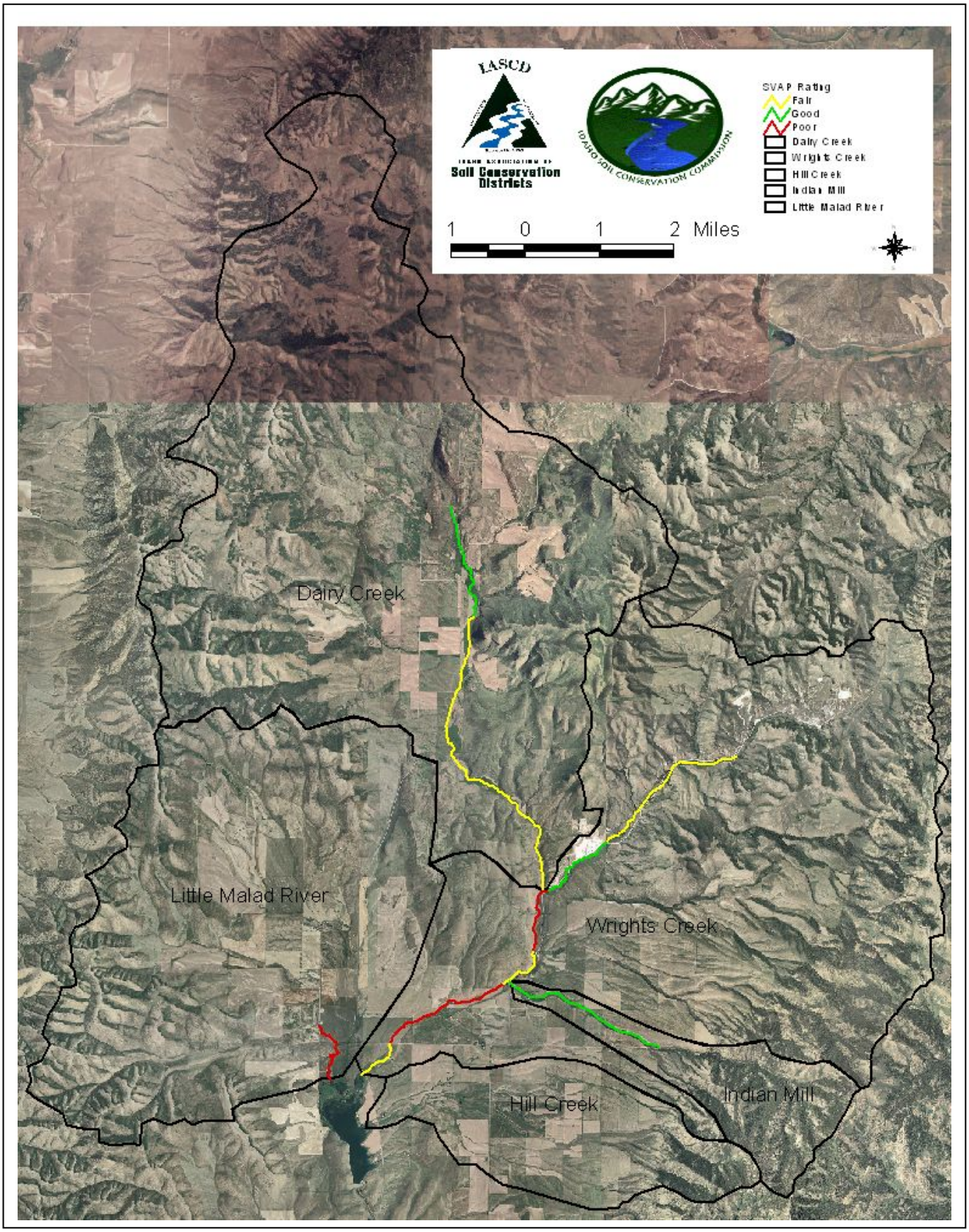


Table 8. Identified Problems and Recommended BMPs on Assessed Stream Reaches

Reach	Identified Problems	Recommended BMPs
DC1	Noxious weeds, unstable crossings, eroding banks, lack of trees/shrubs, unstable water structures	Stream crossings, watering facilities, prescribed grazing, use exclusion, structures for water control, pest management, tree/shrub planting, filter strip, riparian buffers
DC2 DC3	Eroding roads, over utilized pastures, winter feed area, channelization	Access road, stream habitat improvement, stream crossings, use exclusion, heavy use protection, waste facility
DC4	Unstable banks, lack of trees/shrubs, channelization, dewatering, irrigation erosion, early grazing on saturated soils	Crop rotation, permanent vegetation, filter strips, riparian buffer, tree/shrub planting, use exclusion, prescribed grazing, watering facilities, irrigation system, structures for water control
DC5	Unstable water structures, dewatering, irrigation erosion, over utilized pastures	Open channel, riparian buffer, use exclusion, structure for water control, irrigation system, wetland wildlife habitat, prescribed grazing, watering facilities
DC6	Dewatering, lack of trees/shrubs, unstable water structures, unstable crossings	Heavy use protection, stream crossings, prescribed grazing, irrigation management, watering facilities
DC7	Eroding banks, incised channel, lack of vegetation, winter feed area, eroding roads	Access road, stream stabilization, tree/shrub planting, stream bank protection
IM1	Unstable crossings, return drain, over utilized pastures	Watering facilities, use exclusion, prescribed grazing, water/sediment control basin
IM2	Plugged culverts, fish barrier	Stream crossings, barrier removal, watering facilities
LM1	Over utilized pastures, lack of trees/shrubs	Riparian buffer, tree/shrub planting, prescribed grazing, watering facilities
WC1	Fish barrier, over utilized pastures	Prescribed grazing, barrier removal, use exclusion
WC2	Unstable banks, over utilized pastures	Prescribed grazing, use exclusion
WC3	Fish barrier, over utilized pastures	Prescribed grazing, barrier removal
WC4	Unstable stream banks & bed	Stream stabilization, prescribed grazing, use exclusion, watering facilities,
WC5 WC6	Fish barrier, eroding banks, eroding roads	Prescribed grazing, access road, barrier removal, heavy use protection
WC7 WC8	Unstable banks, noxious weeds, channelization, lack of vegetation, limited floodplain access	Pest management, use exclusion, tree/shrub planting, open channel, streambank protection, stream habitat improvement
WC9	Fish barriers, lack of trees/shrubs, over utilized pastures	Prescribed grazing, barrier removal, use exclusion, tree/shrub planting
WC10	Unstable crossings, over utilized pastures	Stream crossing, access road, prescribed grazing, heavy use protection
WC11 WC12	Noxious weeds, eroding banks, lack of trees/shrubs	Tree/shrub planting, pest management, use exclusion, prescribed grazing, streambank protection, watering facilities
WC13	Over Utilized Pastures, lack of trees/shrubs	Riparian buffer, tree/shrub planting, prescribed grazing, watering facilities

Non-Irrigated Hay, Pasture, and Crop Lands

There are 12,530 acres of non-irrigated hay, pasture, and crop lands located in the watershed. Over 70% of these acres are located in the Dairy and Wrights subwatersheds. Precipitation is 10 to 16 inches per year. Average growing season ranges from 90 to 120 days. Elevations range from 4,000 to 5,500 feet. Typical soils are silt loams on 3 to 12% slopes. Water quality related resource concerns include sheet and rill erosion and ephemeral gully erosion which deliver eroded soil and increases suspended sediment in these creeks. Conservation crop rotation and residue management are existing practices.

Most of the croplands are mulch tilled with winter wheat stubble chiseled and subsoiled in the fall. Spring tillage uses field cultivators. Reduced tillage results in approximately 25% residue after

planting. Terraces and water & sediment control structures have been installed and store water and interrupt transport of sediment. Some conventionally tilled croplands are present and planted to winter wheat/fallow rotation. This cropland is characterized by ephemeral gully eroded areas which have been stabilized. Tillage practices typically consist of fall chiseling, rod weeding, and spring disking.
Some grain fallow croplands were converted to dry hay and pasture lands. Very few of these lands (<320 acres) are irrigated with water diverted from the creeks. Plants are introduced perennial forage species, or a mixture of native and introduced species. Commercial fertilizers are used, but soil testing is rarely done. Livestock grazing of hay, pasture, and crop aftermath usually occurs.

Grazed Range Lands

There are 11,030 acres of grazed rangelands located in the watershed. Water quality related resource concerns include sheet and rill erosion, ephemeral gully erosion, and classic gully erosion which transports eroded soil and increases suspended sediment into the stream.

Vegetation consists of sagebrush, perennial grasses, and forbs. Precipitation ranges from 12 to 16 inches per year, most of which falls in winter and early spring outside the growing season. Average frost free period ranges from 80 to 140 days. Elevations range from 3,500 to 7,000 feet. Topography consists of nearly level flats up to benches and rolling foothills with steep slopes. Soils are loamy to gravelly, usually shallow with some rock outcrops. Boundary fencing is generally an existing practice.

Livestock grazing occurs during the spring, summer, and fall. Overgrazing is common, which can lead to noxious weed invasions. Roads, mines, and wildfires also degrade soils and yield sediment to streams.

Animal Facilities

The Idaho Legislature enacted Idaho law, *I.C. §37-401, Title 37, Chapter 4, Sanitary Inspections of Dairy Products*, which requires sanitary inspections and nutrient management plans for all dairy farms. Existing dairy farms were required to submit a nutrient management plan for approval to ISDA on or before July 1, 2001. In 2000, the Idaho Legislature passed Idaho law, *I.C. §22-4906, Title 22, Chapter 49, Beef Cattle Environmental Control Act*. Beef cattle animal feed operations were required to submit a nutrient management plan to ISDA for approval no later than January 1, 2005. It was found through visual assessment that there were seven animal feed operations in the Daniels watershed.

Threatened and Endangered Species

The threatened and endangered species present in Oneida County are the Canada lynx (*Lynx canadensis*) and bald eagle (*Haliaeetus lucocephalus*). Oneida County contains no candidate or proposed species (NRCS, 1999). The US Fish and Wildlife Service are concerned about the population status and long-term viability of certain plants and animals in Oneida County, which have no status under the Endangered Species Act. The species of concern include: long-legged myotis (*Myotis volans*), pygmy rabbit (*Brachylagus idahoensis*), northern goshawk (*Accipiter gentiles*), Columbian sharp-tailed grouse (*Tympanchus phasianellus columbianus*), western burrowing owl (*Speotyto cunicularia hypugaea*), and the Bonneville cutthroat trout (*Oncorhynchus clarki utah*) (NRCS, 1999).

Proposed Treatment

The watershed is divided into four treatment units (TUs) that have similar land uses, soils, productivity, resource concerns and treatment needs. Each subwatershed is itemized below in Table 9. These TUs not only provide a method for delineating and describing land use but are also used to evaluate land use impacts to water quality and in the formulation of alternatives for solving problems.

Table 9. Treatment Units in the Daniels Watershed by Subwatershed

Subwatershed	TU1 Stream Corridor & Riparian Areas	TU2 Non-Irrigated Hay, Pasture, & Crop Lands	TU3 Range Lands	TU4 Animal Facilities	Total
Wrights Creek	65 ac	4,840 ac	2,726 ac	0	7,631 ac
Indian Mill Creek	26 ac	457 ac	287 ac	0	770 ac
Hill Creek	60 ac	916 ac	21 ac	1 ea	997 ac
Little Malad River	3 ac	2,306 ac	686 ac	2 ea	2,995 ac
Dairy Creek	28 ac	4,011 ac	7,310 ac	4 ea	11,349 ac
Daniels Watershed	182 ac	12,530 ac	11,030 ac	7 ea	23,742 ac

Table 10. Treatment Units in the Daniels Watershed

Acres	Soils	Resource Problems
Treatment Unit #1 – Stream Corridors & Riparian Areas		
182 Acres	Arbone-Hondoho-Cedar hill, 12 to 30% Copenhagen-Longian-Manila Assoc., 12 to 50% These soils formed on stream and fan terraces, and mountain foot slopes. They are poorly to well drained with flooding rare to none with parent material alluvium and loess with no restrictive layers.	Erosive stream channels Lack of riparian vegetation Barriers to fish migration
Treatment Unit #2 – Non-Irrigated Hay, Pasture, & Crop Lands		
12,530 Acres	Rexburg-Water canyon-Lanoak Complex, 12 to 20% Rexburg-Arbone-Ririe Complex, 12 to 25% Ririe-Rexburg Complex, 4 to 12% Arbone-Silt Loam, 12 to 20% These soils formed on foot slopes and fan terraces, they are well drained, formed in loess and in silty alluvium derived from loess.	Accelerated sheet and rill Accelerated gully erosion
Treatment Unit #3 – Range Lands		
11,030 Acres	Hymas-Calpac-Ireland Assoc., 30 to 70% Povey-Pavohoo Assoc., 30 to 60% Hymas-Povey-Pavohoo Assoc., 30 to 70% These soils formed on hill shoulders they are well drained with no flooding, parent material is alluvium and residuum and colluvium from sandstone, quartzite and dolomite with restrictive layers of bedrock at 20 to 40 inches.	Accelerated sheet and rill Accelerated gully erosion Over utilized range
Treatment Unit #4 – Animal Facilities		
7 Facilities	Arbone-Hondoho-Cedar Hill, 12 to 30% Copenhagen-Conigan-Manila Assoc., 12 to 50% These soils formed on stream and fan terraces, and mountain foot slopes. They are poorly to well drained with flooding rare to none, with parent material alluvium and loess with no restrictive layers.	Lack of drinking water sources Inadequate waste storage Runoff from corrals or pen

Estimated BMP Implementation Costs

Table 11 lists BMPs that may be used to treat the resources with their unit amounts and costs.

Table 11. Estimated BMP Installation Costs for the Daniels Watershed By Treatment Unit

Treatment Unit	Best Management Practice	Unit Type	Unit Cost	Unit Amount	Total Funds
TU1 Stream Corridors & Riparian Areas	Channel Vegetation	ac	$2,100	53	$111,300
	Conservation Cover	ac	$60	58	$3,480
	Critical Area Planting	ac	$250	43	$10,750
	Fence, 4-wire	ft	$2	8,585	$17,170
	Heavy Use Area Protection	ac	$50	15	$750
	Pest Management	ac	$20	92	$1,840
	Prescribed Grazing	ac	$5	182	$910
	Riparian Forest Buffer	ac	$185	46	$8,510
	Stream Bank Protection	ft	$20	2,171	$43,420
	Stream Channel Stabilization	ft	$35	1,114	$38,990
	Tree/Shrub Establishment	ac	$290	37	$10,730
	Use Exclusion (Riparian)	ac	$100	46	$4,600
				Subtotal	$252,450
TU2 Non-Irrigated Hay, Pasture, & Crop Lands	Contour Farming	ac	$3	9,055	$27,164
	Conservation Crop Rotation	ac	$2	9,055	$18,109
	Field Border	ac	$88	2,005	$176,466
	Critical Area Planting	ac	$200	1,005	$201,060
	Deep Tillage	ac	$16	9,055	$144,872
	Drip Irrigation	ea	$2	3,450	$6,072
	Irrigation Water Management	ac	$1	960	$960
	Nutrient Management	ac	$3	12,073	$36,219
	Pasture & Hayland Planting	ac	$100	6,038	$603,750
	Pest Management	ac	$20	3,019	$60,370
	Residue Management	ac	$20	7,040	$140,800
	Terrace	ft	$2	27,540	$55,080
	Water & Sediment Control Basin	ea	$800	260	$208,000
	Windbreak/Shelterbelt	ft	$4	11,500	$46,000
				Subtotal	$1,724,922
TU3 Range Lands	Brush Management	ac	$30	2,759	$82,755
	Fence, 4-wire	ft	$2	356,434	$712,867
	Pest Management	ac	$20	2,660	$53,198
	Pipeline, PE 100 psi, 2.0"	ft	$2	259,643	$519,286
	Prescribed Grazing	ac	$3	7,886	$23,658
	Pumping plant for water control	ea	$5,000	19	$95,000
	Range Planting	ac	$80	3,518	$281,400
	Spring Development	ea	$2,400	19	$45,600
	Structure For Water Control	ea	$3,000	19	$57,000
	Water Well	ea	$8,250	19	$156,750
	Watering Facility	ea	$1,150	93	$106,950
				Subtotal	$2,134,464
TU4 Animal Facilities	Corral Fence	ft	$15	10,500	$157,500
	Nutrient Management	ac	$3	140	$420
	Pipeline	ft	$2	7,000	$14,000
	Pumping Plant for water Facility	ea	$3,000	7	$21,000
	Water Well	ea	$8,250	7	$57,750
	Waste Storage Facility	ea	$20,000	7	$140,000
				Subtotal	$390,670
				Total	$4,502,506

Funding

Financial and technical assistance for BMPs are needed to ensure success of this implementation plan. There are many potential sources for funding that will be actively pursued by the Oneida SWCD to implement improvements on private agriculture and grazing lands. Some of the sources are listed below:

CWA 319 – These are EPA funds, which are allocated to the IDEQ to be distributed on a competitive basis. These funds are used to treat non-point sources identified in the TMDL implementation plan. http://www.deq.idaho.gov/water/prog_issues/surface_water/nonpoint.cfm#management

HIP – The IDFG's objective is to provide technical and financial assistance to private landowners and public land managers who want to enhance upland game bird and waterfowl habitat. Funds are available for cost sharing on habitat projects in partnership with private landowners, non-profit organizations, and state and federal agencies. http://fishandgame.idaho.gov/cms/wildlife/hip/default.cfm

The Partners for Fish and Wildlife Program in Idaho – The program began as a small "on-the-ground" restoration program in 1988 and as grown steadily since then. In Idaho, the focus has been on the restoration of degraded riparian areas along streams, and shallow wetland restoration. Recently, there has been increasing interest for in-stream restoration. http://www.fws.gov/partners/pdfs/ID-needs.pdf

WQPA – The ISCC administers the Water Quality Program for Agriculture is coordinated with the TMDLs and identifies the high priority areas. http://www.scc.state.id.us/programs.htm

RCRDP – The ISCC administers the Resource Conservation and Rangeland Development Program which offers low interest loans with terms up to 15 years. http://www.scc.state.id.us/programs.htm

Conservation Improvement Grants – Administered by the ISCC, these grants provide 50% over 1 to 2 year project timeframe. http://www.scc.state.id.us/programs.htm

SRF – The ISCC administers the State Revolving Fund which offers loans for BMPs. Loans have a minimum of $500,000 with a maximum term of 20 years. http://www.scc.state.id.us/programs.htm

CRP – The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners. Through CRP, you can receive annual rental payments and cost-share assistance to establish long-term, resource-conserving covers on eligible farmland. FSA makes annual rental payments based on the agriculture rental value of the land, and it provides cost-share assistance for up to 50% of the participant's costs in establishing approved conservation practices. Participants enroll acres in CRP contracts for 10 to 15 years. http://www.fsa.usda.gov/dafp/cepd/crp.htm

EQIP – Environmental Quality Incentives Program is a voluntary conservation program from the Natural Resources Conservation Service (NRCS). Through EQIP, participants receive help with BMPs on agricultural land. http://www.id.nrcs.usda.gov/programs/eqip/index.html

WHIP – The Wildlife Habitat Incentives Program (WHIP) is a voluntary program from the NRCS. People who want to develop and improve wildlife habitat primarily on private land can receive technical assistance and up to 75% cost-share assistance. http://www.id.nrcs.usda.gov/programs/whip/index.html

WRP – The Wetland Reserve Program (WRP) is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The NRCS provides technical and financial support to help landowners with permanent easements, 30-year easements, and restoration cost-share agreements on wetlands. http://www.id.nrcs.usda.gov/programs/wrp/index.html

GRP – The Grassland Reserve Program (GRP) is a voluntary program offering landowners the opportunity to protect, restore and enhance grasslands on their property. The NRCS, FSA, and Forest Service are coordinating the GRP, which helps landowners restore, protect, or rehabilitate grass, range, pasture, shrub and other lands. http://www.id.nrcs.usda.gov/programs/grp/index.html

PL566 – Small Watershed program administered by the NRCS.

CTA – NRCS provides free conservation technical assistance (CTA) to help farmers and ranchers identify and solve natural resource problems on their farms and ranches. This may come as advice, counsel, design, and implementation of a conservation practice, or part of an active conservation plan. This is provided through the local Soil Conservation District and NRCS. http://www.id.nrcs.usda.gov/

GLCI – The Grazing Land Conservation Initiative (GLCI) was established in 1991 by a coalition of livestock producer organizations, scientific and professional grazing resource organizations, conservation and environmental groups, and state and federal natural resource and agriculture agencies to provide high quality technical assistance on privately owned grazing lands on a voluntary basis and to increase the awareness of the importance of grazing land resources. http://www.glci.org/index.htm

Outreach

Custer SWCD and ISCC staff will assist each other in public outreach activities to provide information to landowners and operators in the watershed in accordance with the Custer SWCD's Five Year plan.

Monitoring and Evaluation

Field Level

At the field level annual contract status reviews will be conducted to insure that the contract is on schedule and that BMPs are being installed according to standards and specifications. BMP effectiveness monitoring will be conducted using the ISCC's BMP Effectiveness Field Guide (ISCC, 2003).

Watershed Level

The IDEQ monitors water quality and determines the beneficial use status of impaired waterbodies. For funded projects, annual project reviews are conducted to ensure the projects are kept on schedule. Because many projects are being implemented across the state, the ISCC developed a software program to the track costs and the amount of each BMP installed. This program can show what has been installed by project, watershed, subbasin, or state level.

To assist the soil and water conservation districts in prioritizing watersheds for treatment, ISDA and IASCD have been doing water quality monitoring at the subbasin level. As data is collected and evaluated, specific watersheds can be focused on to help pinpoint the sources and locations of excess nonpoint source pollution. This monitoring will also show the benefits from the implementation of BMPs on private agriculture lands as projects are implemented.

Implementation Alternatives

The following implementation alternatives were developed on treatment units for consideration:

1. No action
2. Land treatment with non-structural BMPs on hay, pasture, crop and range lands
3. Land treatment with structural and non-structural BMPs on hay, pasture, crop and range lands
4. Riparian and stream channel restoration
5. Animal facility waste management

Description of Alternatives

Alternative 1 – No action

This alternative continues the existing conservation programs without additional project activities. The problems would continue to negatively impact beneficial uses.

Alternative 2 – Land treatment with non-structural BMPs on hay, pasture, crop and range lands

This alternative would reduce accelerated sheet and rill, and gully erosion, this will improve water quality and reduce pollutant loading to the §303(d) stream segments in Daniels watershed. Beneficial uses may be improved with this alternative which includes voluntary participation.

Alternative 3 – Land treatment with structural & non-structural BMPs hay, pasture, crop & range lands

This alternative would reduce accelerated sheet and rill, and gully erosion. It is anticipated that this alternative will reduce soil erosion. This will improve water quality in the watershed and reduce pollutant loading to the §303(d) stream segments in Daniels watershed. Beneficial uses would be improved or achieved with implementation of this alternative. This alternative includes voluntary participation.

Alternative 4 – Riparian and stream channel restoration

This alternative would reduce accelerated stream bank and bed erosion. This alternative would improve water quality, riparian vegetation, aquatic habitat and fish passage in the watershed. Beneficial uses would be improved with implementation of this alternative. This alternative includes voluntary participation.

Alternative 5 – Animal facility waste management

This alternative would reduce sediment and nutrient runoff from animal facilities. This will improve water quality in the watershed and reduce pollutant loading to Dairy Creek, Hill Creek and the Little Malad Spring. This alternative includes voluntary and mandatory landowner participation.

Alternative Selection

The Oneida SWCD selected Alternatives 3, 4, and 5 for this watershed. These three alternatives together meet the objectives set forth in their five year plan by improving water quality in the Daniels watershed (Oneida SWCD, 2004). The timeline for implementation, shown in Table 11, can only occur if all items are fully funded and all residents and landowners voluntarily participate.

Table 12. Estimated Timeline for TMDL Agricultural Implementation

Task	Output	Milestone
Develop conservation plans and contracts	Completed contract agreements	2010
Finalize BMP designs	Completed BMP plans and designs	2015
Design and install approved BMPs	Certify BMP installations	2018
Track BMP installation	Implementation progress report	2022
Evaluate BMP & project effectiveness	Complete project effectiveness report	2025

References

IASS, 1998. 1998 Idaho Agricultural Statistics. Idaho Agricultural Statistics Service, Boise, Idaho.

IDEQ, 1998. State of Idaho's 1998 §303(d) List. Boise, Idaho.

IDEQ, 2002. Subbasin Assessment for the Idaho Bear River Basin. Idaho Department of Environmental Quality, Pocatello, Idaho

IDWR, 2000. Idaho GIS Data website. http://www.idwr.state.id.us/gisdata/gis_data.htm. Idaho State Department of Water Resources, Boise, Idaho.

ISCC, 2003. Idaho Agricultural Pollution Abatement Plan. Idaho Soil Conservation Commission. Boise, Idaho.

ISCC, 2003. Idaho Agricultural Best Management Practices, *A Field Guide for Evaluating BMP Effectiveness*. Idaho Soil Conservation Commission. Boise, Idaho.

ISDA, 2000. The Idaho Beef Cattle Environmental Control Memorandum of Understanding, Pg. 7. Boise, Idaho.

ISDA, 2000. Beef Cattle Animal Feeding Operation Program, 3pp. Boise, Idaho.

Jenkins, A. R. 2007. Little Malad Subbasin Water Quality Monitoring Technical Report Summary ARJ-07-000. Idaho Association of Soil Conservation Districts. Pocatello, Idaho.

Link, Paul K. & Phoenix, E. Chilton. Rocks, Rails, and Trails. Second Edition 1996. Copyright 2006. pp. 7, 11, & 100.

NASS, 2002. Census for Agriculture. http://www.nass.usda.gov/census/

Natural Resources Conservation Service. 1998. Stream Visual Assessment Protocol. NWCC-TN-99-1. National Water and Climate Center, Portland, OR

NRCS, 2007. NRCS eFOTG "Guidance Documents for Resource Management Systems Field Office Technical Guide, Section III". http://ias.sc.egov.usda.gov/auth/CSG/CSGReporteFOTG.aspx

Oneida SWCD, 2005. Five Year Plan. Malad, Idaho

Oneida SWCD, 1999. Dairy Creek Project SAWQP Final Report. Malad, Idaho.

Oneida SWCD, 1999. Daniels Project SAWQP Final Report. Malad, Idaho.

Oneida SWCD, 1999. Wide Hollow Project SAWQP Final Report. Malad, Idaho.

SCS, 1981. Soil Conservation Service. Idaho Cooperative Irrigation Study. July 1981. Boise, Idaho.

APPENDIX A – Wrights Creek Subwatershed Agricultural TMDL Implementation Plan

Subwatershed Setting

The Wrights Creek subwatershed covers 20,546 acres, or approximately 32 square miles, in the northern portion of the Daniels watershed, which is in the western part of the Lower Bear-Malad subbasin. There are approximately 11,665 acres of private land and 9,006 acres managed by CTNF in the Wrights Creek subwatershed. Non-irrigated hay, pasture, and crop land is the major private land use in the watershed at 56% of the acres as shown in Table A-1.

Wrights Creek subwatershed is bounded on the east by the Bannock Range, to the west by the Deep Creek Range, and to the north by Arbon Valley. Wrights Creek's climate is dry summers followed by cold, moist winters. Most of the precipitation occurs from October to May in the form of snow. Average annual precipitation measures 15 inches at the basin floor to 24 inches in the higher elevations. Elevations range from 9,095 feet to 4,470 feet at the valley floor.

Table A-1. Private Land Uses in the Wrights Creek Subwatershed

Land Use	Acres	Percent of Total
Hay, Pasture, & Crop Land	8,346	72%
Range Land	3,059	26%
Riparian	91	1%
Strip Mines	65	1%
Total	11,561	100%

Problem Statement

Identified Problems

The Oneida SWCD identified stream bank modifications, over-utilized pastures, sheet and rill erosion, classic and ephemeral gully erosion, and stream bank erosion as problems in the watershed. Critical erosion periods are spring runoff, spring rains and summer thunderstorms (Oneida SWCD, 2005). Table A-2 shows identified riparian problems from 13 reaches assessed on Wrights Creek.

Table A-2. Identified Problems on Assessed Reaches on Wrights Creek

Description	WC 1	WC 2	WC 3	WC 4	WC 5	WC 6	WC 7	WC 8	WC 9	WC 10	WC 11	WC 12	WC 13
Channel Condition		X					X	X		X		X	X
Hydrologic Alteration			X				X	X		X			
Riparian Zone							X	X	X	X	X		X
Bank Stability							X	X	X	X	X	X	X
Fish Barriers	X	X	X	X			X		X		X		X
Manure Presence	X	X	X	X	X	X	X	X	X	X	X		X

(X) Indicates a SVAP rating of less than 7

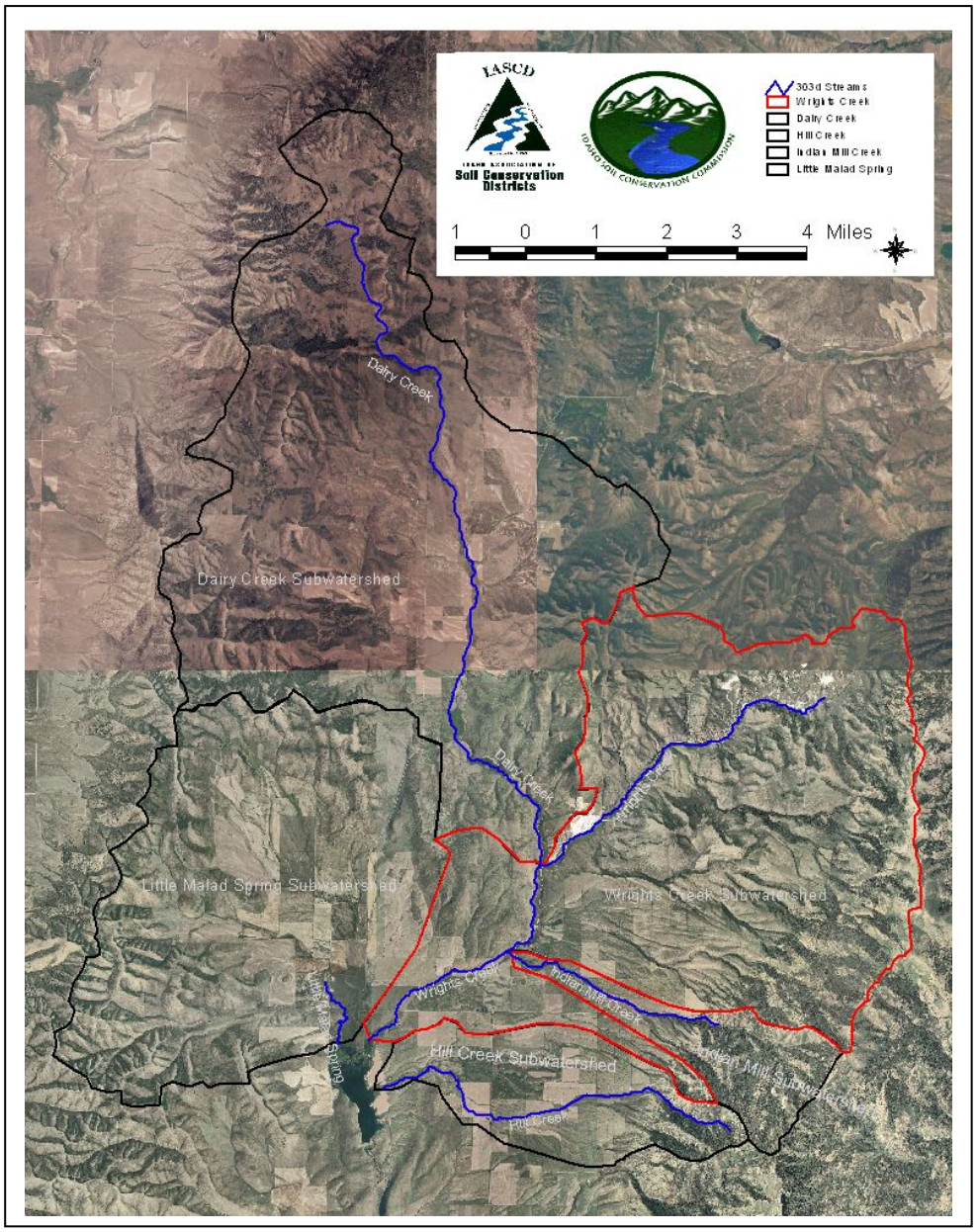
Pollutants of Concern

The subbasin assessment for the Idaho Bear River basin specified that sediment is the pollutant of concern in Wrights Creek (IDEQ 2002).

Critical Areas

The areas having the most significant impact on the water quality of the receiving waters are critical areas. These critical areas include pollutant source and transport areas. The subwatershed consists of 20,546 acres with private land accounting for 11,665 acres. The predominant private land uses in the subwatershed are hay, pasture, crop lands and rangeland, respectively 8,346 and 3,059 acres.

Figure A-1. Wrights Creek Subwatershed in the Daniels Watershed



Proposed Treatment

The subwatershed is divided into four treatment units (Table A-3) these have similar land uses, soils, productivity, resource concerns and treatment needs (Table A-4). The proposed treatment for pollutant reduction will be to implement BMPs through conservation plans.

Table A-3. Treatment Units in the Wrights Creek Subwatershed

Subwatershed	TU1 Stream Corridor & Riparian Areas	TU2 Non-Irrigated Hay, Pasture, & Crop Lands	TU3 Range Lands	TU4 Animal Facilities
Wrights Creek	65	4,840	2,726	0

Table A-4. Treatment Units with Soil Types

Acres	Soils	Resource Problems
Treatment Unit (TU1) Stream Corridors and Riparian Areas		
65 Acres	Arbone-Hondoho-Cedar Hill Complex, 12 to 30 percent Toe-foot Silt Loam, 0 to 4 percent These soils formed on flood plains and terraces and are poorly drained with flooding occasional parent material is mixed and clayey alluvium with no restrictive layers	Unstable and erosive stream bed and banks Dewatered stream reaches Lack of riparian vegetation diversity and density Barriers to fish migration and movement
Treatment Unit (TU2) Non-Irrigated Hay, Pasture, & Crop Lands		
4,840 Acres	Arbone-Hondoho-Cedar Hill Complex, 4 to 12 percent Ririe-Iphil-Rexburg Complex, 4 to 12 percent Hondoho-Hymas-Pavohroo Assoc., 30 to 60 percent These soils formed on foot slopes, fan and stream terraces they are well drained to poorly drained with no flooding, parent material is alluvium and clayey alluvium with some loess with no restrictive layers	Accelerated sheet and rill or gully erosion
Treatment Unit (TU3) Range Lands		
2,726 Acres	Arbone-Hondoho-Cedar Hill Complex, 4 to 12 percent Hondoho-Hymas-Pavohroo Assoc., 30 to 60 percent These soils formed on hill shoulders they are well drained with no flooding, parent material is residuum and colluvium from sandstone, quartzite and dolomite with restrictive layers of bedrock at 20 to 40 inches	Accelerated sheet and rill or gully erosion Over utilized range lands

Estimated BMP Implementation Costs

Conservation efforts in the subwatershed have demonstrated that landowners will install BMPs when technical and financial assistance is available. Table A-5 lists the BMPs, along with unit amounts and costs to install each BMP, which maybe used to restore beneficial uses in Wrights Creek.

Table A-5. Estimated BMP Installation Costs for the Wrights Creek Subwatershed

Treatment Unit	Best Management Practice	Unit Type	Unit Cost	Unit Amount	Total Funds
TU1 Stream Corridors & Riparian Areas	Channel Vegetation	ac	$2,100	16	$33,600
	Conservation Cover	ac	$60	16	$960
	Critical Area Planting	ac	$250	10	$2,500
	Fence, 4-wire	ft	$2	2,248	$4,496
	Heavy Use Area Protection	ac	$50	2	$100
	Pest Management	ac	$20	33	$660
	Prescribed Grazing	ac	$5	65	$325
	Riparian Forest Buffer	ac	$185	16	$2,960
	Stream Bank Protection	ft	$20	225	$4,500
	Stream Channel Stabilization	ft	$35	150	$5,250
	Tree/Shrub Establishment	ac	$290	13	$3,770
	Use Exclusion (Riparian)	ac	$100	16	$1,600
				Subtotal	$60,721
TU2 Non-Irrigated Hay, Pasture, & Crop Lands	Contour Farming	ac	$3	3,287	$9,861
	Conservation Crop Rotation	ac	$2	3,287	$6,574
	Field Border	ac	$88	657	$57,816
	Critical Area Planting	ac	$200	219	$43,800
	Deep Tillage	ac	$16	3,287	$52,592
	Drip Irrigation	ea	$2	690	$1,173
	Irrigation Water Management	ac	$1	192	$192
	Nutrient Management	ac	$3	4,383	$13,149
	Pasture & Hayland Planting	ac	$100	2,192	$219,200
	Pest Management	ac	$20	1,096	$21,920
	Residue Management	ac	$20	2,192	$43,840
	Terrace	ft	$2	9,994	$19,988
	Water & Sediment Control Basin	ea	$800	91	$72,800
	Windbreak/Shelterbelt	ft	$4	2,300	$9,200
				Subtotal	$572,105
TU3 Range Lands	Brush Management	ac	$30	682	$20,460
	Fence, 4-wire	ft	$2	96,436	$192,872
	Pest Management	ac	$20	682	$13,640
	Pipeline, PE 100 psi, 2.0"	ft	$2	6,750	$13,500
	Prescribed Grazing	ac	$3	2,045	$6,135
	Pumping plant for water control	ea	$5,000	4	$20,000
	Range Planting	ac	$80	1,363	$109,040
	Spring Development	ea	$2,400	4	$9,600
	Structure For Water Control	ea	$3,000	4	$12,000
	Water Well	ea	$8,250	4	$33,000
	Watering Facility	ea	$1,150	25	$28,750
				Subtotal	$458,997
TU4 Animal Facilities	Corral Fence	ft	$15	0	$0
	Nutrient Management	ac	$3	0	$0
	Pipeline	ft	$2	0	$0
	Pumping Plant for Water Facility	ea	$3,000	0	$0
	Water Well	ea	$8,250	0	$0
	Waste Storage Facility	ea	$20,000	0	$0
				Subtotal	$0
				Total	$1,091,823

APPENDIX B – Dairy Creek Subwatershed Agricultural TMDL Implementation Plan

Subwatershed Setting

The Dairy Creek subwatershed covers 24,139 acres in the northern portion of the Daniels watershed, which is in the western part of the Lower Bear-Malad subbasin as shown in Figure 1. There are approximately 17,321 acres of private land and 6,120 acres managed by the IDL, BLM, and CTNF. Rangeland is the major private land use in the watershed at 71% of the acres as shown in Table B-1.

Dairy Creek subwatershed is bounded by Dry Creek subwatershed to the east, to the west by the Deep Creek Range, to the north by Arbon Valley, and Malad Valley to the south. Dairy Creek's climate is dry summers followed by cold moist winters. Most of the precipitation occurring from October-May comes in the form of snow. Average annual precipitation measures 15 inches at the basin floor to 24 inches in the higher elevations. Elevations range from 6,325 feet to 5,454 feet.

Table B-1. Private Land Uses in the Dairy Creek Subwatershed

Land Use	Acres	Percent of Total
Hay, Pasture, & Crop Land	8,541	49%
Range Land	8,698	50%
Riparian	70	<1%
Strip Mines	12	<1%
Total	17,321	100%

Problem Statement

Identified Problems

The Oneida SWCD identified stream bank modifications, over utilized pastures, sheet and rill erosion, classic and ephemeral gully erosion, and stream bank erosion as problems in the watershed. Critical erosion periods are spring runoff, spring rains and summer thunderstorms (Oneida SWCD, 2005). Table B-2 shows identified riparian problems from seven reaches assessed on Dairy Creek.

Table B-2. Identified Problems on Assessed Reaches on Dairy Creek

Description	DC 1	DC 2	DC 3	DC 4	DC 5	DC 6	DC 7
Channel Condition			X	X	X		
Hydrologic Alteration	X		X	X	X		X
Riparian Zone	X		X	X			X
Bank Stability	X		X	X	X		X
Fish Barriers			X	X	X	X	X
Manure Presence	X	X	X	X	X	X	X

(X) Indicates a SVAP rating of less than 7

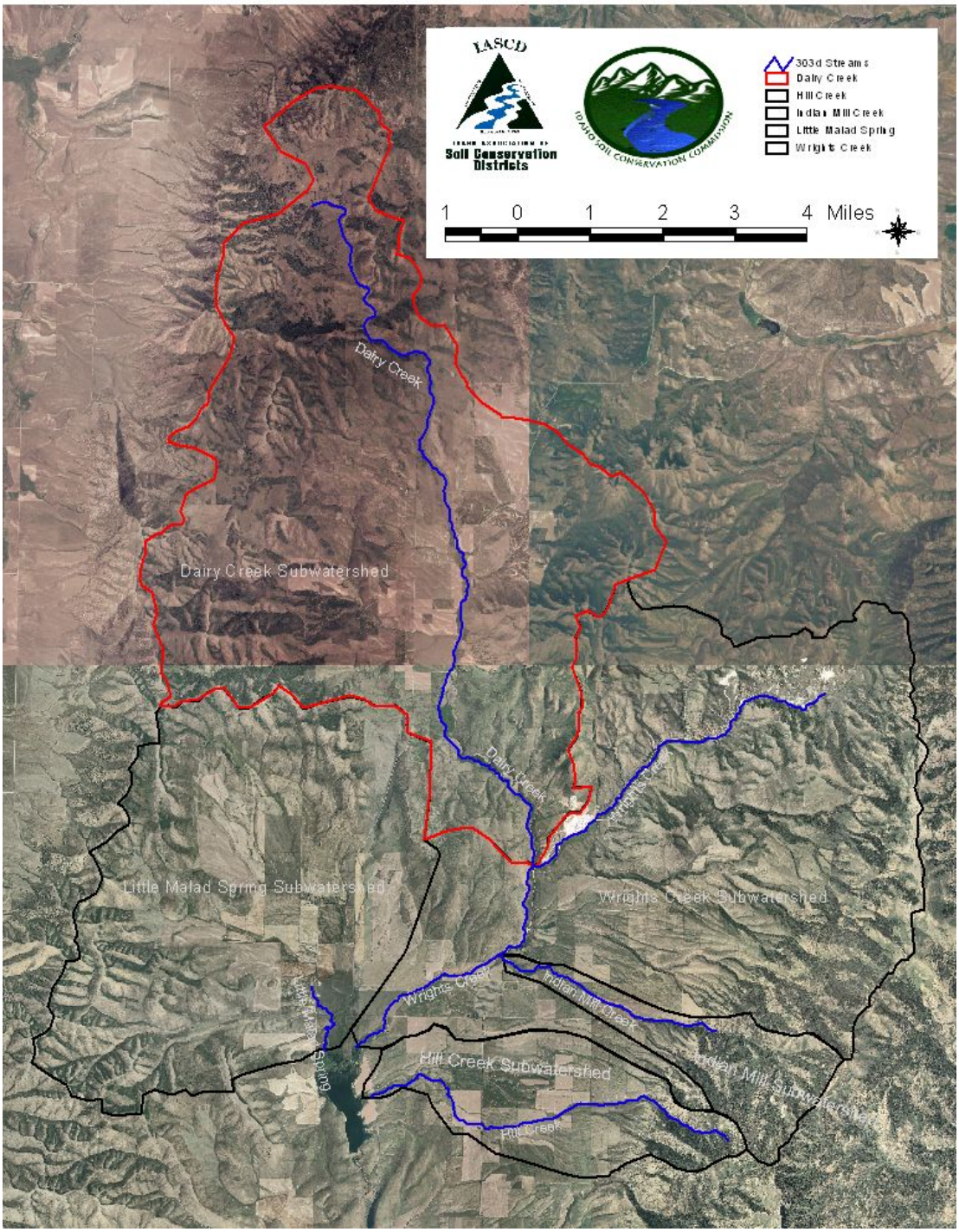
Pollutants of Concern

The subbasin assessment for the Idaho Bear River basin specified that the pollutants of concern are unknown in Dairy Creek (IDEQ 2002).

Critical Areas

Those areas having the most significant impact on the quality of the receiving waters are critical areas. These critical areas include pollutant source and transport areas. The subwatershed consists of 24,139 acres with private land accounting for 17,321 acres. The predominant private land uses within the subwatershed are rangeland and hay, pasture, and crop lands, respectively 8,698 and 8,541 acres.

Figure B-1. Dairy Creek Subwatershed in the Daniels Watershed



Proposed Treatment

The subwatershed is divided into four treatment units (Table B-3) that have similar land uses, soils, productivity, resource concerns and treatment needs (Table B-4).

Table B-3. Treatment Units in the Dairy Creek Subwatershed

Subwatershed	TU1 Stream Corridor & Riparian Areas	TU2 Non-Irrigated Hay, Pasture, & Crop Lands	TU3 Range Lands	TU4 Animal Facilities
Dairy Creek	28	4,011	7,310	4

Table B-4. Treatment Units with Soil Types

Acres	Soils	Resource Problems
Treatment Unit (TU1) Stream Channels and Riparian Areas		
28 Acres	Inkom silt loam, 0 to 1% Arbone-Hondoho-Cedar Hill, 12 to 30% Copenhagen-Lonigan-Manila Assoc. 12 to 50% These soils formed on stream and fan terraces, and mountain foot slopes. They are poorly to well drained with flooding rare to none with parent material alluvium and loess with no restrictive layers.	Unstable and erosive stream bed and banks Dewatered stream reaches Lack of riparian vegetation diversity and density Barriers to fish migration and movement
Treatment Unit (TU2) Non-Irrigated Hay, Pasture, & Crop Lands		
4,011 Acres	Rexburg-Lanoak-Watercanyon Complex, 0 to 2% Rexburg-Watercanyon-Lanoak Complex, 12 to 20% Rexburg-Arbone-Ririe Complex, 12 to 25% These soils formed on foot slopes and fan terraces, they are well drained, formed in loess and in silty alluvium derived from loess.	Accelerated sheet and rill or gully erosion
Treatment Unit (TU3) Range Lands		
7,310 Acres	Hymas-Calpac-Ireland Assoc., 30 to 70% Povey-Pavohoo Assoc., 30 to 60% Hymas-Povey-Pavohoo Assoc., 30 to 70% These soils formed on hill shoulders they are well drained with no flooding, parent material is alluvium and residuum and colluvium from sandstone, quartzite and dolomite with restrictive layers of bedrock at 20 to 40 inches	Accelerated sheet and rill or gully erosion Over utilized range lands
Treatment Unit (TU4) Animal Facilities		
4 Facilities	Inkom silt loam, 0 to 1% Arbone-Hondoho-Cedar Hill, 12 to 30% Copenhagen-Lonigan-Manila Assoc. 12 to 50% These soils formed on stream and fan terraces, and mountain foot slopes. They are poorly to well drained with flooding rare to none with parent material alluvium and loess with no restrictive layers.	Lack of drinking water sources Inadequate waste storage Runoff from corrals or pens

Estimated BMP Implementation Costs

Conservation efforts in the subwatershed have demonstrated that landowners will install BMPs when technical and financial assistance is available. Table B-5 lists the BMPs, along with unit amounts and costs to install each BMP, which may be used to restore beneficial uses in Dairy Creek.

Table B-5. Estimated BMP Installation Costs for the Dairy Creek Subwatershed

Treatment Unit	Best Management Practice	Unit Type	Unit Cost	Unit Amount	Total Funds
TU1 Stream Corridors & Riparian Areas	Channel Vegetation	ac	$2,100	14	$29,400
	Conservation Cover	ac	$60	19	$1,140
	Critical Area Planting	ac	$250	19	$4,750
	Fence, 4-wire	ft	$2	3,790	$7,580
	Heavy Use Area Protection	ac	$50	9	$450
	Pest Management	ac	$20	14	$280
	Prescribed Grazing	ac	$5	28	$140
	Riparian Forest Buffer	ac	$185	7	$1,295
	Stream Bank Protection	ft	$20	1,667	$33,340
	Stream Channel Stabilization	ft	$35	834	$29,190
	Tree/Shrub Establishment	ac	$290	6	$1,740
	Use Exclusion (Riparian)	ac	$100	7	$700
				Subtotal	$110,005
TU2 Non-Irrigated Hay, Pasture, & Crop Lands	Contour Farming	ac	$3	3,008	$9,024
	Conservation Crop Rotation	ac	$2	3,008	$6,016
	Field Border	ac	$88	842	$74,096
	Critical Area Planting	ac	$200	602	$120,400
	Deep Tillage	ac	$16	3,008	$48,128
	Drip Irrigation	ea	$2	690	$1,173
	Irrigation Water Management	ac	$1	192	$192
	Nutrient Management	ac	$3	4,011	$12,033
	Pasture & Hayland Planting	ac	$100	2,006	$200,600
	Pest Management	ac	$20	1,003	$20,060
	Residue Management	ac	$20	3,008	$60,160
	Terrace	ft	$2	9,146	$18,292
	Water & Sediment Control Basin	ea	$800	83	$66,400
	Windbreak/Shelterbelt	ft	$4	2,300	$9,200
				Subtotal	$645,774
TU3 Range Lands	Brush Management	ac	$30	1,828	$54,840
	Fence, 4-wire	ft	$2	258,603	$517,206
	Pest Management	ac	$20	1,828	$36,560
	Pipeline, PE 100 psi, 2.0"	ft	$2	241,229	$482,458
	Prescribed Grazing	ac	$3	5,483	$16,449
	Pumping plant for water control	ea	$5,000	12	$60,000
	Range Planting	ac	$80	1,828	$146,240
	Spring Development	ea	$2,400	12	$28,800
	Structure For Water Control	ea	$3,000	12	$36,000
	Water Well	ea	$8,250	12	$99,000
	Watering Facility	ea	$1,150	60	$69,000
				Subtotal	$1,546,553
TU4 Animal Facilities	Corral Fence	ft	$15	6,000	$90,000
	Nutrient Management	ac	$3	80	$240
	Pipeline	ft	$2	4,000	$8,000
	Pumping Plant for Water Facility	ea	$3,000	4	$12,000
	Water Well	ea	$8,250	4	$33,000
	Waste Storage Facility	ea	$20,000	4	$80,000
				Subtotal	$223,240
				Total	$2,525,572

APPENDIX C – Little Malad Spring Subwatershed Agricultural TMDL Implementation Plan

Subwatershed Setting

The Little Malad Spring subwatershed covers 14,354 acres, or approximately 22 square miles, in the northwestern part of the Lower Bear-Malad subbasin as shown in Figure 1. There are approximately 9,916 acres of private land and 1,857 acres managed by IDL, BLM and CTNF in the subwatershed. Non-irrigated hay, pasture, and crop land is the major private land use in the subwatershed at 68% of the acres and shown in Table C-1.

The subwatershed has a climate of short, cool summers followed by long cold winters with most of the precipitation occurring from October to May in the form of snow. Average annual precipitation measures 15 inches at the valley floor to 24 inches in the higher elevations, with elevations ranging from 5,247 feet to 5,177 feet at the valley floor.

Table C-1. Private Land Uses in the Little Malad Spring Subwatershed

Land Use	Acres	Percent of Total
Hay, Pasture, & Crop Land	7,857	80%
Range Land	1,883	19%
Riparian	56	1%
Total	9,796	100%

Problem Statement

Identified Problems

The Oneida SWCD identified stream bank modifications, over utilized pastures, sheet and rill erosion, classic and ephemeral gully erosion, and stream bank erosion as problems in the watershed. Critical erosion periods are spring runoff, spring rains and summer thunderstorms (Oneida SWCD, 2005). Table C-2 shows identified riparian problems from one reach assessed on Little Malad Spring.

Table C-2. Identified Problems on Little Malad Spring

Description	LM 1
Channel Condition	X
Hydrologic Alteration	
Riparian Zone	X
Bank Stability	X
Fish Barriers	
Manure Presence	X

(X) Indicates a SVAP rating of less than 7

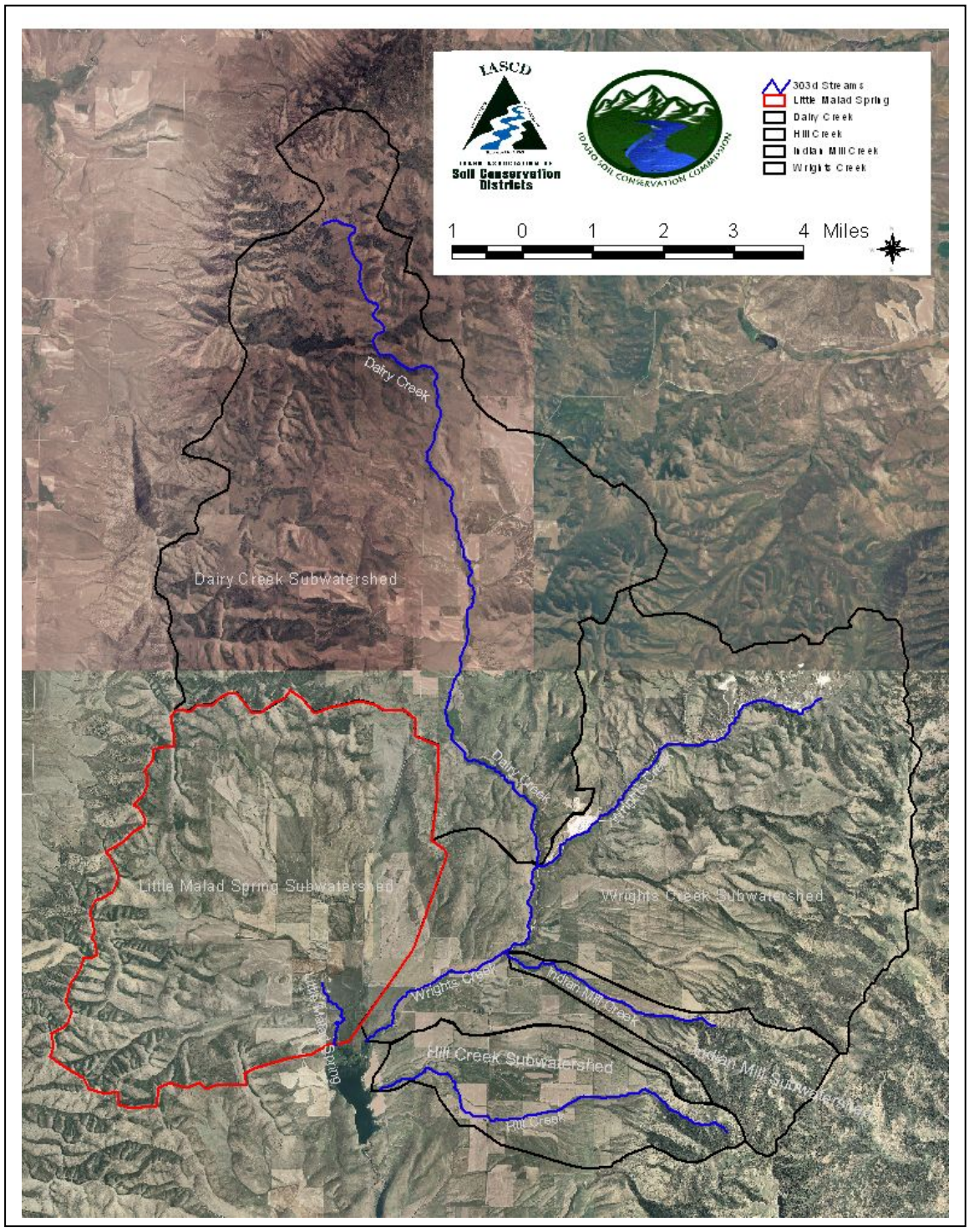
Pollutants of Concern

The subbasin assessment for the Little Malad Spring specified that sediment and nutrients are pollutants of concern in the subwatershed (IDEQ, 2002).

Critical Areas

Those areas having the most significant impact on the quality of the receiving waters are critical areas. These critical areas include pollutant source and transport areas. The subwatershed consists of 14,354 acres with private land accounting for 9,916 acres. The predominant private land uses within the subwatershed are hay, pasture, crop lands and rangeland, respectively 7,857 and 1,883 acres.

Figure C-1. Little Malad Spring Subwatershed in the Daniels Watershed



Proposed Treatment

The subwatershed is divided in to four treatment units (Table C-3) that have similar land uses, soils, productivity, resource concerns, and treatment needs (Table C-4).

Table C-3. Little Malad Spring Treatment Unit Acres by Land Use

Subwatershed	TU1 Stream Corridor & Riparian Areas	TU2 Non-Irrigated Hay, Pasture, & Crop Lands	TU3 Range Lands	TU4 Animal Facilities
Little Malad Spring	3	2,306	686	2

Table C-4. Treatment Units with Soil Types

Treatment Unit (TU1) Stream Channels and Riparian Areas		Resource Problems
3 Acres	Soils – Lanoak Silt Loam, 0- 4 percent These soils formed on foothills, ridges, fan terraces, and mountainsides. This soil is well drained, and very deep with flooding rare with parent material alluvium and loess with no restrictive layers	Unstable and erosive stream bed and banks Dewatered stream reaches Lack of vegetation diversity and density Barriers to fish migration and movement
Treatment Unit (TU2) Non-Irrigated Hay, Pasture, & Crop Lands		**Resource Problems**
2,306 Acres	Ririe-Rexburg Complex, 4- 12 percent Ririe-WaterCanyon Complex, 12- 30 percent Arbone Silt Loam, 12- 20 percent These soils formed on stream terraces and fan terraces are well drained with no flooding and parent material alluvium and loess with no restrictive layers	Accelerated sheet and rill or gully erosion
Treatment Unit (TU3) Range Lands		**Resource Problems**
686 Acres	Bear Lake Complex, 0 - 1 percent Bear lake – Lago Complex, 0 - 2 percent Everry - Preuss Complex, 5 - 45 percent Hagen Barth- Woodcanyon Complex 20- 50 percent These soils formed on stream terraces and foot slopes are poorly drained and well drained with flooding occasional to none with parent material alluvium and alluvium over residuum from calcareous siltstone with no restrictive layers to bedrock 40 to 60 inches	Accelerated sheet and rill or gully erosion Over utilized range lands
Treatment Unit (TU4) Animal Facilities		**Resource Problems**
2 Facilities	Bear Lake–Chesbrook–Laroco Complex, 0-2 percent Bern silt loam, 0 - 2 percent Lago _Bear Lake Complex, 0 - 1 percent These soils formed on stream terraces and flood plains are poorly drained with flooding rare with parent material alluvium and loess with no restrictive layers	Lack of drinking water sources Inadequate waste storage Runoff from corrals or pens

Estimated BMP Implementation Costs

Conservation efforts in the subwatershed have demonstrated that landowners will install BMPs when technical and financial assistance is available. The proposed treatment for pollutant reduction will be to implement BMPs through conservation plans. Table C-5 lists BMPs, along with unit amounts and costs to install each BMP, which may be used to restore beneficial uses.

Table C-5. Estimated BMP Installation Costs for the Little Malad Spring

Treatment Unit	Best Management Practice	Unit Type	Unit Cost	Unit Amount	Total Funds
TU1 Stream Corridors & Riparian Areas	Channel Vegetation	ac	$2,100	1	$2,100
	Conservation Cover	ac	$60	1	$60
	Critical Area Planting	ac	$250	1	$250
	Fence, 4-wire	ft	$2	1,250	$2,500
	Heavy Use Area Protection	ac	$50	1	$50
	Pest Management	ac	$20	2	$40
	Prescribed Grazing	ac	$5	3	$15
	Riparian Forest Buffer	ac	$185	1	$185
	Stream Bank Protection	ft	$20	125	$2,500
	Stream Channel Stabilization	ft	$35	50	$1,750
	Tree/Shrub Establishment	ac	$290	1	$290
	Use Exclusion (Riparian)	ac	$100	1	$100
				Subtotal	$9,840
TU2 Non-Irrigated Hay, Pasture, & Crop Lands	Contour Farming	ac	$3	1,730	$5,189
	Conservation Crop Rotation	ac	$2	1,730	$3,459
	Field Border	ac	$88	346	$30,439
	Critical Area Planting	ac	$200	115	$23,060
	Deep Tillage	ac	$16	1,730	$27,672
	Drip Irrigation	ea	$2	690	$1,380
	Irrigation Water Management	ac	$1	192	$192
	Nutrient Management	ac	$3	2,306	$6,918
	Pasture & Hayland Planting	ac	$100	1,153	$115,300
	Pest Management	ac	$20	577	$11,530
	Residue Management	ac	$20	1,153	$23,060
	Terrace	ft	$2	5,258	$10,516
	Water & Sediment Control Basin	ea	$800	48	$38,400
	Windbreak/Shelterbelt	ft	$4	2,300	$9,200
				Subtotal	$306,315
TU3 Range Lands	Brush Management	ac	$30	172	$5,145
	Fence, 4-wire	ft	$2	460	$919
	Pest Management	ac	$20	103	$2,058
	Pipeline, PE 100 psi, 2.0"	ft	$2	1,500	$3,000
	Prescribed Grazing	ac	$3	343	$1,029
	Pumping plant for water control	ea	$5,000	1	$5,000
	Range Planting	ac	$80	172	$13,720
	Spring Development	ea	$2,400	1	$2,400
	Structure For Water Control	ea	$3,000	1	$3,000
	Water Well	ea	$8,250	1	$8,250
	Watering Facility	ea	$1,150	5	$5,750
				Subtotal	$50,271
TU4 Animal Facilities	Corral Fence	ft	$15	3,000	$45,000
	Nutrient Management	ac	$3	40	$120
	Pipeline	ft	$2	2,000	$4,000
	Pumping Plant for Water Facility	ea	$3,000	2	$6,000
	Water Well	ea	$8,250	2	$16,500
	Waste Storage Facility	ea	$20,000	2	$40,000
				Subtotal	$111,620
				Total	$478,046

APPENDIX D – Hill Creek Subwatershed Agricultural TMDL Implementation Plan

Subwatershed Setting

The Hill Creek subwatershed covers 3,414 acres, or approximately 5 square miles, in the northwestern part of the Lower Bear subbasin as shown in Figure D-1. There are approximately 3,022 acres of private land and 392 acres managed by USFW, CTNF, IDL, and BLM in the subwatershed. Non-irrigated hay, pasture, and crop land is the major private land use in the subwatershed at 88% of the acres as shown in Table D-1.

The subwatershed is bounded on the eastside by Bannock Range, to the south is the Malad River and to the north Arbon Valley. The subwatershed has a climate of short cool summers followed by long, cold winters with most of the precipitation occurring from October to May in the form of snow. Average annual precipitation measures 10 inches at the valley floor to 30 inches in the higher elevations, with elevations ranging from 7,300 feet to 5,280 feet at the valley floor. Valley and highland runoff occur simultaneously resulting in very short duration high spring flows.

Table D-1. Private Land Uses in the Hill Creek Subwatershed

Land Use	Acres	Percent of Total
Hay, Pasture, & Crop Land	2,757	91%
Range Land	190	6%
Riparian	65	2%
Strip Mines	10	1%
Total	3,022	100%

Problem Statement

Identified Problems

The Oneida SWCD identified stream bank modifications, over utilized pastures, sheet and rill erosion, classic and ephemeral gully erosion, and stream bank erosion as problems in the watershed. Critical erosion periods are spring runoff, spring rains and summer thunderstorms (Oneida SWCD, 2005). Hill creek was not assessed; therefore there are none identified for this subwatershed.

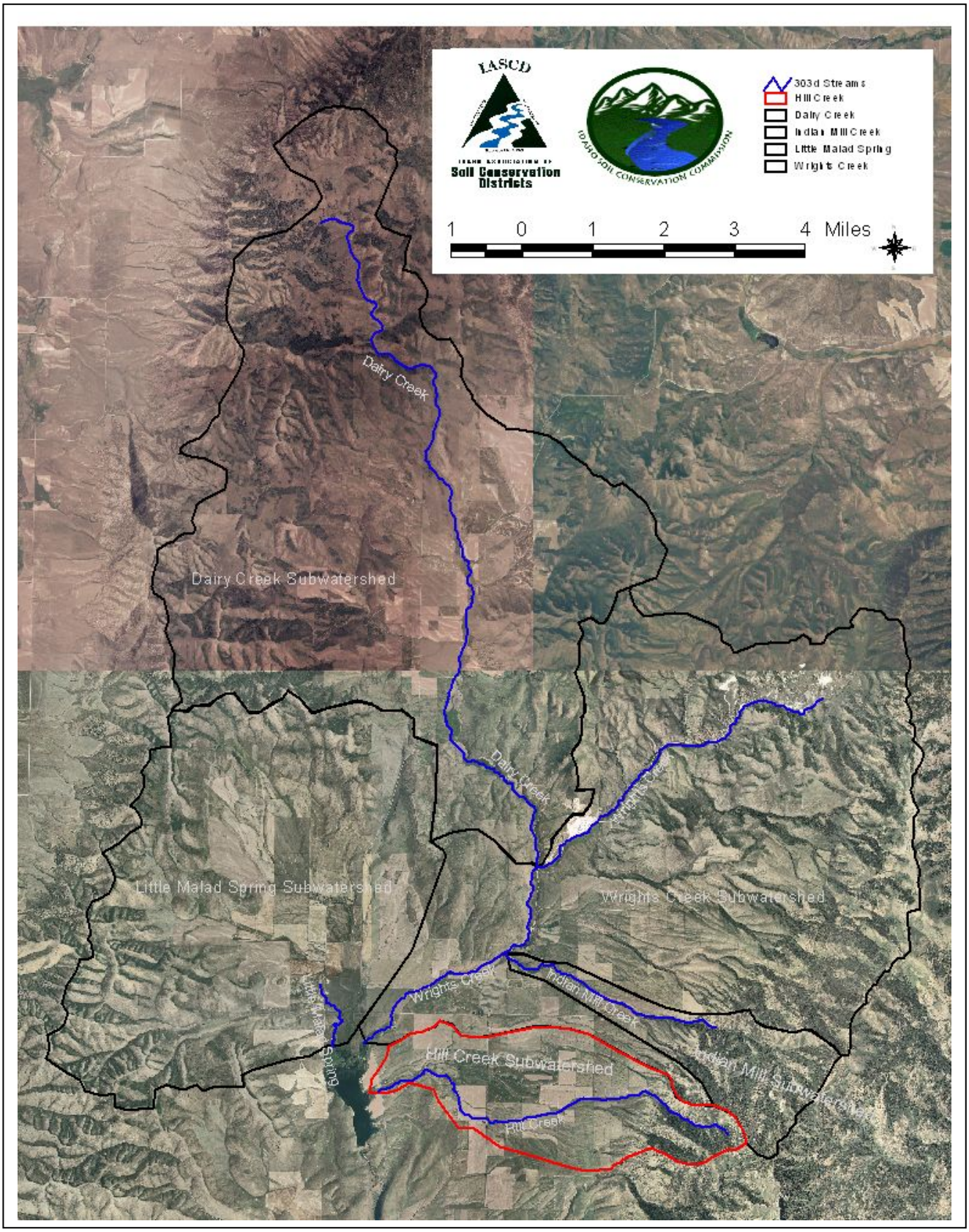
Pollutants of Concern

The subbasin assessment for the Hill Creek specified that sediment and nutrients are pollutants of concern in the subwatershed (IDEQ 2002).

Critical Areas

Those areas having the most significant impact on the quality of the receiving waters are critical areas. These critical areas include pollutant source and transport areas. The subwatershed consists of 3,414 acres with private land accounting for 3,022 acres. The predominant private land uses within the subwatershed are hay, pasture, crop lands and rangeland, respectively 2,757 and 190 acres.

Figure D-1. Hill Creek Subwatershed in the Daniels Watershed



Proposed Treatment

The subwatershed is divided in to four treatment units (Table D-2) that have similar land uses, soils, productivity, resource concerns, and treatment needs (Table D-3).

Table D-2. Hill Creek Treatment Unit Acres by Land Use

Subwatershed	TU1 Stream Corridor & Riparian Areas	TU2 Non-Irrigated Hay, Pasture, & Crop Lands	TU3 Range Lands	TU4 Animal Facilities
Hill Creek	60	916	21	1

Table D-3. Treatment Units with Soil Types

Treatment Unit (TU1) Stream Channels and Riparian Areas		Resource Problems
60 Acres	Lanoak Silt Loam, 0 to 4 percent These soils formed on foothills, ridges, fan terraces, and mountainsides. This soil is well drained, and very deep with flooding rare with parent material alluvium and loess with no restrictive layers	Unstable and erosive stream bed and banks Dewatered stream reaches Lack of riparian vegetation diversity and density Barriers to fish migration and movement
Treatment Unit (TU2) Non-Irrigated Hay, Pasture, & Crop Lands		Resource Problems
916 Acres	Ririe-Rexburg Complex, 4 to 12 percent Ririe-WaterCanyon Complex, 12 to 30 percent Arbone Silt Loam, 12 to 20 percent These soils formed on stream terraces and fan terraces are well drained with no flooding and parent material alluvium and loess with no restrictive layers	Accelerated sheet and rill or gully erosion
Treatment Unit (TU3) Range Lands		Resource Problems
21 Acres	Bear Lake Complex, 0 to 1 percent Bear lake – Lago Complex, 0 to 2 percent Everry - Preuss Complex, 5 to 45 percent Hagen Barth- Woodcanyon Complex 20 to 50 percent These soils formed on stream terraces and foot slopes are poorly drained and well drained with flooding occasional to none with parent material alluvium and alluvium over residuum from calcareous siltstone with no restrictive layers to bedrock 40 to 60 inches	Accelerated sheet and rill or gully erosion Over utilized range lands
Treatment Unit (TU4) Animal Facilities		Resource Problems
1 Facility	Bear Lake–Chesbrook–Laroco Complex, 0 to 2 percent Bern silt loam, 0 to 2 percent Lago _Bear Lake Complex, 0 to 1 percent These soils formed on stream terraces and flood plains are poorly drained with flooding rare with parent material alluvium and loess with no restrictive layers	Lack of drinking water sources Inadequate waste storage Runoff from corrals or pens

Estimated BMP Implementation Costs

Conservation efforts in the subwatershed have demonstrated that landowners will install BMPs when technical and financial assistance is available. Table D-4 lists BMPs, along with unit amounts and costs to install each BMP, which may be used to restore beneficial uses.

Table D-4. Estimated BMP Installation Costs for the Hill Creek Subwatershed

Treatment Unit	Best Management Practice	Unit Type	Unit Cost	Unit Amount	Total Funds
TU1 Stream Corridors & Riparian Areas	Channel Vegetation	ac	$2,100	15	$31,500
	Conservation Cover	ac	$60	15	$900
	Critical Area Planting	ac	$250	9	$2,250
	Fence, 4-wire	ft	$2	1,284	$2,568
	Heavy Use Area Protection	ac	$50	2	$100
	Pest Management	ac	$20	30	$600
	Prescribed Grazing	ac	$5	60	$300
	Riparian Forest Buffer	ac	$185	15	$2,775
	Stream Bank Protection	ft	$20	129	$2,580
	Stream Channel Stabilization	ft	$35	65	$2,275
	Tree/Shrub Establishment	ac	$290	12	$3,480
	Use Exclusion (Riparian)	ac	$100	15	$1,500
				Subtotal	$50,828
TU2 Non-Irrigated Hay, Pasture, & Crop Lands	Contour Farming	ac	$3	687	$2,061
	Conservation Crop Rotation	ac	$2	687	$1,374
	Field Border	ac	$88	137	$12,091
	Critical Area Planting	ac	$200	46	$9,200
	Deep Tillage	ac	$16	687	$10,992
	Drip Irrigation	ea	$2	690	$1,173
	Irrigation Water Management	ac	$1	192	$192
	Nutrient Management	ac	$3	916	$2,748
	Pasture & Hayland Planting	ac	$100	458	$45,800
	Pest Management	ac	$20	229	$4,580
	Residue Management	ac	$20	458	$9,160
	Terrace	ft	$2	2,088	$4,176
	Water & Sediment Control Basin	ea	$800	19	$15,200
	Windbreak/Shelterbelt	ft	$4	2,300	$9,200
				Subtotal	$127,947
TU3 Range Lands	Brush Management	ac	$30	5	$150
	Fence, 4-wire	ft	$2	743	$1,486
	Pest Management	ac	$20	3	$60
	Pipeline, PE 100 psi, 2.0"	ft	$2	693	$1,386
	Prescribed Grazing	ac	$3	1	$3
	Pumping plant for water control	ea	$5,000	1	$5,000
	Range Planting	ac	$80	11	$880
	Spring Development	ea	$2,400	1	$2,400
	Structure For Water Control	ea	$3,000	1	$3,000
	Water Well	ea	$8,250	1	$8,250
	Watering Facility	ea	$1,150	1	$1,150
				Subtotal	$23,765
TU4 Animal Facilities	Corral Fence	ft	$15	1,500	$22,500
	Nutrient Management	ac	$3	20	$60
	Pipeline	ft	$2	1,000	$2,000
	Pumping Plant for water Facility	ea	$3,000	1	$3,000
	Water Well	ea	$8,250	1	$8,250
	Waste Storage Facility	ea	$20,000	1	$20,000
				Subtotal	$55,810
				Total	$258,350

APPENDIX E – Indian Mill Creek Subwatershed Agricultural TMDL Implementation Plan

Subwatershed Setting

The Indian Mill Creek subwatershed covers approximately 2,362 acres, or 4 square miles, in the northern portion of the Daniels watershed, which is in the western part of the Lower Bear-Malad subbasin as shown in Figure E-1. There are 770 acres of private land in the subwatershed. Non-irrigated hay, pasture, and crop land is the major private land use in the watershed at 33% of the acres shown in Table E-1. There are 1,592 acres governed by the CTNF, IDL, and BLM in the subwatershed.

Indian Mill Creek subwatershed is bounded on the east by Bannock Range, to the west by the Deep Creek Range and to the north by Wrights Creek. Indian Mill Creek's climate is dry summers followed by cold, moist winters with most of the precipitation occurring from October to May in the form of snow. Average annual precipitation measures 15 inches at the basin floor to 24 inches in the higher elevations. Elevations range from 8,660 feet to 5,400 feet at the valley floor.

Table E-1. Private Land Uses in the Indian Mill Creek Subwatershed

Land Use	Acres	Percent of Total
Hay, Pasture, & Crop Land	457	59%
Range Land	282	37%
Riparian	26	3%
Road	5	1%
Total	770	100%

Problem Statement

Identified Problems

The Oneida SWCD identified stream bank modifications, over utilized pastures, sheet and rill erosion, classic and ephemeral gully erosion, and stream bank erosion as problems in the watershed. Critical erosion periods are spring runoff, spring rains and summer thunderstorms (Oneida SWCD, 2005). Table E-2 shows identified riparian problems from two reaches assessed on Indian Mill Creek.

Table E-2. Identified Problems on Assessed Reaches on Indian Mill Creek

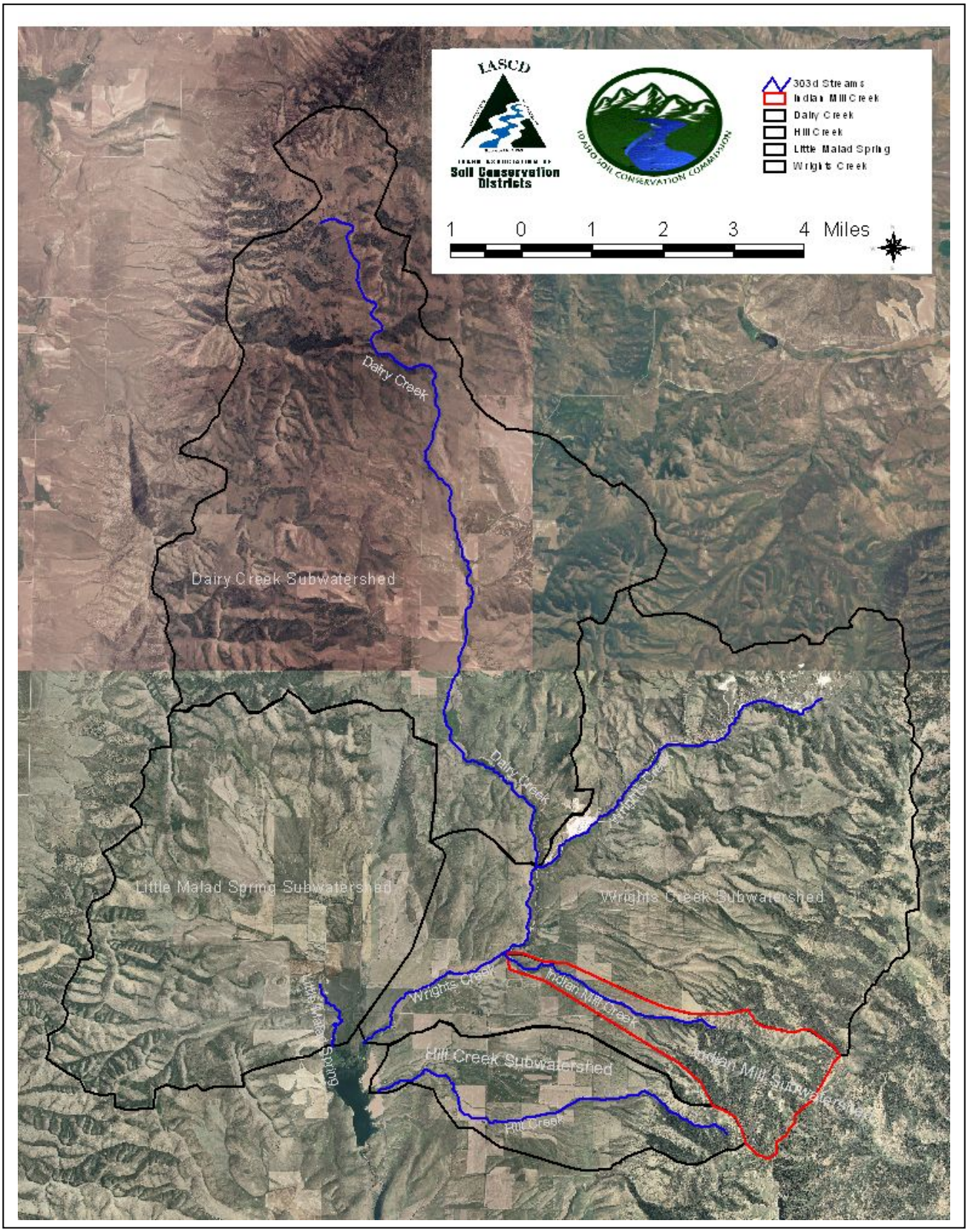
Description	IM 1	IM 2
Channel Condition		
Hydrologic Alteration		X
Riparian Zone		
Bank Stability		
Fish Barriers	X	X
Manure Presence	X	X

(X) Indicates a SVAP rating of less than 7

Pollutants of Concern

The subbasin assessment for the Indian Mill Creek specified that sediment and nutrients are pollutants of concern in the subwatershed (IDEQ 2002).

Figure E-1. Indian Mill Creek in the Daniels Watershed



Proposed Treatment

The subwatershed is divided into four treatment units (Table E-3) that have similar land uses, soils, productivity, resource concerns and treatment needs (Table E-4).

Table E-3. Treatment Units in the Indian Mill Subwatershed

Subwatershed	TU1 Stream Corridor & Riparian Areas	TU2 Non-Irrigated Hay, Pasture, & Crop Lands	TU3 Range Lands	TU4 Animal Facilities
Wrights Creek	26	457	287	0

Table E-4. Treatment Units with Soil Types

Treatment Unit (TU1) Stream Channels and Riparian Areas		Resource Problems
26 Acres	Hondoho-Hymas-Pavohroo Assoc., 30-60 percent Hondoho-Ridgecrest-Hades, 15-50 percent These soils formed on flood plains and terraces and are poorly drained with flooding occasional parent material is mixed and clayey alluvium with no restrictive layers	Unstable and erosive stream bed and banks Dewatered stream reaches Lack of riparian vegetation diversity and density Barriers to fish migration and movement
Treatment Unit (TU2) Non-Irrigated Hay, Pasture, & Crop Lands		**Resource Problems**
457 Acres	Arbone-Hondoho-Cedar Hill Complex, 4-12 percent Ririe-Iphil-Rexburg Complex, 4-12 percent Hondoho-Hymas-Pavohroo Assoc., 30-60 percent These soils formed on foot slopes, fan and stream terraces they are well drained to poorly drained with no flooding, parent material is alluvium and clayey alluvium with some loess with no restrictive layers	Accelerated sheet and rill or gully erosion
Treatment Unit (TU3) Range Lands		**Resource Problems**
287 Acres	Hondoho-Ridgecrest-Hades, 15-50 percent Arbone-Hondoho-Cedar Hill Complex, 4-12 percent Hondoho-Hymas-Pavohroo Assoc., 30-60 percent These soils formed on hill shoulders they are well drained with no flooding, parent material is residuum and colluvium from sandstone, quartzite and dolomite with restrictive layers of bedrock at 20 to 40 inches	Accelerated sheet and rill or gully erosion Over utilized range lands

Estimated BMP Implementation Costs

Conservation efforts in the subwatershed have demonstrated that landowners will install BMPs when technical and financial assistance is available. Table E-5 lists the BMPs, along with unit amounts and costs to install each BMP, which maybe used to restore beneficial uses in Indian Mill Creek.

Table E-5. Estimated BMP Installation Costs for the Indian Mill Creek Subwatershed

Treatment Unit	Best Management Practice	Unit Type	Unit Cost	Unit Amount	Total Funds
TU1 Stream Corridors & Riparian Areas	Channel Vegetation	ac	$2,100	7	$14,700
	Conservation Cover	ac	$60	7	$420
	Critical Area Planting	ac	$250	4	$1,000
	Fence, 4-wire	ft	$2	13	$26
	Heavy Use Area Protection	ac	$50	1	$50
	Pest Management	ac	$20	13	$260
	Prescribed Grazing	ac	$5	26	$130
	Riparian Forest Buffer	ac	$185	7	$1,295
	Stream Bank Protection	ft	$20	25	$500
	Stream Channel Stabilization	ft	$35	15	$525
	Tree/Shrub Establishment	ac	$290	5	$1,450
	Use Exclusion (Riparian)	ac	$100	7	$700
				Subtotal	$21,056
TU2 Non-Irrigated Hay, Pasture, & Crop Lands	Contour Farming	ac	$3	343	$1,029
	Conservation Crop Rotation	ac	$2	343	$686
	Field Border	ac	$88	23	$2,024
	Critical Area Planting	ac	$200	23	$4,600
	Deep Tillage	ac	$16	343	$5,488
	Drip Irrigation	ea	$2	690	$1,173
	Irrigation Water Management	ac	$1	192	$192
	Nutrient Management	ac	$3	457	$1,371
	Pasture & Hayland Planting	ac	$100	229	$22,850
	Pest Management	ac	$20	114	$2,280
	Residue Management	ac	$20	229	$4,580
	Terrace	ft	$2	1,054	$2,108
	Water & Sediment Control Basin	ea	$800	19	$15,200
	Windbreak/Shelterbelt	ft	$4	2,300	$9,200
				Subtotal	$72,781
TU3 Range Lands	Brush Management	ac	$30	72	$2,160
	Fence, 4-wire	ft	$2	192	$384
	Pest Management	ac	$20	44	$880
	Pipeline, PE 100 psi, 2.0"	ft	$2	9,471	$18,942
	Prescribed Grazing	ac	$3	14	$42
	Pumping plant for water control	ea	$5,000	1	$5,000
	Range Planting	ac	$80	144	$11,520
	Spring Development	ea	$2,400	1	$2,400
	Structure For Water Control	ea	$3,000	1	$3,000
	Water Well	ea	$8,250	1	$8,250
	Watering Facility	ea	$1,150	2	$2,300
				Subtotal	$54,878
TU4 Animal Facilities	Corral Fence	ft	$15	0	$0
	Nutrient Management	ac	$3	0	$0
	Pipeline	ft	$2	0	$0
	Pumping Plant for water Facility	ea	$3,000	0	$0
	Water Well	ea	$8,250	0	$0
	Waste Storage Facility	ea	$20,000	0	$0
				Subtotal	$0
				Total	$148,715