Weiser River Subbasin

Total Maximum Daily Load

Implementation Plan for Agriculture

Developed for the Idaho Department of Environmental Quality
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Introduction

The process and preparation of the Weiser River Watershed Subbasin Assessment and Total Maximum Daily Load (TMDL) was contentious. In the earliest phase of the TMDL process, the local stakeholders and members of the Weiser River Watershed Advisory Group (WAG) experienced extreme frustration with the presentation of data and information from the Idaho Department of Environmental Quality (IDEQ). The local landowners' knowledge and history in the area was not being used to help develop the TMDL targets in their watershed. Water quality data submitted to IDEQ by other agencies and organizations was not initially readily accepted and incorporated into the TMDL. Much of the data presented by IDEQ to establish targets fell short of the WAG members' expectations of quality assurance. In short, the Weiser River TMDL did not start off on the right foot.

The disagreements between the WAG and IDEQ ultimately led to proposed legislation from Legislative District 9 to empower WAGs with approval authority over TMDL data. The legislation came in the form of House Bill No. 544 during the 57th Idaho Legislature in February 2004. The Bill passed the House and Senate before being vetoed by the Governor. A similar bill (House Bill No. 145) with greater emphasis on WAG participation and review of TMDLs was eventually passed during the 2005 legislative session.

In the end, the message from the Weiser subbasin stakeholders was clear: successful TMDLs require successful partnerships between IDEQ and the local WAG. It's a credit to the residents of the watershed that many of the original WAG members, stakeholders, and participants did not turn their backs on the process, but rather remain a vital part of the WAG to help foster implementation.

Ultimately as a result of this intense scrutiny, the Weiser River Watershed Subbasin Assessment (SBA) and TMDL completed by IDEQ and approved by the Environmental Protection Agency (EPA) is thorough and comprehensive. Public involvement via the WAG process was critical to achieving this result.

PURPOSE

The Weiser River TMDL Implementation Plan for Agriculture outlines an adaptive management approach for implementation of Best Management Practices (BMPs) on agricultural lands. The purpose of this plan is to initiate a focused effort toward achieving the water quality targets established in the Weiser River Watershed SBA and TMDL and associated addendums.

GOALS AND OBJECTIVES

The goal of this plan is to provide a strategy for agriculture to assist and/or complement other watershed efforts to improve water quality in the Weiser River subbasin (Figure 1, delineated in yellow). The ultimate objective is to restore and protect the beneficial uses for water quality impaired streams in the Weiser River subbasin (HUC 17050124) by reducing the amount of pollutants entering the identified impaired water bodies from non-

point agricultural sources. Agricultural pollutant reductions will be achieved by on-farm conservation planning with individual operators and implementation of BMPs in critical areas.

This implementation plan will provide guidance to the Weiser River and Adams Soil Conservation Districts (as well as agricultural producers in the Weiser River subbasin) to implement agricultural BMPs necessary and appropriate to help achieve the TMDL targets established in the Weiser River Watershed SBA and associated addendums.

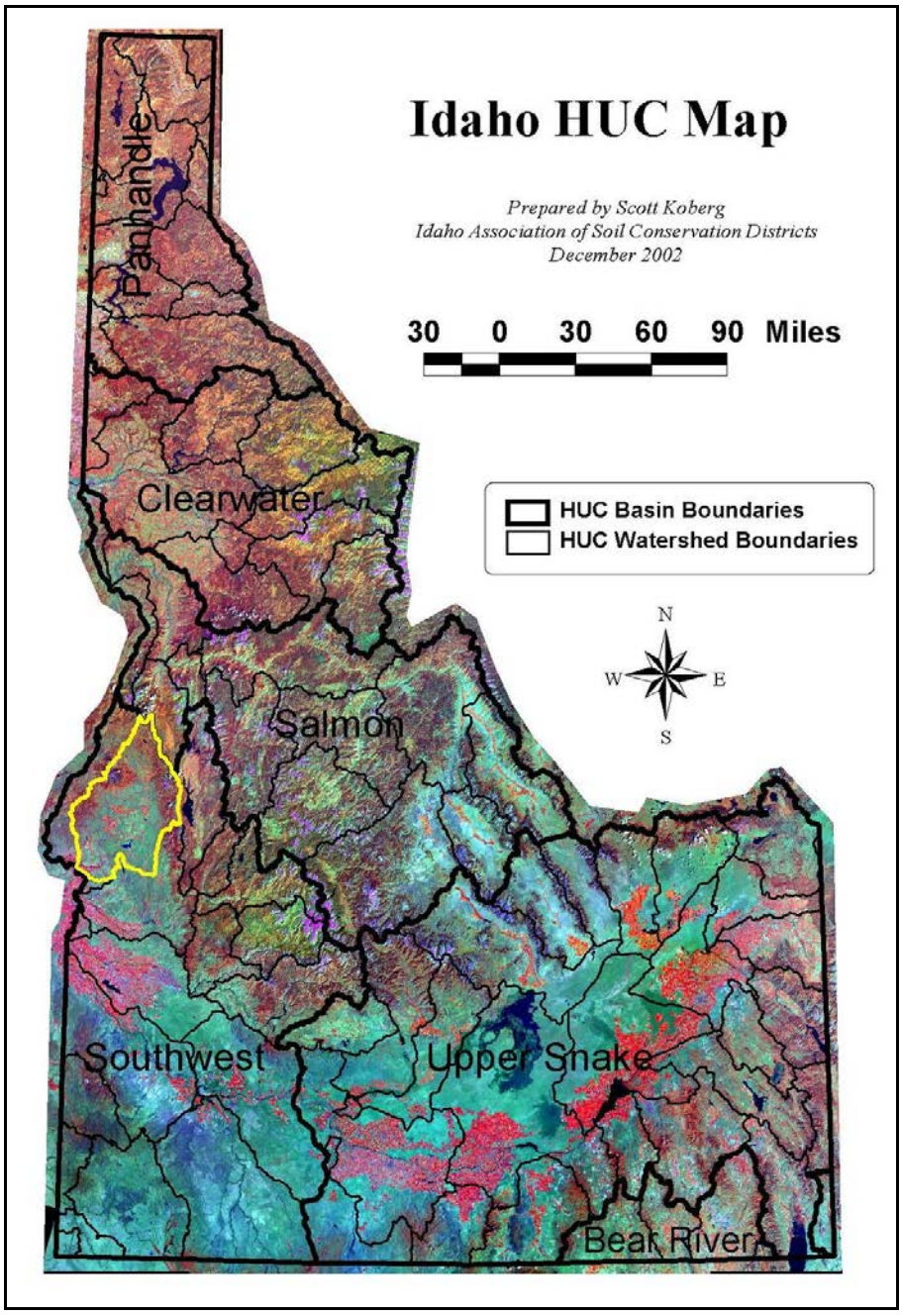

Figure1. Weiser River Subbasin Location

WATER QUALITY IMPAIRMENT SUMMARY

The water quality impaired stream segments for which TMDLs were completed and for which pollutant reduction targets were established are identified in the Weiser River Watershed SBA-TMDL (Ingham, 2006) and summarized in Table 1. As a result of the findings in the Crane Creek Reservoir Reconnaissance Report (IDEQ, 2008) "[Crane Creek Reservoir] appears to be in full compliance with Idaho's water quality standards." Therefore, it will be excluded from the list of impaired stream segments in this implementation plan.

Additionally, it should be noted that the "watershed approach" utilized in the Weiser River Subbasin Temperature TMDL (IDEQ, 2006) includes potential shade targets for several stream segments that are not identified as impaired on the 303(d) list. Similarly, the phosphorus TMDL addendum identified targets for several tributaries to the Weiser River that remain unlisted. These segments are not included in Table 1, but are addressed separately in the *Temperature TMDL Inventory and Implementation Priority* section of this implementation plan.

Table 1. Weiser River Subbasin Impaired Stream Segments

Water body	Listed Pollutants
Weiser River (Galloway Dam to Snake River)	Sediment Bacteria Total Phosphorus Temperature
Weiser River (Little Weiser River to Galloway Dam)	Sediment Total Phosphorus Temperature
Crane Creek (Crane Creek Reservoir to Weiser River)	Sediment Bacteria Total Phosphorus Temperature
Little Weiser River (Indian Valley to Weiser River)	Sediment Bacteria Total Phosphorus Temperature
North Crane Creek (Headwaters to Crane Creek Reservoir)	Temperature

With the exception of the temperature TMDL addendum, the SBA-TMDL indicates that non-point source pollutant loading to the impaired segments originates from the land areas in the southern portion of the subbasin. In fact, all other originally 303(d) listed segments within the upper portion of the subbasin were recommended for de-listing by IDEQ due to lack of evidence to support beneficial use impairment (Figure 2).

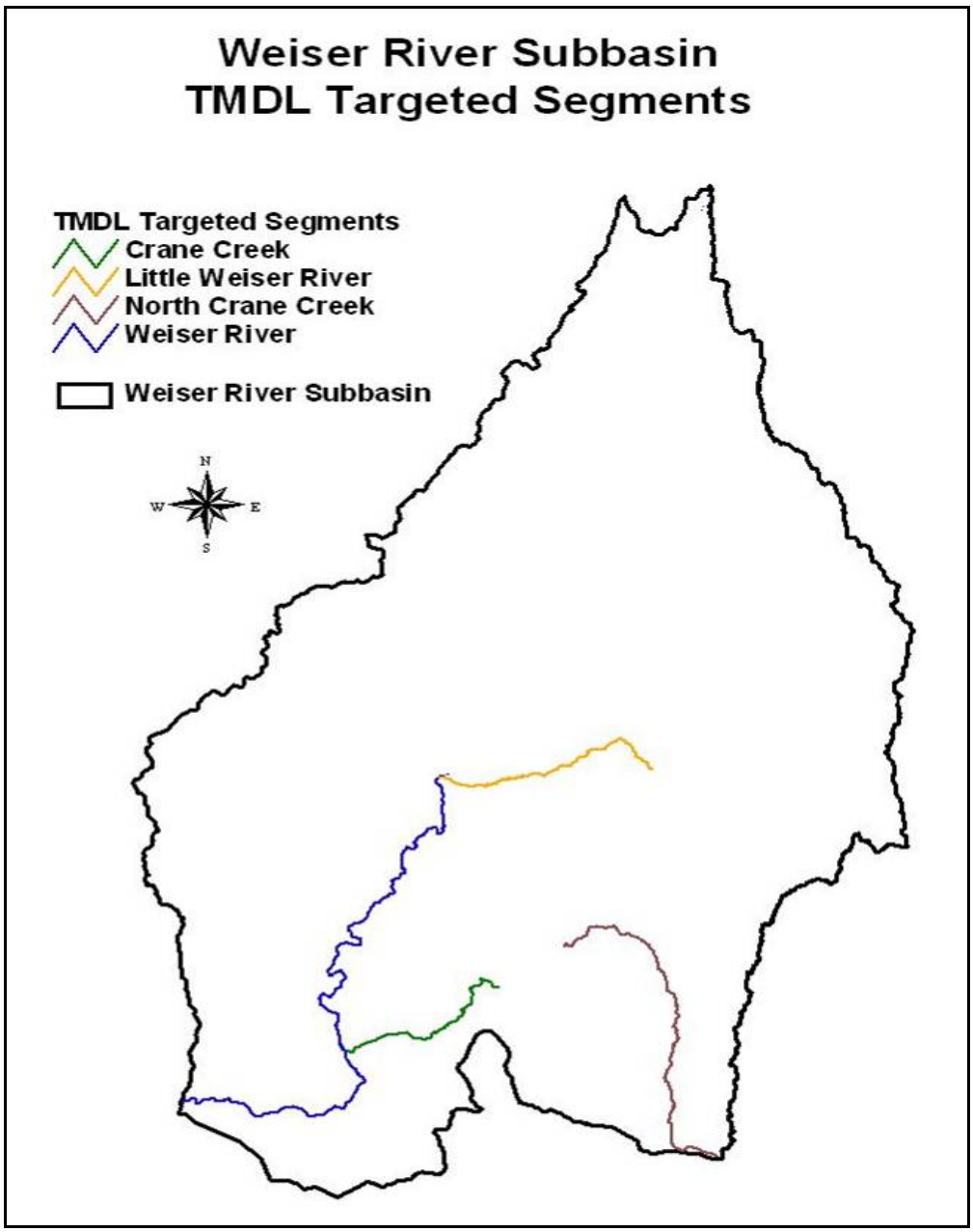

Figure 2. Weiser River Subbasin TMDL Targeted Segments

Background

In addition to the subbasin setting information included here, extensive information and discussion regarding Weiser River subbasin characteristics including hydrology, geology, topography, soils, and vegetation is located on pages 9 through 33 of the Weiser River Watershed SBA-TMDL.

PROJECT SETTING

The Weiser River subbasin 8-Digit Hydrologic Unit Code (HUC 17050124) is located in Idaho's Southwest Basin. The Weiser River, along with several of its tributaries, flows in a southwesterly direction toward its confluence with the Snake River near the town of Weiser.

ELEVATION

Elevations within the subbasin range from 2,100 feet in the southwestern portion at the confluence of the Weiser River and the Snake River, to over 8,000 feet in the mountainous east-central portion. Council Mountain (the highest point in the subbasin) is 8,107 feet, while most of the land in the subbasin lies between 2,500 and 4,000 feet elevation. This land is comprised primarily of agricultural valleys, foothills, benches, and relatively flat terraces.

CLIMATE AND PRECIPITATION

While the climate in the valleys is typically defined by hot, dry summers and cool, wet winters, temperatures and precipitation vary widely throughout the subbasin. Although the majority of the land area within the subbasin falls within an average annual precipitation range of 20-30 inches, the average precipitation range in the high and mountainous elevations of the subbasin is 40-60 inches annually. Much of that falls in the form of snow. In the low-lying valleys where the majority of agricultural activities take place, annual precipitation can average as little as 10 inches.

Ambient air temperatures can vary widely across the subbasin also, however, average annual temperature data from the three weather-monitoring stations within the subbasin provide the best characterization of seasonal temperatures in the predominantly agricultural areas (Table 2).

Table 2. Weiser River Subbbasin Air Temperature Data (Ingham, 2006)

Climate Parameter	**Weiser, Idaho Elev.: 2,110 feet Station Number: 109638**	**Cambridge, Idaho Elev.: 2,650 feet Station Number: 101408**	**Council, Idaho Elev.: 3,150 feet Station Number: 102187**
Avg. Max. Temp. (°C / °F)	17.9 / 64.3	16.9 / 62.4	16.1 / 61.9
Avg. Min. Temp. (°C / °F)	2.3 / 36.1	0.8 / 33.5	1.6 / 35.0
Avg. Max. Temp. (June-August) (°C / °F)	31.4 / 88.5	31.1 / 88.0	30.5 / 86.9
Avg. Min. Temp. (Dec-February) (°C / °F)	-6.2 / 20.9	-8.7 / 16.4	-7.8 / 18.0

COMMON RESOURCE AREAS (CRA)

Within the Weiser River subbasin, geographical areas that exhibit similar landscape conditions, soils, climate, human considerations, and other natural resource information have been categorized into Common Resource Areas (CRA). These areas are considered to have similar resource concerns, problems, and treatment needs. The CRA categorization within the Weiser River subbasin was completed by the USDA-Natural Resources Conservation Service (NRCS) and includes eight separate CRA classes and their associated class descriptions (Figure 3). A complete CRA report can be found at: ftp:\\ftfpc.egov.usda.gov/ID/technical/pdffiles/IdahoCRAReport.pdf.

In reference to the class descriptions listed below, the majority of acreage in agricultural production falls within three of the CRA classes: 1) Central Rocky and Blue Mountain Foothills – Semiarid Foothills, 2) Snake River Plains – Treasure Valley, and 3) Snake River Plains – Dry Unwooded Alkaline Foothills.

10.1: Central Rocky and Blue Mountain Foothills - Warm Dry Blue and Seven Devils Mountain Foothills

This unit lies between Oregon's Blue and Wallowa Mountains and the northwestern Snake River Plain. This unit is characterized by rangeland soils on hills and mountains associated with basalt and exposed tuffaceous sediments. The combined masses of the Cascade Range and the Blue and Wallowa Mountains block any maritime influence, creating a continental climate. As a result, plants are subject to wide temperature ranges, high evaporation and transpiration, and high early-season moisture stress. The dominant soils are Brogan, Simas, Ruckles and Ruclick soil series. Temperature regime is mesic and the moisture regime is aridic. Mean annual precipitation is 9 to 12 inches. Vegetation is Wyoming big sage and bluebunch wheatgrass (warm day climate).

10.4: Central Rocky and Blue Mountain Foothills - Semiarid Foothills

The shrub- and grass-covered foothill unit is higher and more rugged than nearby CRA units. A few perennial streams flow across the unit but are absent on the lacustrine deposits of the Unwooded Alkaline Foothills CRA. Shallow, clayey soils are common and often support medusahead, wild rye, cheatgrass, and scattered shrubs. Wildfire frequency is high. Land use is primarily livestock grazing and is distinct from the irrigated agriculture of the Treasure Valley.

11.1: Snake River Plains - Treasure Valley

This unit is characterized by irrigated cropland, pastureland, and rapidly growing cities, suburbs, and industries. Many canals, reservoirs, and diversions are present. Aridic soils predominate and require irrigation to grow commercial crops. Surface water quality has been significantly affected by channel alteration, dams, irrigation return flow, and urban, industrial, and agricultural pollution. Crops include wheat, barley, alfalfa, sugar beets, potatoes, and beans. Crop diversity is greater, temperatures are warmer, and the mean frost free season is longer than in other CRA units. Population density is much greater than in nearby, rangeland-dominated units.

11.7: Snake River Plains - Dry Unwooded Alkaline Foothills

The shrub- and grass-covered foothill unit is higher and more rugged than adjacent valley CRAs. Alkaline lacustrine terrace deposits characterize the soil and support a unique flora. Shallow and moderately deep soils over cemented pans are common. Potential natural vegetation is saltbush-greasewood and sagebrush steppe. Today, cheatgrass and crested wheatgrass are also common and the unit is used for livestock grazing. The soil temperature regime is mesic and the soil moisture regime is aridic.

43B.8: Central Rocky Mountains--Southern Forested Mountains

The Southern Forested Mountains ecoregion is mantled by droughty soils derived from granitic rocks and is only marginally affected by maritime influence. Open Douglas-fir is common, grand fir and subalpine fir occur at higher elevations, and ponderosa pine grows in canyons. Mountain sagebrush and forest are found in the south. Streams are subject to high sediment loading when soils are disturbed.

43C.3: Blue and Seven Devils Mountains - High Elevation Blue and Seven Devils Mountain Forests

This unit is characterized by forested plateaus having cryic temperatures. These areas characteristically have deep snowpack, and a very short growing season. Moisture regime is udic. Vegetation is dominated by subalpine fir, Engelmann spruce, and western larch. Streams follow fault lines, have steep gradients and have eroded deep canyons. Land uses include grazing, logging, recreation, and wildlife habitat.

43C.6 : Blue and Seven Devils Mountains - Melange

This unit is characterized by a melange of bedrock types including limestone, mudstone, greenstone and schists. Soil temperature regimes are frigid and cryic and moisture regimes are xeric and udic. Forests dominated by Douglas-fir, ponderosa pine, and lodgepole pine, and shrublands and grasslands also occur. Lithology affects soil, vegetation, and the quantity and quality of surficial water. Grazing is common but logging is limited by the difficulty of reforesting droughty soils.

43C.8 : Blue and Seven Devils Mountains - Blue and Seven Devils Mountains Dissected Uplands

This unit is characterized by deeply dissected forested mountain slopes. Temperature regime is frigid and the moisture regime is xeric. Vegetation is grand fir, Douglas-fir and ponderosa pine. The soils on the north facing slopes retain an ash mantle but south facing slopes lack this mantle due to erosion. Below about 4,500 feet elevation, the Douglas-fir forest changes abruptly to grassland of the Warm Canyons and Dissected Uplands CRA.

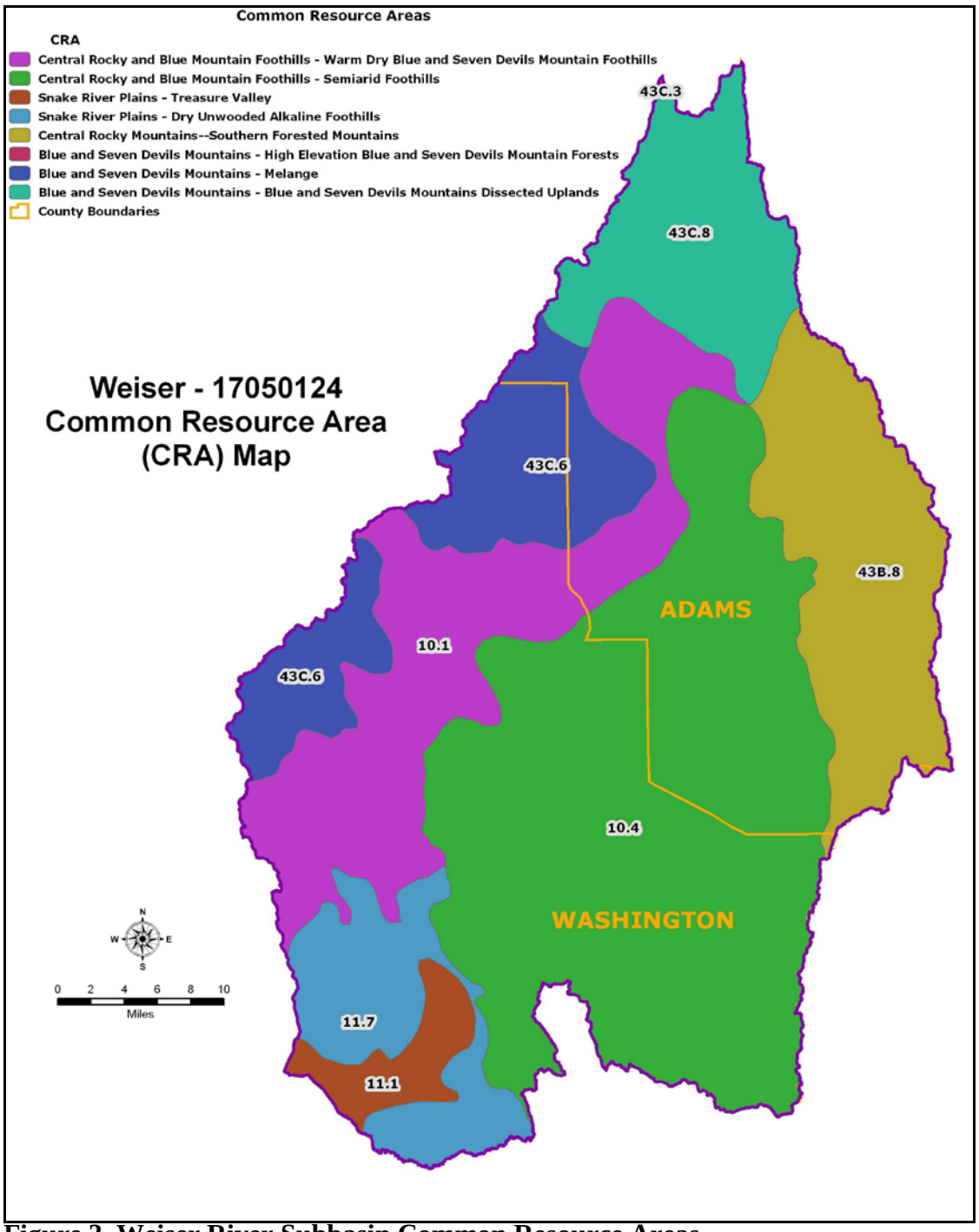

Figure 3. Weiser River Subbasin Common Resource Areas

COUNTIES AND COMMUNITIES

The Weiser River subbasin consists of approximately 1,079,143 acres and includes all or part of the established communities of Weiser, Midvale, Cambridge, and Council as well as several associated rural agricultural areas. Portions of two counties fall within the Weiser River subbasin boundary. Washington County on the southern end accounts for three of the communities (Weiser, Midvale, and Cambridge) and approximately fifty-seven percent of the total subbasin acreage. Forty-three percent of the subbasin is in Adams County, which includes the community of Council (Figure 4).

The county boundaries are also consistent with the Soil Conservation District (SCD) boundaries. While Adams County residents are served by the Adams SCD, the SCD that serves Washington County residents is referred to as the Weiser River SCD.

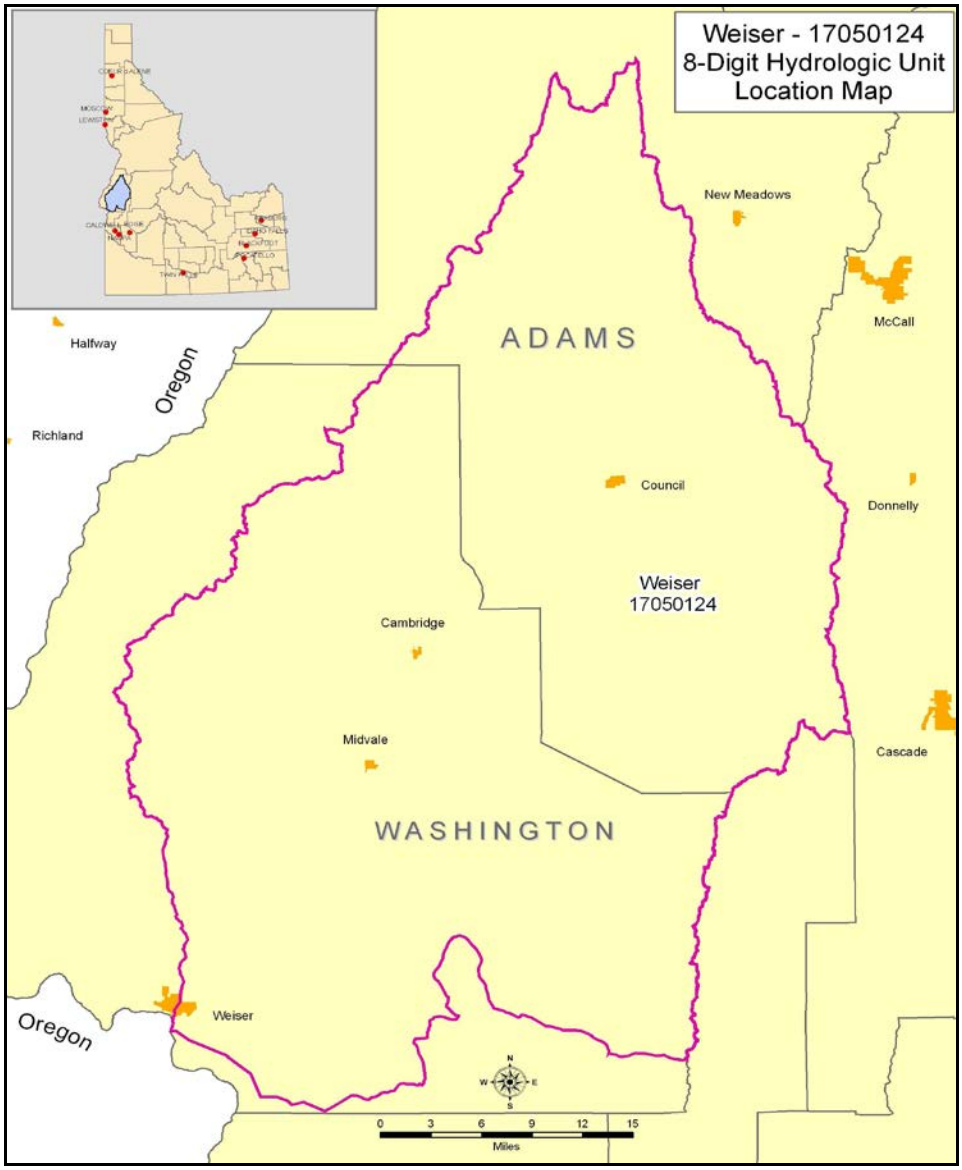

Figure 4. Weiser River Subbasin Counties and Communities

LAND OWNERSHIP AND LAND USE

Land ownership within the Weiser River subbasin is divided almost equally between private and public lands. Of the approximately 1,079,143 acres within the subbassin 541,854 acres (50.2%) is privately owned, while 533,799 acres (49.5%) fall under public ownership (Table 3).

The majority of the publicly owned land consists of U.S. Forest Service (USFS) land in the mountainous areas that surround the western, northern, and eastern portions of the subbasin. The land owned by the Bureau of Land Management (BLM) consists mostly of rangeland near the outer reaches of the valleys and foothills. Private landownership consists primarily of the private rangeland and irrigated agricultural lands adjacent to the water bodies and drainages in the central portion of the subbasin (Figure 5).

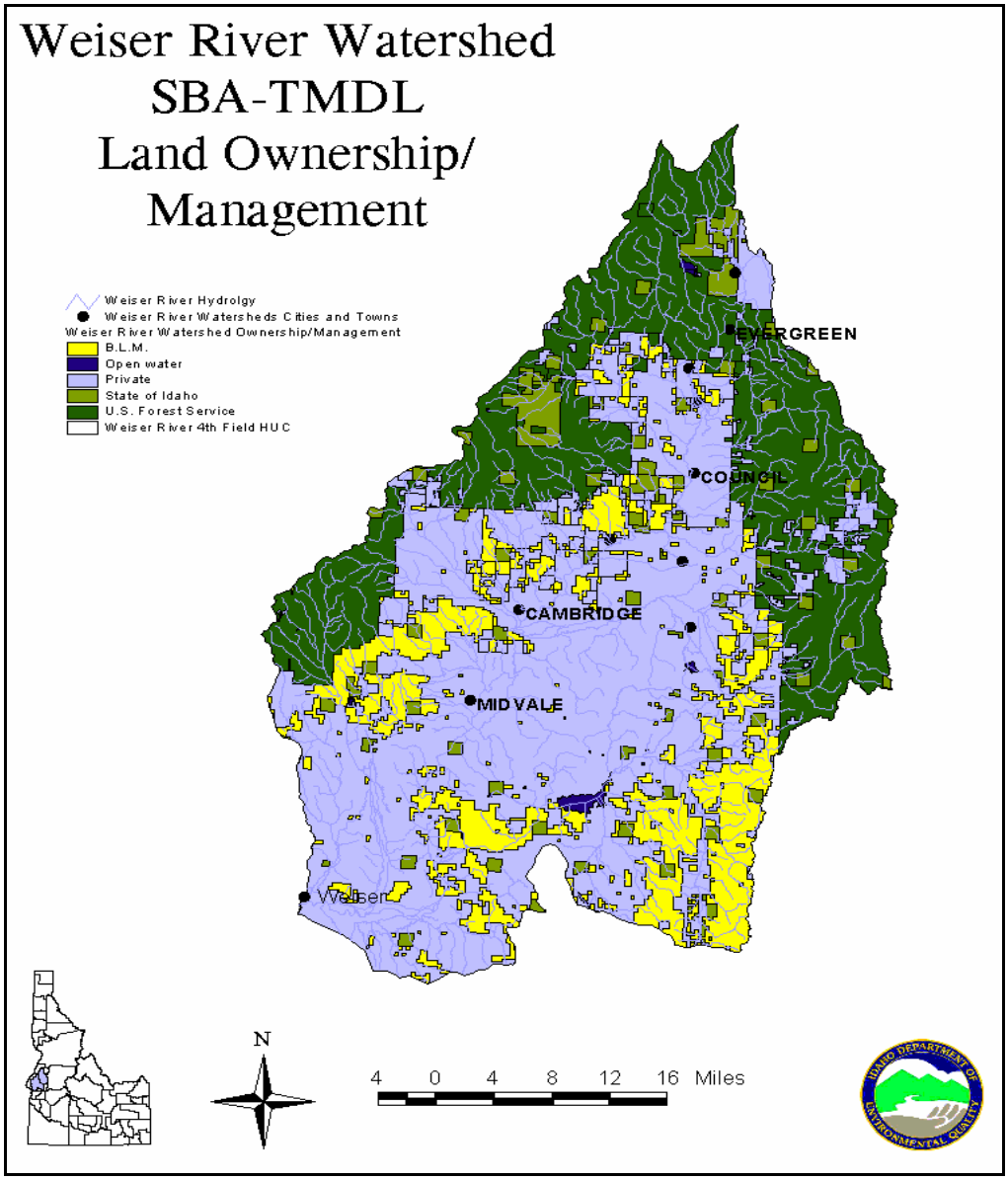

Figure 5. Ownership/Land Management, Weiser River Watershed (Ingham 2006).

Table 3. Land Ownership/Management, Weiser River Watershed (Ingham 2006).

Owner/Manger	Total Acres	Percent of Total
Private Holdings	541,854	50.2%
U.S. Forest Service	308,406	28.6%
Bureau of Land Management	164,259	15.2%
State of Idaho	61,134	5.7%
Open Water	3,490	0.3%
Total	**1,079,143**	**100%**

Table 4 and Figure 6 focus on land use within the Weiser River subbasin downstream from the Little Weiser River, as well as the subwatershed of the Little Weiser River. This is the area of the subbasin which contains 303(d) listed streams. Therefore, the following land use table and figure do not show the entire subbasin. This is an initial step toward implementation prioritization within the subbasin. With the exception of the upper portion of the Little Weiser River subwatershed in Adams County near Indian Valley, the main priority area for BMP implementation on private agricultural lands is located within the Weiser River Soil Conservation District in Washington County.

Table 4. Non-point Source Assessment Area Land Use (Ingham 2006).

5th Field HUC	Dryland (acres)	Gravity Irrigated (acres)	Sprinkler Irrigated (acres)	Rangeland (acres)	Forest (acres)	Urban (acres)	Open Water (acres)
Monroe-Mann		5,789	1,741	20,587		580	41
Weiser Cove	174	5,873	2,826	58,034			
Sage		483		20,537	500		
Lower Crane		1,000	903	30,263			1
Keithly	248	6,744	2,702	34,629		1	
Pine		5,262	257	25,488	3,005		
Crane Creek Reservoir	47	222	2,996	49,246			1,507
Big Flats		1,676	71	42,010			
Soulen	198	697	752	29,403			
Cove Creek	1,600	130	285				
Little Weiser		7,368	365	39,868			221
Total	**2,267**	**35,244**	**12,898**	**350,065**	**3,505**	**581**	**1,770**

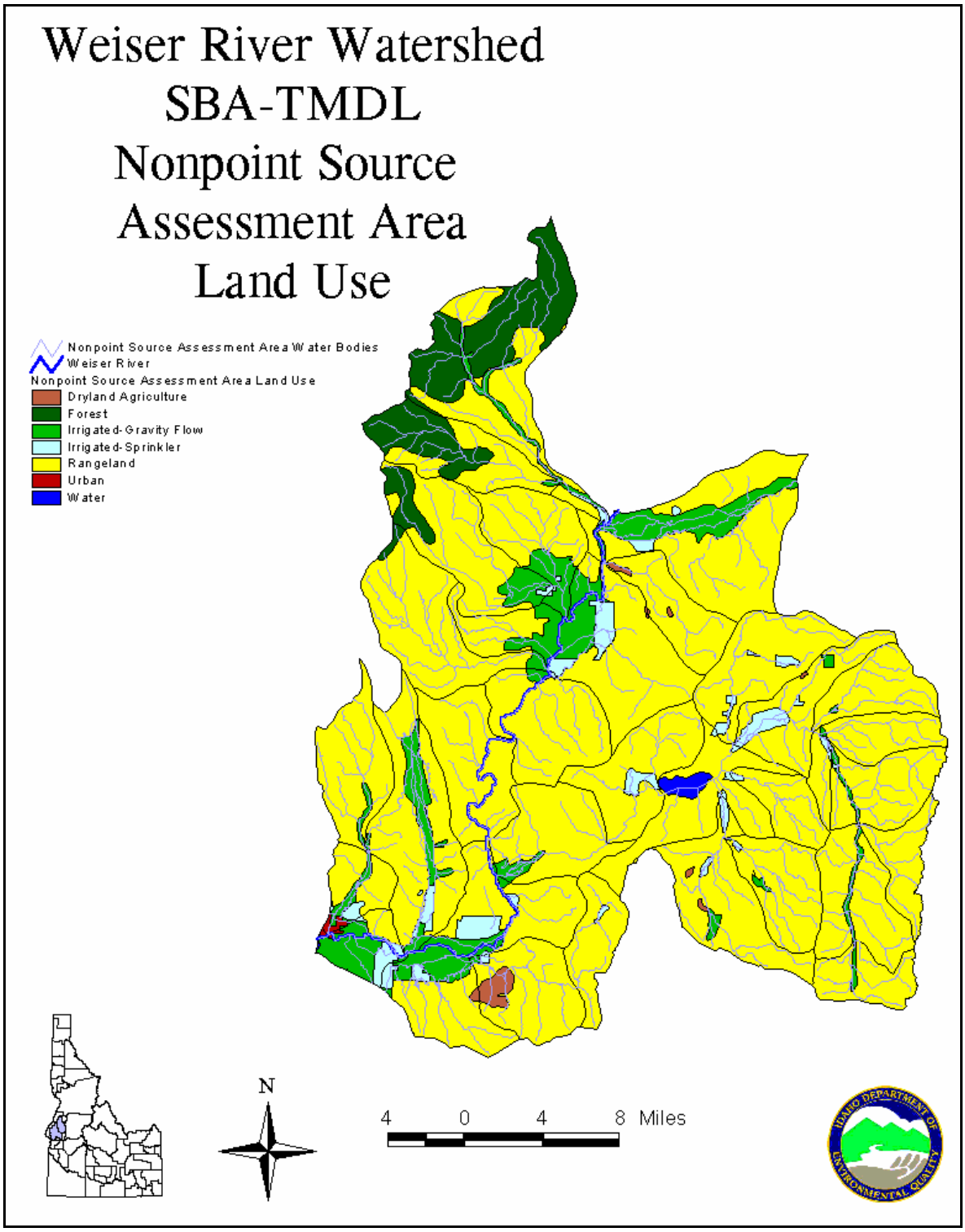

Figure 6. Non-Point Source Assessment Area Land Use (Ingham 2006)

CONSERVATION ACCOMPLISHMENTS

There have been several coordinated efforts initiated by the Weiser River SCD and NRCS to improve surface and ground water quality conditions within the subbasin. Among the most recent efforts and studies are the following:

- Southern Washington County Water Quality Project Preliminary Investigation (NRCS 2000)
- Section 319 Ground Water BMP Implementation Project including Scott Creek/Mann Creek Management Area (Boyle 2002)
- Weiser Area Ground Water Quality Management Plan (IDEQ 2003)
- Weiser Water Quality Protection Project (Weiser SCD 2004)
- Southern Washington County Water Quality Project (NRCS 2004)
- Weiser River Subbasin Rapid Watershed Assessment (ISCC/NRCS 2007)

As part of the TMDL process, the Weiser River SCD provided acreage estimates of BMP's implemented by drainage within the Weiser River subbasin. Most of the implemented BMPs were coordinated efforts between the landowner(s), Weiser River SCD, and NRCS. Funding for the projects was provided primarily by NRCS through Farm Bill programs or by IDEQ through the 319 program. The BMP summary provided by the Weiser River SCD is as follows:

Mainstem Weiser River	-19 contracts (6,449 total acres)
Little Weiser River Drainage	- 5 contracts (2,473 total acres)
Crane Creek Drainage	- 1 contract (266 total acres)

The above generalized summation provides a glimpse of the scope of past efforts. Table 5 displays more specific information regarding the best management practices installed from 2004 to 2008. This information is based on data from the NRCS Performance Results System (PRS) (http://ias.sc.egov.usda.gov/PRSHOME). Future surface water quality implementation efforts related to TMDL targets should be more focused and prioritized using the TMDL implementation strategies identified in this plan.

Table 5. Conservation Practices Installed in the Weiser River Subbasin

Practice Applied	Practice No.	Unit	2008	2007	2006	2005	2004	TOTAL
Channel Bank Vegetation	322	ac			1			**1**
Conservation Cover	327	ac	694					**694**
Conservation Completion Incentive	CCIA	no	2		1			**3**
Conservation Crop Rotation	328	ac	29			1,616	199	**1,645**
Diversion	362	ft	2,930					**2,930**
Fence	382	ft	20,034	5,247	12,965	6,033	23,856	**68,135**
Forage Harvest Management	511	ac	77	77	55	570	641	**1,420**
Forest Stand Improvement	666	ac	25		30			**55**
Irrigation Land Levelling	464	ac		38	89	58		**185**
Irrigation System Sprinkler	442	ac	30		248		6	**278**
Irrigation System, Surface & Subsurface	443	ac	2	106	2	182	5	**297**
Irrigation Water Conveyance, Corrugated Metal Pipeline	780	ft	199					**199**
Irrigation Water Conveyance, ditch and canal lining	428A	ft			757		192	**757**
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic	430dd	ft	5,948	2,285	3,390	9,211	1,150	**21,984**
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	430ee	ft			3,725	1,320	4,934	**5,045**
Irrigation Water Conveyance, Pipeline, Steel	430ff	ft	86		103	175		**364**
Irrigation Water Conveyance, Rigid Gated Pipeline	430hh	ft	1,860	4,110	2,610	8,150	6,350	**23,080**
Irrigation Water Management	449	ac	118		578	352	449	**1,497**
Land Smoothing	466	ac	20					**20**
Nutrient Management	590	ac	98				62	**98**
Pasture and Hay Planting	512	ac			126	48		**174**
Pest Management	595	ac	97	56	55	1,525	736	**2,469**
Pipeline	516	ft	4,053	1,300	155	10,299		**15,807**
Pond	378	no		7	1	3	1	**12**
Prescribed Grazing	528	ac	5,265	3,452	676	168		**9,561**
Prescribed Grazing	528A	ac				2,592	14,476	**2,592**
Pumping Plant	533	no	2	1	1	1		**5**
Range Planting	550	ac	15					**15**
Sediment Basin	350	no				1		**1**
Spring Development	574	no	4		1			**5**
Structure for Water Control	587	no	6	3	4	8	7	**28**
Tillage and Residue Management	329B	ac		77	525	507	180	**1,289**
Tree and Shrub Establishment	612	ac		30				**30**
Tree and Shrub Site Preparation	490	ac		30				**30**
Upland Wildlife Habitat Management	645	ac	12	3,452				**3,464**
Waste Storage Facility	313	no	3		2			**5**
Watering Facility	614	no	10	2	2	6		**20**
Water Well	642	no	1	2		1		**4**

Water Quality Problems

BENEFICIAL USE STATUS

Idaho water quality standards require that surface waters of the state be protected for beneficial uses. Beneficial uses can include existing uses, designated uses, and presumed existing uses. For a detailed explanation of these uses please refer to pages 51-52 of the Weiser River Watershed SBA-TMDL. Table 6 includes a summary of the water quality related designated beneficial uses for the water bodies in the Weiser River subbasin that received TMDL target allocations. Although North Crane Creek is an intermittent stream in which water quality data indicates full support of the existing use of secondary contact recreation, a temperature TMDL was developed for this segment.

Table 6. Weiser River Subbasin Impaired Stream Segment Beneficial Uses

Water Body	Boundaries	Beneficial Uses	Support Status
Weiser River	Galloway Dam to Snake River	Cold Water Aquatic Life Primary Contact Recreation Secondary Contact Recreation	Not supported Not supported Not supported
Weiser River	Little Weiser River to Galloway Dam	Cold Water Aquatic Life Primary Contact Recreation Secondary Contact Recreation	Not supported Fully supported Fully supported
Little Weiser River	Indian Valley to Weiser River	Cold Water Aquatic Life Primary Contact Recreation Secondary Contact Recreation	Not supported Not supported Not supported
Crane Creek	Crane Creek Res. to Weiser River	Cold Water Aquatic Life Primary Contact Recreation Secondary Contact Recreation	Not supported Not supported Not supported
North Crane Creek	Headwaters to Crane Creek Res.	Secondary Contact Recreation	Fully supported

SURFACE WATER POLLUTANTS AND WATER QUALITY TARGETS

The overall objective of the TMDL process is to achieve full support of designated or existing beneficial uses for impaired water bodies. In order to work toward this objective, target loads are developed for specific pollutants in the impaired water bodies. The targets used in the Weiser River SBA-TMDL for sediment, bacteria, and phosphorus are included in Table 7.

Table 7. Weiser River Subbasin TMDL Pollutant Targets

Pollutant	Water Bodies Affected	Selected Targets
Sediment	Weiser River (Galloway to Snake) Weiser River (Little Weiser to Galloway) Little Weiser River Crane Creek	1) Less than or equal to 50mg/L TSS for no more than 30days 2) Less than or equal to 80mg/L TSS for no more than 14 days 3) Substrate fines (<6.0 mm) not to exceed 30%
Bacteria	Weiser River (Galloway to Snake) Little Weiser River Crane Creek	Less than 126 E. coli cfu or mpn/100 ml as a 30 day log mean with a minimum of 5 samples and no sample greater than 406 E.coli cfu or mpn/100 ml
Phosphorus	Weiser River (Galloway to Snake) Weiser River (Little Weiser to Galloway) Little Weiser River Crane Creek	0.07 mg/L (May – September)

Sediment targets within the subbasin were established in response to perceived or measured impairments to cold water aquatic life. Bacteria targets were established in response to perceived or measured impairments to primary and/or secondary contact recreation.

While there was no beneficial use impairment related to phosphorus loading throughout the entire subbasin, the phosphorus target was derived from the Snake River-Hells Canyon TMDL to which the Weiser River is a tributary. In the Weiser River Total Phosphorus Allocations Addendum, the 0.07 mg/L phosphorus target has been applied to the water bodies listed in Table 7 in addition to several other non-303(d) listed tributaries to the Weiser River.

Temperature targets from the TMDL are not as straightforward as those for sediment, bacteria, and phosphorus. Accordingly, additional discussion regarding the temperature (PNV) targets is included in the Temperature TMDL Inventory and Implementation Priority section of this plan.

WATER QUALITY MONITORING

Several sources of water quality data were used in determining existing loads in the Weiser River SBA-TMDL. In addition to the Beneficial Use Reconnaissance Program (BURP) inventory and water quality data collected by IDEQ, data provided by the Idaho State Department of Agriculture (ISDA), U.S. Bureau of Reclamation (USBR), U.S. Geological Survey (USGS), U.S. Environmental Protection Agency (USEPA), and the Weiser River WAG were used by IDEQ during the SBA-TMDL process. For a complete

inventory of data, please refer to Appendices C and D (p. 295-358) of the Weiser River SBA-TMDL.

Two additional water quality analyses have been completed since approval of the SBA-TMDL by EPA. Both analyses were submitted to the Weiser River WAG in January 2008. The first is a report by ISDA entitled *Crane Reservoir and Crane Creek Water Quality Evaluation* and includes data collected by ISDA at three Crane Creek sites from April – October 2007 (ISDA 2007). The second is a report completed by IDEQ entitled *Crane Creek Reservoir Reconnaissance* and includes water quality samples collected from Crane Creek Reservoir from May through November 2007 (IDEQ 2007).

While the results of the IDEQ reconnaissance indicate full support of beneficial uses in Crane Creek Reservoir, the findings of the ISDA report indicate impairment to Crane Creek resulting from the reservoir. One conclusion of the ISDA report is, "Without TP reductions within the reservoir, there will never be a reduction in TP levels in Crane Creek. The high TP levels are solely driven by the poor quality of the reservoir's water."

GROUNDWATER POLLUTANTS

The Weiser area is ranked as the third nitrate priority area for Idaho (IDEQ 2008). Water samples from domestic wells show that nitrate levels often exceed the 5 mg/L and 10 mg/L targets. Only the southwestern portion of the Weiser River subbasin falls within the Weiser nitrate priority area. The Weiser Area Ground Water Quality Management Plan (IDEQ 2003) has been developed to address ground water quality concerns as they relate to agricultural non-point source pollution.

AGRICULTURAL NON-POINT SOURCES OF POLLUTION

In general, agricultural sources of sediment, phosphorus, and bacteria in receiving water bodies originate from surface irrigated cropland and pastures, animal feeding operations, livestock grazing on or near waterways, ditch maintenance activities, and other soil, water, and fertilizer management activities related to production agriculture. The conditions caused by these activities that can impair water quality include, but are not limited to the following:

1) Irrigation induced erosion
2) Pollutant mobilization, transport, and delivery
3) Streambank erosion
4) Riparian buffer encroachment (lack of adequate native vegetation)

As a result of the pollutant targets established for the Weiser River subbasin, reduction requirements have been developed for each 303(d) listed stream segment (Table 8). The percentage reductions are based on existing load data. Required reductions given in a range format are based on monthly variation in pollutant load. In order to work toward achieving these reductions, BMP implementation must occur in the agricultural community.

Table 8. Pollutant Reduction Targets for 303(d) Listed Stream Segments

Water Body	303(d) Listed Pollutants	Required Reduction to meet TMDL
Weiser River (Galloway to Snake)	Sediment (TSS)	8% - 11%
	Sediment (% fines)	28%
	Bacteria (*E. coli*)	90% (July)
	Phosphorus (TP)	26% - 69%
Weiser River (Little Weiser to Galloway)	Sediment (TSS)	11% - 45%
	Phosphorus (TP)	26% - 65%
Little Weiser River (Indian Valley to Weiser River)	Sediment (% fines)	N/A
	Bacteria (*E. coli*)	81% (July)
	Phosphorus (TP)	29% - 73%
Crane Creek (Reservoir to Weiser River)	Bacteria (*E. coli*)	83% (July)
	Phosphorus (TP)	64% - 73%

THREATENED AND ENDANGERED SPECIES

Bull trout (*Salvelinus confluentus*) are the only threatened species in the subbasin. The upper portion of the Weiser River subbasin (upstream from the Little Weiser River) has been identified as key bull trout watershed. Bull trout is a "listed threatened" species under the Endangered Species Act. Additionally, local bull trout populations have been identified in the upper Little Weiser River, the East Fork Weiser River, and upper Hornet Creek (Figure 7).

Agricultural conservation planning identified in this plan, particularly as it relates to the temperature TMDL targets, will be coordinated with other bull trout recovery and protection efforts in the subbasin to improve habitat and address any potential impacts from BMP implementation. Improvements in water quality, achieved from BMPs installed on agricultural lands, are not expected to adversely affect bull trout and should improve or enhance their habitat. Any BMP implementation that may potentially affect bull trout will follow Endangered Species Act (ESA) consultation requirements.

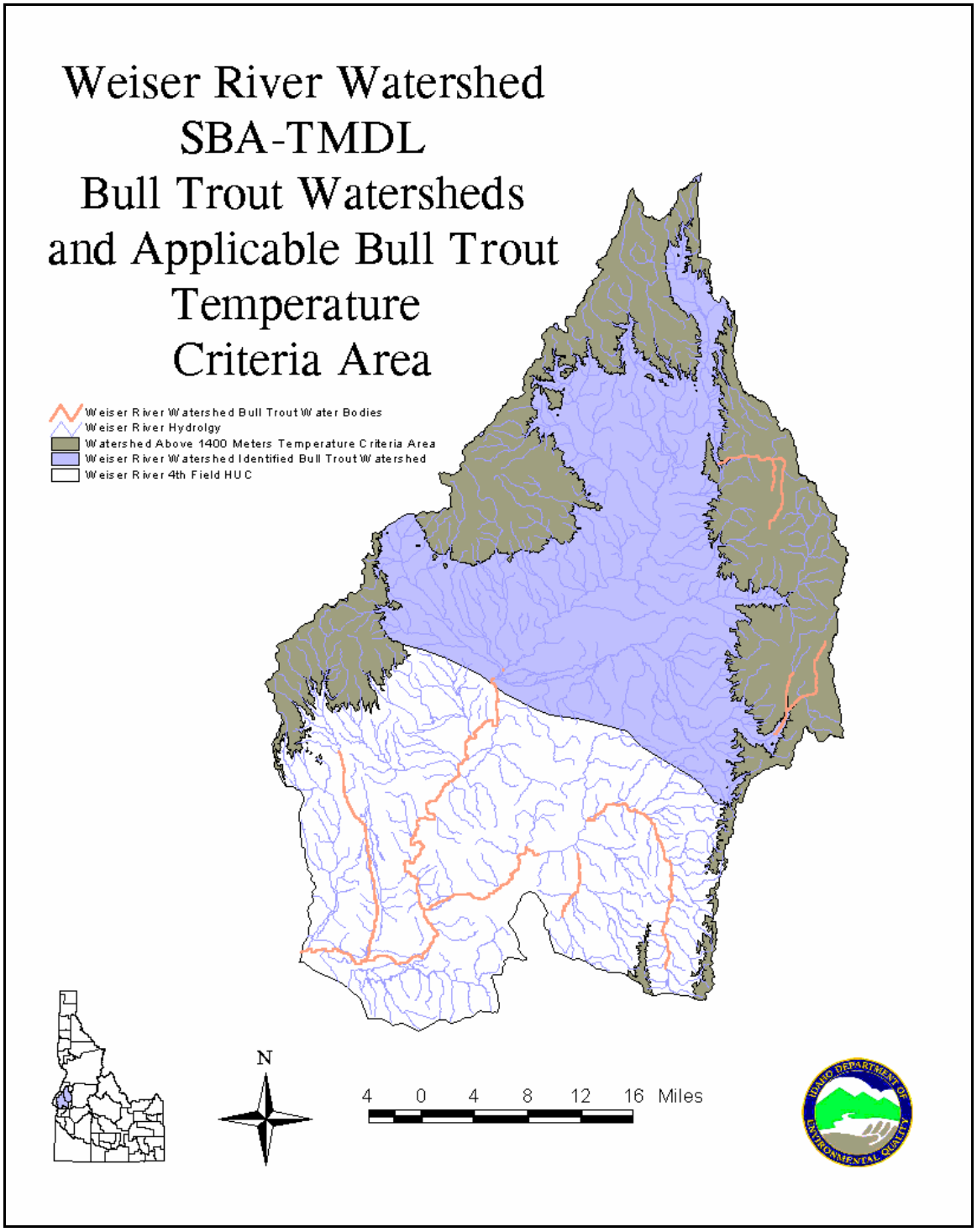

Figure 7. Key Bull Trout Watersheds and Applicable State Water Quality Temperature Criteria Area, Weiser River Watershed (Ingham 2006).

ANIMAL FEEDING OPERATIONS AND DAIRIES

In the Weiser River subbasin there are ten animal feeding operations and four dairies (NRCS 2007). The laws, briefly described below, explain how beef cattle animal feeding operations and dairy farms maintain compliance.

The Idaho Legislature passed Idaho law, *I.C. §22-4906, Title 22, Chapter 49, Beef Cattle Environmental Control Ac,* in 2000. ISDA promulgated rules (IDAPA 02.04.15.000 et seq.) which became effective in September 2000. Beef cattle animal feed operations are required to submit a nutrient management plan to ISDA for approval no later than January 1, 2005 (Smith S. and Banks C. 2008).

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. Any new dairy farms are required to have an approved nutrient management plan before issuance of a milk permit. ISDA promulgated rules (IDAPA 02.04.14.000 et seq.) for dairy waste and they were adopted in 1997 (Smith S. and Banks C. 2008).

Sediment, Bacteria, and Phosphorus TMDL Inventory

SPRINKLER IRRIGATED CROPLAND

Sprinkler irrigated cropland occurs in small pockets of the Weiser River subbasin. Some of the soil types used for sprinkler irrigated cropland are Bissell, Catherine, Newell, Onyx, and Baldock-Moulton-Cashmere. Dominant soils are clay, silt, or sandy loams, with slow runoff and slight potential for erosion by water. Landscape features are fan terraces formed by lakes or streams. Slope is 0 to 2 percent or 4 to 8 percent depending on the soil. Elevation ranges from 2,100 to 3,400 ft. Precipitation can range from 10 to 20 inches. The growing season is 110-155 days. Typical crops grown are alfalfa hay, corn, sugar beets, wheat, and potatoes (Rasmussen, 1990).

SURFACE IRRIGATED CROPLAND

Surface irrigated cropland is the second largest private land use in the subbasin. Some soil types used for surface irrigated cropland are Catherine, Greenleaf, Newell-Langrell, Onyx, and Shoepeg-Langrell. Dominant soils are fine, silt loams, with slow runoff and slight potential for erosion by water. Landscape features are fan and stream terraces formed by lakes or streams. Slope is 0 to 20 percent depending on the soil. Elevation ranges from 2,200 to 3,500 ft. Precipitation can range from 14 to 22 inches. The growing season is 110-160 days. Typical crops grown are alfalfa hay, corn, sugar beets, wheat, and potatoes (Rasmussen, 1990)

DRYLAND (NON-IRRIGATED CROPLAND)

Dryland (non-irrigated cropland) comprises a very small portion of the subbasin. Some of the soil types used for dryland farming are Midvale-Appledellia, Greenleaf, Haw, and Shoepeg-Langrell. Dominant soils are silt loams or sandy loams, with slow to rapid runoff and slight to severe potential for erosion by water depending upon the soil. With the exclusion of Haw silt loam, runoff is slow and water erosion is slight. Landscape features are fan, lacustrine, and stream terraces formed by lakes or streams. Slope is 0 to 20 percent depending on the soil. Elevation ranges from 2,400 to 3,500 ft. Precipitation can range from 10 to 22 inches. The growing season is 110-160 days. Non-irrigated alfalfa hay and wheat are the common dryland crops, although corn silage, sugar beets, and potatoes can also be grown (Rasmussen, 1990).

PASTURE/HAYLAND

Pasture/hayland is interspersed throughout the subbasin. Some of the soil types used for pasture/hayland are Brownlee, Greenleaf, Langrell, and Midvale-Appledellia. Dominant soils are silt loams or sandy loams, with slow runoff and slight potential for erosion by water. Landscape features are fan, lacustrine, and stream terraces formed by lakes or streams. Slope is 0 to 20 percent depending on the soil. Elevation ranges from 2,400 to 4,000 ft. Precipitation can range from 12 to 26 inches. The growing season is 110-160 days (Rasmussen, 1990). Typical forage species are wheat grasses, fescues, bromes, orchard grass, and alfalfa (NRCS 2007).

RANGELAND

Rangeland covers a large portion of the Weiser River subbasin. There are a variety of soil types used for range, such as Gem-Reywat-Bakeoven, Haw-Payette-Van Dusen, Langrell, and Meland-Riggins. Dominant soils are well-drained, silt loams or clay loams, with medium to rapid runoff and moderate to severe potential for erosion by water. Landscape features are terraces, foothills, slopes, and mountains. Slope can be from 8 to 60 % percent depending on the soil. Elevation ranges from 2,300 to 4,800 ft. Precipitation can range from 12 to 35 inches throughout the subbasin, but most of the rangeland has an average precipitation of 24 inches. The growing season can be 110-160 days (Rasmussen, 1990). Sagebrush steppe species that grow naturally in this area are sagebrush, bitterbrush, rabbitbrush, perennial bunchgrasses, and forbs. Invasive species such as cheatgrass are commonly present. Cattle grazing also occurs on forested areas dominated by a ponderosa pine and douglas fir (NRCS 2007).

IMPLEMENTATION PRIORITY

CRITICAL AREAS

Areas of agricultural lands that contribute excessive pollutants to water bodies are defined as critical areas for BMP implementation. Critical areas are prioritized for treatment based on their proximity to a water body of concern and the potential for pollutant transport and delivery to the receiving water body. Critical areas are those areas in which treatment is considered necessary to address resource concerns affecting water quality. In this plan, the critical areas are categorized on a tier basis according to implementation prioritization.

This plan is divided into four sections based on 303 (d) listed stream segments and the lands that surround them. For each section, there is a discussion regarding critical areas for treatment as well as proposed BMPs for treatment.

1) Weiser River (Galloway to Snake River)
2) Weiser River (Little Weiser River to Galloway)
3) Little Weiser River (Indian Valley to Weiser River)
4) Crane Creek (Crane Creek Reservoir to Weiser River)

TIERS

A subbasin inventory was completed to help identify critical areas for treatment in the Weiser River subbasin. Digital aerial photography, topographic maps, tract/field/farm data, field investigations, and land owner interviews were used to determine land areas that impact water quality in the Weiser River subbasin. Digitized farm field boundaries mark implementation priority areas for each tier under the four sections described above.

In the Weiser River watershed, one farmer's wastewater often becomes another farmer's irrigation water. The accuracy in determining exactly where particular pollutants originate is compromised as distance from the water body of concern increases. Accordingly, critical areas closest to the mouth of the subwatersheds or adjacent to the tributaries themselves are considered highest priority for treatment due to the increased potential to directly impact surface water quality

BMP installation will be broken out in three tiers. Tier 1 lands have the most immediate impact on water quality due to their proximity to the surface water tributaries. Unlike Tier 1 lands, Tier 2 lands are not directly adjacent to the tributaries of concern, and the wastewater from Tier 2 acreage has the potential to be reused by Tier 1 acreage before entering a 303(d) listed stream segment of concern. Tier 3 acreage is located in the uplands where wastewater has the potential to be used multiple times by Tier 2 and Tier 1 acreage before entering a stream segment of concern. In terms of BMP implementation Tier 1 is high priority, Tier 2 is medium priority, and Tier 3 is low priority.

WEISER RIVER (GALLOWAY DAM TO SNAKE RIVER)

Within this reach of the Weiser River, two tributaries with adjacent surface irrigated agricultural land discharge to the river. Monroe Creek and Mann Creek are parallel drainages that incorporate irrigation wastewater flows from their respective corridors prior to their outlets on the north side of the Weiser River (Figure 8). Although Cove Creek also discharges to the river from the southeast within this section, water quality impacts to the river are minimal due to low annual flows.

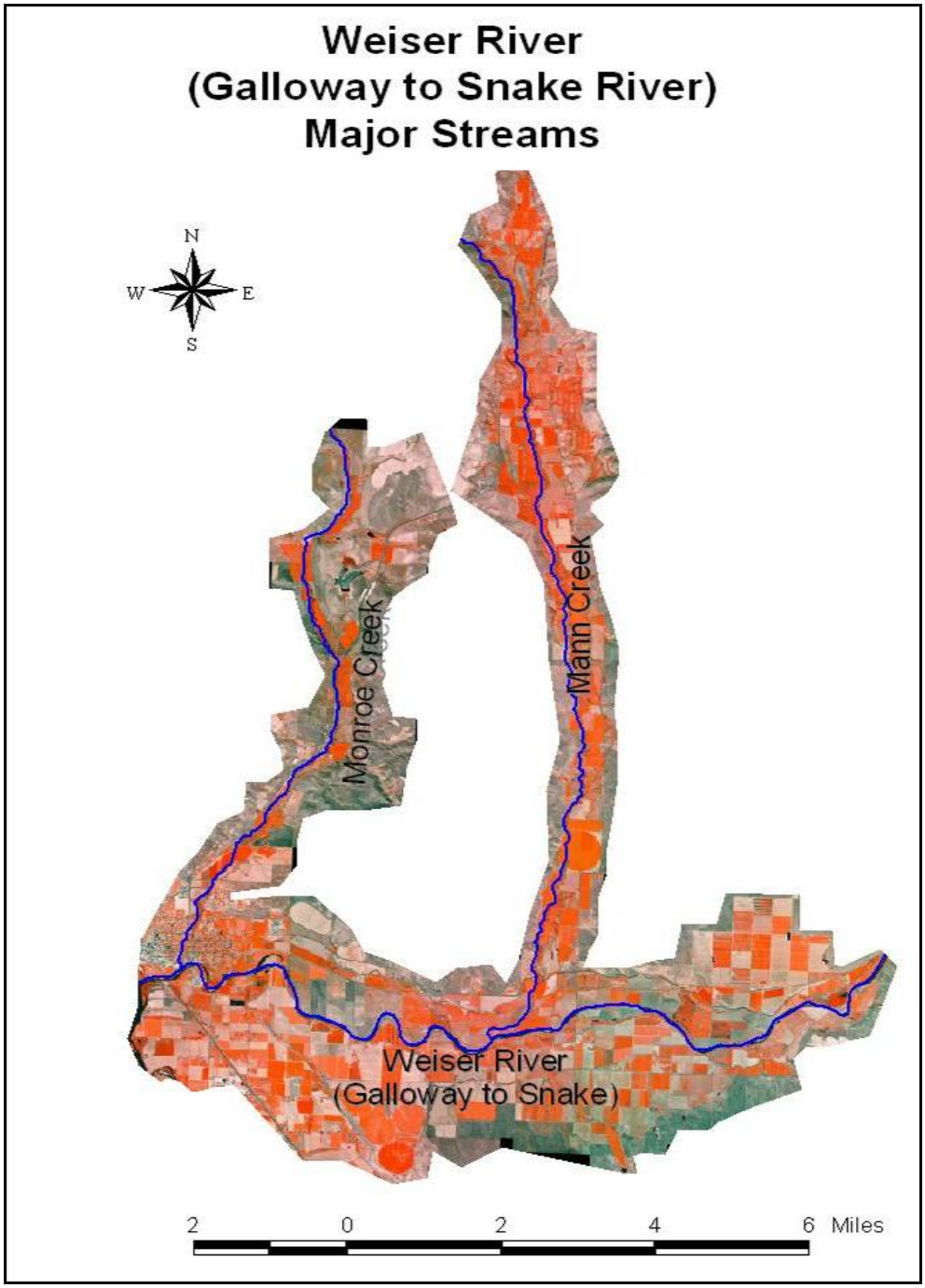

Figure 8. Weiser River (Galloway to Snake River) Major Streams

Drainage ditches, irrigation supply canals, topography transitions, and roads determine the route of irrigation wastewater and natural drainage in this area of the Weiser River subbasin. The Galloway Canal provides most of the irrigation source water to the farm fields on the north side of the Weiser River corridor, while the Sunnyside Ditch provides much of the irrigation source water on the south side of the river. As a result of the hydrologic modifications, irrigation wastewater flows within the corridor can be intercepted by canals or drains, or reused by neighboring farms prior to discharge to the Weiser River. This area has been categorized for treatment according to the subwatershed boundaries displayed in Figure 9.

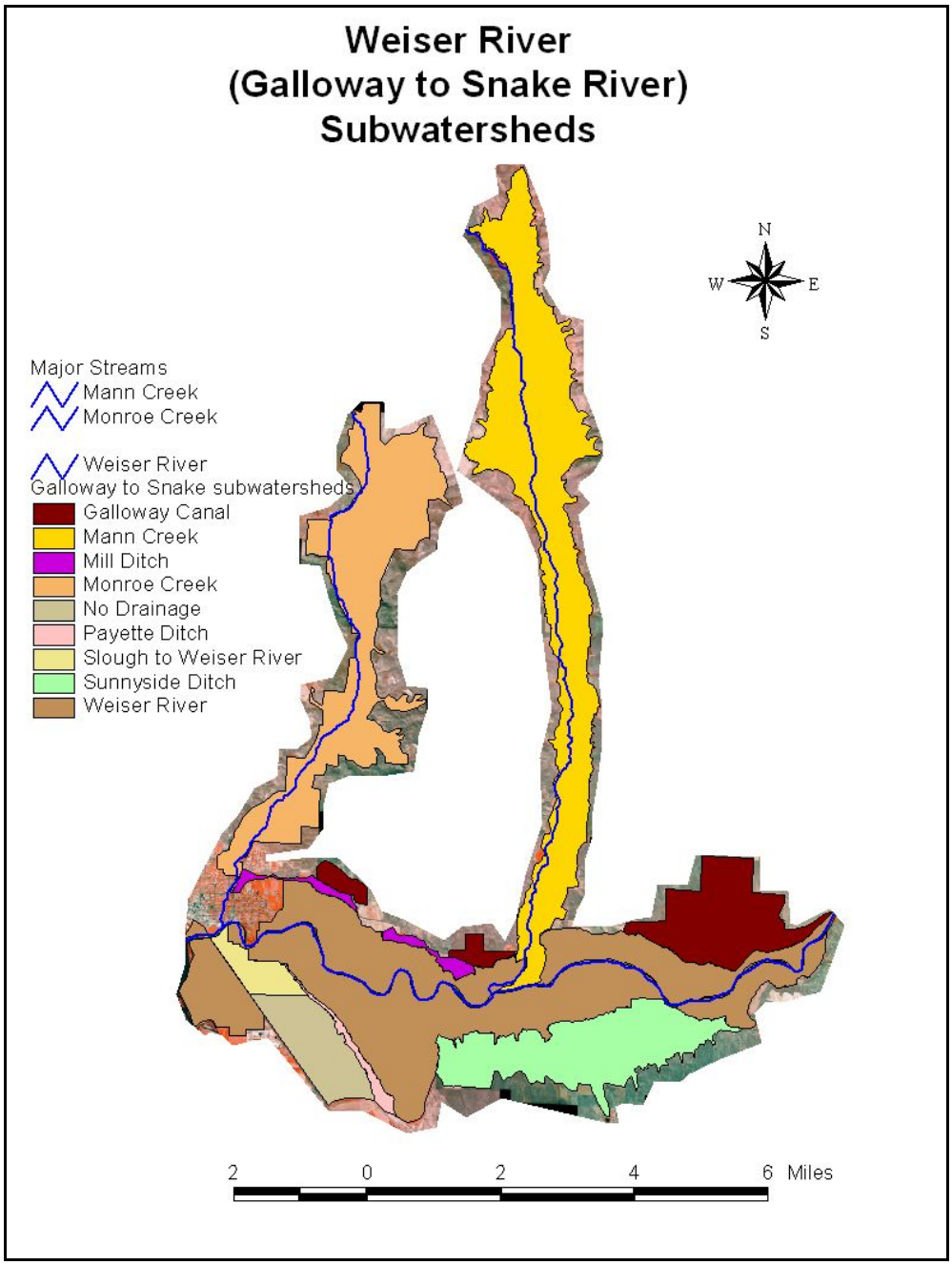

Figure 9. Weiser River (Galloway to Snake River) Subwatershed Boundaries

BMP alternatives will be developed in conjunction with landowners on a site specific basis according to land use, management, identified problems, and other criteria. Initial implementation efforts for the Weiser River (Galloway to Snake River) should focus on working with willing agricultural producers on fields within the Tier 1 subwatersheds before proceeding to Tier 2 or 3 subwatersheds (Figure 10). There are approximately 15,827 total acres currently under agricultural production within all subwatersheds.

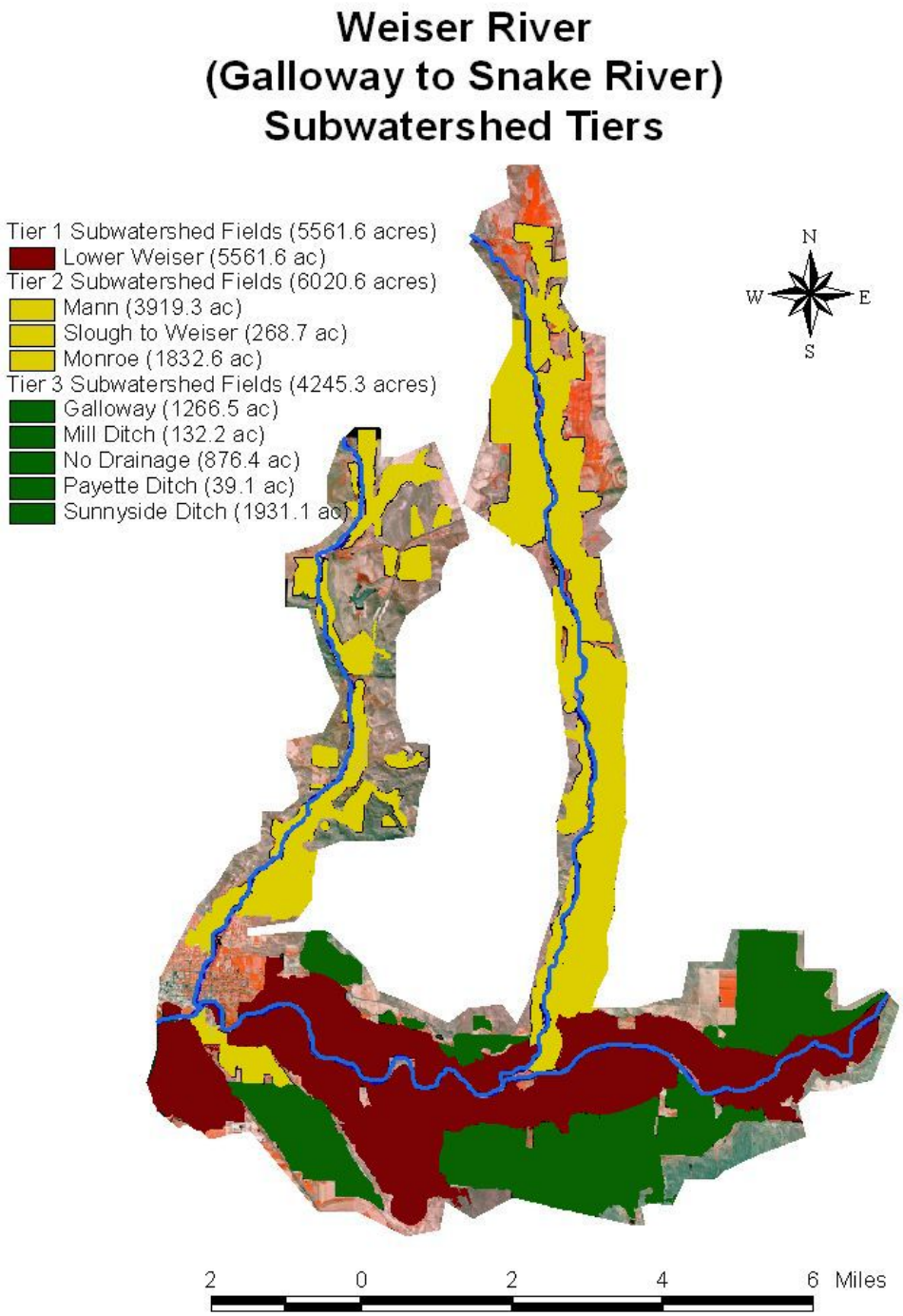

Figure 10. Weiser River (Galloway to Snake) Subwatershed Tiers

In response to the TMDL targets for phosphorus, implementation of BMPs for water quality improvement for the Weiser River (Galloway to Snake River) should not focus exclusively on individual farm fields. Much of the measured total phosphorus within the Weiser River system is in the form of dissolved phosphorus. Accordingly, end of drain or creek systems that incorporate wetland vegetation would likely be the most effective treatment for reducing total phosphorus currently discharging directly to the Weiser River. Properly designed and maintained sediment/wetland retention BMPs are also ideal for banking of phosphorus credits for potential future phosphorus trading opportunities within the greater Lower Snake-Hells Canyon watershed.

The potential for implementation of larger scale sediment/wetland retention BMPs near the mouths of both Monroe and Mann creeks should be seriously considered and evaluated during the implementation process. The Payette Ditch and Cove Creek (a low flow, high phosphorus concentration tributary) should also be considered for potential end of drain BMPs near their confluences with the river.

WEISER RIVER (LITTLE WEISER RIVER TO GALLOWAY DAM)

Although this is a long reach of the Weiser River (20.9 miles according to the Weiser River Watershed TMDL-SBA), much of its length is confined to a narrow channel within a canyon. As a result, the rangeland adjacent to much of the corridor within this reach has little impact on surface water quality. Shoepeg Road is the upstream boundary of the subwatershed; the canyon below Banner Creek is the downstream boundary (Figure 11). The entire watershed consists of approximately 8,530 total acres.

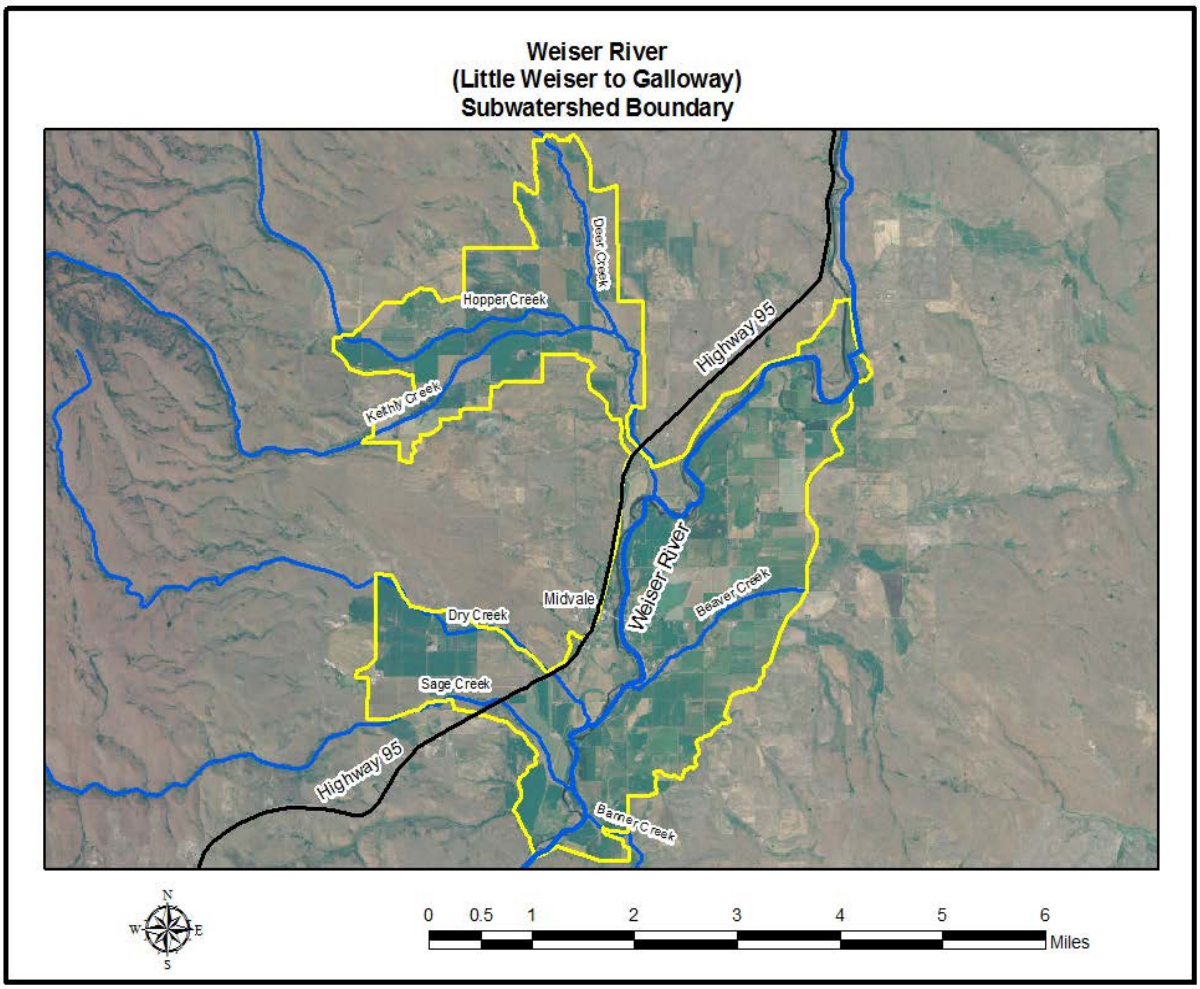

Figure 11. Weiser River (Little Weiser River to Galloway) Subwatershed Boundary

It is not until the canyon opens up into the Middle Valley and Shoepeg Valley areas near the town of Midvale that the adjacent land use begins to significantly impact surface water quality. Within this approximately seven mile stretch, five tributaries with adjacent surface irrigated cropland and pasture discharge into the river.

Irrigation returns from the west side of the river in the Shoepeg Valley area enter Keithly Creek, Dry Creek, and Sage Creek prior to their confluence with the Weiser River. On the east side of the Weiser River just upstream from Shoepeg Road, an irrigation

diversion from the river feeds a canal that is used to irrigate much of the cropland and pasture in the Middle Valley area. Beaver Creek and Banner Creek collect irrigation wastewater flows from the east side before discharging into the Weiser River.

Agricultural land use within this subwatershed area is primarily surface irrigated hay and pasture with very few row crops (typically corn or sugar beets). For purposes of implementation, this section of the Weiser River can be defined by three separate areas in order of priority: 1) Middle Valley corridor, 2) Keithly Creek and tributaries, and 3) Dreek Creek / Sage Creek.

Implementation of BMPs for water quality enhancement in the Weiser River (Little Weiser to Galloway Dam) should be focused near Midvale within the subwatershed boundary area identified in Figure 11. BMP alternatives will be developed in conjunction with landowners on a site specific basis according to land use, management, identified problems, and other criteria. Initial implementation efforts within this segment of the Weiser River should focus on working with willing agricultural producers on Tier 1 fields before proceeding into Tier 2 or 3 fields (Figure 12). There are approximately 464 fields and 6,844 total acres currently in fields under agricultural production within all three tiers.

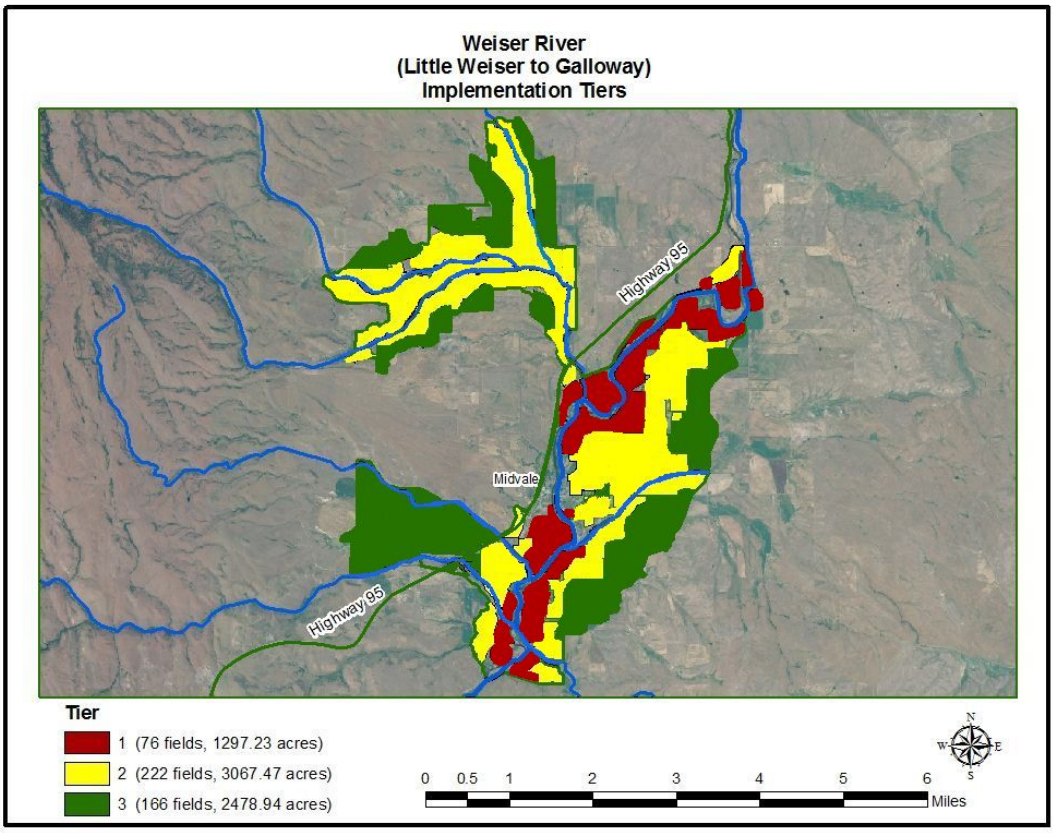

Figure 12. Weiser River (Little Weiser River to Galloway) Subwatershed Tiers

LITTLE WEISER RIVER (INDIAN VALLEY TO WEISER RIVER)

According to the Weiser River Watershed SBA-TMDL, the impaired section of the Little Weiser River includes 17.3 miles from Indian Valley to its confluence with the Weiser River. The upstream subwatershed boundary is defined by the Mundy Gulch Road crossing, just downstream from the C. Ben Ross Reservoir outlet to the Little Weiser River. The downstream subwatershed boundary incorporates the adjacent agricultural land areas impacting the Little Weiser River just downstream from the town of Cambridge (Figure 13). The entire subwatershed consists of approximately 7,180 total acres. For purposes of implementation, the Little Weiser subwatershed can be defined by three separate areas: 1) Indian Valley, 2) Highway 95 corridor, and 3) Little Weiser River Valley near Cambridge.

For the Indian Valley area, the subwatershed boundary is defined on the north by sloping terraces and irrigation laterals and on the south by the base of the foothills. The land use adjacent to the Indian Valley area is primarily surface irrigated hay and pasture. Irrigation wastewater discharges to the river as combined field flows rather than properly defined tributaries. Livestock access to the stream channel and riparian corridor is common and has contributed to water quality impairment.

Once it flows through the broader Indian Valley, the Little Weiser River travels through a narrow corridor defined by Highway 95 to the north and foothills to the south. This portion of the Little Weiser, as well as other sections further downstream, displays typical streambank erosion characteristics resulting from historic stream channel alteration (straightening and narrowing) by the U.S. Army Corps of Engineers. Within this narrow corridor, livestock grazing and encroachment on the existing stream channel have also contributed to additional streambank erosion and surface water quality impairment.

The Little Weiser River Valley near Cambridge is defined on both the north and south sides by irrigation diversions from the Little Weiser River. Agricultural land use within this portion of the watershed is primarily surface irrigated alfalfa (furrow and sprinkler) and surface irrigated pasture, although a few row crop fields (typically corn or sugarbeets) are also present. As in the Indian Valley area, irrigation wastewater discharges to the river as combined field flows rather than properly defined tributaries.

Implementation of BMPs for water quality enhancement in the Little Weiser River (Indian Valley to Weiser River) should initially be focused along the Little Weiser River corridor and include all portions from Indian Valley at Mundy Gulch Road to the mouth. BMP alternatives will be developed in conjunction with landowners on a site specific basis according to land use, management, identified problems, and other criteria. Initial implementation efforts within the Little Weiser River should focus on working with willing agricultural producers on Tier 1 fields before proceeding into Tier 2 or 3 fields (Figure 14). There are approximately 301 fields and 5,647 total acres currently under agricultural production within all three tiers.

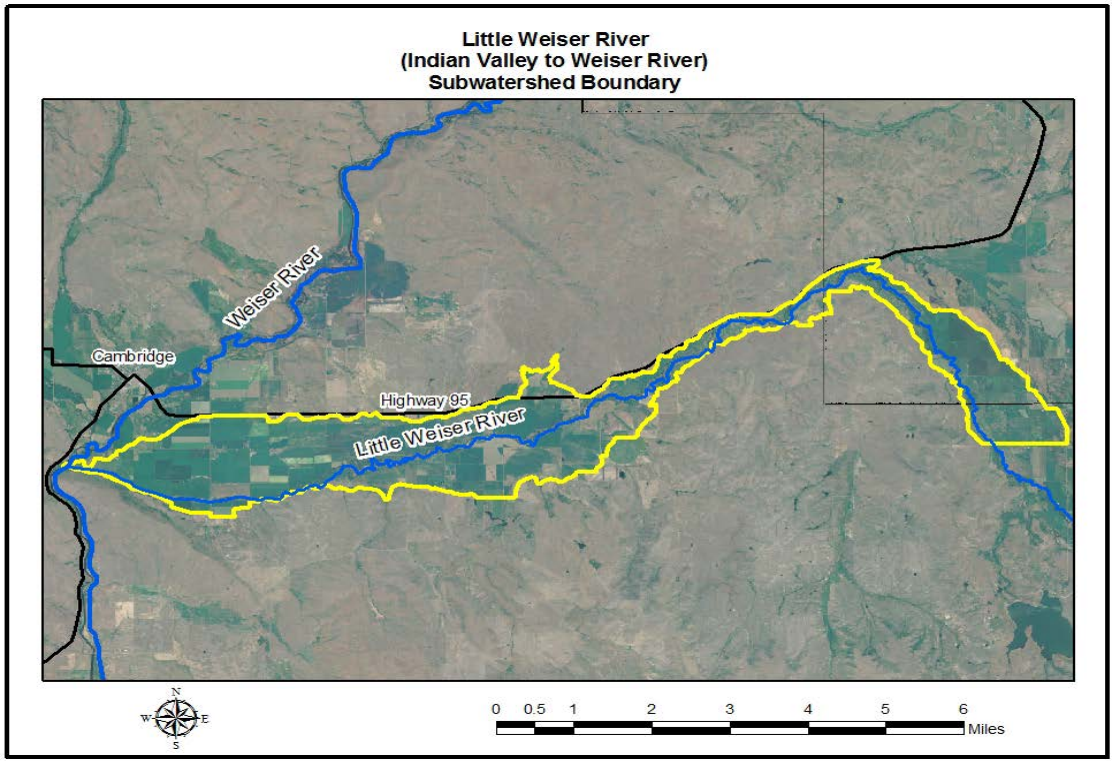

Figure 13. Little Weiser River (Indian Valley to Weiser River) Subwatershed Boundary

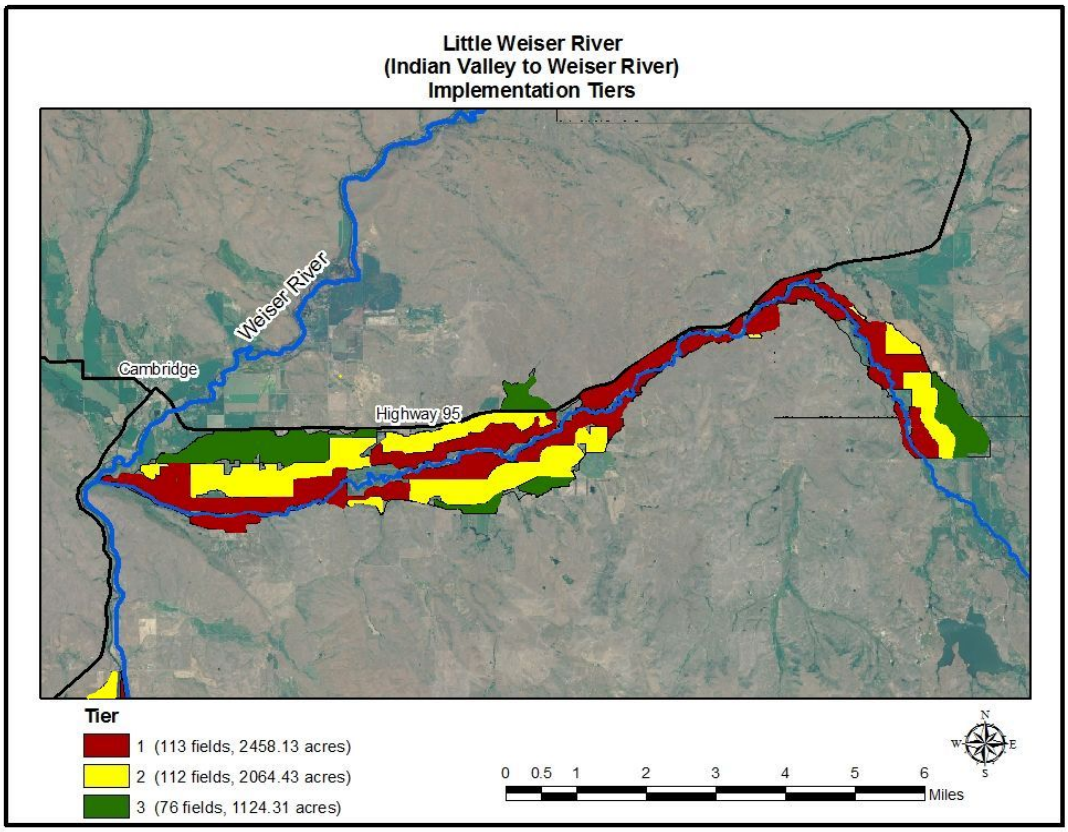

Figure 14. Weiser River (Indian Valley to Weiser River) Subwatershed Tiers

CRANE CREEK (CRANE CREEK RESERVOIR TO WEISER RIVER)

The water quality impaired reach of Crane Creek identified in the Weiser River Watershed TMDL-SBA includes the entire length of the stream (approximately 12.6 miles) from Crane Creek Reservoir to its mouth at the Weiser River. Water quality monitoring data collected by ISDA at three sites on Crane Creek during the 2007 irrigation season indicate that pollutant loading in Crane Creek (particularly sediment and phosphorus) is directly related to discharge from the Crane Creek Reservoir outlet (ISDA 2007). The mean concentrations of both sediment (SSC) and phosphorus (TP) actually decrease from the reservoir outlet to the mouth of Crane Creek. Crane Creek Reservoir, however, was de-listed as an impaired water body by IDEQ in 2008.

At its headwaters (the reservoir outlet), Crane Creek enters a narrow canyon and the adjacent land use for the next 10 stream miles has little impact on water quality. It is not until the lower valley area near the mouth of Crane Creek that adjacent land use has a direct and substantial influence on water quality. Water quality monitoring data collected by ISDA indicate that bacteria (*E. coli*) levels typically increase from the headwaters of the lower valley to the mouth. Sediment and phosphorus levels in the creek, although less than at the headwaters, still exceed TMDL targets at both lower valley sites. Accordingly, the subwatershed boundary for implementation is confined to this lower valley area and includes approximately 2.6 miles of Crane Creek and 1,247 total acres (Figure 15).

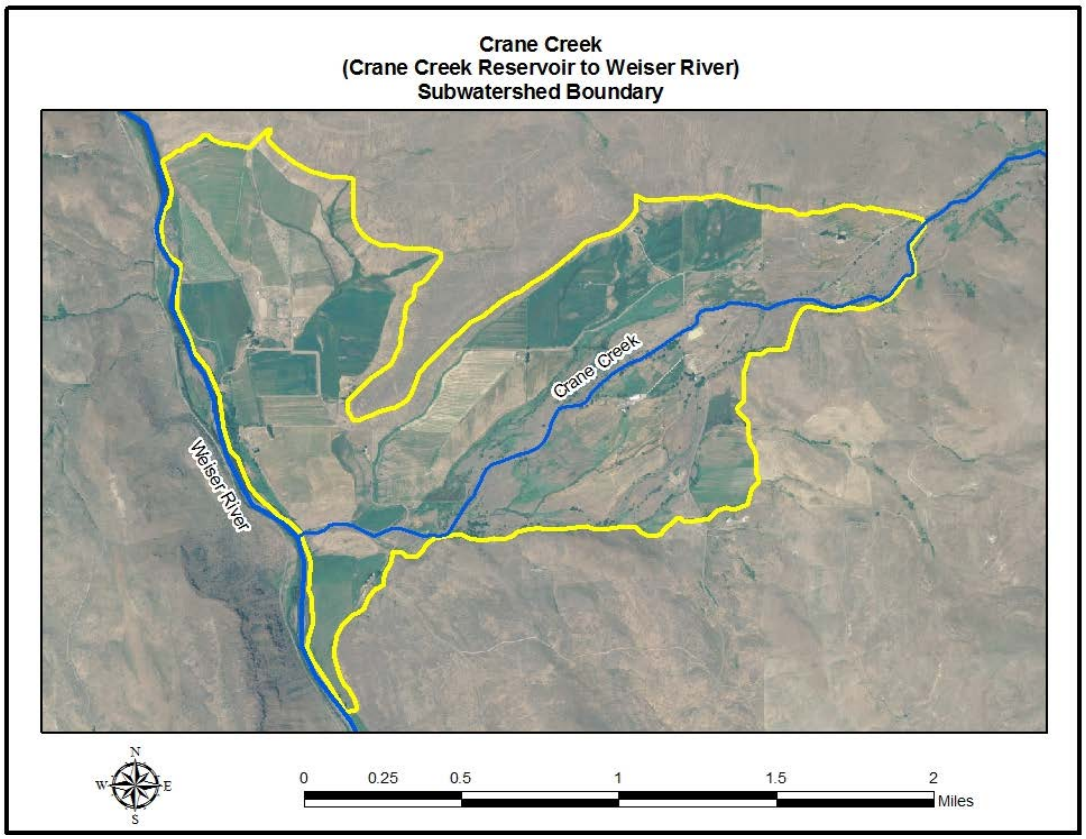

Figure 15. Crane Creek (Reservoir to Weiser River) Subwatershed Boundary

Land use within the lower Crane Creek valley consists of surface irrigated pasture on marginal, rocky ground and surface irrigated hay. The northern subwatershed boundary is defined by an irrigation diversion that occurs as the creek enters the lower valley. The southern subwatershed boundary primarily follows a braided channel of the creek as it flows along the base of the foothills. Livestock access to the main creek channel and its braids is unmitigated and grazing of stream banks is common.

Implementation of BMPs for water quality enhancement should be focused on the Crane Creek corridor (and channel braids) in the lower valley area. BMP alternatives will be developed in conjunction with landowners on a site specific basis according to land use, management, identified problems, and other criteria. Initial implementation efforts within the Crane Creek subwatershed should focus on working with willing agricultural producers on Tier 1 fields before proceeding into Tier 2 or 3 fields. There are approximately 64 fields and 983 total acres currently under agricultural production within all three tiers (Figure 16).

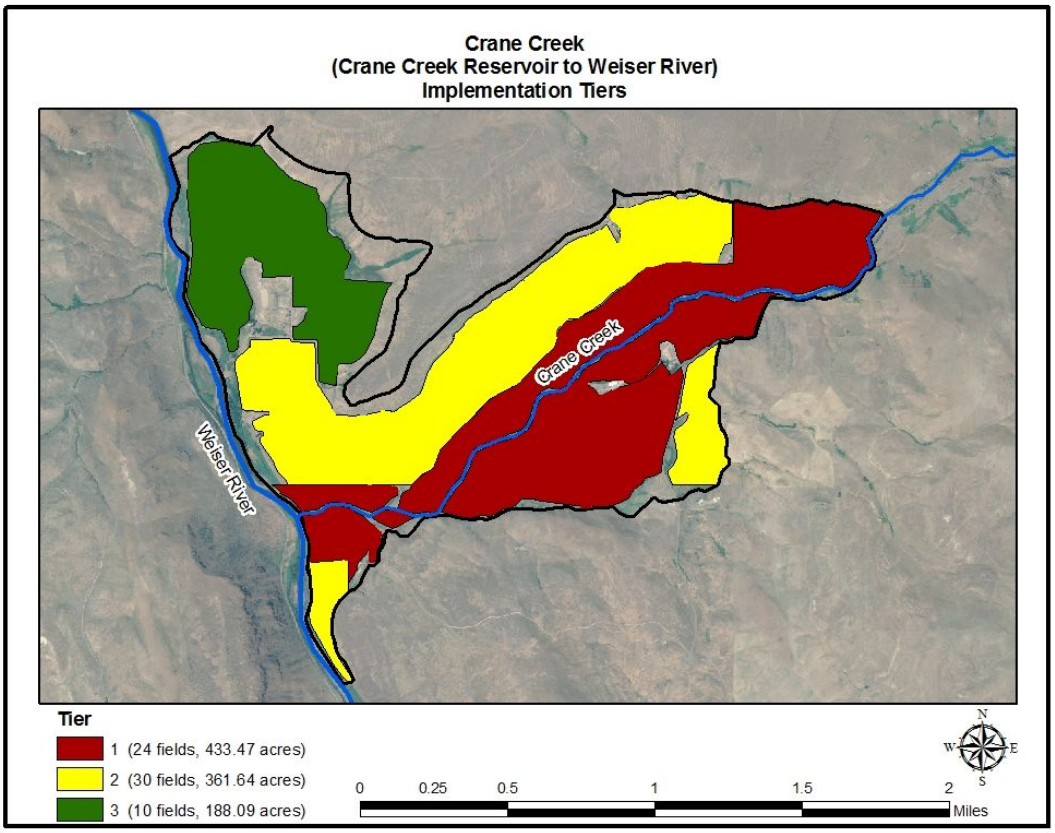

Figure 16. Crane Creek (Reservoir to Weiser River) Subwatershed Tiers

BMP RECOMMENDATIONS AND ESTIMATED COSTS

The practices and costs identified in Table 9 are from the 2008 Environmental Quality Incentives Program (EQIP) cost list and primarily include BMPs associated with surface irrigated cropland, surface irrigated pasture, and livestock grazing operations. Individual conservation planning with willing landowners will determine the most appropriate BMPs to install on a case by case basis. A more precise estimate of quantities of each BMP recommended for installation will be determined at the time of conservation planning with individual landowners.

Table 9. Weiser River Subbasin Recommended BMPs to reduce bacteria, sediment, and phosphorus loading

NRCS Code	Practice Name	Component	Cost ($/Unit)	Unit
450	Anionic Polyacrylamide (PAM) Erosion Control	Anionic Polyacrylamide (PAM)	40	ac
584	Channel Stabilization	Channel Stabilization	37.5	ft
100	Comprehensive Nutrient Mgt Plan	CNMP <100 Animal Units	4000	no
100	Comprehensive Nutrient Mgt Plan	CNMP 100-300 Animal Units	5000	no
100	Comprehensive Nutrient Mgt Plan	CNMP > 300 Animal Units	6000	no
327	Conservation Cover	Native Vegetation	210	ac
656	Constructed Wetland	For Surface Irrigated Runoff	27300	no
332	Contour Buffer Strips	Contour Buffer Strips (Expiring CRP)	300	ac
342	Critical Area Planting	Critical Area Planting (All components with slight shaping if needed) Not to exceed 5 ac.	376	ac
342	Critical Area Planting	Critical Area Planting (All components with moderate shaping) Not to exceed 5 ac	712	ac
342	Critical Area Planting	Critical Area Planting (All components with heavy shaping) Not to exceed 5 ac	1036	ac
382	Fence	Barb Wire	3.46	ft
393	Filter Strip	Filter Strip	130	ac
561	Heavy Use Area Protection	Heavy Use Area Protection Smaller Material - No Concrete	1.36	sqft
464	Irrigation Land Leveling	Irrigation Land Leveling (100 acres max)	220	ac
441	Irrigation System, Micro-irrigation	Irrigation System, Micro-irrigation (cropland)	1360	ac
442	Irrigation System, Sprinkler	Center Pivot	630	ac
442	Irrigation System, Sprinkler	Wheel Line	460	ac
443	Irrigation System, Surface & Subsurface	Surge Valve with Controller	2540	no
428A	Irrigation Water conveyance Ditch & Canal Lining	Concrete Ditch, 16"	7.56	ft
449	Irrig. Water Management	Low Intensity	10	ac
449	Irrig. Water Management	High Intensity, Electronic Moisture Sensing	20	ac
590	Nutrient Management	Basic	10	ac
590	Nutrient Management	High Intensive	20	ac
590	Nutrient Management	Precision Ag	30	ac
512	Pasture & Hayland Planting	Pasture/Hayland Planting (following crop)	244	ac
595	Pest Management	Irrigated Cropland Basic	30	ac

NRCS Code	Practice Name	Component	Cost ($/Unit)	Unit
595	Pest Management	Irrigated Cropland High Intensive	60	ac
595	Pest Management	Precision Ag	100	ac
528	Prescribed Grazing	Range Site ($3,500 Max. per Yr.)	4	ac
528	Prescribed Grazing	Pasture Site ($3,500 Max. per Yr.)	10	ac
329	Residue Management	No Till/Strip Till/Direct Seed	60	ac
329	Residue Management	No Till/Strip Till/Direct Seed - 3 year POA (1 time payment)	180	ac
345	Residue Management	Mulch Tillage - Irrigated Cropland	30	ac
345	Residue Management	Mulch Tillage - Following Winter Wheat as Part of No-Till System Only	60	ac
350	Sediment Basin	Sediment Basin construction (doesn't included inlet or outlet pipe)	4.5	cuyd
578	Stream Crossing	Stream Crossing	5250	no
395	Stream Habitat Improvement & Mngmt.	Stream Habitat (Management) - Not exceed $1,000 in payment	10	ft
580	Streambank & Shoreline Protection	Bio-Engineering	52.5	ft
580	Streambank & Shoreline Protection	Rip-Rap/Barbs	90	ft
472	Use Exclusion	Livestock Exclusion (Riparian Only) for up to 3 yrs	68	ac
313	Waste Storage Facility	Size 1 - All Components, Based on Size and Component Cost Estimate	30000	no
313	Waste Storage Facility	Size 2 - All Components, Based on Size and Component Cost Estimate	52500	no
313	Waste Storage Facility	Size 3 - All Components, Based on Size and Component Cost Estimate	75000	no
313	Waste Storage Facility	Size 4 - All Components, Based on Size and Component Cost Estimate	97500	no
313	Waste Storage Facility	Size 5 - All Components, Based on Size and Component Cost Estimate	120000	no
313	Waste Storage Facility	Size 6 - All Components, Based on Size and Component Cost Estimate	142500	no
313	Waste Storage Facility	Size 7 - All Components, Based on Size and Component Cost Estimate	165000	no
638	Water & Sediment Control Basin	Water & Sediment Control Basin earth work & seeding (< 4' embankment)	800	no
638	Water & Sediment Control Basin	Water & Sediment Control Basin earth work & seeding (> or = 4' embankment)	1300	no
614	Watering Facility	Storage Tank (new)	3.76	gal
614	Watering Facility	Watering Facility -Trough Water on Demand	2466	no
614	Watering Facility	Watering Facility (Heated) < 500 gal	4.5	gal
614	Watering Facility	Watering Facility (Heated) 501 - 700 gal	3.46	gal
614	Watering Facility	Watering Facility (Heated) >700 gal	2.26	gal
614	Watering Facility	Watering Facility < 500 gal	3.82	gal
614	Watering Facility	Watering Facility 501 - 700 gal	2.86	gal
614	Watering Facility	Watering Facility > 700 gal	1.96	gal
658	Wetland Creation	Wetland Creation	1670	ac
659	Wetland Enhancement	Wetland Enhancement (Create Open Water)	450	ac
659	Wetland Enhancement	Wetland Enhancement (Riparian Area)	382	ac
657	Wetland Restoration	Management Practice plus Structures	934	ac

Temperature TMDL Inventory and Implementation Priority

In addition to the TMDL targets established for sediment, bacteria, and phosphorus, a temperature TMDL was developed by IDEQ that established potential natural vegetation (PNV) targets for several stream segments within the Weiser River subbasin. PNV is a surrogate measure for temperature and assumes that shading of the stream channel reduces solar loading to the stream, thereby reducing the temperature of the water. PNV essentially refers to an intact and mature riparian plant community with little, if any, anthropogenic disturbance. For the Weiser temperature TMDL, five types of general riparian communities were identified and used to determine PNV for the stream segments. The five types include:

1) Mixed conifer: vegetation type at the upper headwaters where denser stands of subalpine fir, Douglas fir, grand fir, and ponderosa pine occur
2) Conifer/meadow: vegetation type where tree density is more open; shrub and grass meadows may occupy thin areas along streambanks with conifers in the nearby overstory
3) Grass meadow: community on wide open meadows where conifers and shrubs tend to be absent or much reduced
4) Cottonwood/conifer mix: community that occurs in the area above and below Starkey where a transition occurs between the conifer zone and the cottonwood/shrub community
5) Cottonwood/shrub: community where cottonwood trees dominate an understory of mixed deciduous shrubs

The PNV shade targets and the previously mentioned community types were applied not only to the five 303(d) listed temperature segments within the subbasin, but also to several other non-listed stream segments in the subbasin. The rationale for IDEQ applying this "watershed approach" to develop the PNV targets was to address the impacts that non-listed segments may have on water temperature in listed segments when confluences occur between them.

As a result of this watershed approach, the temperature TMDL addendum includes a loading analysis for the five 303(d) listed tributaries, as well as the Weiser River and ten of its major tributaries. Excess solar loads, based upon perceived existing vegetation/shade, for all of these streams and the percent reduction relative to each segment's total load are summarized in Table 10.

According to the temperature TMDL, the streams segments that require less than a 20% reduction are in good condition and are considered in less need of treatment. Using similar rationale, while also incorporating excess load ranking (ranking of waterbodies from 1 to 21 by excess solar load); the priority stream segments for implementation are divided into the following categories:

1) Tier 1 – (excess load ranking 1-7 *and* greater than 20% reduction)
2) Tier 2 – (excess load ranking 1-7 *and* less than 20% reduction, *or* excess load ranking 8-14 *and* greater than 20% reduction)
3) Tier 3 – (excess load ranking 8-14 *and* less than 20% reduction, *or* excess load ranking 15-21)

Table 10. Temperature Reduction Targets and Tiers

Water Body	Excess Load (kWh/day)	Excess Load Rank	Percentage Reduction	Tier
Little Weiser River	-1,498,616	2	28%	1
Middle Fork Weiser River	-438,129	6	28%	1
Hornet Creek	-479,100	5	34%	1
Hornet Creek drainage (summation)	-624,406	3	35%	1
Weiser River, Fruitvale to mouth	-3,234,559	1	9%	2
Crane Creek drainage (summation)	-608,417	4	11%	2
Lower Crane Creek	-384,433	7	13%	2
Pine Creek drainage (summation)	-254,054	9	21%	2
West Fork Weiser River	-131,201	14	27%	2
North Hornet Creek	-145,306	13	41%	2
East Fork Weiser River	-176,552	12	63%	2
South Crane Creek	-22,317	20	7%	3
North Crane Creek	-201,667	11	9%	3
Pine Creek	-94,290	16	12%	3
Mann Creek	-234,420	10	15%	3
Weiser River, headwaters to Fruitvale	-331,649	8	18%	3
Monroe Creek	-113,356	15	19%	3
East Pine Creek	-55,902	18	30%	3
West Pine Creek	-66,810	17	35%	3
West Branch Weiser River	-11,447	21	41%	3
Little Pine Creek	-37,052	19	54%	3

In response to the temperature TMDL addendum, a field inventory to collect additional solar pathfinder data was initiated by IASCD, ISCC, and NRCS staff. Since the temperature TMDL was written primarily using aerial photo interpretation and minimal field verification, this was determined by the Weiser River WAG and IDEQ to be an appropriate method for confirming or disputing the potential natural vegetation (PNV) targets identified in the temperature TMDL. It was also used as a strategy by the inventory team to further identify priority areas for treatment within each inventoried segment.

Three streams were selected for solar pathfinder field inventories due to TMDL targets, ease of access, ownership contacts, time constraints, and other considerations. The following in an excerpt from the temperature TMDL addendum:

> Several other non-listed tributaries stand out as possible contributors of excess heat. Most notably the Hornet Creek drainage had the third largest excess solar load and needed a 35% reduction to achieve potential. Because that stream has not been thoroughly investigated or field verified, more work needs to be done to determine the extent of the problem in Hornet Creek. The Middle Fork Weiser River also ranks moderately high in excess solar load and percent reduction required to achieve potential.

The streams inventoried by the IASCD field team were the Middle Fork Weiser River, Hornet Creek, and North Hornet Creek. A summary of the inventory results and segment prioritization is included here. The color coding used in the following figures reflects the existing shade percentage ("cover class") assigned to each segment by IDEQ in the temperature TMDL addendum. For additional information regarding the cover classes and associated color codes, please refer to pages 12-36 of the Weiser River Subbasin Temperature TMDL Addendum (IDEQ, 2006).

MIDDLE FORK WEISER RIVER

In the Weiser River Subbasin Temperature TMDL Addendum completed by IDEQ, the entire reach of the Middle Fork Weiser River (41,140 meters or 25.56 miles) was divided into twenty-five separate segments. Each segment was defined by a percentage of existing shade assigned by IDEQ within its length. The segments varied greatly in both length (260 to 3820 meters) and existing shade (10% - 80%). The target shade percentage for the segments also exhibited a wide range (42% - 95%). According to the TMDL addendum, there are no segments currently achieving their assigned potential shade targets.

The solar pathfinder inventory completed for this plan included nine of the twenty five total segments on the Middle Fork Weiser River. The inventoried segments were selected to include those that exhibited the largest difference between existing solar load and potential solar load. In short these segments are those that, according to IDEQ, would have the largest impact on reducing stream temperature if they were to achieve their assigned potential shade targets. The inventoried segments are displayed in Figure 17.

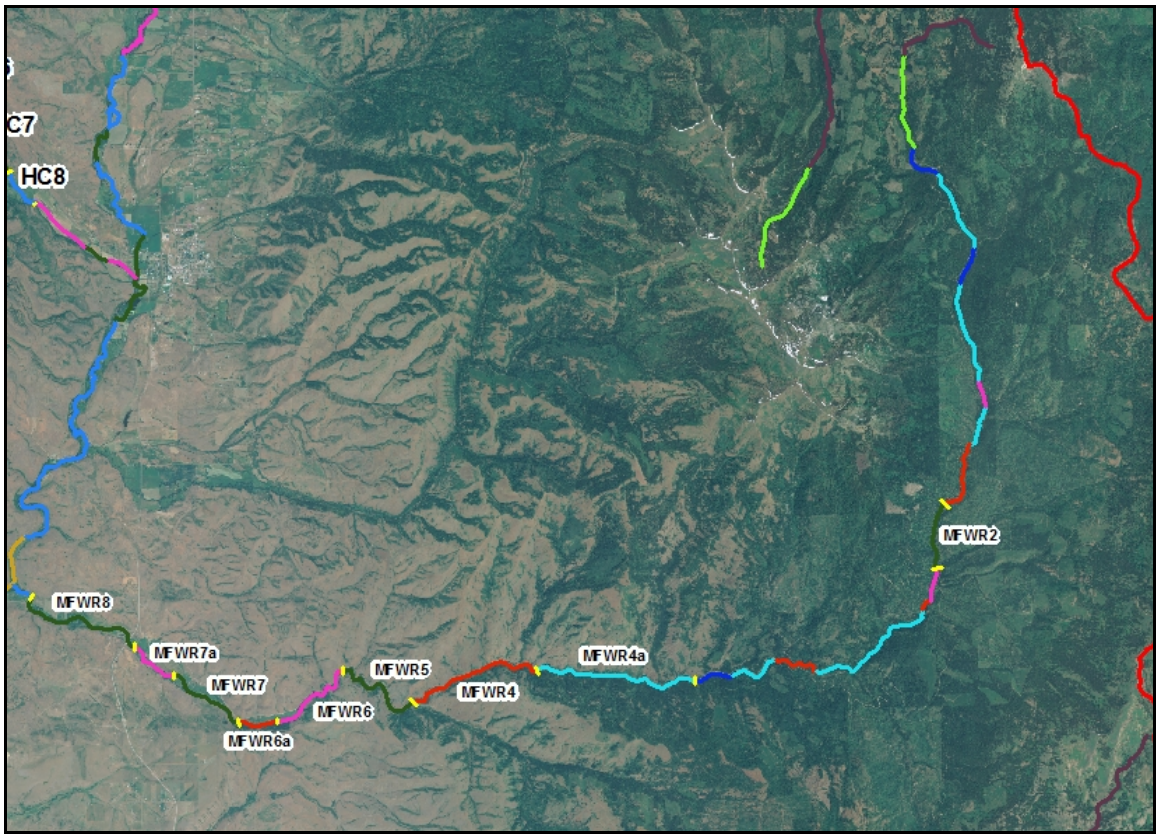

Figure 17. Middle Fork Weiser River Pathfinder Inventory Segments

Typically within each segment, five clusters with five separate equally spaced pathfinder readings were captured by the IASCD field team for a total of twenty-five readings per segment. Each reading measured the percentage of existing shade on a monthly basis. All readings, for the critical temperature time period identified in the TMDL (April - September), were then averaged together to determine actual percentage of existing shade within each segment.

With the exception of the final 500 meter segment at the mouth, the solar pathfinder inventory on the Middle Fork Weiser River included all of the privately owned agricultural segments. As a result of the solar pathfinder field inventory results, BMP implementation priority for the Middle Fork Weiser River is as follows:

1) High Priority – MFWR8, MFWR7, MFWR6a, MFWR6
2) Medium Priority – MFWR5, MFWR4
3) Low Priority – MFWR7a, MFWR4a, MFWR2

HORNET CREEK

In the Weiser River Subbasin Temperature TMDL Addendum completed by IDEQ, the entire reach of Hornet Creek (32,140 meters or 19.97 miles) was divided into twenty-seven separate segments. Each segment was defined by a consistent percentage of existing shade assigned by IDEQ within its length. The segments varied greatly in both length (200 – 4,100 meters) and existing shade (0% - 80%). The target shade percentage for the segments also exhibited a wide range (39% - 95%). According to the TMDL addendum, there are no segments currently achieving their assigned potential shade targets.

The solar pathfinder inventory completed for this plan included eight of the twenty-seven total segments on Hornet Creek. The inventoried segments were selected to include those that exhibited the largest difference between existing solar load and potential solar load. In short these segments are those that, according to IDEQ, would have the largest impact on reducing stream temperature if they were to achieve their assigned potential shade targets. The inventoried segments are displayed in Figure 18.

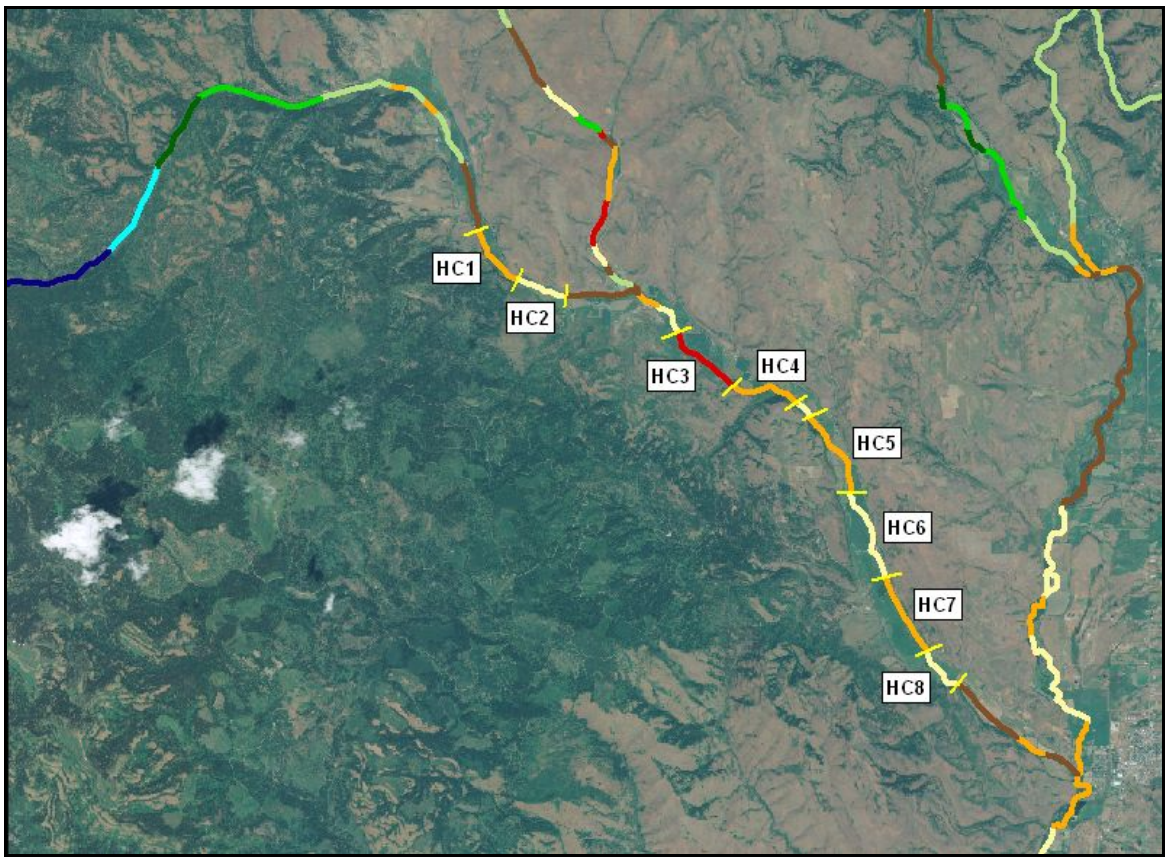

Figure 18. Hornet Creek Solar Pathfinder Inventory Segments

Typically within each segment, five clusters with five separate equally spaced pathfinder readings were captured by the IASCD field team for a total of twenty-five readings per segment. Each reading measured the percentage of existing shade on a monthly basis.

All readings for the critical temperature time period identified in the TMDL (April - September) were then averaged together to determine actual percentage of existing shade within each segment.

As a result of the solar pathfinder field inventory results, BMP implementation priority for Hornet Creek is as follows:

1) High Priority – HC1, HC2, HC3, HC6
2) Medium Priority – HC4, HC5, HC7
3) Low Priority – HC8, all other non-inventoried segments downstream from HC2

NORTH HORNET CREEK

In the Weiser River Subbasin Temperature TMDL Addendum completed by IDEQ, the entire reach of North Hornet Creek (25,030 meters or 12.76 miles) was divided into sixteen separate segments. Each segment was defined by a consistent percentage of existing shade assigned by IDEQ within its length. The segments varied greatly in both length (130 – 6400 meters) and existing shade (0% - 80%). The target shade percentage for the segments also exhibited a wide range (45% - 95%). According to the TMDL addendum, there are no segments currently achieving their assigned potential shade targets.

The solar pathfinder inventory completed for this plan included five of the total sixteen segments on North Hornet Creek. The inventoried segments were selected to include those that exhibited the largest difference between existing solar load and potential solar load. In short these segments are those that, according to IDEQ, would have the largest impact on reducing stream temperature if they were to achieve their assigned potential shade targets. It should be noted that while the inventory on North Hornet Creek took place in September (during the critical time period for stream temperature), there was no moving water in any of the inventoried segments. The inventoried segments are displayed in Figure 19.

Typically within each segment, five clusters with five separate equally spaced pathfinder readings were captured by the IASCD field team for a total of twenty-five readings per segment. Each reading measured the percentage of existing shade on a monthly basis. All readings for the critical temperature time period identified in the TMDL (April - September) were then averaged together to determine actual percentage of existing shade within each segment.

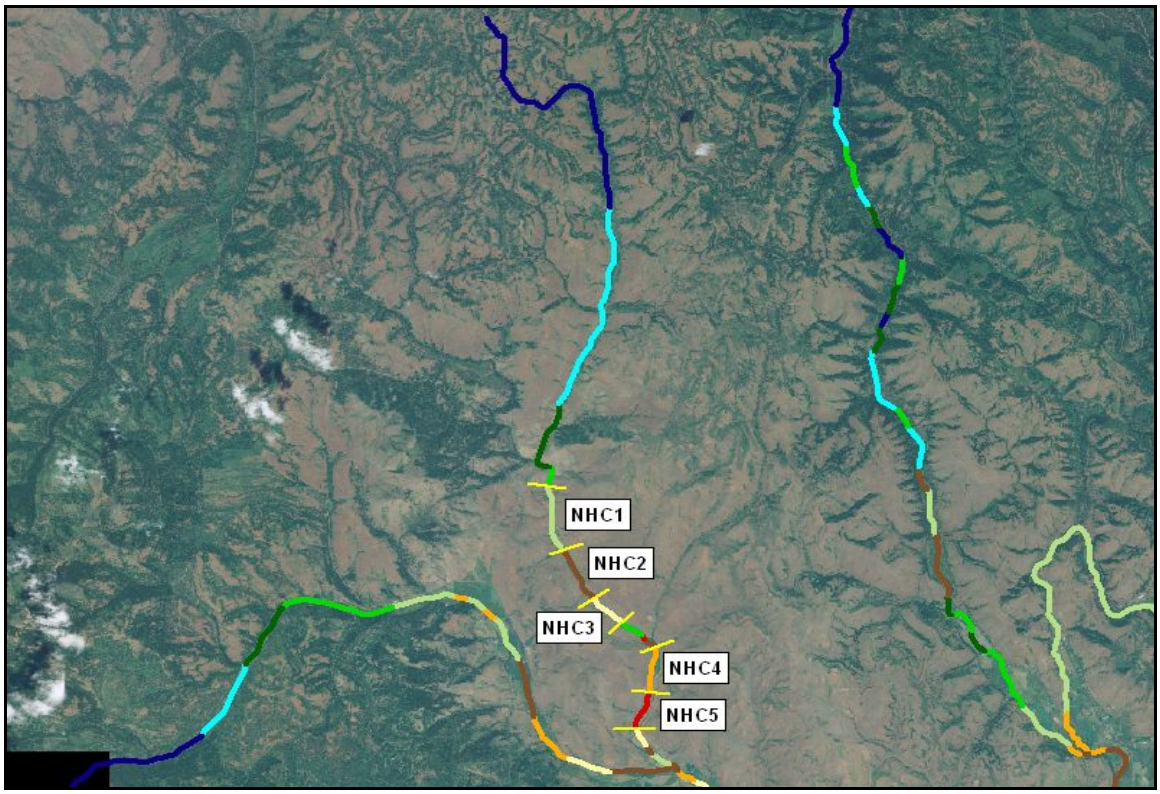

Figure 19. North Hornet Creek Solar Pathfinder Inventory Segments

As a result of the solar pathfinder field inventory results, BMP implementation priority for North Hornet Creek is as follows:

1) High Priority – NHC3, NHC5
2) Medium Priority – NHC4
3) Low Priority – NHC1, NHC2, all other non-inventoried segments downstream from NHC3

BMP RECOMMENDATIONS AND OTHER CONSIDERATIONS

Recommended BMPs to work towards achieving the shading targets identified in the Weiser River Subbasin Temperature TMDL addendum include, but are not limited to those identified in Table 11. The practices and costs identified in the table are from the 2008 Environmental Quality Incentives Program (EQIP) cost list and primarily include BMPs associated with riparian area restoration and livestock grazing operations.

Table 11. Weiser River Subbasin Recommended BMPs to reduce temperature loading

NRCS Code	Practice Name	Component	Cost ($/Unit)	Unit
584	Channel Stabilization	Channel Stabilization	37.50	ft
327	Conservation Cover	Native Vegetation	210	ac
342	Critical Area Planting	Critical Area Planting (All components /slight shaping) Not to exceed 5 ac.	376	ac
342	Critical Area Planting	Critical Area Planting (All components /moderate shaping) Not to exceed 5 ac	712	ac
342	Critical Area Planting	Critical Area Planting (All components /heavy shaping) Not to exceed 5 ac	1036	ac
382	Fence	Barb Wire	3.46	ft
561	Heavy Use Area Protection	Heavy Use Area Protection Smaller Material - No Concrete	1.36	sqft
590	Nutrient Management	Basic	10	ac
512	Pasture & Hayland Planting	Pasture & Hayland Plantin	244	ac
528	Prescribed Grazing	Range Site ($3,500 Max. per Yr.)	4	ac
528	Prescribed Grazing	Pasture Site ($3,500 Max. per Yr.)	10	ac
391	Riparian Forest Buffer	Riparian Forest Buffer	2250	ac
390	Riparian Herbaceous Cover	Riparian Herbaceous Cover Seed Bed Preparation, Seed and Seeding	450	ac
578	Stream Crossing	Stream Crossing	5250	no
395	Stream Habitat Improvement/Management	Stream Habitat (Management) - Not exceed $1,000 in payment	10	ft
580	Streambank & Shoreline Protection	Bio-Engineering	52.50	ft
580	Streambank & Shoreline Protection	Rip-Rap/Barbs	90	ft
612	Tree and Shrub Establishment	Conifer seedlings used to establish forestlands to desired stocking levels	0.6	tree
612	Tree and Shrub Establishment	Planted tree with tree tube and chemical spot treatment	1.50	tree
612	Tree and Shrub Establishment	Planted tree, chemical spot treatment, alternative browse protection applied	1.06	tree
490	Tree/Shrub Site Preparation	Light Site Prep	126	ac
490	Tree/Shrub Site Preparation	Chain saw cut or hand work	250	ac
490	Tree/Shrub Site Preparation	Mechanical	226	ac
490	Tree/Shrub Site Preparation	Mastication	476	ac
645	Upland Wildlife Habitat Management	Upland Wildlife Habitat Mgmt. ($500 Max/year) for 3 yrs.	20	ac
472	Use Exclusion	Livestock Exclusion (Riparian) up to 3 yrs	68	ac
614	Watering Facility	Storage Tank (new)	3.76	gal
614	Watering Facility	Facility -Trough Water on Demand	2466	no
614	Watering Facility	Watering Facility (Heated) < 500 gal	4.50	gal
614	Watering Facility	Watering Facility (Heated) 501-700 gal	3.46	gal
614	Watering Facility	Watering Facility (Heated) >700 gal	2.26	gal
614	Watering Facility	Watering Facility < 500 gal	3.82	gal
614	Watering Facility	Watering Facility 501 - 700 gal	2.86	gal
614	Watering Facility	Watering Facility > 700 gal	1.96	gal
659	Wetland Enhancement	Wetland Enhancement (Riparian Area)	382	ac

On site planning with individual landowners must occur prior to the selection and implementation of site specific BMPs to enhance stream shading. Planning and implementation efforts should initially focus on the three Tier 1 inventoried streams (Middle Fork Weiser River, Hornet Creek, and North Hornet Creek) and the Little Weiser River (the only Tier 1 stream not inventoried).

Prioritization of segments for BMP implementation on the Little Weiser River will be determined using the TMDL tables for existing and potential solar load, since there was no field data collected for this stream. Each privately owned agricultural segment will be ranked in order of prioritization based on the largest difference between overall existing load and potential load (kWh/day). Initial implementation efforts should focus on the Tier 1 streams prior to moving into the Tier 2 or Tier 3 streams.

Outreach

The Weiser River SCD has done an outstanding job coordinating outreach programs for water quality within their District. Past efforts initiated by the Weiser River SCD have included demonstration projects, field tours, newsletters, informational brochures, landowner meetings, one-on-one personal contacts, and an educational video. Throughout the TMDL process, these educational outreach strategies have been coordinated with the Weiser River WAG. Continued water quality outreach within the Weiser River subbasin is critical to the successful implementation of the BMPs identified in this plan. Accordingly, a targeted outreach strategy will be developed and initiated by the Weiser River SCD, Adams SCD, Weiser River WAG, and other conservation partners regarding the Weiser River TMDL Implementation Plan for Agriculture.

Funding

Financial and technical assistance for installation of BMPs is needed to ensure success of this implementation plan. The Weiser River and Adams Soil Conservation Districts will actively pursue multiple potential funding sources to implement Best Management Practices (BMPs) for water quality enhancement on private agricultural and grazing lands. Many of these programs can be used in combination with each other to implement BMPs.

These sources include (but are not limited to):

CWA 319 –These are Environmental Protection Agency funds allocated to the Nez Perce Tribe and the State of Idaho. The Idaho Department of Environmental Quality (DEQ) administers the Clean Water Act §319 Non-point Source Management Program for areas outside the Nez Perce Reservation. Funds focus on projects to improve water quality and are usually related to the TMDL process. The Nez Perce tribe has CWA 319 funds available for projects on Tribal lands on a competitive basis.
http://www.deq.idaho.gov/water/prog_issues/surface_water/nonpoint.cfm#management
Water Quality Program for Agriculture (WQPA) –The WQPA is administered by the Idaho Soil Conservation Commission (ISCC). This program is also coordinated with the TMDL process. http://www.scc.state.id.us/programs.htm

Resource Conservation and Rangeland Development Program (RCRDP) –The RCRDP is a loan program administered by the ISCC for implementation of agricultural and rangeland best management practices or loans to purchase equipment to increase conservation. http://www.scc.state.id.us/programs.htm

Conservation Improvement Grants – These grants are administered by the ISCC. http://www.scc.state.id.us/programs.htm

PL-566 –This is the small watershed program administered by the USDA Natural Resources Conservation Service (NRCS).

Agricultural Management Assistance (AMA) –The AMA provides cost-share assistance to agricultural producers for constructing or improving water management structures or irrigation structures; planting trees for windbreaks or to improve water quality; and mitigating risk through production diversification or resource conservation practices, including soil erosion control, integrated pest management, or transition to organic farming. http://www.nrcs.usda.gov/programs/ama/

Conservation Reserve Program (CRP) –The CRP is a land retirement program for blocks of land or strips of land that protect the soil and water resources, such as buffers and grassed waterways. http://www.nrcs.usda.gov/programs/crp/

Conservation Technical Assistance (CTA) –The CTA provides free technical assistance to help farmers and ranchers identify and solve natural resource problems on their farms and ranches. This might come as advice and counsel, through the design and implementation of a practice or treatment, or as part of an active conservation plan. http://www.nrcs.usda.gov/programs/cta/

Environmental Quality Incentives Program (EQIP): EQIP offers cost-share and incentive payments and technical help to assist eligible participants in installing or implementing structural and management practices on eligible agricultural land. http://www.nrcs.usda.gov/programs/eqip/

Wetlands Reserve Program (WRP) –The WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. Easements and restoration payments are offered as part of the program. http://www.nrcs.usda.gov/programs/wrp/

Wildlife Habitat Incentives Program (WHIP) –WHIP is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Cost-share payments for construction or re-establishment of wetlands may be included. http://www.nrcs.usda.gov/programs/whip/

State Revolving Loan Funds (**SRF) –**These funds are administered through the ISCC. http://www.scc.state.id.us/programs.htm

Grassland Reserve Program (GRP) –The GRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance grasslands on their property. http://www.nrcs.usda.gov/programs/GRP/

Conservation Security Program (**CSP) –**CSP is a voluntary program that rewards the Nation's premier farm and ranch land conservationists who meet the highest standards of conservation environmental management. http://www.nrcs.usda.gov

Grazing Land Conservation Initiative (**GLCI) –**The GLCI's mission is 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/

HIP – This is an Idaho Department of Fish and Game program 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

Partners for Fish and Wildlife Program in Idaho – This is a U.S. Fish and Wildlife program providing funds for the restoration of degraded riparian areas along streams, and shallow wetland restoration. http://www.fws.gov/partners/pdfs/ID-needs.pdf

Monitoring and Evaluation

FIELD LEVEL

At the field level, annual status reviews will be conducted to insure that conservation plans and contracts developed to comply with TMDL targets are on schedule and that BMPs are being installed according to standards and specifications identified in the NRCS Field Office Technical Guide (FOTG). BMP effectiveness monitoring will be conducted on installed projects to determine installation adequacy, operation consistency and maintenance, and the relative effectiveness of BMPs in reducing agricultural non-point source pollution. These BMP effectiveness evaluations will be conducted according to the protocols outlined in the Agriculture Pollution Abatement Plan and the ISCC Field Guide for Evaluating BMP Effectiveness.

The Revised Universal Soil Loss Equation (RUSLE) and Surface Irrigation Soil Loss (SISL) Equation are used to predict sheet and rill erosion on non-irrigated and irrigated lands. The Alutin Method, Imhoff Cones, and direct-volume measurements are used to determine sheet and rill irrigation-induced and gully erosion. Stream Visual Assessment Protocol (SVAP) and Streambank Erosion Condition Inventory (SECI) are used to assess aquatic habitat, streambank erosion, and lateral recession rates. The Idaho OnePlan CAFO/AFO Assessment Worksheet is used to evaluate livestock waste, feeding, storage, and application areas. The Water Quality Indicators Guide is utilized to assess nitrogen, phosphorus, sediment, and bacteria contamination from agricultural land.

WATERSHED LEVEL

At the watershed level, there are many governmental and private groups involved with water quality monitoring. The Idaho Department of Environmental Quality uses the Beneficial Use Reconnaissance Protocol (BURP) to collect and measure key water quality variables that aid in determining the beneficial use support status of Idaho's water bodies. The determination will tell if a water body is in compliance with water quality standards and criteria. In addition, IDEQ will be conducting five-year TMDL reviews.

Annual reviews for funded projects will be conducted to insure the project is kept on schedule. With many projects being implemented across the state, ISCC developed a software program to track the costs and other details of each BMP installed. This program can show what has been installed by project, by watershed level, by sub-basin level, and by state level. These project and program reviews will insure that TMDL implementation remains on schedule and on target. Monitoring BMPs and projects will be the key to a successful application of the adaptive watershed planning and implementation process.

During the implementation planning process, several needs were identified for additional monitoring to facilitate implementation. The potential sites include upstream and downstream river road crossing locations in the Little Weiser River (Indian Valley to Weiser River) and the Weiser River (Little Weiser to Galloway). Three sites for the Little Weiser (Mundy Gulch Road, Gladhart Lane, and Burton Lane) should be added to future water quality monitoring efforts to help determine trends for selected pollutants. On the Weiser River there are two sites (Shoepeg Road and Bridge Street) that would facilitate implementation efforts.

In cooperation with the Weiser River WAG, ISCC, and IDEQ, the Idaho State Department of Agriculture (ISDA) will develop a water quality monitoring plan that will allow trend analysis of water quality and gauge progress toward meeting the TMDL load reduction targets. The proper time to revisit each subwatershed for evaluation of water quality improvements will be decided through joint agency cooperation, data review, and BMP implementation evaluation. This could be based on a number of factors including percent of critical acres treated or specific time interval.

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