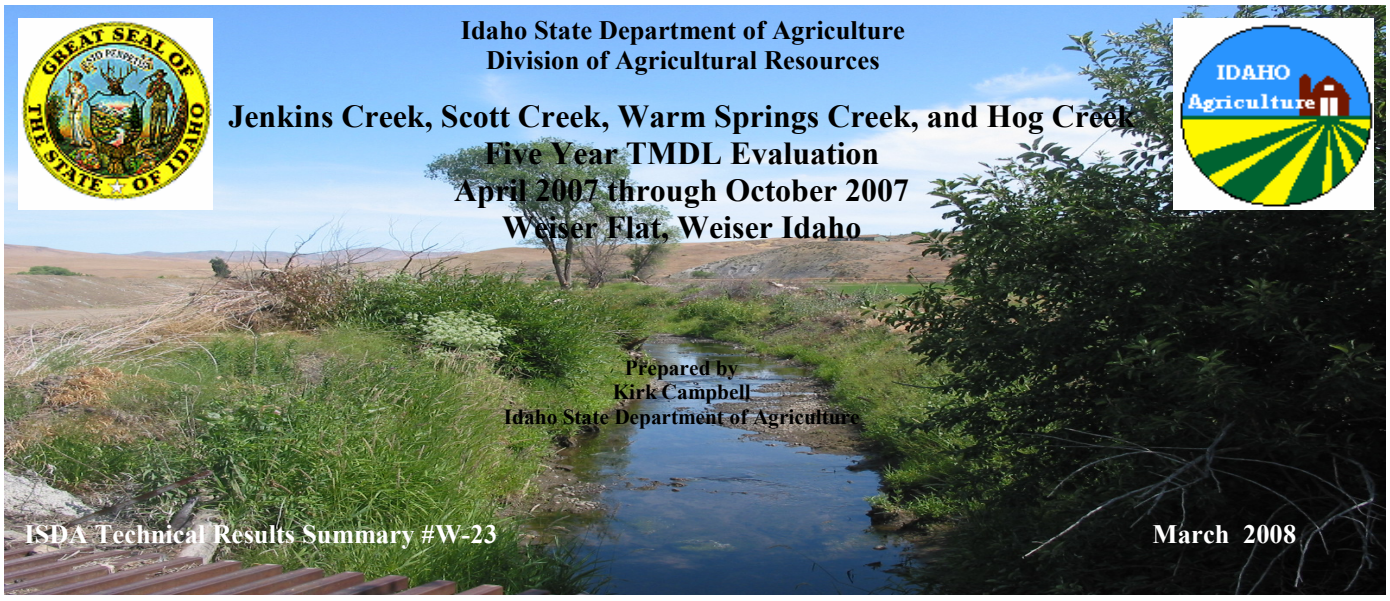

Idaho State Department of Agriculture
Division of Agricultural Resources

Jenkins Creek, Scott Creek, Warm Springs Creek, and Hog Creek Five Year TMDL Evaluation April 2007 through October 2007 Weiser Flat, Weiser Idaho

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ISDA Technical Results Summary #W-23

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Introduction

With support from the Weiser River Watershed Advisory Group (WAG) and the Weiser Soil Conservation District (SCD) the Idaho State Department of Agriculture (ISDA) conducted water quality monitoring on four creeks located within Weiser Flat, Weiser Idaho (Figure 1). These four Creeks; Jenkins (JC-1), Scott (SC-1) Warm Springs (WS-1) and Hog Creek (HC-1) are all currently listed on the state of Idaho's 303(d) list for impaired waters. A total maximum daily load (TMDL) was established for these creeks, by the Idaho Department of Environmental Quality (IDEQ), and approved by the Environmental Protection Agency (EPA) in November of 2003 (Table 1).

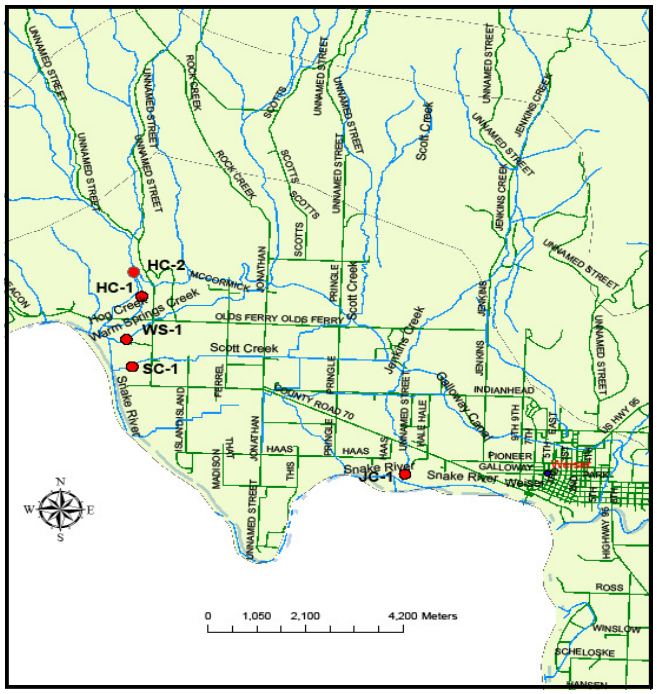

Figure 1. Sample locations Weiser Flat.

Table 1. TMDL parameter levels of concern.

Creek Name	Sediment Target	Phosphorus Target	Bacteria (*E-coli)* secondary contact
Jenkins (JC-1)	50 mg/L monthly average.	0.07 mg/L	576 colony forming units
Scott (SC-1)	50 mg/L monthly average	0.07 mg/L	576 colony forming units
Warm Springs (WS-1)	50 mg/L monthly average	0.07 mg/L	576 colony forming units
Hog (HC-1)	None	0.07 mg/L	576 colony forming units

ISDA conducted bi-weekly monitoring starting in April and proceeding through October 2007. Parameters collected were suspended sediment concentration (SSC), total phosphorus (TP), dissolved phosphorus (DP) and bacteria (*E-coli*). On-site measurements were collected for discharge, pH, dissolved oxygen, temperature, conductivity and total dissolved solids.

It should be noted for this report that the sites monitored in 2007 were different than the locations that were sampled by ISDA during 1999-2001. With the exception of Hog Creek, most of the sites were moved closer to their confluence with the Snake River. While doing this, the new sites were below additional irrigation check diversions that tend to trap sediment during the irrigation season. The new sites, especially on Warm Springs and Scott Creek were below major check dams. These check diversion tend to lower SSC and TP values by allowing sediment and sediment bound phosphorus time to settle out prior to discharging downstream.

The Hog Creek site had to be moved further upstream due to lack of access to its lower reach and a large beaver complex that caused severe back water effects. The new

downstream site (HC-1) was just below two newly installed holding ponds that store water directly from Hog Creek. These ponds hold and divert water for irrigation and directly control the discharge within Hog Creek. The sampling site was located approximately 0.41 miles downstream of where Galloway Canal empties directly into Hog Creek. During the irrigation season, Galloway Canal supplies all of the water to Hog Creek. There is minimal agricultural ground between where Galloway enters Hog Creek to where the monitoring site was established. In addition to the lower site on Hog Creek (HC-1), samples were also collected from Galloway Canal (HC-2). These samples were collected to determine the effectiveness of the two new holding ponds to remove phosphorus from Hog Creek. Hog Creek was not listed for sediment impairment in the TMDL.

Sediment Results

It appears that reductions occurred in average monthly sediment concentration from the 1999-2000 data when compared to the 2007 sampling data (Figure 2).

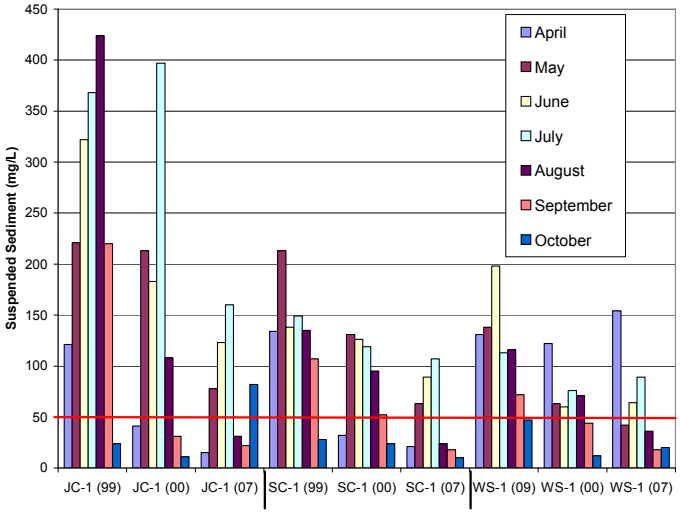

Figure 2. Average monthly SSC concentrations for all three monitoring years. Red line indicates TMDL 50 mg/L monthly average.

The decrease in sediment concentrations could be caused by increased use of best management practices (BMPs) for sediment control. Another reason, for possible reductions, was the movement of the sites further downstream closer to their confluence with the Snake River. JC-1, SC-1, and WS-1 were all moved further downstream from their original locations in 1999 and 2000. This new placement puts them further below a number of irrigation diversions that may have a direct impact on sediment concentrations.

In addition, flow rates dropped significantly between 1999-2000 and 2007 (Figure 3). This drop in discharge would lower the capability of these creeks to transport sediment.

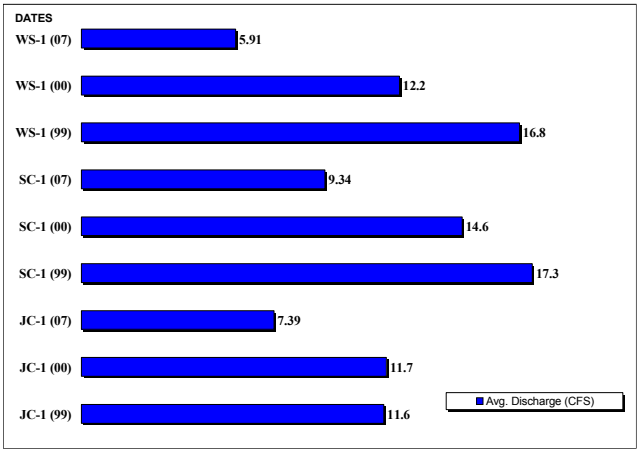

Figure 3. Discharge (CFS) 1999, 2000, and 2007.

Even with what appears to be an overall reduction in monthly SSC concentration, sites JC-1, SC-1 and WS-1 would still require reduction during certain months of the irrigation season (Table 2). Average reductions for these sites is as follows: JC-1 (55%), SC-1 (39%), and WS-1 (45%).

Table 2. SSC monthly average and reductions needed.

Site	Month	Monthly Avg. SSC mg/L	% Reduction to meet TMDL
JC-1	May	78	36
	June	123	59
	July	160	69
SC-1	May	63	20
	June	89	44
	July	107	53
WS-1	April	154	68
	June	64	22
	July	89	44

Phosphorus

The TMDL established phosphorus level, for the creeks within Weiser Flat, were based on the Snake River Hells Canyon TMDL (SRHC-TMDL) which set a concentration goal of 0.07 mg/L. The overall reductions needed for phosphorus to meet the TMDL did not vary, to any great degree, from the data collected in 1999-2000 and the data collected in 2007 (Table 3).

Table 3. Average phosphorus concentrations and reduction needs.

Sites	TP (mg/L) 1999-2000	TMDL % reductions	TP (mg/L) 2007	TMDL % reduction
JC-1	0.415	83	0.37	81
SC-1	0.315	78	0.30	77
WS-1	0.25	72	0.47	85
HC-2 Galloway	0.15	54	0.25	72
HC-1 below ponds	0.20	65	0.19	63

The data from 1999-2000 to 2007 indicates a slight decrease in average concentration at both Jenkins Creek and Scott Creek. Warm Springs had almost a two-fold increase in average TP from 1999-2000 to 2007 (Figure 4).

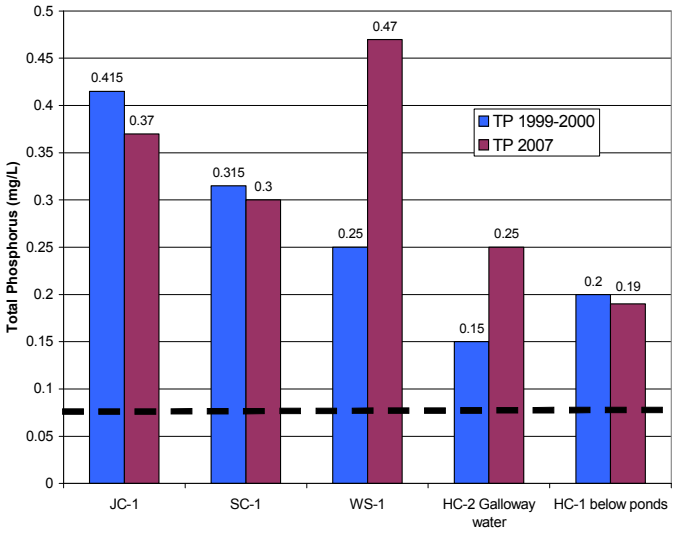

Figure 4. Average TP concentrations black dotted line indicates the TMDL target of 0.07 mg/L.

Figure 4 indicates that during the 2007 season the water from Galloway canal that dumps into Hog Creek had a higher average concentration than the 1999-2000 data. It appears that the two new holding ponds that were constructed to hold Hog Creek water are providing some treatment with an average 24% TP reduction.

Total phosphorus is composed of both particulate phosphorus (bound to sediment) and dissolved phosphorus (in solution). The average TP levels in the creeks within Weiser Flat consist of a large percentage of the dissolved form; JC-1 (53%), SC-1 (61%), WS-1 (50%), HC-2 (52%), and HC-1 (95%). This is noteworthy because even with large reductions in sediment and associated particulate phosphorus the creeks still would probably not meet the TMDL goal of 0.07 mg/L due to the large percentage of dissolved phosphorus.

Escherichia Bacteria (*E-coli*)

The TMDL listed all four creeks as exceeding the secondary contact level for *E-coli* of 576 colony forming units (CFUs).

The number of detections exceeding the TMDLs secondary contact level of 576 CFUs, for all four creeks, were detections of 29 in 1999, 34 in 2000, and 20 in 2007 (Table 4).

Table 4. E-coli secondary contact 576 (CFU) exceedances in 2007.

Date	JC-1	SC-1	WS-1	HC-1	HC-2
4/3/2007	39	180	170	dry	
4/18/2007	99	200	490	250	
5/1/2007	270	2000	390	91	
5/15/2007	160	550	490	370	340
5/30/2007	440	580	290	40	550
6/12/2007	460	1400	460	1400	250
6/26/2007	770	690	1300	410	770
7/9/2007	1300	1700	840	170	1000
7/24/2007	410	1200	520	330	1600
8/7/2007	920	870	820	130	310
8/28/2007	1300	210	260	23	dry
9/5/2007	410	120	290	580	160
9/18/2007	160	550	820	dry	dry
10/2/2007	250	120	190	120	64
10/18/2007	54	17	46	110	dry

Conclusions

Based on the data gathered to date, Jenkins Creek, Scott Creek and Warm Springs Creek would require additional reduction in sediment to meet the TMDL monthly average of 50 mg/L. The 2007 data indicated that there had been a reduction in overall sediment since the 1999-2000 monitoring. The cause of these reductions is unknown and could be caused by any of the following factors:

- Temporal or spatial difference between sampling events and site location.
- The installation of sediment BMPs and better irrigation efficiencies.
- The lower discharge rate observed at each creek.
- Meteorological differences.

Phosphorus levels remained relatively unchanged between the 1999-2000 and 2007 season. If the cause for sediment reductions were improved sediment BMPs one would think that particulate phosphorus levels would follow the same trend, this is not the case. Large reductions are still required at all sites to reach the phosphorus TMDL goal of 0.07 mg/L. Given the large percentage of dissolved phosphorus in the systems, BMPs to control sediment and particulate phosphorus would only reduce the overall phosphorus concentrations by approximately 50% which still wouldn't meet the TMDLs reduction goal.

Bacteria appears to be of concern due to the numerous detections exceeding the secondary contact level for *E-coli*. Geomean monitoring (five samples over 30 days) would be required at each location to determine if an actual state water quality violation has occurred.

Recommendations

- Attempt to focus BMPs in critical areas as outlined in the Weiser Flat agricultural implementation plan.
- Evaluate irrigation water return systems to determine which ones are causing the majority of impacts to the creeks.
- Evaluate stream bank conditions for areas that indicate severe down cutting, sloughing and loss of riparian function.
- The SCD, NRCS, SCC, and ISDA should work with landowners and cooperators to fund and implement projects that will improve the overall water quality within the watershed.
- A long term monitoring program that helps reduce some of the variables would be needed to accurately evaluate the overall water quality of these creeks.

References

(IDEQ) Idaho Division of Environmental Quality. 2003. Brownlee Reservoir (Weiser Flat) Subbasin Assessment and TMDL.