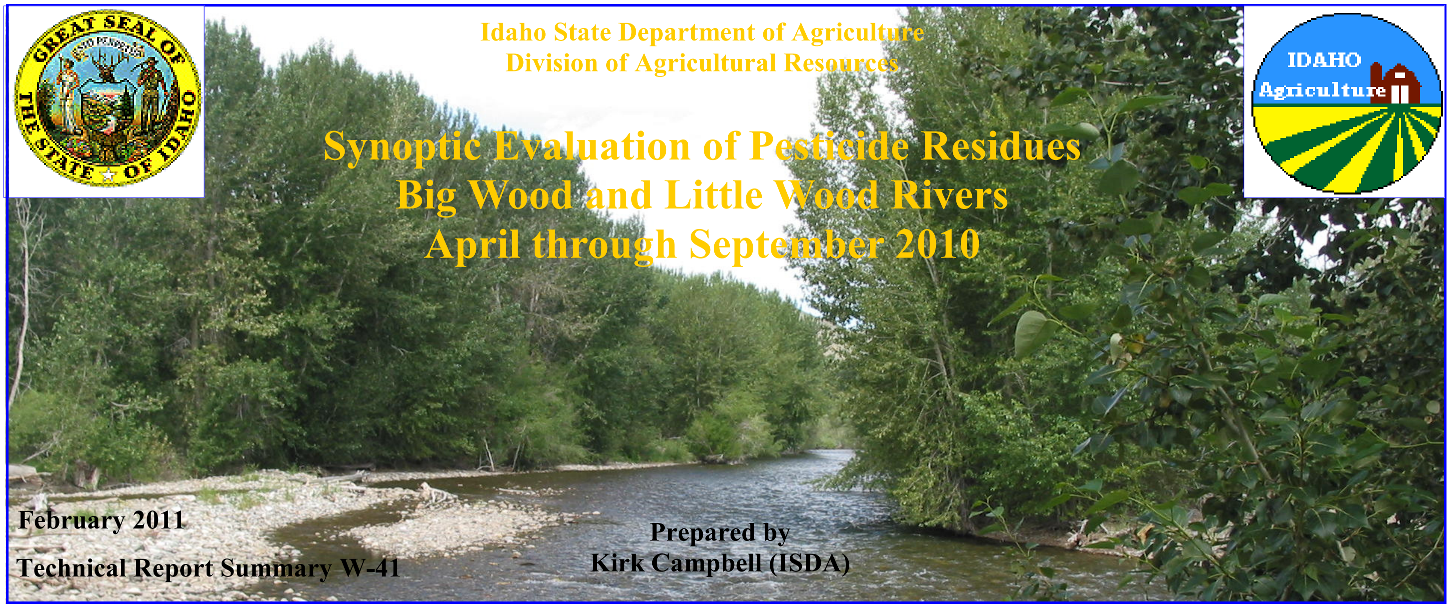
Idaho State Department of Agriculture
Division of Agricultural Resources

Synoptic Evaluation of Pesticide Residues Big Wood and Little Wood Rivers April through September 2010



February 2011

Technical Report Summary W-41

Prepared by
Kirk Campbell (ISDA)

Introduction

In 2010, the Idaho State Department of Agriculture (ISDA) conducted a water quality monitoring program for pesticides on the Big Wood and Little Wood Rivers. The Big Wood River resides in Hydrological Unit Code (HUC) 17040219 and the Little Wood is located in HUC 17040221.

There were three monitoring station established on the Little Wood River (LWR-1, LWR-2, and LWR-3) and two monitoring sites (BWR-1 and BWR-2) established on the Big Wood River (Figure 1). There were a total of 12 samples collected from each location during this program. The original upstream site on the Little Wood (LW-3) was established at the bridge on Highway 26 in Carey, Idaho but only one sample could be collected there before the site went dry due to irrigation diversions.

The new LW-3 site was established approximately four miles south of Richfield, Idaho where the Little Wood crosses under Highway 26. Station LWR-2 was located just downstream of where the Milner-Gooding canal enters the Little Wood River. The final site on the Little Wood (LW-1) was located in Gooding where 9th Street and Colorado Street intersect to the west of town.

The Big Wood site BW-2 was located near the irrigation diversion in Bellevue, Idaho; while BW-1 was located where County Road 1700 crosses over the Big Wood River, just north of Gooding, Idaho.

The Big Wood River is located in four counties: Blaine (67%), Camas (5%), Gooding (18%), and Lincoln (17%) (IDEQ, 2002). The Little Wood River is also located in four counties with the majority in Blaine County (58.6%), followed by Lincoln (37%), with a small portion in Good-

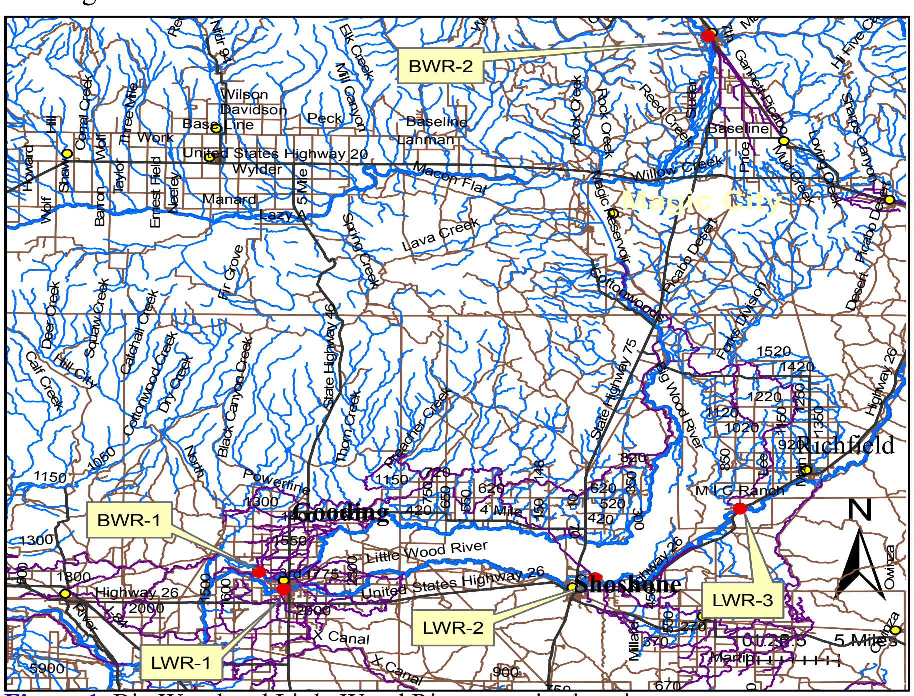


Figure 1. Big Wood and Little Wood Rivers monitoring sites.

ing County (3.0%) and Jerome County (1.4%) (IDEQ, 2005).

The Little Wood River watershed encompasses approximately 724,130 acres while the Big Wood River watershed contains approximately 957,520 acres (NRCS, 2005 and 2006). Land usage and approximate acreage is listed in Table 1.

Table 1. Big and Little Wood River land usage and acreage.

Little Wood River	Acreage	Big Wood River	Acreage
Forest	33,190	Forest	179,260
Grain Crops	30,690	Grain Crops	31,270
Grass/Pasture/Hay	165,430	Grass/Pasture/Hay	208,960
Row Crops	28,850	Row Crops	24,310
Shrub/Rangelands	446,310	Shrub/Rangelands	457,190
Others	19,210	Others	11,470
Total	724,130	Total	957,520

Analytical Methods and Quality Assurance

Analytical testing was conducted at the University of Idaho Analytical Science Laboratory (UIASL) in Moscow, Idaho. Analytical methods and techniques are listed in Table 2.

Table 2. UIASL methods and techniques.

Method	Compounds	Techniques
EPA 507	Nitrogen and phosphorus	Gas Chromatography Mass Selective Detector
	containing pesticides	Gas Chromatography Flame Photmetric Detector
EPA 508	Chlorinated pesticides	GC/MSD and GC/FPD
EPA 515.2	Chlorinated Acids (Herbicides)	Gas Chromatograph Electron Capture Detector
		GC/MSD
EPA 632	Carbamates and Urea pesticides	Liquid Chromatography Mass Selective Detector

UIASL follows strict quality control guidelines that require the extraction and analysis of samples be accompanied by laboratory fortified blanks, reagent blanks, laboratory fortified matrix spikes, quality control samples, and performance check standards to evaluate and document data quality. All analyte spikes and surrogate standard recoveries during this study were within acceptable ranges (70-130%), indicating that pesticide residues were accurately recovered.

For field quality assurance (QA) three types of QA samples were submitted during this project including: duplicates, field blanks, and equipment blanks. All QA samples were submitted to UIASL as blind samples. All field and equipment blanks submitted during this study resulted in non-detectable results indicating both field and laboratory activities were free from contamination. Relative percent difference (RPD) calculated on field duplicates had a range of 0-26%, an overall mean of 9%, and a median of 7.5%.

Sampling Methods

Samples for this project were collected using a USDH-81 depth integrated suspended sediment sampler. The sampler was equipped with a one-liter glass sample bottle and a Teflon cap and nozzle.

Multiple discrete vertical samples from each site were composited into a clean 2.5 gallon glass carboy. The composite sample was then poured off into three laboratory cleaned, one-liter amber glass bottles. All sampling equipment was thoroughly cleaned between monitoring locations using the following procedure: thorough scrubbing with deionized water and Liqui-Nox detergent, deionized water rinse, acetone (high resolution chromatography grade) rinse, followed by a deionized water rinse. The equipment was then rinsed with source water just prior to collection.

All samples from each study were placed in a cooler on ice for shipment directly to the UIASL. All samples were shipped priority overnight and Chain-of-Custody protocols were followed throughout the project.

Overall Results

The five sampling sites monitored for this study had a total of 11 detections of five pesticide compounds (Figure 2).

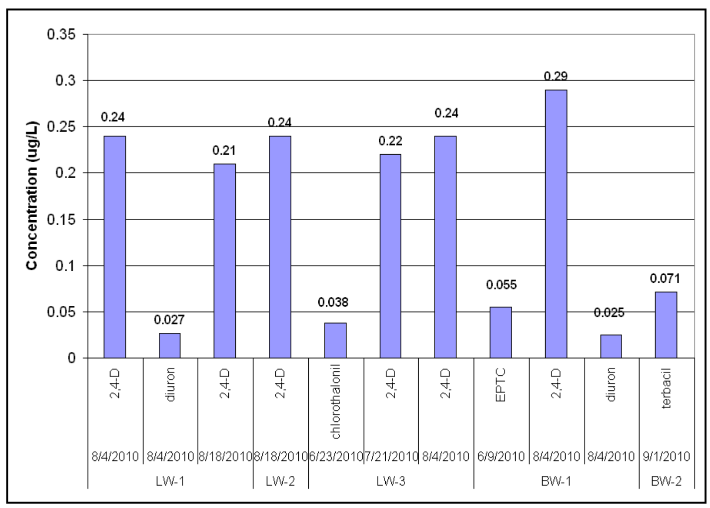


Figure 2. Total pesticides detected during this study.

Stations LW-1, LW-3, and BW-1 all had three pesticide detections while LW-2 and BW-2 each had only one detection. Of the five pesticide compounds detected four (2,4-D, diuron, EPTC, and terbacil) are general use herbicides for weed control. The pesticide chlorothalonil which was detected once at LW-3 is a fungicide. Out of 11 detections six were 2,4-D, two were diuron, and one detection each of EPTC, chlorothalonil, and terbacil.

The four herbicides 2,4-D, diuron, EPTC, and terbacil all exhibit moderate to low toxicity to aquatic organisms (Extoxnet, 1996). Chlorothalonil is considered highly toxic to fish and aquatic invertebrates but at much higher concentrations then found in this study. Table 3 compares the detected pesticide concentrations for each location with the Environmental Protection Agencies (EPA) acute and chronic Aquatic Life Benchmarks for pesticides.

Table 3. Pesticide detections and Aquatic Benchmarks.

				EPA Aquatic Life Bencmarks ug/L			
Site	**Date**	**Pesticide**	**Concentration**	**Fish Acute**	**Fish Chronic**	**Inv. Acute**	**Inv. Chronic**
LW-1	8/4/2010	2,4-D	0.24	50,000	14,200	12,500	16,400
	8/4/2010	diuron	0.027	200	26	80	200
	8/18/2010	2,4-D	0.21	50,000	14,200	12,500	16,400
LW-2	8/18/2010	2,4-D	0.24	50,000	14,200	12,500	16,400
LW-3	6/23/2010	chlorothalonil	0.038	5.25	3	1.8	0.6
	7/21/2010	2,4-D	0.22	50,000	14,200	12,500	16,400
	8/4/2010	2,4-D	0.24	50,000	14,200	12,500	16,400
BW-1	6/9/2010	EPTC	0.055	7,000	—	3,245	—
	8/4/2010	2,4-D	0.29	50,000	14,200	12,500	16,400
	8/4/2010	diuron	0.025	200	26	80	200
BW-2	9/1/2010	terbacil	0.071	23,100	1,200	32,500	640

Conclusions

The low number of pesticide detections within these two large watersheds indicates, at this time, that pesticide residues within both the Big and Little Wood Rivers are not a threat to aquatic organisms. The herbicides detected, during this study, all have high concentration thresholds for acute and chronic impacts on fish or aquatic invertebrates. The fungicide (chlorothalonil) has lower acute and chronic levels for aquatic organisms but the one detection at LW-3 was lower than the EPA aquatic benchmarks. The majority of agricultural acreage in these two watersheds consist of grass, pasture, and hay lands. These types of agricultural activities are not known for heavy pesticide usage; and the majority of irrigation is sprinkler which reduces the potential for runoff.

The herbicides found were all common GUP pesticides so care should be taken by applicators to follow label requirements to prevent losses of these pesticides into surface waters.

References

Idaho Department of Environmental Quality, May 2002. Big Wood River Watershed Management Plan.

Idaho Department of Environmental Quality, September 2005. Little Wood River Subbasin Assessment and TMDLs.

Natural Resource Conservation Service, Rapid Watershed Assessment, 2005 and 2006. http:www.id.nrcs.usda.gov/technical/watersheds.html.