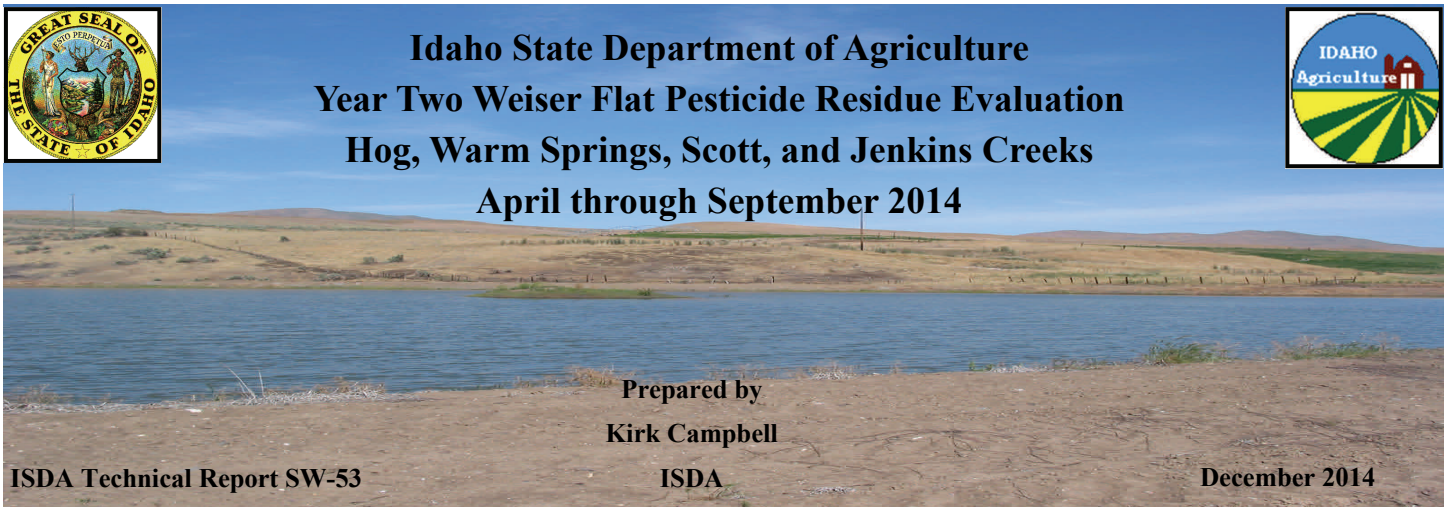

Idaho State Department of Agriculture
Year Two Weiser Flat Pesticide Residue Evaluation
Hog, Warm Springs, Scott, and Jenkins Creeks
April through September 2014

Prepared by

Kirk Campbell

ISDA

ISDA Technical Report SW-53 **December 2014**

Introduction

The Idaho State Department of Agriculture (ISDA) conducted a second year of pesticide monitoring on four creeks that are located west of Weiser, Idaho within the Weiser Flat area (Figure 1). The four creeks: Hog Creek (HC-1), Warm Springs Creek (WS-1), Scott Creek (SC-1), and Jenkins Creek (JC-1) were monitored for pesticides on a bi-weekly schedule from April 23 through September 24, 2014.

Currently Warm Springs, Scott, and Jenkins Creeks are listed on the Idaho Department of Environmental Quality's 2012 Integrated Report: Category 5 (§303(d)) list for pesticides. The 2012 Integrated report lists Jenkins Creek for chlorpyrifos, Scott Creek and Warm Spring Creek for methyl parathion. Methyl parathion is no longer registered by the EPA and the next IDEQ Integrated Report should reflect the cancellation of methyl parathion for both Scott and Warm Spring Creeks.

Pesticides of Concern (POC)

ISDA considers a potential Pesticide of Concern (POC) as any pesticide detection that is greater than or equal to fifty percent (≥ 50%) of an established Environmental Protection Agency (EPA) Aquatic Life Benchmark. These established EPA Aquatic Life Benchmarks list pesticide concentrations that could have acute or chronic effects on fish and invertebrates and acute effects on both nonvascular and vascular plants.

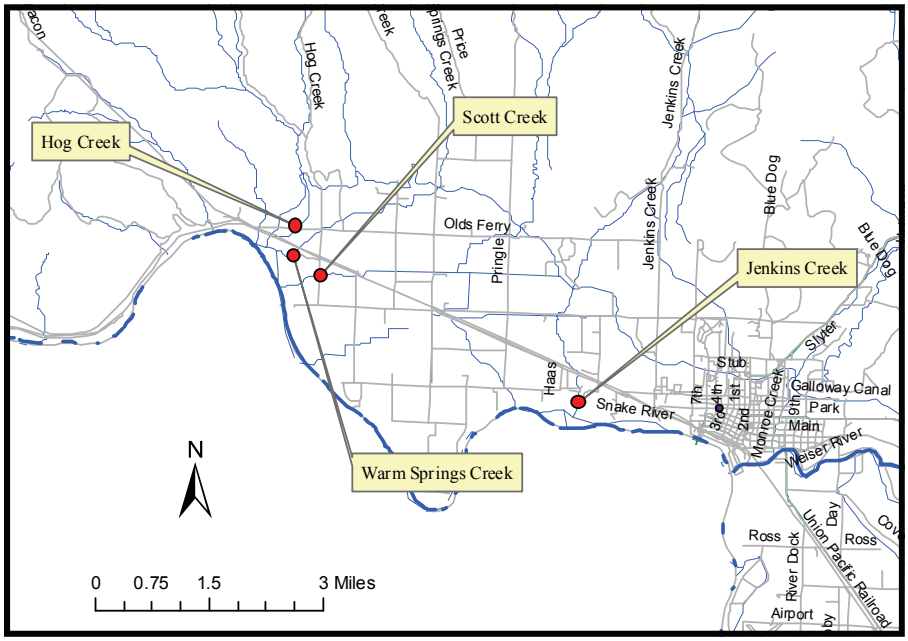

Figure 1. Hog Creek, Warm Springs Creek, Scott Creek and Jenkins Creek monitoring locations.

Results

In 2014, there were a total of 158 detections, which is down from the 178 detections in 2013 (Figure 2). There were fewer herbicide detections in 2014 (149) when compared to the 2013 data (156). Total insecticide detections were down considerably in 2014 (5) when compared to the 2013 data (13). This variability in detections is brought on by a variety of conditions including: monitoring schedule, pesticide use patterns, crop rotation, irrigation changes, management, and rainfall distribution, to name a few. Better understanding of these variables, along with long term monitoring, can help us better understand pesticide usage and its presence in surface water and ground water.

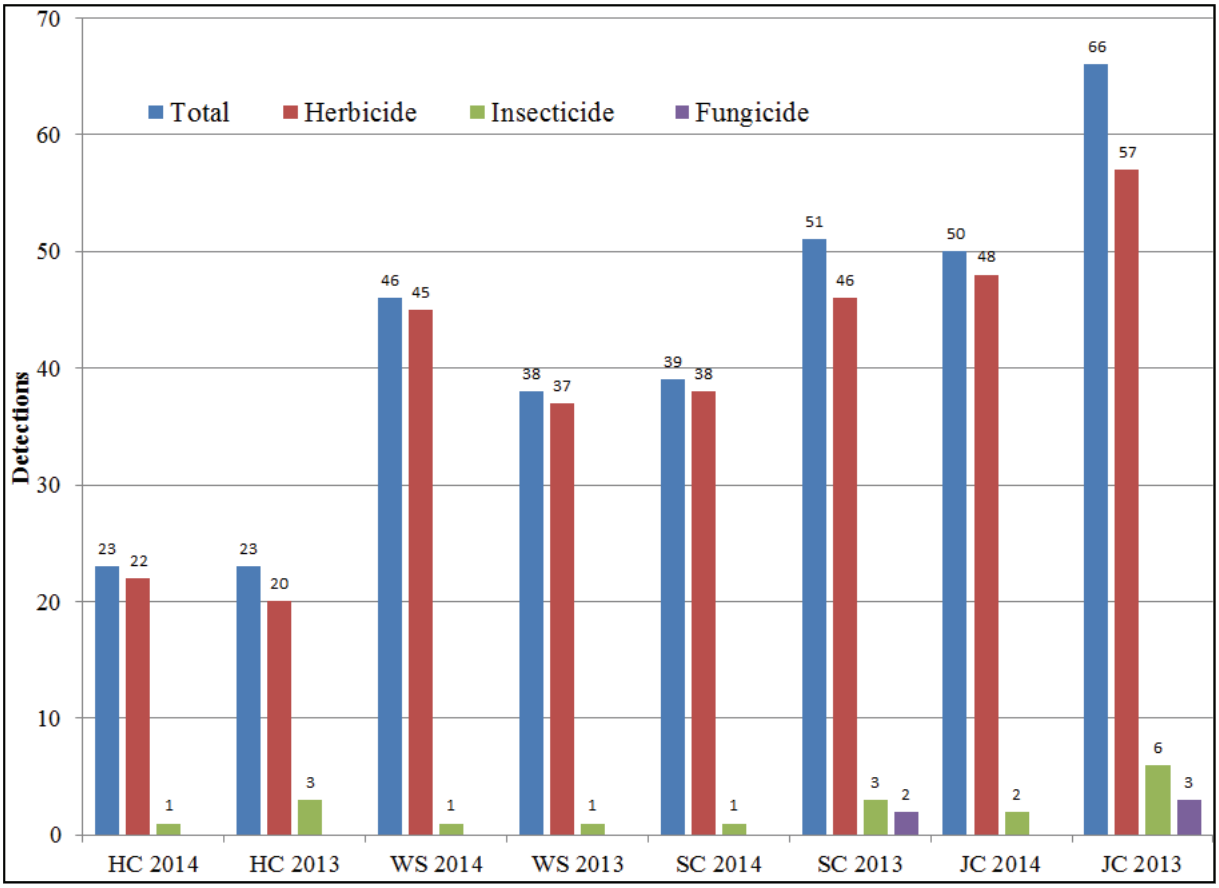

Figure 2. Pesticide type and total detections in monitoring years 2014 and 2013.

Pesticides detected in 2014, along with number of detections, type of pesticide, and trade names, are listed in Table 1.

Table 1. List of detected pesticides in 2014, those in red are insecticides.

Pesticide	# Detects	Type	*Trade Name	Pesticide	# Detects	Type	*Trade Name
2,4-D	35	H	Weedar 64	hexazinone	4	H	Velpar
bromacil	3	H	Hyvar X	MCPA	9	H	Rhomene
bromoxynil	16	H	Buctril	metolachlor	24	H	Dual
chlorpyrifos	5	I	Lorsban	metribuzin	4	H	Sencor
desethyl atrazine	4	D	NA	oxyfluorfen	7	H	Goal
dicamba	19	H	Dicamba 4	pendimethalin	24	H	Prowl
diuron	1	H	Karmex	prometon	1	H	Sonora 4SC
ethalfluralin	1	H	Sonalan	triclopyr	1	H	Trycera

H= Herbicide, I = Insecticide, D = degradate of atrazine. Pesticide in red is an insecticide. * Trade Names may vary.

Hog Creek had nine pesticides detected, with eight herbicides and one insecticide (Table 2). There were a total of 23 detections with 22 herbicides and one insecticide. The one insecticide detection was for the organophosphate pesticide chlorpyrifos. The one chlorpyrifos detection is considered a POC by ISDA because it is ≥ 50% of an established EPA Aquatic Benchmark (Table 2).

Table 2. Hog Creek pesticide results

Pesticide Detected	Pesticide Type	Number of Detections	Highest Detection ppb	Fish Acute ppb	Fish Chronic ppb	Inverts. Acute ppb	Inverts. Chronic ppb	Non Vasc. Acute ppb	Vascular Acute ppb
2,4-D	H	9	0.67	12,075	14,200	12,500	16,050	3,880	13.1
bromacil	H	1	0.09	18,000	3,000	60,500	8,200	6.8	45
bromoxynil	H	1	0.20	26.5	18	48	2.5	51	–
chlorpyrifos	I	1	0.049	0.9	0.57	0.05	0.04	140	–
dicamba	H	5	0.13	14,000	–	17,300	–	61	>3,250
MCPA	H	1	0.26	14,000	–	17,300	–	61	>3,250
metirbuzin	H	1	0.042	21,000	3,000	2,100	1,290	8.7	130
metolachlor	H	2	0.077	1,600	1,000	550	1	8	21
pendimethalin	H	2	0.13	69	6.3	140	14.5	5.2	12.5

Warm Springs Creek had a total of 46 detections with 45 herbicides detections and one insecticide (Table 3). Overall, there were nine pesticides detected with eight herbicides and one insecticide. The POC insecticide chlorpyrifos had one detection and the herbicide metolachlor had three detections that exceeded the invertebrate chronic criteria and one that was ≥50% of the invertebrate chronic benchmark (Table 3).

Table 3. Warm Springs Creek pesticide results.

Pesticide Detected	Pesticide Type	Number of Detections	Highest Detection ppb	Fish Acute ppb	Fish Chronic ppb	Inverts. Acute ppb	Inverts. Chronic ppb	Non Vasc. Acute ppb	Vascular Acute ppb
2,4-D	H	9	1.1	12,075	14,200	12,500	16,050	3,880	13.1
bromoxynil	H	6	1.1	26.5	18	48	2.5	51	–
dicamba	H	8	1.3	14,000	–	17,300	–	61	>3,250
MCPA	H	4	1.1	14,000	–	17,300	–	61	>3,250
chlorpyrifos	I	1	0.047	0.9	0.57	0.05	0.04	140	–
hexazinone	H	1	0.083	137,000	17,000	75,800	20,000	7	37.4
metolachlor	H	9	1.7	1,600	1,000	550	1	8	21
			1.6	1,600	1,000	550	1	8	21
			0.83	1,600	1,000	550	1	8	21
			1.2	1,600	1,000	550	1	8	21
metribuzin	H	1	0.043	21,000	3,000	2,100	1,290	8.7	130
oxyfluorfen	H	1	0.054	102	1.3	40	13	0.29	0.35
pendimethalin	H	6	0.041	69	6.3	140	14.5	5.2	12.5

Scott Creek had 13 pesticides identified with 12 herbicides and one insecticide. There was a total of 39 detections with 38 herbicides and one insecticide. The organophosphate chlorpyrifos had one detection that exceeded ISDA's POC criteria for both acute and chronic invertebrates. The herbicide metolachlor had three detections that were ≥50% of the invertebrate chronic benchmark (Table 4).

Table 4. Scott Creek pesticide results.

Pesticide Detected	Pesticide Type	Number of Detections	Highest Detection ppb	Fish Acute ppb	Fish Chronic ppb	Inverts. Acute ppb	Inverts. Chronic ppb	Non Vasc. Acute ppb	Vascular Acute ppb
2,4-D	H	9	2.1	12,075	14,200	12,500	16,050	3,880	13.1
bromacil	H	2	0.055	18,000	3,000	60,500	8,200	6.8	45
bromoxynil	H	3	0.64	26.5	18	48	2.5	51	–
chlorpyrifos	I	1	0.059	0.9	0.57	0.05	0.04	140	–
dicamba	H	5	0.16	14,000	–	17,300	–	61	>3,250
ethalfluralin	H	1	0.079	16	0.4	30	24	25	–
hexazinone	H	1	0.086	137,000	17,000	75,800	20,000	7	37.4
MCPA	H	2	0.72	14,000	–	17,300	–	61	>3,250
metolcahlor	H	6	0.82	1,600	1,000	550	1	8	21
			0.69	1,600	1,000	550	1	8	21
			0.82	1,600	1,000	550	1	8	21
metribuzin	H	1	0.049	21,000	3,000	2,100	1,290	8.7	130
oxyfluorfen	H	1	0.081	102	1.3	40	13	0.29	0.35
pendimethalin	H	6	0.11	69	6.3	140	14.5	5.2	12.5
triclopyr	H	1	0.13	58,500	–	66,450	–	29,800	–

Jenkins Creek had the highest number of pesticide detections with 50, which is lower than the 66 detections in 2013. There were 44 herbicide detections, two insecticide detections, and four detections of the degradate of atrazine (desethyl atrazine). There were a total of 13 pesticides identified with 11 herbicides, one insecticide, and one desethyl atrazine. There were two detections of chlorpyrifos that exceeded the POC criteria of ≥ 50% of acute and chronic concentrations for invertebrates. Metolachlor had one detection out of seven that exceeded the invertebrate chronic EPA benchmark (Table 5).

Table 5. Jenkins Creek pesticide results.

Pesticide Detected	Pesticide Type	Number of Detections	Highest Detection ppb	Fish Acute ppb	Fish Chronic ppb	Inverts. Acute ppb	Inverts. Chronic ppb	Non Vasc. Acute ppb	Vascular Acute ppb
2,4-D	H	8	0.50	12,075	14,200	12,500	16,050	3,880	13.1
bromoxynil	H	6	1.1	26.5	18	48	2.5	51	–
chlorpyrifos	I	2	0.048	0.9	0.57	0.05	0.04	140	–
	I		0.099	0.9	0.57	0.05	0.04	140	–
desethyl atrazine	D	4	0.034	2,650	–	360	60	<1	0.001
dicamba	H	1	0.081	14,000	–	17,300	–	61	>3,250
diuron	H	1	0.12	200	26	80	200	2.4	15
hexazinone	H	2	0.098	137,000	17,000	75,800	20,000	7	37.4
MCPA	H	2	1.0	14,000	–	17,300	–	61	>3,250
metolachlor	H	7	1.8	1,600	1,000	550	1	8	21
metribuzin	H	1	0.044	21,000	3,000	2,100	1,290	8.7	130
oxyfluorfen	H	5	0.12	102	1.3	40	13	0.29	0.35
pendimethalin	H	10	0.55	69	6.3	140	14.5	5.2	12.5
prometon	H	1	0.10	6,000	19,700	12,850	3,450	98	–

Conclusions

Total pesticide detections were down for the 2014 study (158) when compared to the data collected in 2013 (178). Herbicide detections were down from 156 in 2013 to 149 in 2014, which is only a five percent decrease. The largest decrease (62%) occurred for the insecticide detections which went from 13 in 2013, to five detections in 2014. The reason behind the decreases is unknown, but pesticide detections vary due to pesticide use patterns, changes in cropping and pesticide use, irrigation techniques, weather conditions, monitoring schedule and numerous other factors. Long term monitoring and additional data gathering may help to identify and reduce sources of pesticides that are entering these creeks.

The pesticide of concern identified during this study was the insecticide chlorpyrifos for Hog, Warm Springs, Scott and Jenkins Creeks. Chlorpyrifos is an organophosphate insecticide and can be highly toxic to aquatic species. The other pesticide of concern was metolachlor for Warm Springs, Scott, and Jenkins Creeks. Metolachlor is a herbicide used to control broadleaf and annual grassy weeds. Concentrations of metolachlor, during this study, were at levels that could have chronic effects on invertebrates. There was an increase for 2014 in the detection of the herbicide metolachlor (24), when compared to 2013 (12). In 2013 there were only three metolachlor detections that were considered a POC, while there were eight POC concentrations in 2014. ISDA may conduct an additional year of monitoring, in 2015, to evaluate the rising trend in metolachlor (Dual) detections.