



Idaho State Department of Agriculture Surface Water Pesticide Fact Sheet Lower Boise River and Select Drainages, 2016



ISDA Surface Water Fact Sheet

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July 2017

In 2016, the Idaho State Department of Agriculture (ISDA) conducted a pesticide residue-monitoring program at two locations on the Lower Boise River and two tributaries/drainages to the Lower Boise River (Figure 1). The two locations on the Lower Boise River were near bridges in Parma (LBR-1), and Notus (LBR-2). The two tributaries/drainages were Mason Creek (MC-1) at Polk Street in Caldwell, and Dixie Slough (DS-1) at Boise River Road. The Lower Boise River monitoring began on May 25, 2016. Samples were collected at all sites through September 26, 2016. The samples were shipped to and analyzed by the Idaho Food Quality Assurance Laboratory (IFQAL), located in Twin Falls, Idaho. Pesticide monitoring in the Lower Boise River watershed has been ongoing since 2009.

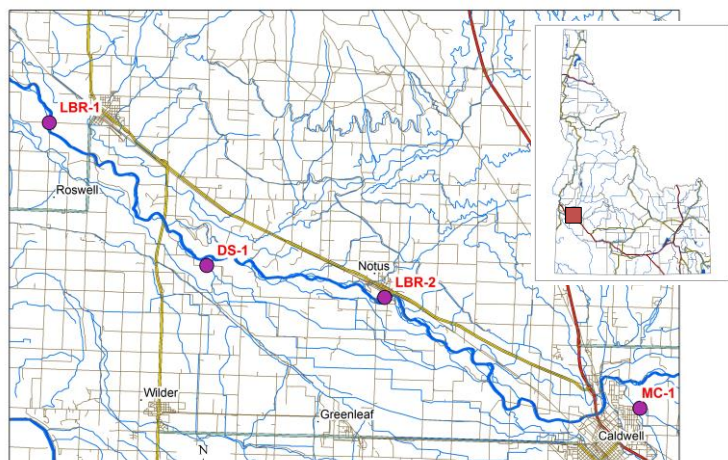


Figure 1. Monitoring sites: Lower Boise River, Dixie Slough, and Mason Creek.

The Lower Boise River is considered to initiate at Lucky Peak dam, and flows approximately 64-miles through the Treasure Valley and a mix of urban and rural land-uses before terminating at the confluence with the Snake River, near Parma, Idaho. The Lower Boise River Watershed is approximately 825,600 acres and has multiple impairments to the water quality from several factors, including sediment, total phosphorus and bacteria.

At the four monitoring locations, approximately 60 samples collected, and each sample was analyzed for nearly 110 pesticide compounds. Twenty-one different pesticide compounds were identified (all locations combined) during this study. They consisted of ten herbicides; six insecticides, four fungicides, and one degradate of atrazine (Desethyl atrazine). There were 171

pesticide detections which consisted of 104 herbicides, 33 insecticides, 30 fungicides and four detections of the degradate of Atrazine (Desethyl atrazine). The pesticides with the highest number of detections were the herbicides 2,4-D with 30, whereas Ethoprop had 13 detections, the most for an insecticide (Table 2).

Table 1. Overall Detections.

Location	Herbicide	Insecticide	Fungicide	Atrazine degradate	Total
DS-1	24	4	7	0	35
LBR-1	20	6	4	0	30
LBR-2	18	6	3	1	28
MC-1	42	17	16	3	78
Total	104	33	30	4	171

Of the 21 pesticide compounds identified, four that were measured at high levels (Table 1 and Figure 2). The greatest concern is with Chlorpyrifos, Ethoprop, Desethyl atrazine (an Atrazine degradate), and Methomyl, all of which exceeded an Aquatic Life Benchmark in the Boise River and Mason Creek. Chlorpyrifos concentrations were identified at twice the acute invertebrate benchmark. Three of the five Chlorpyrifos detections exceeded the acute invertebrate benchmark, whereas the other two detections were greater than 50% of the acute invertebrate benchmark.

Twice Ethoprop was detected at high concentrations. Once it was detected at two-times the chronic invertebrate benchmark in the Boise River. The second detection was 50% above the chronic invertebrate

benchmark in Mason Creek. Desethyl atrazine was measured at concentrations in both the Lower Boise River and Mason Creek. Each of the four Desethyl atrazine detections exceeded the acute vascular plant benchmark. Methomyl exceeded the chronic invertebrate benchmark in Mason Creek in one sample, out of the ten times it was detected during the study.

Assessment of potential impacts to the aquatic life and habitat was beyond the scope of this study.

Pesticides of Concern

ISDA defines a pesticide of concern (POC) as any pesticide that is detected at a concentration that is greater than or equal to fifty percent ($\geq 50\%$) of an established US EPA Aquatic Life Benchmark. Table 2 lists the pesticides detected in 2016, the number of detections, POC detections, and whether those pesticides have historically been considered a POC in the surface waters of Idaho. The benchmarks are developed for acute and chronic effects on fish, aquatic invertebrates, and acute effects on vascular and nonvascular plants. Acute toxicity of a pesticide refers to the effects from a single dose or repeated exposure over a short period of time (i.e. a few hours or a day). Chronic toxicity is the ability of a substance to cause adverse health effects resulting from long-term or repeated low levels of exposure.

Table 2. Lower Boise River Detections-ISDA historically identified pesticides of Concern; red font indicates POC detections in 2016.

Pesticide	Number of Detections	Type	ISDA POC
2,4-D	30	Herbicide	
Azoxystrobin	10	Fungicide	
Bentazon	26	Herbicide	
Boscalid	6	Fungicide	
Bromoxynil	1	Herbicide	POC
Chlorpyrifos	5	Insecticide	POC
Desethyl atrazine	4	Degredate	
Dicamba	1	Herbicide	
Dimethoate	3	Insecticide	POC
Diuron	11	Herbicide	
EPTC	1	Herbicide	
Ethoprop	13	Insecticide	POC
Imidacloprid	1	Insecticide	
MCPA	2	Herbicide	
Methomyl	10	Insecticide	POC
Metolachlor	20	Herbicide	POC
Oxamyl	1	Insecticide	POC
Pendimethalin	6	Herbicide	
Propiconazole	10	Fungicide	
Pyraclostrobin	4	Fungicide	
Terbacil	6	Herbicide	

concentration exceeded either the POC or Aquatic Life Benchmark. While some benchmarks were exceeded, these instances may not meet the threshold for impairment of beneficial uses as described in the Idaho Code and DEQ's Water Body Assessment Guidance.

ISDA will continue to educate landowners and applicators about the potential impacts that pesticides can have on water quality and the environment. ISDA shares our data with the Idaho Department of Environmental Quality (DEQ), US EPA, our cooperators and inspectors. ISDA will continue to monitor the Boise River water quality for pesticide residue.

Special thanks to Daniel Sandoval, ISDA, and the US EPA for contributing to this report.

For additional information about this program or projects, please contact Curtis Cooper, Idaho State Department of Agriculture at (208) 332-8597 or email at curtis.cooper@isda.idaho.gov

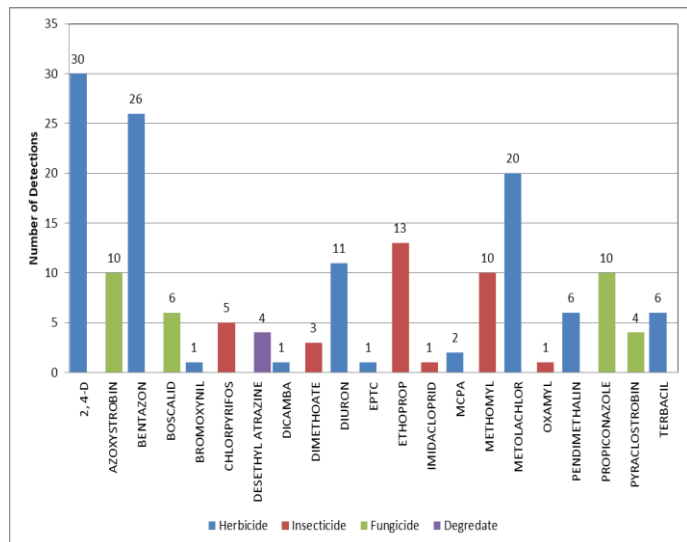


Figure 2. Pesticide detections and type.

Conclusions

There were POC detections at all of the riverine monitoring stations during this study. Several pesticides exceeded an aquatic life benchmark (where the POC level is half the benchmark). Based on the measured concentrations, Chlorpyrifos is of special interest as it can be toxic to freshwater fish, and is highly toxic to aquatic invertebrates. The LBR-1, LBR-2, MC-1 sites had detections that exceeded the Acute (and Chronic) benchmarks for invertebrates of the insecticide Chlorpyrifos, with additional detections above the POC level.

Of additional note, there are regular detections of 2,4D, Bentazon, and Metolachlor. While many of these were at levels well below any aquatic life benchmarks, these detections indicate that there is opportunity to improve the retention of these pesticides in the locations they were intended. Removal of pesticides not only decreases their effectiveness where applied, but also represents an economic loss.

There is concern that these concentrations may lead to additional impairments to the Lower Boise River habitat and beneficial uses. Assessment of impacts to the aquatic life and habitat was beyond the scope of this study. However, data are provided to Idaho DEQ so that they can determine if there are any impairments to beneficial uses associated with the monitored locations for those instances where measured