Idaho State Department of Agriculture
Surface Water Pesticide Fact Sheet
Henry's Fork – Teton Rivers, 2018

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ISDA Surface Water Fact Sheet

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Background

In 2018, the Idaho State Department of Agriculture (ISDA) conducted water quality monitoring for pesticide residues at six locations in the Henry's Fork River and Teton River Subbasins (Figure 1). This study was designed to determine if pesticide residues were being mobilized from contributing areas into these rivers and streams. There is concern that pesticide residues may reach surface waters since the majority of acreage in these subbasins is in cultivated agricultural production. The riverine sites were monitored at six locations in the subbasins, Upper Henry's Fork (HUC 17040202) – Lower Henry's Fork (HUC 17040203) – and Teton (HUC 17040204) (Figure 1). Portions of these greater subbasins reside in areas outside of the borders of Idaho and pesticide residue impacts from these areas were not expected. The areas outside of Idaho either border, or are within, Yellowstone National Park or Grand Teton National Park and are expected to have limited pesticide applications.

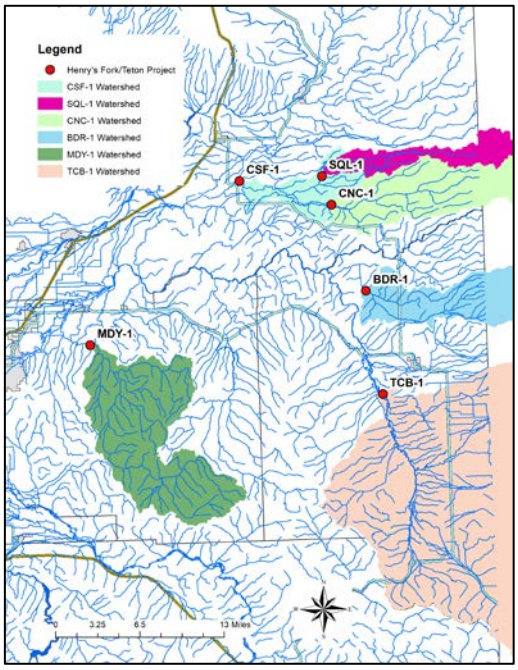

Figure 1. Monitoring locations in the Henry's Fork – Teton River Subbasins.

The monitoring project was designed to expand the identification of potential contributing areas within the subbasins. In 2017, seven sites on the mainstems of the Henry's Fork River and Teton River were monitored for pesticide residue. The Teton River monitoring at Cache Bridge/Packsaddle Rd (TCB-1) was the only location monitored in both 2017 and 2018. The other 2018 monitoring locations in the Teton River Subbasin were on Badger Creek (BDR-1) and on Moody Creek (MDY-1) (Figure 1). In 2018 tributary monitoring within the Henry's Fork River Subbasin included Conant Creek above the confluence with Squirrel Creek at N4400E (CNC-1), on Squirrel Creek above the confluence with Conant Creek near Squirrel (SQL-1), and at Conant Creek above the confluence with Fall River (NCSF-1) (Figure 1). Pesticide residue detection data will be used to focus ISDA outreach, training and future monitoring. ISDA uses the US Environmental Protection Agency (EPA) Aquatic Life Benchmarks to describe the water quality of these rivers and streams.

Sixty samples were collected at the six locations in the Henry's Fork and Teton Rivers subbasins; each sample was analyzed for approximately 110 pesticide compounds. However, Badger Creek was dry after July 10, 2018 and only 5 of the 11 sample dates had sufficient water for sample collection.

The overall contributing area has been delineated for each monitoring location (Figure 1). Pesticides mobilized in the surface waters within this area were expected to be identified at the downstream monitoring site. The areas contributing to the stream are a mix of land-use (cultivated agriculture, grazing, forestland and rural development). The contributing watershed was identified for each sample location (Figure 1). These delineated watersheds were developed to identify potential source zones.

Results

Three of the sample locations had no measureable detections of pesticides during the 2018 monitoring. One of these locations was on Badger Creek (BDR-1), which had no detections in the five samples submitted. The other two locations were in the upper Conant Watershed at the two locations above the confluence of Conant and Squirrel Creeks (CNC-1 and SQL-1). Lower Conant Creek, above the confluence with Fall River, had one low level detection of the herbicide Trifluralin, which is primarily used to control grasses and broadleaf weeds prior to sprouting. The measured detection (0.068 µg/L or 68 parts per trillion) was significantly below any Aquatic Life Benchmark (Table 1). Similarly, at the Teton River location there were also low-level detections of Triallate (0.079 µg/L), and 2,4-D (0.19 µg/L), both below benchmarks (Table 1).

The exception to these single detections was at Moody Creek on May 29, 2018, where nine low level detections were measured, and one concerning detection of Imidacloprid (Table 1). Of the nine low level detections, most were significantly lower than the benchmark. At the time of monitoring, there had been rain the night before, resulting in "very muddy" and elevated water levels.

Concerning Detections and Benchmarks

ISDA defines a concerning detection as any pesticide that is detected at a concentration that is greater than or equal to fifty percent (≥ 50%) of an established US EPA Aquatic Life Benchmark. There was one concerning detection during the 2018 monitoring. The only Imidacloprid detection exceeded the chronic invertebrate benchmark; however, it is not currently expected to meet the threshold for chronic exposure for invertebrates. 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 1. Pesticide detections and the maximum concentration.

Location	Pesticide	# Detections	Max (ug/L)
Conant at E 1000 N	Trifluralin	1	0.068
Moody at N 6000 E	2, 4-D	1	0.11
	Azoxystrobin	1	0.065
	Boscalid	1	0.12
	Bromoxynil	1	0.19
	Imidacloprid	1	0.23
	MCPA	1	0.37
	Metolachlor	1	0.37
	Metribuzin	1	0.43
	Pendimethalin	3	0.096
	Pentachlorophenol	1	0.14
Teton River	2, 4-D	1	0.19
	Triallate	1	0.79

Discussion

The May 29, 2018 detections of multiple pesticides and Imidacloprid are concerning, however; there were no other comparable sample dates or detections at the Moody Creek location for the remaining 2018 monitoring. Therefore, this was categorized as an isolated incidence that was most likely related to the rainfall and sediment load, not to pesticide application. Best management practices to limit soil mobilization from cultivated fields should mitigate these types of incidences. Based on findings from the 2018 monitoring, there is not a high priority concern that pesticides are being mobilized or transported into streams and rivers. As there were limited pesticide detections, these streams are not priority areas for 2019 monitoring. The single detection of the neonicotinoid Imidacloprid was elevated and categorized into the chronic benchmark levels, however the duration of exposure does not appear to have reached the chronic threshold.

Conclusions

Based on the findings from the 2017 and 2018 monitoring, there is not a high priority concern that pesticides are being mobilized or transported into streams and rivers in these Subbasins. In 2018, there was one detection of a pesticide above or near an Aquatic Life Benchmark. This was at a chronic level detection and there is no indication the duration was sufficiently prolonged to meet the threshold for impairments from chronic exposure. At three monitoring locations, there were no detections in samples submitted for analysis. The other locations typically had one or two pesticide detections, with the exception of Moody Creek.

As there were limited pesticide detections, these streams are not priority areas for 2019 monitoring. ISDA will continue to educate landowners and applicators about potential impacts that pesticides can have on water quality and the environment. ISDA shares data with the Idaho Department of Environmental Quality (DEQ), US EPA, our cooperators and inspectors. There are indications that there is a soil management (erosion) issue in this watershed, and this can move pesticides from their applied locations.

Assessment of potential impacts to the aquatic life and habitat was beyond the scope of this study. However, data are provided to the Idaho DEQ so they can determine if there are impairments to beneficial uses associated with the monitored locations for those instances where measured concentration were near or exceeded any Aquatic Life Benchmarks. There were no indications in 2017 and 2018 that Aquatic Life benchmarks were exceeded due to pesticides in the Henry's Fork/Teton Rivers Subbasins leading to impairments for aquatic life. Any potential future detections may be assessed against beneficial uses as described in the Idaho Code and DEQ's Water Body Assessment Guidance.

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