

Pesticide Stewardship Partnership Monitoring Summary

Clackamas River Watershed

February 2014

The Clackamas River provides drinking water for 400,000 people. Endangered fish spawn, rear and migrate in the Clackamas River and its tributaries. Thousands of people recreate on the Clackamas River year-round.

Several groups are collaborating to protect the Clackamas River watershed's resources and to understand how pesticides are degrading water quality, particularly for fish health and drinking water. The Oregon Department of Environmental Quality and local watershed-based groups initiated a Pesticide Stewardship Partnership in the Clackamas River watershed in 2005. The Pesticide Stewardship Partnership (PSP) is a collaborative monitoring, information sharing and problem solving effort. Regulations, alone, can't fully address all current pesticide issues because few current-use pesticides have established water quality standards. As well, mixtures of pesticides can result in greater impacts to aquatic life than a

single pesticide, on its own. DEQ has found the PSP model very successful at reducing pesticide concentrations in surface water in the Hood River, Mill Creek (The Dalles) and Walla Walla Basins. But land uses in the Clackamas River basin are more heterogeneous than in those basins, so pesticide stewardship strategies need to reflect that complexity. Pesticides in the Clackamas River watershed have many applications including residential lawns and gardens, business landscaping, public parks, road and ditch maintenance, nurseries, Christmas tree farms, forestry, and golf courses.

Since 2005, DEQ has monitored five sites on tributaries to the lower Clackamas River: Noyer Creek, North Fork Deep Creek (two locations), Rock Creek, and Sieben Creek (Figure 1). The two sites surrounded by agricultural land use, including nurseries, are on Noyer Creek and North Fork Deep Creek.

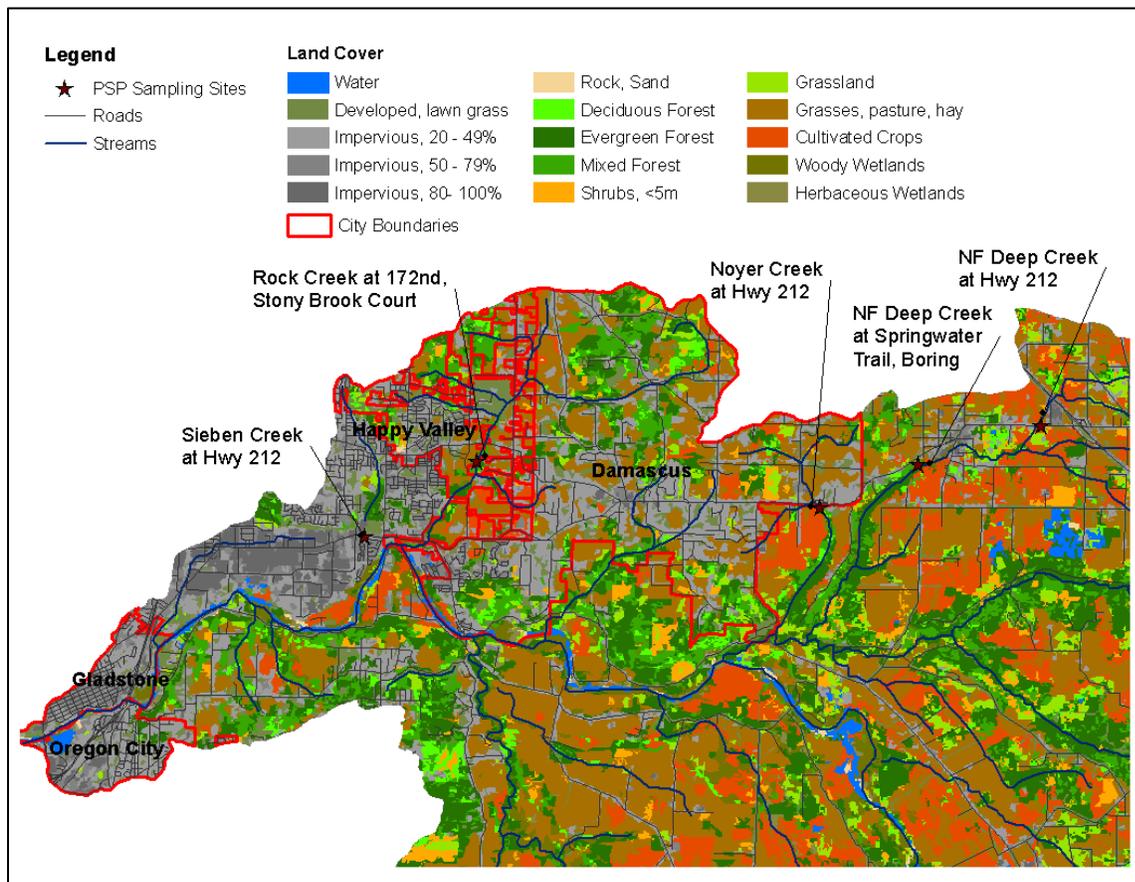


Figure 1: Pesticide Stewardship Partnership sampling sites in the Clackamas River watershed.

Sampling Results

Between 2005 and 2008, DEQ's monitoring focused primarily on organophosphate insecticides, but in 2009 expanded to include over 100 pesticides. While very few of those pesticides have water quality criteria, most have non-regulatory benchmarks developed by EPA's Office of Pesticide Programs. DEQ's sampling and analysis have identified several pesticides measured in Noyer Creek and North Fork Deep Creek samples. Chemicals in Table 1 are those with elevated concentrations relative to benchmarks or frequent, multi-year detections. Chemicals in bold were detected at least once over aquatic life benchmarks or Oregon water quality criteria.

acute water quality criteria have been set for chlorpyrifos (Lorsban). As of 2010, chlorpyrifos was detected in Noyer Creek and North Fork Deep Creek, but since 2008 average and maximum concentrations of chlorpyrifos at the North Fork Deep Creek sites have dropped below the chronic water quality criterion. In Noyer Creek, chlorpyrifos has been detected at least once at or over the chronic criterion each year since 2005 (Figure 2), with no obvious decreasing or increasing trend in concentrations or detections. Diazinon, another organophosphate insecticide, has been detected multiple times in the Clackamas Basin, including once over the benchmark in 2012, but detections have generally decreased in recent years.

The one pesticide found consistently in the Clackamas River watershed for which chronic and

Table 1: Pesticides in the Clackamas River watershed measured at concentrations exceeding benchmarks, or having frequent multi-year detections.

INSECTICIDES	HERBICIDES	FUNGICIDES
Chlorpyrifos (Lorsban)	Diuron (<i>Karmex</i>)	Chlorothalonil (Bravo)
Bifenthrin (Brigade)	Simazine (<i>Princep</i>)	Pyraclostrobin (<i>Headline</i>)
Diazinon (Knox Out)	Metolachlor (<i>Parallel</i>)	Propiconazole (<i>Propimax</i>)
Endosulfan Sulfate (<i>Thionex</i>)	Sufometuron-methyl (<i>Oust</i>)	
Imidacloprid (<i>Admire</i>)	Pendimethalin (<i>Prowl</i>)	
Carbaryl (<i>Sevin</i>)	Trifluralin (<i>Treflan</i>)	
	Oxyfluorfen (Goal)	
	Dichlobenil (<i>Casoron</i>)	

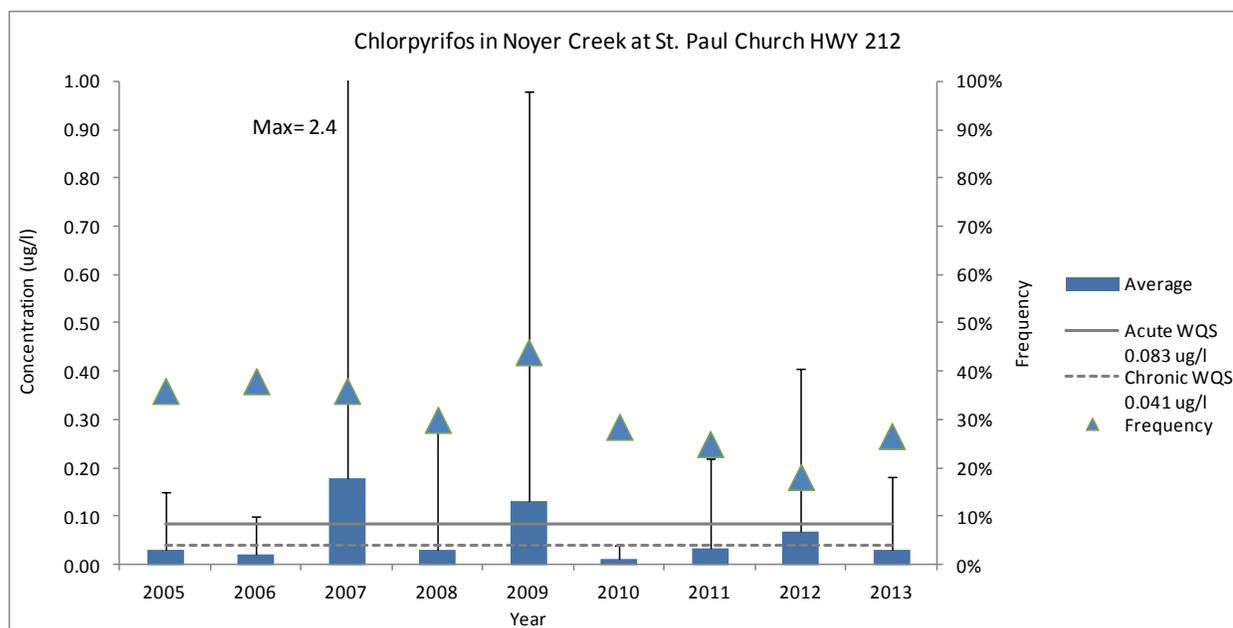


Figure 2: Summarized chlorpyrifos concentrations measured in Noyer Creek, 2005 – 2013.

With the addition of new pesticide analytes in 2009, the number of pesticides detected in Clackamas streams has increased. In 2013, 29 pesticides were detected. Figure 3 illustrates the four pesticides detected most frequently in the Clackamas River watershed from 2005 - 2013. Diuron has also been frequently detected but has only been analyzed since 2009, so is depicted

separately (Figure 4). The herbicides diuron and simazine in 2013 were detected in approximately 70% of the samples. These detections were all below benchmarks, but the maximum concentration of diuron in earlier years has exceeded 50% of the benchmark (Figure 4).

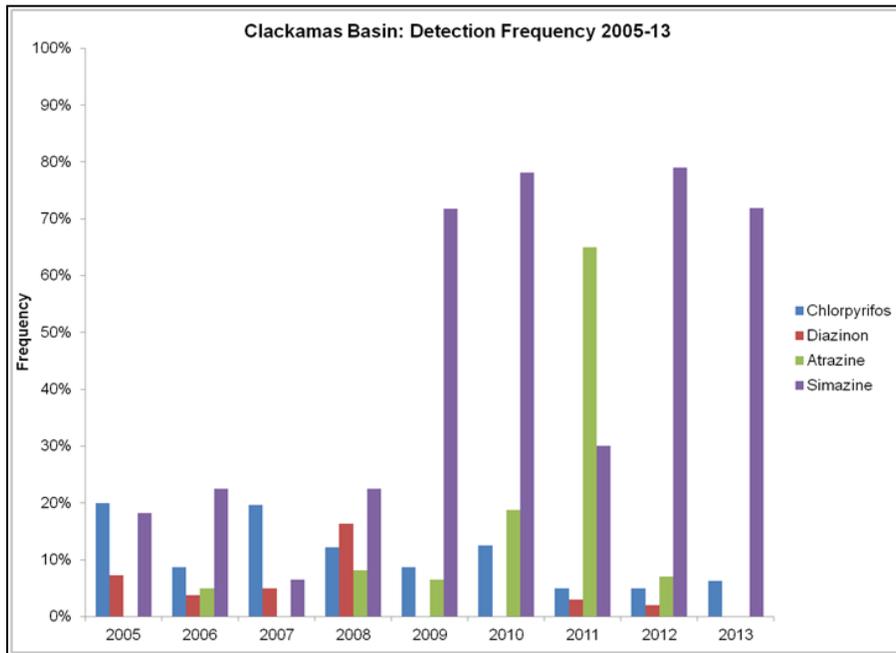


Figure 3: The most frequently detected pesticides in the Clackamas River watershed, 2005 – 2013.

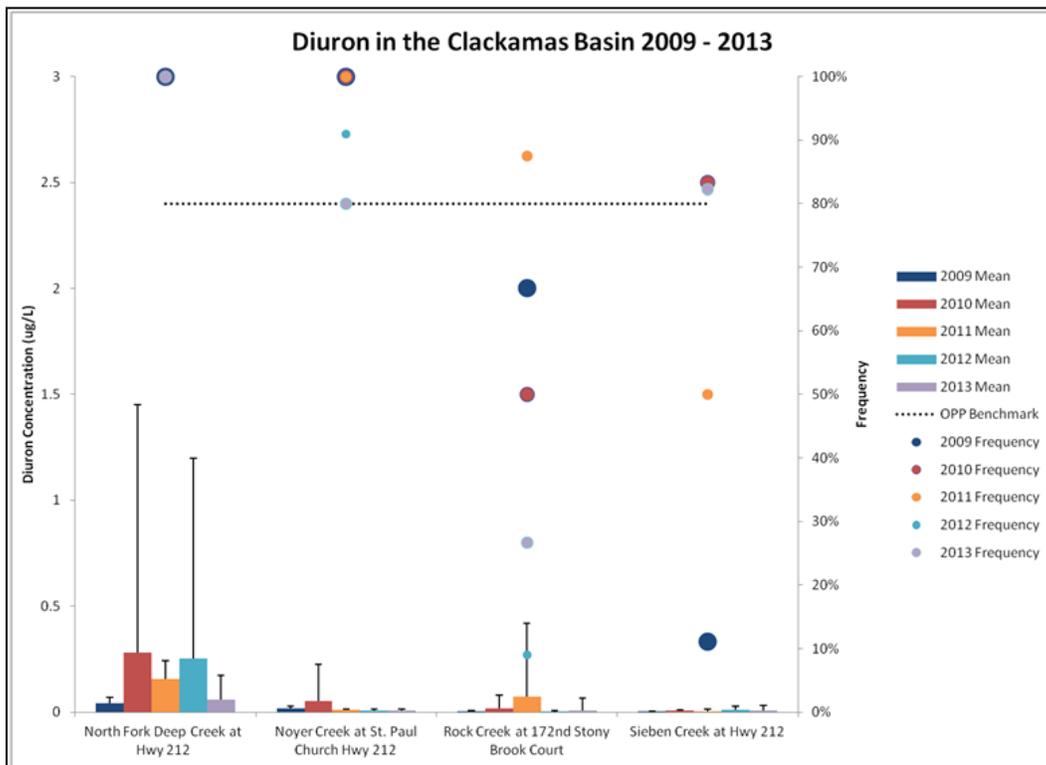


Figure 4: Diuron concentrations measured at four Clackamas River watershed sites, 2009 – 2013.

For More Information and Technical Assistance

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