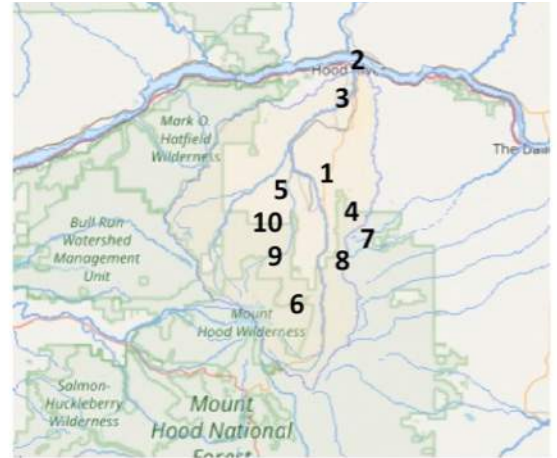




HOOD RIVER

Pesticide Stewardship Partnership 2015-17 Biennial Summary

- ▶ **History:** The Hood River Pesticide Stewardship Partnership (PSP) was established in 2000. Working closely with local stakeholders in the region, the Oregon Department of Environmental Quality (DEQ) began two pilot projects in the Columbia Gorge area: Hood River and Mill Creek. DEQ and local stakeholders assessed whether current-use pesticides were detectable in local surface waters at concentrations of concern. In both basins, initial data showed repeated detections of the pesticide chlorpyrifos at levels that failed meet state water quality standards. Hood River also had ambient water quality that didn't meet standards for the insecticide azinphos-methyl. Mill Creek (Wasco County) had elevated levels of the insecticide malathion. Local partners, including Columbia Gorge Fruit Growers and the Oregon State University Extension Service (OSU), used the water quality data and local expertise to change the region's pesticide management and application processes. Within a short time both pilot projects showed substantial improvements in water quality associated with changes in pesticide management practices. Continued monitoring indicates very few if any organophosphates are being found in water bodies, however continued detections of the herbicide diuron remain as a concern.
- ▶ **Land Use:** The Hood River PSP encompasses 340 square miles and contains substantial forest areas but managed land use is dominated by tree fruit. The largest city within the watershed is Hood River with a population of 7,140 (2017 PSU estimates). Based on 2011 National Land Coverage Data (NLCD), the breakdown of land use in the watershed is 62.2% forest, 24.7% other, 10.5% agriculture and 2.6% urban. The designation as "other" can include rangeland, wetlands, scrubland, etc.
- ▶ **Pesticide Monitoring:** As part of the PSP program, water quality is monitored for pesticide residues beginning in March and continuing through June and again in September and continuing through November. During the timeframe July 1, 2015 through June 30, 2017, water quality samples were collected from 10 locations. Water samples were taken at Upper Neal Creek, Lower Neal Creek, Lenz Creek, Odell Creek, and the mainstem Hood River. The program collects data from five routine sites 11972, 13141, 13183, 13249, and 32464. The remaining sampling sites were used to collect water quality data when sediment samples were collected as part of DEQ's Hood River sediment study.



Water Quality Monitoring Locations 2015-17

WATER QUALITY MONITORING STATIONS 2015-17 BIENNIUM

Station ID	Map Number	Description	Predominate Land Use	No. Detections	BM* Exceedances
11972	1	Lenz Creek at Mouth**	Mixed	135	1
12012	2	Hood River @ Footbridge I-84	Mixed	0	0
13141	3	Neal Creek at Mouth**	Orchards	97	0
13183	4	East Fork Neal Creek at Mouth**	Forestry, ROW	6	0
13249	5	Odell Creek US Of WWTP**	Orchards	60	1
25124	6	Evans Creek at Bridge	Orchards	2	0
30174	7	Upper Neal Creek	Forestry, ROW	3	0
32464	8	West Fork Neal Creek**	Forestry, ROW	12	1
34788	9	Rogers Spring Creek	Forestry, ROW	0	0
38333	10	East Fork Hood River DS Trout Creek	Orchard	0	0

*BM = US EPA Aquatic Life Benchmark for pesticides

Mixed = Urban, rural land uses ROW = Right of Way ** = Routine monitoring locations

WATER QUALITY DATA SUMMARY FOR ALL SAMPLE LOCATIONS 2015-17 BIENNIUM

Pesticide	Type	Benchmark Value µg/L	No. of Analysis	No. of Detections	Max. Conc. µg/L	Average Conc. µg/L	Percent Detections	Percent of Benchmark (Max. Conc.)
2,6-dichlorobenzamide	M	NA	124	86	.269	.048	69.4	
Acetamiprid	I	2.1	124	1	.028	.0002	.8	1.3
AMPA	M	249500	24	6	1.84	.0193	25	0.0
Atrazine	H	1	124	5	.03	.0005	4	3
Carbaryl	I	.5	124	14	.097	.0024	11.3	19.5
Desisopropylatrazine	M	NA	124	61	.031	.0044	49.2	
Dichlobenil	H	30	123	2	.065	.0007	1.6	.2
Diuron	H	2.4	124	75	.296	.022	60.5	12.3
Glyphosate	H	1800	25	3	.079	.043	12	0
Imazapyr	H	18	124	1	.075	.0006	.8	.4
Imidacloprid	I	.01	124	2	.093	.0011	1.6	926
Metsulfuron methyl	H	.36	116	2	.013	.0002	1.7	3.5
Propiconazole	F	21	124	4	.132	.0022	3.2	.6
Pyralostrobin	F	1.5	120	7	.018	.0006	5.8	1.2
Simazine	H	2.24	124	37	.173	.0058	29.8	7.7
Sulfometuron-methyl	H	.45	124	3	.028	.0003	2.4	6.3

Pesticides highlighted in red are of high concern, pesticides highlighted in yellow are of moderate concern based upon frequency of detection and maximum detected concentration as compared to the EPA aquatic life benchmark.

F = fungicide, H = herbicide, I = insecticide, M = metabolite (breakdown product)

Water quality monitoring during the 2015-17 biennium (July 1, 2015–June 30, 2017) has indicated the presence of numerous pesticides. However, with the exception of the insecticide imidacloprid, none of the detections have exceeded established U.S. Environmental Protection Agency's (EPA) aquatic life benchmarks. In 2017, the EPA lowered the aquatic life benchmark for imidacloprid from 1.05 µg/L to .01 µg/L. The result of this change is to elevate imidacloprid from what was previously a pesticide of moderate concern to one of high concern.

The herbicide diuron has been detected at frequencies at or above 60% for several years within the watershed. Its use in the Hood River PSP is thought to be primarily for weed control in rights-of-way (roads, railroads, etc.) and other non-crop weed control. Detections during the 2015-17 period were highest at three monitoring stations (Lenz Creek at mouth, 29 detections; Neal Creek at mouth, 24 detections; and Odell Creek above the Waste Water Treatment Plant, 11 detections).

► **Detection of Metabolites:** Metabolites are “breakdown” products of some pesticides. They occur generally after the original pesticide has undergone chemical change due to interactions with the environment or soil microbes. Three metabolites were detected at frequencies above 20% during the sampling period: 2,6-dichlorobenzamide (BAM), aminomethylphosphonic acid (AMPA) and desisopropylatrazine.

2,6-dichlorobenzamide is a metabolite of the herbicide dichlobenil commonly known as Casoron. It is detected at a high frequency at a majority of the nine current PSP areas throughout the state. At this time, there are no aquatic life benchmarks. The lifetime human health benchmark (HHBM) as established by the EPA is 29 µg/L, the maximum detected concentration in the watershed during the period July 1, 2015 through June 30, 2017 was .269 µg/L (two orders of magnitude below the current HHBM), with an average of all detections at .048 µg/L.

Aminomethylphosphonic acid (AMPA) is a metabolite of the herbicide glyphosate. Glyphosate is sold under a variety of names. It has an established EPA aquatic life benchmark of 249500 µg/L (this high benchmark indicates a relatively low toxicity to aquatic life). At this time, EPA has not established a human health benchmark.

Desisopropylatrazine is a metabolite of the herbicides atrazine and simazine. Atrazine is sold under the many names the most common being Aatrex. At this time, there is no EPA aquatic life benchmark or human health benchmark established for desisopropylatrazine.

PESTICIDES OF CONCERN DETECTED IN THE HOOD RIVER PESTICIDE STEWARDSHIP PARTNERSHIP

Pesticide	Common Trade Names ¹	Pesticide Classification
Diuron	Direx, Karmex	Herbicide
Imidacloprid	Amire, Gaucho, Premier, Provado	Insecticide

► **Sediment Data:** Sediment samples were collected and analyzed from four sites in the watershed. These sites were Hood River at the footbridge downstream of Interstate 84 (12012) and Neal Creek at the mouth (13141), Odell Creek above the WWTP (13249), and Evans Creek at Baseline Road (25124). No detections of any currently used pesticide were noted. Detections of the DDT metabolites 4,4'-DDT, 4,4'-DDD, and 4,4'-DDE were present². None of the detections appeared to exceed the LC₅₀ for benchmark species toxicity. Porewater estimates for all detections exceeded the Oregon Department of Environmental Quality’s human health water quality criteria for each of the DDT metabolites detected.

► **Projects Funded and Improvements Made:** Significant progress has been made in reducing pesticide concentrations within the Hood River watershed. These reductions are due to wide spread adoption of effective pesticide application management measures since the mid-2000s. This includes greater use of weather data, expansion of IPM activities, and more accurate aerial spray applications. A five-year trend analysis of pesticide concentrations indicates a slight upward trend of one pesticide, diuron. All other pesticides detected have remained steady or are on a downward trend.

¹Trade names presented are common examples used in Oregon and do not represent all current existing names for the pesticide

²2016 Hood River Sediment Pesticide Monitoring Summary Report, August 2017, Oregon Department of Environmental Quality

During the 2015-17 biennium, the PSP program funded several projects designed to improve upon pesticide reduction activities. In 2015, the Oregon Water Quality Pesticide Management Team provided the Columbia Gorge Fruit Growers with a grant of \$20,000 to demonstrate the use of new tools for monitoring natural enemies of pear psylla. This project engaged Hood River area fruit growers and local pest control advisors. Horticulturalist Steve Castagnoli managed this program while continuing an ongoing sprayer technology training program using equipment for air blast sprayer optimization. Both programs are designed to help local and regional orchardists minimize negative impacts of pesticide use while maximizing orchardists' efficacy and efficiency. The Hood River Soil and Water Conservation District was awarded \$3,750 to collect and submit water quality samples from selected monitoring sites during the 2015-17 growing seasons.

COMPARISON OF ANALYTICAL RESULTS 2013-15 AND 2015-17 BIENNIAL MONITORING

Station Number	2013-15% Detections	Number of BM Exceedances	Number of Individual Pesticides	2015-17 % Detections	Number of BM Exceedances	Number of Individual Pesticides
11972	4	1	13	4	2	13
12012	.2	0	2	0	0	0
13141	3.6	1	14	2.2	0	10
13249	2.2	0	10	1.9	0	8
25124	.9	0	1	.9	0	1
30174+	.7	0	4	.3	0	1
34788	0	0	0	0	0	0

Orange indicates samples collected as part of sediment analysis
 + 4134 analyses in 2013-15, 887 in 2015-17

A comparison of analytical results for the 2013-15 and 2015-17 biennial monitoring indicates that a slight overall improvement in the frequency of detection, number of pesticides detected and the rate at which aquatic life benchmarks were exceeded.

*Produced by the Oregon Water Quality Pesticide Management Team.
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