



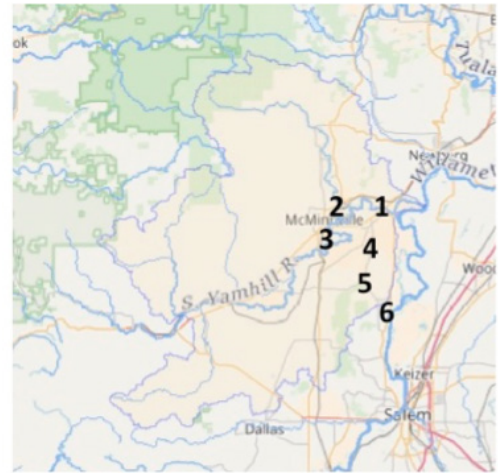
GREATER YAMHILL

Pesticide Stewardship Partnership 2015-17 Biennial Summary

► **History:** In 2007, several local groups came together to in an effort to protect the Yamhill River watershed’s resources and to understand how application of pesticides maybe impacting water quality. This group approached the Oregon Department of Environmental Quality (DEQ) regarding the establishment of a Pesticide Stewardship Partnership (PSP). Later that year, collaboration between state agencies and the Greater Yamhill Watershed Council (GYWC), Yamhill Soil and Water conservation District (SWCD), and Oregon State University Extension Service (OSU) began. Initially, water quality monitoring focused on organophosphate insecticides (e.g., chlorpyrifos, malathion). In 2009, the number of pesticides tested expanded to over 100 pesticides and breakdown products.

► **Land Use:** The Greater Yamhill PSP encompasses 632 square miles and contains a significant amount of agricultural land use. Primary crops grown within the watershed are wine grapes, orchards (fruit and nut), hay and sod grass. The largest city within the watershed is McMinnville, OR with a population of 35,000 (2016 US Census estimates). Based on 2011 National Land Coverage Data (NLCD), the breakdown of land use in the watershed is 40.4% agriculture, 33.4% forest, 19.4% other, and 6.8% urban.

► **Pesticide Monitoring:** Pesticide monitoring began initially in 2005 (limited duration) and became routine in 2007. Water quality monitoring begins in March and continuing through June, and again in September and continuing through November. During the timeframe of July 1, 2015 through June 30, 2017 water quality samples were collected from six locations; five within the watershed and one additional site at the Palmer Creek Irrigation district intake.



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
34232	1	W.F. Palmer Creek at Webfoot Bridge	Agriculture	491	31
34234	2	Lower Cozine Creek at Davis Bridge	Urban	216	15
34235	3	Middle Cozine at Old Sheridan Road	Mixed	240	14
37639	4	W.F. Palmer Creek (SE Palmer Creek Road)	Agriculture	407	22
37640	5	W.F. Palmer Creek at Lafayette Highway	Agriculture	273	5
36391	6	Palmer Creek at Willamette Intake	Mixed	7	0

*BM = US EPA Aquatic Life Benchmark for pesticides

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.)
2,4-D	H	299.2	116	23	6.1	.00016	19.8	2
2,4-DB	H	1100	117	3	.9	.00002	2.6	0
2,4,5-tp	NR		118	1	.1	0	2	
2,6-dichlorobenzamide	M	NA	175	153	.34	.083	87.4	
Acephate	I	150	41	6	1.84	.0673	14.6	1
Acetamiprid	I	2.1	75	8	.035	.0007	10.7	2
Acifluorfen (sodium)	H	265	109	1	.2	0	.9	0
AMPA	M	249500	49	49	4.88	1.48	100	0
Atrazine	H	1	175	98	.83	.0234	56	83
Azoxystrobin	F	44	41	18	.282	.034	43.9	1
Bifenthrin	I	0.04	175	8	.0416	.00147	4.6	104
Bromacil	H	6.8	175	2	.0642	.00037	1.1	1
Carbaryl	I	.5	175	14	.378	.0047	8	76
Carbofuran	I	.75	175	1	.00439	0	.6	1
Chlorothalonil	F	.6	175	3	.568	.004	1.7	95
Chlorpyrifos	I	.041	175	19	.278	.0056	10.9	678
DEET	R	37500	175	3	.163	.0019	1.7	0
Deisopropylatrazine	M	NA	175	110	.5	.023	62.9	
Desethylatrazine	M	NA	175	61	.559	.0178	34.9	
Diazinon	I	.05	175	11	5.21	.0503	6.3	10420
Dicamba	H	61	118	10	2.1	.008	8.5	3
Dichlobenil	H	30	175	7	.092	.0018	4	0
Dimethenamid	H	8.9	175	70	1.05	.0785	40	12
Dimethoate	I	.5	175	4	1.32	.0167	2.3	264
Dinoseb	NR		107	1	1	0	.9	
Diuron	H	2.4	175	174	3.95	.213	99.4	165
Endosulfan sulfate	I	1.9	175	1	.022	.00012	.6	1
Eptc	H	800	175	14	6.49	.049	8	1
Ethoprop	I	.8	175	17	.456	.0157	9.7	57
Glyphosate	H	1800	49	41	10.9	.763	83.7	1
Imazapyr	H	18	174	12	.163	.0066	6.9	1
Imidacloprid	I	.01	175	57	1.05	.055	32.6	10500
Methiocarb	I	2.75	175	3	.035	.00034	1.7	1
Metolachlor	H	1	175	87	1.88	.046	49.7	188
Metribuzin	H	8.1	175	52	.118	.0073	22.3	1
Metsulfuron methyl	H	.36	175	44	.296	.011	25.1	82
Napropamide	H	1100	175	1	.0296	.00017	.6	0
Norflurazon	H	9.7	175	34	.669	.021	19.4	7
Oxyfluorfen	H	.33	175	21	.085	.0055	12	26
Pendimethalin	H	5.2	175	39	.193	.0117	22.3	4
Pronamide	H	NA	175	20	.23	.0102	3.9	.4
Propazine	H	24.8	175	1	.0074	.00004	.6	
Propiconazole	F	21	175	107	4.57	.103	61.1	22
Pyraclostrobin	F	1.5	175	11	.0322	.00096	6.3	2
Simazine	H	2.24	175	104	8.08	.122	59.4	361
Sulfometuron-methyl	H	.45	175	79	.525	.0186	45.1	117
Tebuthiuron	H	50	175	4	.0608	.00078	2.3	0
Triclopyr	H	19	118	14	7.5	.0002	11.9	39
Trifluralin	H	2.4	175	13	.0806	.0034	7.4	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 from July 1, 2015 through June 30, 2017 as compared to the EPA aquatic life benchmark. F = fungicide, H = herbicide, I = insecticide, M = metabolite (breakdown product), NR = Not Registered

Water quality monitoring conducted during the timeframe July 1, 2015 through June 30, 2017 indicated the presence of a significant number of pesticides at high concentrations and frequency, a majority of which is attributed to agricultural land use. Ten pesticides were detected are at levels of high concern while seven were detected at levels of moderate concern. The frequency and magnitude of the detections of the insecticide bifenthrin within the sub-watershed monitored by station 37639 are is of additional concern.

PESTICIDES OF CONCERN DETECTED IN THE GREATER YAMHILL PESTICIDE STEWARDSHIP PARTNERSHIP

Pesticide	Common Trade Names	Pesticide Classification
Atrazine	AAtrex, Primatol	Herbicide
Bifenthrin	Brigade, Capture, Talstar, Various Home and Garden	Insecticide
Chlorpyrifos	Dursban, Lorsban , Piridane	Insecticide
Diazinon	Diazinon, Knox Out	Insecticide
Dimethoate	Cygon, Dimet, Trimetion	Insecticide
Diuron	Direx, Karmex	Herbicide
Imidacloprid	Amire, Gaucho, Premier, Provado	Insecticide
Metolachlor	Bicep, Dual, Pennant	Herbicide
Simazine	Princep, Primatol, Simadex	Herbicide
Sulfometuron-methyl	Ally, Escort, Oust	Herbicide

One sediment sample was collected on October 27, 2015 at the West Fork Palmer Creek at Webfoot Bridge (34232). Results were positive for DDT metabolites and for the current use insecticide bifenthrin but not at levels that could potentially impact aquatic life.

Based on a request by stakeholders to evaluate potential pesticide loadings from the Willamette River into the Palmer Creek Irrigation District system, the Palmer Creek Water District Willamette withdrawal was monitored for pesticides and flow obtained to coincide with that monitoring. Using the discharge data, it was possible to evaluate the pesticide loading coming into the irrigation system.

Date	Station ID	Pesticide	Discharge (CFS)	Concentration µg/L	Pesticide Load (Lbs./day)
5/31/16	38516	Diuron	22.28	.047	.0057
5/31/16	38516	Sulfometron-methyl	22.28	.0173	.0021
6/13/16	38516	Diuron	22.28	.0361	.0043
6/13/16	38516	Sulfometron-methyl	22.28	.00847	.001
7/20/16	38516	Atrazine	34.53	.00565	.0011
7/20/16	38516	Diuron	34.53	.00877	.0016
9/12/16	38516	Diuron	NA	.00615	NA

The findings of the sampling indicated that pesticide residues were entering the irrigation system from the Willamette withdrawal, however the loading entering the system from the Willamette River was very low.

- **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 .34 µg/L (1.1% of the HHBM) with an average of all detections at .083 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.

Deisopropylatrazine and desethylatrazine are metabolites of the herbicides atrazine and simazine. Atrazine is sold under the many names the most common being Aatrex. Simazine is predominately sold under the name Princep. At this time, there is no EPA aquatic life benchmark or human health benchmark established for deisopropylatrazine or desethylatrazine.

► **Projects Funded and Improvements Made:** Much of the PSP activities within the Greater Yamhill PSP has been focused on agricultural pesticide contributions to nearby waterways. In the previous biennium, the GYWC was awarded a grant from the Oregon Water Quality Pesticide Management Team (WQPMT) of \$8,250 to collect water quality samples and develop and implement outreach to these sectors for pesticide reduction activities. These actions included conducting five field demonstrations of recycling sprayer technology and holding several meetings and workshops with stakeholder groups regarding pesticide results. Additionally, OSU was awarded \$37,460 to begin modeling of pesticide use and hydrology in the Palmer Creek sub-watershed. As of December 2017, significant progress had been made regarding crop and hydrology characterization potentially leading to the ability to predict pesticide impacts to water using a variety of scenarios.

Progress in reducing pesticide residues in streams have been limited. Especially challenging has been achieving reductions in areas where land use is diversified agricultural. While there has been some progress made in reducing the frequency of detections, the significant increase in benchmark exceedances and the number of pesticides detected indicate limited success in the effectiveness, thus far, of management measures implemented. The shift in focus toward sub-watersheds is expected to result in a more targeted approach to delivering education and outreach materials as well as technical assistance. A five-year trend analysis indicates some success in reducing pesticide concentrations for chlorpyrifos, dimethoate, glyphosate, metsulfuron methyl, and oxyfluorfen. However, upward trends were noted for bifenthrin, dimethenamid, diazinon, ethoprop, imidacloprid, propiconazole and sulfometuron.

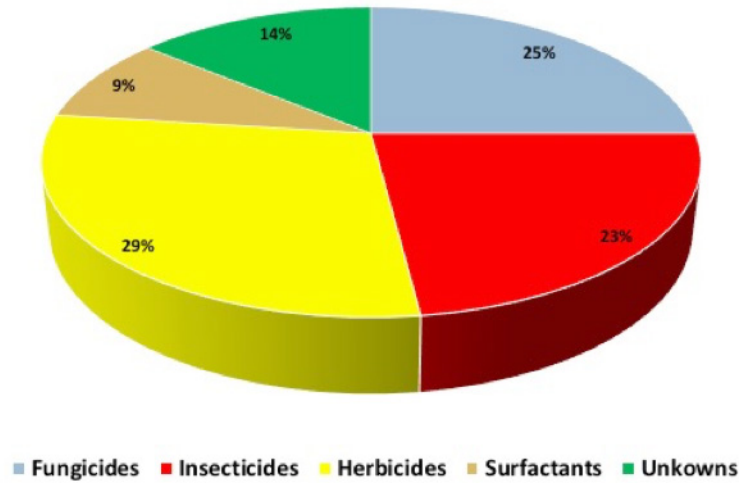
The following table provides a comparison between monitoring results obtained for pesticides determined to exist in water in the 2013-15 biennium to those obtained in the 2015-17 biennium.

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
34232	39.1	23	35	38.6	31	41
34234	28	3	31	22	15	30
34235	33	0	24	26	14	30
37639	44	17	31	37.7	22	37
37640	38	1	25	34.3	5	27

► **Pesticide Collections:** In November 2016, a waste pesticide collection event was held in McMinnville. The event removed 48,148 pounds of waste from the surrounding area at a cost of \$67,585. This event was the largest in terms of pounds collected and participation conducted statewide during the 2015-17 biennium.

McMinnville Collection Event – Nov. 2016



*Produced by the Oregon Water Quality Pesticide Management Team.
For further information, please contact Kirk V. Cook, RG, Chairman at (541) 841-0074 or kcook@oda.state.or.us*