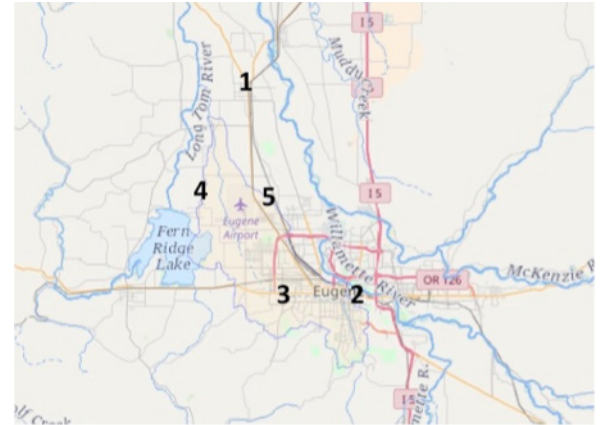




AMAZON

Pesticide Stewardship Partnership 2015-17 Biennial Summary

► **History:** In 2011, the Long Tom Watershed Council (LTWC) teamed with the Oregon Water Quality Pesticide Management Team (WQPMT) to form a Pesticide Stewardship Partnership (PSP). The focus of this PSP is the Amazon Creek watershed. The watershed is unique in that emphasis is placed on urban landscapes. Amazon Creek moves water from 35 square miles of urban and industrial areas into agricultural lands. This differs from most landscapes, where urban activities exist lower in the watershed with agricultural and forest lands existing higher up. The partnerships formed to support this effort include key businesses and agricultural constituents, the City of Eugene, and others. The goal of the PSP is to monitor for pesticides in Amazon Creek to determine what chemicals are impacting water quality in the area. This data is used to engage agricultural landowners, landscape companies, businesses, and commercial property owners to voluntarily reduce or eliminate pesticide use on their properties.



Water Quality Monitoring Locations 2015-17

► **Land Use:** The Amazon Creek PSP encompasses 60.5 square miles and contains a significant amount of urbanized lands. The largest city within the watershed is Eugene with a population of 166,575 (2016 PSU estimates). Over 250,000 reside within the Eugene metro area. Based on 2011 National Land Coverage Data (NLCD), the breakdown of land use in the watershed is 45.1% urban, 38.3% agriculture, 8.8% forest and 7.8% other. The designation as “other” may include rangeland, scrubland, wetland, etc.

► **Pesticide Monitoring:** As part of the PSP, water quality is monitored for pesticide residues beginning in March and continuing through June (spring sampling) and again in September and continuing through November (fall sampling). During the 2015-17 biennium (July 1, 2015–June 30, 2017), water quality samples were collected from five locations.

WATER QUALITY MONITORING STATIONS 2015-17 BIENNIUM

Station ID	Map Number	Description	Predominate Land Use	No. Detections	BM* Exceedances
25270	1	Amazon Creek at High Pass Road	Agriculture	200	1
25624	2	Amazon Creek at 29th St. Gage Station	Urban	73	1
36389	3	Amazon Creek at Beltline Road	Commercial	92	2
36390	4	Amazon Creek at Bond Road	Pre-Agriculture	174	0
36391	5	A1 Channel at Awbrey Lane	Commercial/Industrial	336	3

*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	102	34	2.9	.142	33.3	1
2,4-DB	H	1100	95	12	4.1	.275	12.6	.4
2,4,5-T	NR		100	2	.3	.019	2	
2,6-dichlorobenzamide	M	NA	169	135	.445	.136	79.9	
3,5-dichlorobenzoic acid	M		97	1	.3	.0031	1	
AMPA	M	249500	43	43	3.31	.501	100	0.0
Atrazine	H	1	169	26	.0101	.001	15.4	1
Bromacil	H	6.8	169	2	.277	.219	.0029	4
Carbaryl	I	.5	169	4	.039	.00061	2.4	7.7
DCPA Acid Metabolites	M	75 (HAL)	97	1	.6	.006	1	.8
DEET	R	37500	169	12	.219	.0055	7.1	0
Desethylatrazine	M	NA	169	42	.016	.0023	24.9	
Dicamba	H	61	102	3	.6	.0137	2.9	1
Dichlobenil	H	30	169	10	.148	.0024	5.9	.5
Dinoseb	NR		94	1	.3	.0032	1.1	
Diuron	H	2.4	168	114	1.67	.113	67.9	69.6
Glyphosate	H	1800	43	30	11.5	.75	69.8	.6
Imazapyr	H	18	169	18	1.04	.0287	10.7	4.3
Imidacloprid	I	.01	169	2	.093	.0011	1.6	926
MCPA	H	20	101	1	.091	.0009	1	.5
Metolachlor	H	1	169	6	.063	.0009	3.6	6.3
Metribuzin	H	8.1	169	16	.137	.0021	9.5	1.7
Metsulfuron methyl	H	.36	169	24	.37	.0067	14.2	102
Pentachlorophenol	F	25	100	11	.7	.0002	11	2.8
Picloram	H	550	102	4	2	.048	3.9	.4
Prometon	H	98	169	2	.015	.0003	1.2	0
Propiconazole	F	21	169	82	29.9	.634	48.8	142
Sulfometuron-methyl	H	.45	169	57	1.09	.0829	33.7	242.2
Tebuthiuron	H	50	169	1	1.25	.0074	.6	2.5
Triclopyr	H	19	99	10	1.9	.064	10.1	10

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 during the period 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)

Water quality monitoring conducted from July 1, 2015 through June 30, 2017 indicated the presence of pesticides. Fifty-one percent of these detections were attributed to urban/commercial land use and 43% from agricultural land use. Eighty-six percent of aquatic life benchmark exceedances occurred at monitoring stations located in urban/commercial areas, while 14% were located in agricultural areas. Two pesticides that have been removed from use since the 1980s (2,4,5-T and dinoseb) were detected within the A1 Channel, which is located within an area of industrial land use.

PESTICIDES OF CONCERN DETECTED IN THE AMAZON PESTICIDE STEWARDSHIP PARTNERSHIP

Pesticide	Common Trade Names	Pesticide Classification
Diuron	Direx, Karmex	Herbicide
Imidacloprid	Amire, Gaucho, Premier, Provado	Insecticide
Metsulfuron methyl	Ally, Escort	Herbicide
Propiconazole	Alamo, Banner, Orbit, Tilt,	Fungicide
Sulfometuron-methyl	Ally, Escort, Oust	Herbicide

► **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 has been detected at a high frequency in 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 .445 µg/L (1.5% of the current HHBM), with an average of all analytical results .048 µg/L. 2,6-dichlorobenzamide was detected in 80% of the samples analyzed.

Aminomethylphosphonic acid (AMPA) is a metabolite of the herbicide glyphosate. Glyphosate is sold under a variety of names the most common being Roundup™. It has an established EPA aquatic life benchmark of 249500 µg/L. At this time, EPA has not established a human health benchmark. AMPA was detected in 100% of the samples analyzed.

Desethylatrazine 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 desethylatrazine. Desethylatrazine was detected in 25% of the samples analyzed.

► **Sediment Data:** One sediment sample was collected in the summer of 2015. This sample was obtained from the Amazon Creek at 29th Street Gaging Station. One currently used pesticide and one metabolite from the legacy compound DDT was detected. The analytical result for the insecticide bifenthrin was 7.37 µg/kg carbon normalized to 670 µg/kg. The analytical result for 4,4'-DDT was 6.9 µg/kg carbon normalized to 627.3 µg/kg. In the case of bifenthrin, the levels detected exceed the LC⁵⁰ for the the benchmark aquatic species and therefore would pose a risk to aquatic life. The estimated pore water concentration of .0028 µg/L exceeds the EPA aquatic life benchmark. In regards to the DDT metabolite 4,4'-DDT, no exceedences of the LC₅₀ for aquatic toxicity were noted. The estimated pore water concentration for 4,4'-DDT exceeded the DEQ human health water quality criteria of .000022 µg/L.

► **Projects Funded and Improvements Made:** Many of the activities within the Amazon Creek PSP have focused on urban, industrial, and commercial pesticide contributions to nearby waterways. In the previous biennium, the LTWC was awarded a grant from the WQPMT of \$45,313 to develop and implement outreach to landowners and urban, industrial and commercial pesticide applications. Many of those activities continued through the 2015-17 biennium. During this period, a grant of \$7,897 was awarded to the LTWC to collect water quality samples from five locations in the watershed and to begin stream flow monitoring at two locations.

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

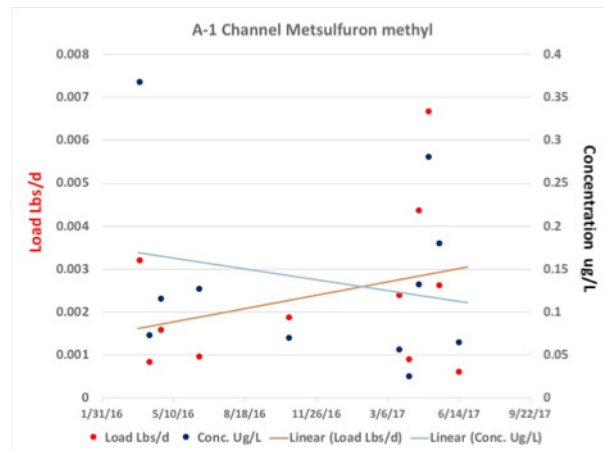
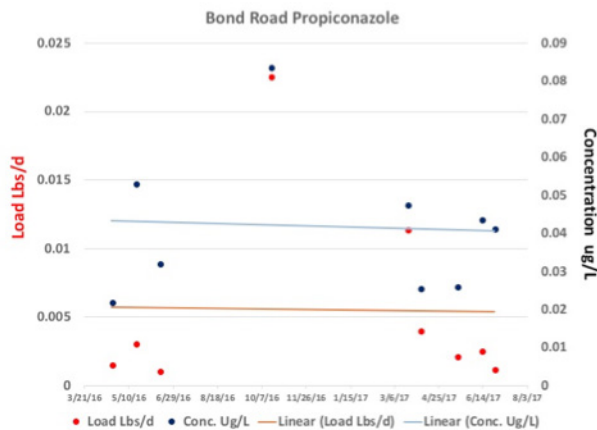
Progress in reducing pesticide residues in stream has been limited. Especially challenging has been achieving reductions in areas where land use is predominately urban, industrial, and commercial. Within the Amazon, the number of pesticides whose concentration rise to the level of concern are limited. A five-year trend analysis indicates a downward trend in concentrations for the pesticide or pesticide metabolites atrazine, desethylatrazine, metolachlor, and metsulfuron methyl. An upward trend was noted for Deisopropylatrazine, Carbaryl, Glyphosate, AMPA, and Propiconazole. While these pesticides are used in agricultural and urban settings, a review of individual water quality monitoring station indicate that there is a high likelihood that urban use is the larger contributor.

The following table provides a comparison between monitoring results obtained for pesticides present in monitored waterbodies 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
25270	39	0	18	40.1	1	18
25624	28	0	11	20	1	14
36389	25	0	15	27.6	2	12
36390	23.7	0	19	27.9	0	22
36391	24	3	22	44.9	3	22

Beginning in 2015, stream discharge measurements were taken at the Bond Road and A1 Channel sampling locations. Using this information pesticide loading determinations can be made. This affords a more comprehensive evaluation of the impact to water from pesticide residues. The following graphs illustrate the influence stream flow can have on the evaluation of pesticide impacts to waterbodies.



Within the structure of the PSP program, LTWC has facilitated meetings with the WQPMT, pesticide applicators, local farmers, and members of the industrial sector to review PSP findings and discuss solutions. These meetings have included an introduction of the Trout Friendly Landscapes program (TFL) and an overview of available technical assistance and support. Given the likelihood that urban homeowner, and commercial pesticide use is the main contributor to pesticide loading in Amazon streams, several initiatives have begun to address these issues.

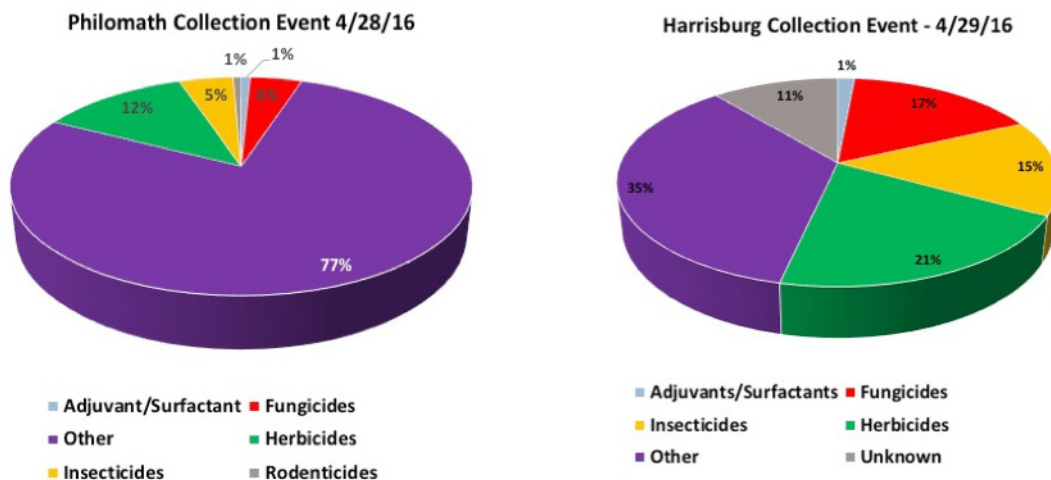
The TFL provides outreach, education, technical assistance for commercial and industrial businesses to voluntarily improve water quality impacts. The focus is on improving site practices and installing Green Storm water Infrastructure (GSI) such as rain gardens and storm water planters. Twenty-two GSI facilities have been installed to date with two more currently under construction. Over 90 businesses have consulted with the program, and more than 200 businesses have expressed interest in engaging. As of May 2018, there are five projects at industrial facilities, three at religious institutions, four schools, and one gas station in various stages of project installation.

The LTWC has been working on strategies to rank projects and most effectively apply available funding for the TFL program. Currently, through an Oregon Watershed Enhancement Board (OWEB) technical assistance grant, the LTWC is creating a comprehensive framework to prioritize potential projects with the guiding expertise of a technical advisory team of approximately 20 regional storm water and ecology specialists.

In addition to activities associated with the TFL, the LTWC implements the Urban Waters and Wildlife Program, based upon the findings from the Amazon Creek PSP that focuses on improving water quality and habitat. The program started in the Amazon Creek watershed, then quickly expanded to the entire Eugene urban growth boundary (UGB), and then Springfield's UGB. The program is now engaging the smaller urban areas in the Long Tom Watershed, including the cities of Monroe, Veneta and Junction City.

The City of Eugene has been a strong partner in this program, offering a 50:50 match incentive to business owners for the installation of voluntary GSI projects since 2012. In 2016, the City of Springfield also started offering a 50:50 match and has renewed its commitment to provide match for the next two years. Funding partners to support outreach and technical assistance include Meyer Memorial Trust, EPA, OWEB, ODA, and DEQ. To support the proper installation and maintenance of both voluntary and required GSI facilities, the Cities of Eugene and Springfield, the local utilities, and LTWC developed a two-day GSI Maintenance Training for landscapers.

► **Pesticide Collections:** In March 2015, two waste pesticide collection events were held in close proximity to the Amazon Creek PSP. The events were held in Philomath and Harrisburg and removed 24,200 Lbs. of waste from the surrounding area at a cost of \$43,320. During the Philomath event, an unusual amount of material that was later classified as nutrients was accepted. Following this event, procedures were into place that has significantly reduced this type of material from entering the program.



Produced by the Oregon Water Quality Pesticide Management Team.
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