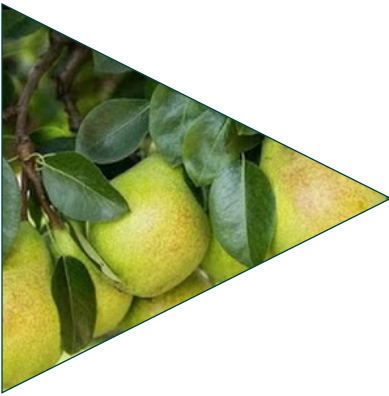
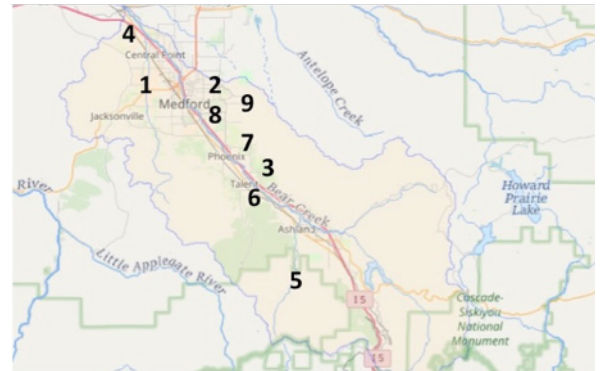




MIDDLE ROGUE

Pesticide Stewardship Partnership 2015-17 Biennial Summary

- **History:** The Middle Rogue was selected as a Pesticide Stewardship Partnership watershed by the Oregon Water Quality Pesticide Management Team (WQPMT) in 2014. The Jackson Soil and Water Conservation District (SWCD) expressed a strong interest in supporting the PSP monitoring, as well as helping to build a local partnership network. Pilot monitoring conducted in 2014 showed relatively frequent detections of multi-use herbicides in multiple parts of the watershed. Based on the monitoring results, the diverse land uses, and a strong local partnership commitment, the WQPMT selected the Middle Rogue as the next long-term PSP project in 2016. Since then the Middle Rogue Watershed has partnered with numerous local agencies, interest groups and the Oregon State University's Southern Oregon Research and Extension Center to expand PSP activities beyond water quality monitoring. These partners are currently in the process of developing a five-year strategic plan for all future PSP activities.
- **Land Use:** The Middle Rogue PSP encompasses 362 square miles and is characterized by multiple land uses. The largest city within the watershed is Medford, OR with a population of 81,630 and a metro area population of 286,000 (2018 Portland State University estimates). Based on 2011 National Land Coverage Data (NLCD) the breakdown of land use in the watershed is 38.8% forest, 32.8% other, 15% agriculture and 13.4% urban. Land uses classified as "other" can include rangeland, scrublands, wetlands, 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 of July 1, 2015 through June 30, 2017 water quality samples were collected from seven locations.



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
11128	1	Larson Creek at Ellendale Drive**	Urban	14	0
12719	2	Jackson Creek at Beall Lane***	Mixed	40	1
23074	3	Wagner Creek at Mouth	Mixed	12	0
38280	4	Jackson Creek at Bramson Road	Mixed	102	4
38281	5	Wagner Creek at Wagner Creek Park***	Agriculture	8	0
38282	6	Wagner Creek at Wagner Creek Trail	Forestry	10	0
38829	7	Payne Creek at Fern Valley Road**	Orchard	16	3
38830	8	Larson Creek at Bear Creek**	Urban	5	0
38832	9	Larson Creek at N. Phoenix Road**	Urban	22	0

*BM = US EPA Aquatic Life Benchmark for pesticides

** = Stations monitored in 2017 only

*** = Stations monitored in 2015-15 only

Stations 23074, 38280, and 38282 were monitored from March 2015 – November 2017

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	37	4	.3	.0195	10.8	0.1
2,6-dichlorobenzamide	M	NA	151	5	.0367	.00097	3.3	NA
Acetamiprid	I	2.1	151	2	.0104	.00012	1.3	.5
AMPA	M	249500	36	30	.825	.1430	83.3	0
Atrazine	H	1	151	2	.0071	.00059	1.3	.7
Carbaryl	I	.5	151	1	.0073	.00005	.7	84.9
Chlorpyrifos	I	.041	151	1	.034	.00023	.7	19609.8
Deisopropylatrazine	M	NA	151	1	.0049	.00003	.7	NA
Diazinon	I	.05	151	2	.356	.0046	1.3	712
Dichlobenil	H	30	151	6	.0543	.0017	4	.2
Diuron	H	2.4	151	71	.782	.0322	47	32.6
Fluridone	H	480	151	2	.163	.0017	1.3	0
Glyphosate	H	1800	36	19	.49	.0906	52.8	.0
Imazapyr	H	24	151	16	.49	.017	10.6	2
Imidacloprid	I	.01	151	5	.0693	.0014	3.3	693
Oxyfluorfen	H	.33	151	17	.368	.0085	.7	111.5
Pendimethalin	H	5.2	151	1	.0257	.00017	1.3	.5
Prometon	H	98	151	2	.015	.00019	1.3	0
Simazine	H	2.24	151	2	.0454	.00005	1.3	2
Sulfometuron-methyl	H	.45	151	35	.0875	.00369	23.2	19.4
Triclopyr	H	19	37	1	.6	.00002	2.7	3.2

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)

Water quality monitoring during the timeframe July 1, 2015 through June 30, 2017 indicated the presence of numerous pesticides and pesticide breakdown products. Three pesticides were detected above the U.S. Environmental Protection Agency's (EPA) aquatic life benchmark, they were diazinon, imidacloprid, and oxyfluorfen. The benchmark exceedances for the insecticide imidacloprid is attributed to the 2017 lowering of the EPA aquatic life benchmark from 1.05 µg/L to the current number of .01 µg/L and not necessarily indicate significant changes in applications or land use.

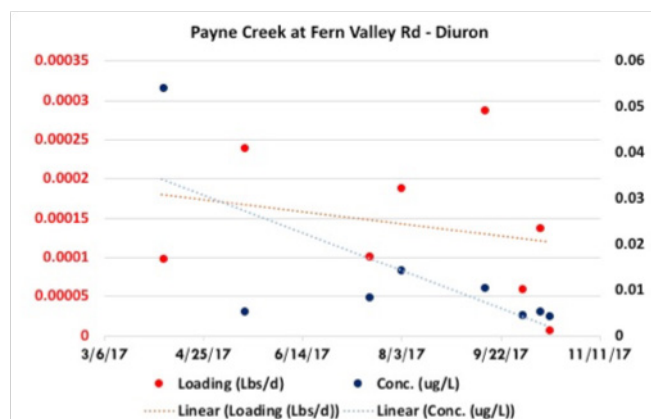
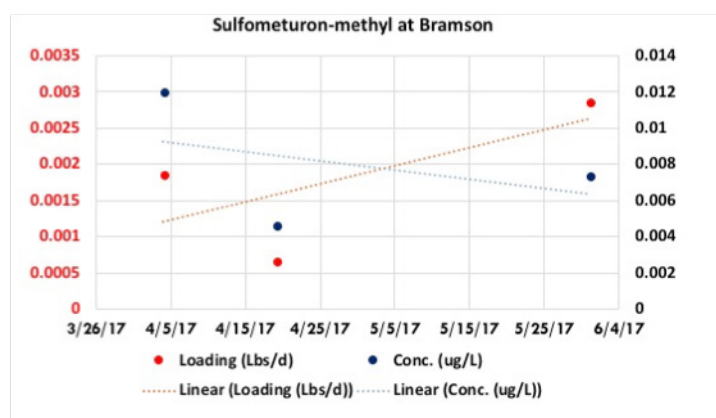
► **Detection of Metabolites:** Metabolites are “breakdown” products of some pesticides. They occur generally after the original pesticide has undergone chemical change due to interactions with the environment or soil microbes. One metabolite was detected at a frequency above 20%, that being aminomethylphosphonic acid (AMPA). Two additional metabolites 2,6-dichlorobenzamide (BAM), and desisopropylatrazine were detected at frequencies below 5%.

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 .0367 µg/L with an average of all analytical results of .00097 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. At this time, EPA has not established a human health benchmark. The maximum detected concentration in the watershed during the period July 1, 2015 through June 30, 2017 was .825 µg/L with an average of all analytical results of .1430 µg/L.

Deisopropylatrazine 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 deisopropylatrazine. The maximum detected concentration in the watershed during the period July 1, 2015 through June 30, 2017 was .0049 µg/L with an average of all analytical results of .00004 µg/L.

► **Additional Activities:** Beginning in 2017, discharge measurements were taken at the Jackson Creek at Bramson Road and Payne Creek at Fern Valley 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. As additional data is collected pesticide loading assessments will be made for each location. Examples of first year results are shown below.



PESTICIDES OF CONCERN DETECTED IN THE MIDDLE ROGUE PESTICIDE STEWARDSHIP PARTNERSHIP

Pesticide	Common Trade Names ¹	Pesticide Classification
Chlorpyrifos	Dursban, Lorsban , Piridane	Insecticide
Diazinon	Diazinon, Knox Out	Insecticide
Diuron	Direx, Karmex	Herbicide
Imidacloprid	Amire, Gaucho, Premier, Provado	Insecticide
Oxyfluorfen	Goal, Koltar	Herbicide
Sulfometuron-methyl	Ally, Escort, Oust	Herbicide

► **Groundwater Studies:** In 2015 DEQ investigated 107 wells within the Middle Rogue basin in which the PSP area was included¹. The results of that study indicated no exceedances of human health or aquatic life benchmarks for any currently used pesticide. However, several currently used pesticides were detected in both the winter and fall samplings. Five pesticides and/or pesticide metabolites detected through surface water monitoring conducted through the PSP were detected in groundwater. These pesticides were diuron, acetamiprid, and triazines and degradates (either atrazine, simazine and /or deisopropylatrazine).

The detected pesticides in both surface and groundwater have properties that classify them as having high to medium leachability potential (travel through soils to underlying groundwater easily). The legacy pesticides detected in the DEQ study were not evaluated as to leachability.

WATER QUALITY COMPARISONS TO SURFACE AND GROUNDWATER RESULTS

Pesticide	PSP Detection Frequency	GW Detection Frequency (2015) (n=59)	Toxics Monitoring Detection Frequency (2011) (n=30)
CURRENT USE PESTICIDES			
Diuron	92.4	10.2	43.3
(AMPA)	63.2	N/A	N/A
Glyphosate	36.8	N/A	N/A
Sulfometuron-methyl	24.5	0	0
2,6-Dichlorobenzamide	20.8	8.5	N/A
Imidacloprid	15.1	0	0
2,4-D	10.5	0	0
Acetamiprid	7.5	1.7	0
Triazines and degradates	30.2	12.3	6.7
Atrazine	5.7	5.1	23.3
Oxyfluorfen	5.7	0	N/A
Deisopropylatrazine	3.8	25.4	3.3
Carbaryl	1.9	0	0
DEET	1.9	0	0
Desethylatrazine	1.9	15.3	0
Norflurazon	1.9	1.7	0
Imazapyr	1.9	0	0
Dichlobenil	1.9	0	N/A
Simazine	0	15.3	0
Prometon	0	3.4	0
LEGACY PESTICIDES²			
Heptachlor epoxide	0	1.7	0
4,4-DDD	0	3.4	0
2,4-DDD	0	1.7	0
4,4'-DDE	1.9	5.1	0
4,4-DDT	0	3.4	0

¹Goodwin, Kara and Evans, Paige: Statewide Groundwater Monitoring Program: Mid-Rogue Basin 2015, DEQ16-LAB-0042-TR, December 16, 2016

²Legacy pesticides are those no longer registered for use by the US EPA and the State of Oregon

► **Projects Funded and Improvements Made:** Generally, pesticide concentrations within the Middle Rogue watershed have been of little concern with the exception of the insecticide imidacloprid. A five-year trend analysis of pesticide and pesticide metabolite concentrations indicate a downward trend for the herbicide diuron. Upward trends were indicated for glyphosate and its metabolite AMPA, oxfluorfen and sulfometuron-methyl. It is noted that for the vast number of pesticides sampled, there were no detections or too few to conduct a trend analysis, but positive indications. Since 2014, many of the activities within the Middle Rogue PSP have been focused on water quality monitoring and the establishment of routine monitoring locations. The data collected thus far has provided information allowing for the analysis of pesticide applications on a variety of land uses including urban, forestry, agricultural, industrial, and commercial within the watershed.

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In the previous biennium, the Jackson County Soil and Water Conservation District was awarded a grant from the WQPMT of \$7,425.00 to accomplish three tasks:

1. Collect water quality samples from designated monitoring sites,
2. Enhance the collection of information regarding the pesticide use practices being applied by pesticide users in the watershed,
3. Develop a data evaluation report of existing groundwater pesticide and water quality information that can assist in establishing links between surface and groundwater.

The OSU Southern Oregon Research and Extension Center was awarded \$40,853.00 to:

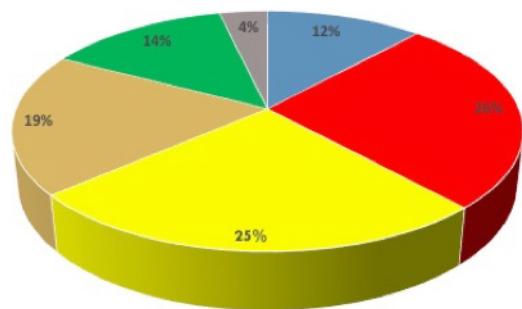
1. To develop and implement a training program for pesticide applicators, to increase the level of equipment calibration thereby reducing pesticide drift potential,
2. To develop a multi-stakeholder application management tool to be distributed through programs of education and communication,

The accomplishments of this project are expected to be realized within the next year or two and will be verified through water monitoring results.

In the upcoming biennium, cooperating stakeholders will begin an effort to develop a strategic plan for the Middle Rogue PSP that will bring together numerous agencies, and organizations to address pesticide occurrences in both surface and groundwater through education, outreach, technical assistance, and community involvement.

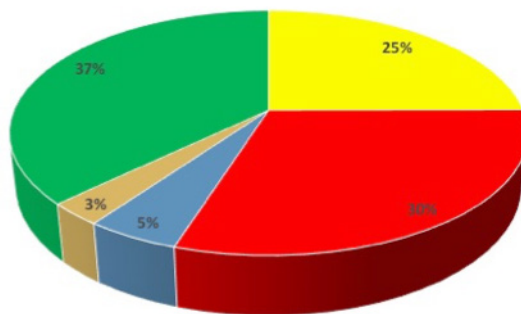
In March 2016 two waste pesticide collection events were held in Grants Pass and White City. The events removed 15,570 pounds of waste from the surrounding area at a cost of \$31,081.00

White City Collection March 2016



■ Fungicide ■ Herbicide ■ Insecticide ■ Unknown ■ Other ■ Fertilizer

Grants Pass Collection March 2016



■ Insecticide ■ Herbicide ■ Fungicide ■ Surfactant ■ Other

Produced by the Oregon Water Quality Pesticide Management Team.

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