MIDDLE DESCHUTES

Pesticide Stewardship Partnership
2017 Pilot Project Summary

History: In 2014, the Pesticide Water Quality Management Team approached the Jefferson Soil and Water Conservation District and the Middle Deschutes Watershed Council about conducting water quality monitoring for pesticides in several areas of the watershed. In cooperation with the SWCD and WC, several sites were selected and monitoring began. The results of that monitoring indicated that there were some waterbodies within the watershed that were potentially impacted by pesticide residues and very few pesticide detections were observed in other streams. Based on the 2014 monitoring results a second round of water sampling began in 2017, and it focused on areas previously impacted by pesticide residues. The second round of water sampling included the addition of a site in the southern part of the watershed established to evaluate agricultural impacts in the Culver area. The results of the latest monitoring indicate the potential need for the establishment of a more formal PSP in some sub-watershed areas within the Middle Deschutes watershed basin.

Water Quality Monitoring Locations 2017

Land Use: The Middle Deschutes PSP Pilot Project encompasses 1,100 square miles. Primary crops grown within the watershed include hay, alfalfa and grass hay, but also include unique specialty crops such as carrot seed, garlic, peppermint oil and tea. The largest city within the watershed is Madras, with a population of 6,730 (2016 US Census estimates). Based on 2011 National Land Coverage Data (NLCD), the breakdown of land use in the watershed is 77.4% other, 13.3% forest, and 6.9% agriculture and 2.3% urban. The "other" land-use classification includes rangeland and scrublands.

Pesticide Monitoring: Water quality monitoring begins in March and continues through June (and again in September and continuing through October. During the period March 20, 2017 through October 30, 2017, water quality samples were collected from five locations. The five monitoring locations assessed water quality from predominately agricultural land use.

WATER QUALITY MONITORING STATIONS 2017

Station ID	Map Number	Description	Predominate Land Use	No. Detections	BM* Exceedances
34797	1	Mud Springs Creek at Gateway	Agriculture	32	3
35226	2	Campbell Creek at Highway 26	Agriculture	87	13
36776	3	Trout Creek D.S. of Mud Springs Creek	Agriculture	1	0
37635	4	Campbell Creek at Mouth	Agriculture	105	7
38827	5	Culver Drain at Crooked River C.G.	Agriculture	16	2

**BM = US EPA Aquatic Life Benchmark for pesticides. Note: Statistics include WQ monitoring from July 1, 2017-October 30, 2017*

WATER QUALITY DATA SUMMARY FOR ALL SAMPLE LOCATIONS 2017

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	10	1	.1	.01	10	0
Acephate	I	150	24	1	.07	.003	4.2	0
AMPA	M	249500	10	9	.67	.2	90	0
Azoxystrobin	F	44	24	13	.19	.045	54.2	.4
Bromacil	H	6.8	39	1	.33	.0085	2.6	4.9
Chloropyrifos	I	.041	39	6	2.15	.073	15.4	5244
Cycloate	H	1200	39	2	.049	.0024	5.1	0
Dacthal (DCPA)	H	11000	39	8	1.58	.035	20.5	0
DCPA Acid Metabolites	M	75	10	2	.003	.0005	20	0
Dimethenamid	H	8.9	39	19	4.25	.26	48.7	47.8
Dimethoate	I	.5	39	8	2.31	.11	20.5	462
Diuron	H	2.4	39	31	2.2	.223	79.5	91.7
Ethoprop	I	.8	39	1	.07	.02	2.6	8.7
Glyphosate	H	1800	10	7	.49	.132	70	0
Hexazinone	H	7	39	3	.105	.006	7.7	1.5
Imazapyr	H	18	39	1	.197	.0051	2.6	.8
Imidacloprid	I	.01	39	2	.056	.0022	5.1	557
Linuron	H	.09	39	29	2.93	.0202	74.4	3256
Metolachlor	H	1	39	5	2.95	.078	12.8	295
Metribuzin	H	8.1	39	12	.913	.029	30.8	11.3
Oxyfluorfen	H	.33	39	8	.0704	.0106	20.5	24.3
Pendimethalin	H	5.2	39	21	2.62	.115	53.8	50.4
Prometon	H	98	39	3	.0078	.00047	7.7	0
Prometryn	H	1.04	39	20	.892	.055	51.3	85.8
Pronamide	H	NA	39	3	.0911	.00426	7.7	
Propiconazole	F	21	39	20	.71	.0694	51.3	3.4
Terbacil	H	11	39	1	.0254	.00065	2.6	.2
Trifloxystrobin	F	2.76	24	3	.0463	.0041	12.5	1.7

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 US EPA aquatic life benchmark.
F = fungicide, H = herbicide, I = insecticide, M = metabolite (breakdown product), NR = Not Registered

Water quality monitoring indicated the presence of a significant number of pesticides a majority is attributed to agricultural land use within the Campbell Creek sub-watershed. While there were a number of detections at the Culver Creek and Mud Springs monitoring sites, the number of pesticide benchmark exceedances was significantly lower than the Campbell Creek monitoring locations. Detections of the insecticide chlorpyrifos and herbicides diuron, linuron, metolachlor, and prometryn are at levels of concern within this area.

COMPARISON OF ANALYTICAL RESULTS 2014 AND 2017 MONITORING

Station Number	2014 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	52	3	17	26	14	30
37639	44	17	31	37.7	22	37
37640	38	1	25	34.3	5	27

The detections of pesticide residues, especially in at the Campbell Creek monitoring site, are likely the result of significant runoff in agricultural fields higher up in the watershed. Turbidity is monitored by the Soil and Water Conservation District and are high and remain so during the spring and fall irrigation periods.

Detections of the herbicide dacthal (DCPA) in surface water may have implications to groundwater quality especially in soil type similar to that in the Middle Deschutes watershed. Detections of this herbicides metabolite in groundwater has occurred throughout the Pacific Northwest[1] in groundwater at levels above the current federal health advisory limit (75 µg/L) where dacthal is or has been used. At this time, there has been no groundwater data collected in the area that would confirm or deny the presence of the metabolite.

PESTICIDES OF CONCERN DETECTED IN THE MIDDLE DESCHUTES PILOT STUDY

Pesticide	Examples of Trade Names[2]	Pesticide Classification
Chlorpyrifos	Dursban, Lorsban	Insecticide
Dimethenamid	Outlook, Tower	Herbicide
Dimethoate	Cygon, Dimate,	Insecticide
Diuron	Direx, Karmex	Herbicide
Imidacloprid	Admire, Gaucho, Premier, Provado	Insecticide
Linuron	Linex, Linurex, Premalin	Herbicide
Metolachlor	Bicep, Dual, Pennant	Herbicide
Oxfluorfen	Goal, Koltar	Herbicide
Pendimethalin	Prowl, Herbadox	Herbicide
Prometryn	Caparol, Promet, Primatol Q	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. One metabolite aminomethylphosphonic acid (AMPA) was detected at frequencies above 20%.

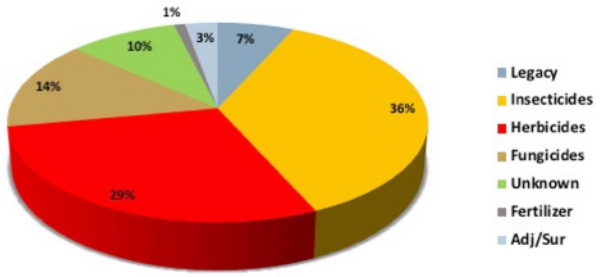
Aminomethylphosphonic acid (AMPA) is a metabolite of the herbicide glyphosate. Glyphosate is sold under a variety of names. It has an established EPA aquatic life benchmark of 249500 µg/L (this high benchmark indicates a realitively low toxicity to aquatic life). At this time, EPA has not established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

Projects Funded and Improvements Made: The Middle Deschutes pilot project is in the second year of assessment. Based on the results of the water quality monitoring, it would appear that the area could benefit from the establishment of a Pesticide Stewardship Partnership at least in the northern areas of the watershed. At this time, the WQPMT will begin assessing the potential for the establishment of a partnership group that would be willing to sponsor the formation of a PSP. This would likely include both the SWCD and the local watershed council. During the 2015-17 biennium the SWCD received $2,500.00 to conduct water quality monitoring, that funding has continued in to the 2017-19 biennium.

Beginning in 2018, flow measurement was begun at all currently active monitoring sites. In late 2018, it will be possible to begin analysis of pesticide loading. An analysis of loading and turbidity will be conducted to determine the relationship between the two parameters.

[1]This includes Malheur County in Oregon, The City of Quincy and Walla Walla in Washington, and areas near Homeland, Idaho
[2]Trade names presented are common examples used in Oregon and do not represent all current existing names for the pesticide

Waste Pesticide Collection: On February 2, 2017 a waste pesticide collection event was held in Madras. Approximately 7,600 pounds of material was collected at a cost of $14,000.00. In addition to pesticides that are currently registered for use but may have had container damage or were no longer needed by the applicator, a significant amount (350 pounds) of banned material was collected including DDT. A significant number of participants indicated that material that was brought to the collection event had been stored in old sheds or were discovered when the property changed owners.



Madras Waste Pesticide Collection Event 2/2/17

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