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Marion Drain

Summary of 2016 Surface Water Monitoring Program Results

Washington State Department of Agriculture
Natural Resources Assessment Section
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Introduction

The Washington State Department of Agriculture (WSDA) has monitored pesticide concentrations in surface water throughout Washington since 2003. WSDA staff take surface water samples during the typical pesticide use season (March through September). In 2016, 12 sites were monitored in Washington, 2 of which were in Yakima County. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.

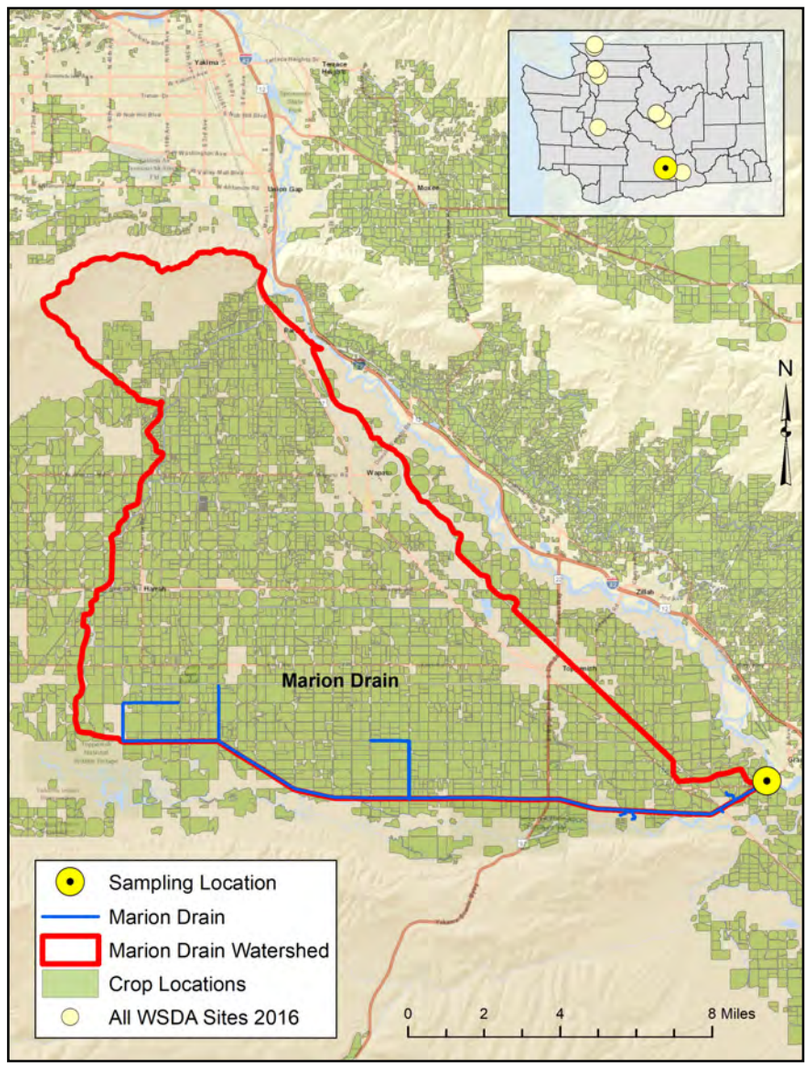
Study Area

WSDA has tested water from Marion Drain from 2003 through 2016. The watershed drains approximately 82,400 total acres and about 69% (57,200 acres) of the watershed is farmland. The main crops are field corn, hops, apples, alfalfa hay, and wheat. Marion Drain provides habitat for fall Chinook, coho, and summer steelhead salmon*. Sample collection at this site occurred in partnership with the Yakama Nation Management Program.

* Washington State Department of Fish and Wildlife SalmonScape (http://apps.wdfw.wa.gov/salmonscape/)

Sampling Details

- Samples were collected for 25 weeks, from March 21 through November 7. Additionally, samples were collected in October and November to see how late into the fall pesticides would be detected.
- Water samples were tested for 152 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide breakdown products.
- Sample analysis was conducted at Manchester Environmental Laboratory in Port Orchard, Washington.
- Streamflow and total suspended solids were measured at every sampling event.
- Air and water temperature (measured every 30 minutes) were monitored for the entire sampling season.
- Fish believed to be juvenile salmonids were frequently observed during site visits.



The table below shows the sample dates and their corresponding detected pesticide concentrations. The detections have been color coded according to assessment criteria, if any, that were surpassed. Assessment criteria for this program are derived by applying a 0.5 safety factor to state and federal water quality criteria. This safety factor is applied to ensure that assessment criteria are protective of aquatic life. Potential water quality issues can be identified early on by using the pesticide data. Watersheds in which detections above assessment criteria occur are a priority for continued monitoring and educational outreach. Please see http://agr.wa.gov/PestFert/natresources/SWM for more information.

Assessment Criteria

- May affect fish survival at sensitive life stages
- Additional level of protection for endangered species
- May affect invertebrate survival
- Nearing a pesticide state water quality standard
- May affect fish growth or reproduction with prolonged exposure
- May affect invertebrate growth or reproduction with prolonged exposure
- May affect aquatic plant growth
- Below all identified criteria
- No published criteria available
- Not detected (below detection limit)

Month	Mar		Apr				May					Jun			Jul				Aug					Oct	Nov
Day of the Month	21	28	4	11	18	26	2	9	17	24	31	13	20	27	5	11	18	27	2	8	15	22	29	31	7
2,4-D				0.027	0.031	0.049	0.071	0.045	0.090	0.195		0.081	0.050	0.059	0.095	0.071	0.045		0.042	0.039			0.051		
Atrazine																				0.018					
Azoxystrobin							0.007						0.008			0.012			0.024						
Bentazon	0.059						0.069	0.075	0.094	0.054	0.078	0.100	0.093	0.114	0.151	0.109	0.125	0.117	0.115	0.142	0.100	0.049	0.069	0.079	0.082
Boscalid														0.037	0.036		0.039		0.038						
Bromoxynil							0.043																		
Chlorantraniliprole		0.004			0.002	0.006	0.006	0.007		0.007	0.009	0.007	0.009			0.008		0.005	0.008			0.003		0.008	0.007
Chlorpyrifos			0.031																						
Clothianidin																				0.022	0.022	0.014	0.015	0.032	0.031
Dacthal (DCPA)																								0.049	
Dicamba	0.022		0.020					0.019	0.038	0.019			0.026						0.037						
Difenoconazole		0.005		0.007																					
Diuron	0.007	0.009	0.013	0.008	0.015	0.033	0.010	0.007	0.006	0.003						0.007									
Fludioxonil									0.021																
Imidacloprid									0.008																
MCPA							0.029			0.029						0.030									
Malathion															0.063										
Monuron																								0.003	
Myclobutanil									0.012	0.010				0.005		0.005			0.009	0.005					
DEET																					0.020				
Pendimethalin						0.056	0.227	0.068	0.057	0.063	0.080	0.048													
Pentachlorophenol																								0.027	0.026
Sulfentrazone							0.087																		
Terbacil						0.314	0.484	0.253	0.227	0.231	0.271	0.190			0.702	0.249	0.131	0.094	0.092	0.070	0.045		0.097		
Thiamethoxam													0.010			0.010	0.011	0.018	0.014	0.029	0.018	0.012	0.013	0.053	0.038
Triazine DEA degradate																								0.009	0.01
Triclopyr acid									0.026																
Trifluralin							0.025																		
Precipitation	0.00	0.00	0.00	0.13	0.16	0.07	0.00	0.00	0.54	0.05	0.00	0.02	0.09	0.00	0.00	0.08	0.01	0.04	0.00	0.07	0.11	0.14	0.03	0.84	0.05
Streamflow	247.7	187.1	256.5	--	255.7	162.2	145.4	122.7	151.0	146.6	75.58	24.02	35.91	23.59	24.96	26.16	21.25	26.15	42.16	62.18	59.03	62.74	69.62	177.8	173.4
Total Suspended Solids	14	10	33	28	21	13	14	14	17	12	4	2	3	2	3	3	3	3	5	16	6	5	6	11	10

Units for pesticide detections are in (µg/L), precipitation measurements in (week total inches), streamflow measurements in (cfs), and total suspended solids in (mg/L). The "--" signifies a sample or measurement was not collected.

Results Summary

- There were 143 pesticide detections in Marion Drain. Of these, 2 were found above assessment criteria.
- WSDA identifies some pesticides as Pesticides of Concern because they have been found somewhere in the state above WSDA's assessment criteria. Azoxystrobin, chlorpyrifos, dacthal, diuron, malathion, and pentachlorophenol are all Pesticides of Concern that were detected in Marion Drain. Only chlorpyrifos and malathion were higher than WSDA's assessment criteria at this site.
- Common products containing chlorpyrifos (an insecticide) are Lorsban and Pilot, and common products containing malathion (also an insecticide) include Drexel Malathion, Fyfanon, and Malathion 57 EC.
- When multiple pesticides are detected simultaneously the environmental effects can combine; multiple pesticides were detected every week Marion Drain was tested. Between 3 and 11 pesticides were detected at the same time.

Recommendations

- Read and follow label directions to protect water quality.
- Choose less-toxic pesticides whenever possible.
- Calibrate, maintain, and inspect application equipment often.
- Check the weather before application to reduce drift or runoff.
- Use best management practices: buffers, filter strips, sediment basins, ground cover, and setbacks.
- Properly dispose of all unneeded pesticides. Apply here to participate in a WSDA waste pesticide collection event: www.agr.wa.gov/wastepesticide