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Sulphur Creek Wasteway

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 the state since 2003. WSDA staff take surface water samples during the typical pesticide use season (March through September). In 2016, WSDA monitored 12 sites 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.

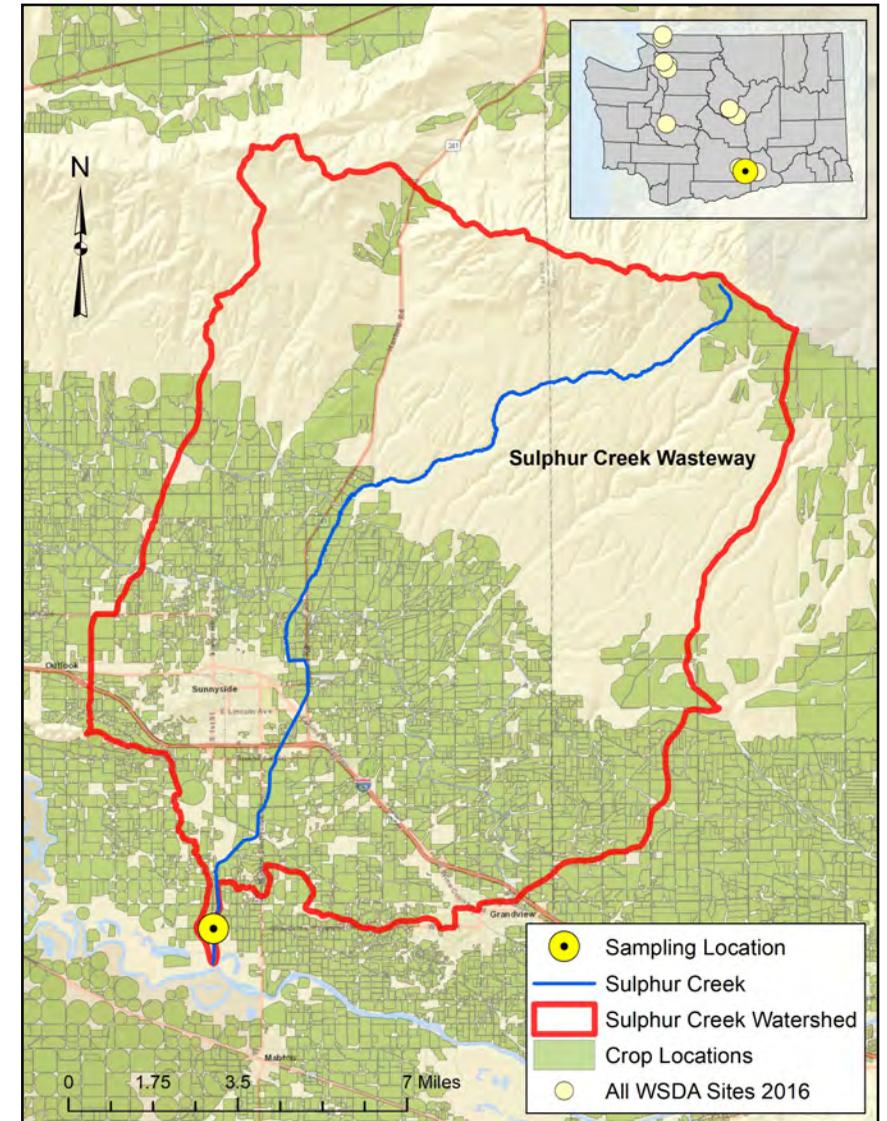
Study Area

WSDA has tested water in Sulphur Creek Wasteway from 2003 through 2016. The watershed drains approximately 102,300 total acres, and about 41% (41,700 acres) of the watershed is farmland. The main crops are field corn, juice grapes, apples, wine grapes, and alfalfa hay. Chinook, coho, and steelhead salmon have been documented downstream of the fish barrier at the Holaday Road crossing*. The fish barrier was constructed in order to restrict salmon from migrating further upstream in the irrigation return channel due to unfavorable habitat conditions.

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

Sampling Details

- Samples were collected for 22 weeks, from March 14 through September 19, 2016. Sampling was suspended during August because there have not been any exceedances of pesticide assessment criteria in Sulphur Creek Wasteway during August in previous years.
- 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.



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	Month	Mar			Apr				May					Jun			Jul				Sep		
	Day of the Month	14	21	28	4	11	18	26	2	9	17	24	31	13	20	27	5	11	18	25	6	12	19
	2,4-D				0.074	0.033	0.043	0.040	0.066	0.067	0.195	0.197	0.138	1.590	0.087	0.147	0.090	0.134	0.092	0.059		0.064	0.062
May affect fish survival at sensitive life stages	2,6-Dichlorobenzamide	0.048																		0.020			
	4,4'-DDE						0.016								0.016			0.014	0.016				
	Atrazine																		0.033				
Additional level of protection for endangered species	Bentazon	0.062																					
	Boscalid													0.092		0.043	0.052	0.046	0.048				
	Bromacil															0.029	0.029				0.030	0.027	
May affect invertebrate survival	Carbaryl							0.014															
	Chlorantraniliprole		0.003	0.002					0.004	0.004				0.005	0.009	0.005			0.003				
	Chlorpyrifos		0.140	0.098	0.042																		
Nearing a pesticide state water quality standard	Dacthal (DCPA)																		0.037				0.045
	Dicamba				0.040				0.023	0.026	0.100	0.033	0.052	0.018	0.032	0.043	0.035						0.036
	Dichlobenil															0.013					0.016		
May affect fish growth or reproduction with prolonged exposure	Difenoconazole					0.007																	
	Diuron	0.077	0.017	0.109	0.107	0.020	0.033	0.061	0.020	0.047	0.024	0.019	0.006	0.009			0.027					0.077	
	Fludioxonil																						0.020
May affect invertebrate growth or reproduction with prolonged exposure	Imazapyr								0.010	0.011	0.012	0.013										0.009	
	Isoxaben						0.002																
	MCPA								0.028										0.040				
May affect aquatic plant growth	Metolachlor												0.030										
	Myclobutanil								0.057														
	DEET														0.021						0.019		
Below all identified criteria	Terbacil																0.034				0.028		0.051
	Triclopyr acid										0.054	0.036											0.050
	Trifluralin						0.039	0.024	0.030														
Not detected (below detection limit)	Precipitation	0.23	0.01	0.01	0.00	0.06	0.13	0.00	0.00	0.00	0.06	0.15	0.00	0.34	0.08	0.00	0.00	0.10	0.00	0.03	0.03	0.12	0.00
	Streamflow	250.7	299.6	400.5	265.2	612.5	285.6	154.5	199.3	167.5	229.6	205.5	143.8	193.1	231.8	165.7	181.2	207.5	193.1	138.5	236.5	257.9	248.3
	Total Suspended Solids	30	145	100	47	75	41	44	76	43	63	41	19	27	29	14	16	14	13	6	16	19	15

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).

Results Summary

- There were 100 total pesticide detections at Sulphur Creek Wasteway. Of these, 7 detections were 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. Chlorpyrifos, dacthal, diuron, and metolachlor are all Pesticides of Concern that were detected in Sulfur Creek Wasteway. Only chlorpyrifos was higher than WSDA’s assessment criteria at this site.
- Every year since 2004, chlorpyrifos has been detected in Sulphur Creek Wasteway at concentrations known to affect aquatic life. Common products containing chlorpyrifos, an organophosphate insecticide, are Lorsban and Pilot.
- DDT was banned in the U.S. in 1972, but DDT and its breakdown products (including 4,4’-DDE) are very persistent in the environment and bind strongly to soil. The 4,4’-DDE detection here was likely due to sediment erosion into the stream.
- When multiple pesticides are detected simultaneously the effects can combine; multiple pesticides were detected every week.

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