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Lower Bertrand Creek

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 - September). In 2016, 12 sites were monitored across Washington, 2 of which were in Whatcom 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

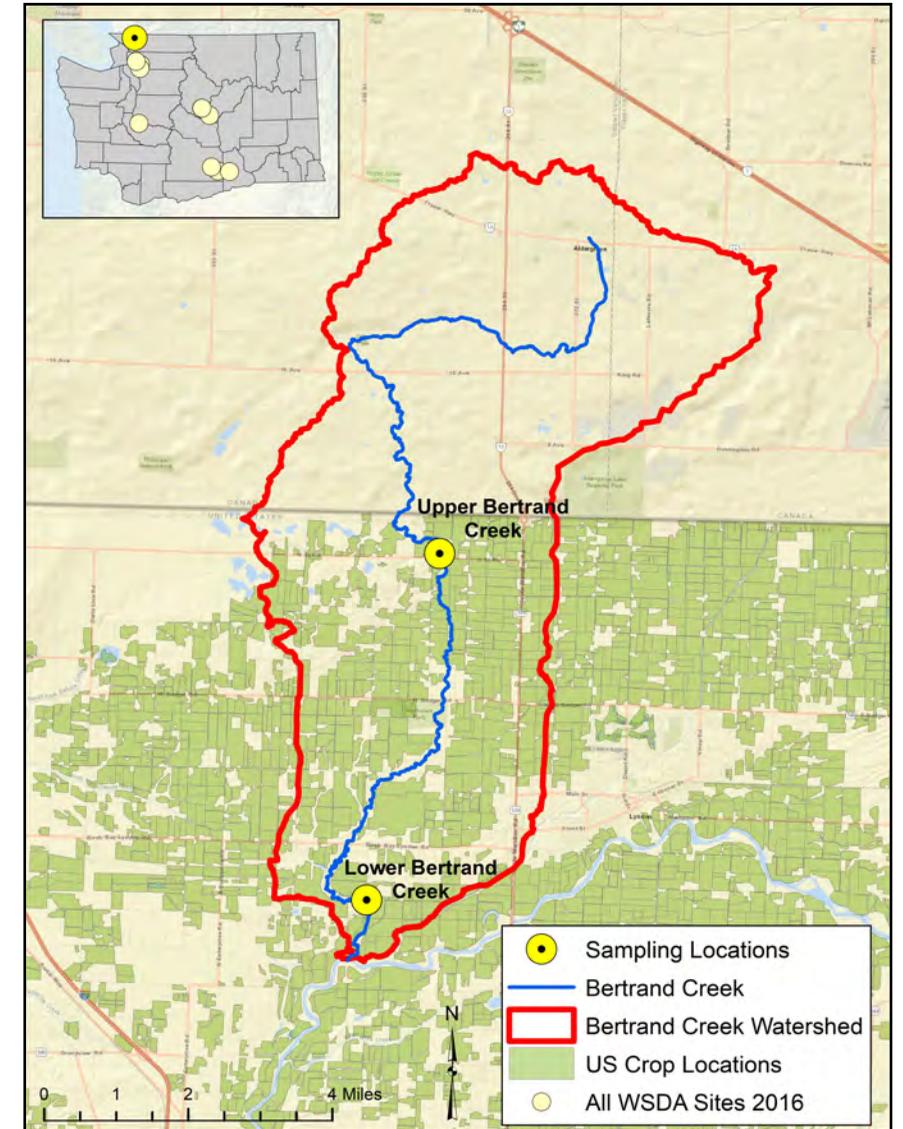
Water has been sampled from Bertrand Creek from 2013 through 2016. The Bertrand Creek watershed drains approximately 26,900 acres, or 42 square miles, in both the United States and Canada. In the United States portion of the watershed, there are about 8,500 acres of farmland. The main crops are grass hay, caneberries, field corn, blueberries, and potatoes. Bertrand Creek provides important habitat for many threatened species including steelhead, Chinook, coho, chum, and sockeye salmon*.

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

WSDA monitors Bertrand Creek at 2 locations: Upper Bertrand located near the Canadian Border and Lower Bertrand located 6.75 miles downstream. Using both sampling locations provides an opportunity to compare potential pesticide inputs from Canada to pesticide detections downstream in the United States.

Sampling Details

- Samples were collected for 24 weeks, from March 16 through August 29.
- 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			Aug									
		Day of the Month	16	22	30	5	13	19	26	3	10	17	26	8	14	22	29	6	12	19	26	3	10	17	24	29
May affect fish survival at sensitive life stages	2,4-D				0.299			0.080									0.064									
	2,6-Dichlorobenzamide	0.051	0.074	0.068	0.115	0.037	0.036	0.056	0.088	0.055	0.035	0.062	0.074	0.061	0.049	0.091	0.087	0.149	0.098	0.086	0.095	0.079	0.077	0.072	0.082	
	Atrazine				0.013											0.055										
	Azoxystrobin				0.013														0.006							
	Boscalid		0.099		0.144	0.066	0.075	0.275	0.086	0.074	0.068	0.074	0.091	0.148	0.036	0.072	0.120	0.088	0.148	0.132	0.115	0.093	0.075	0.061	0.063	
Additional level of protection for endangered species	Bromacil								0.042	0.051	0.052	0.045			0.043	0.041		0.039	0.044	0.044	0.048	0.035	0.035	0.041		
	Chlorantraniliprole	0.004		0.004	0.008	0.004		0.005	0.254	0.153	0.122	0.069	0.057	0.047	0.033	0.017	0.010	0.027	0.014		0.004					
	Cyprodinil							0.020											0.007							
	Dacthal (DCPA)																						0.039	0.046		
	Diazinon			0.063	0.046	0.034		0.055																		
May affect invertebrate survival	Dicamba				0.070			0.026																		
	Dichlobenil		0.025	0.029	0.102	0.019	0.013	0.041	0.006	0.012	0.010		0.009													
	Diuron			0.005	0.008	0.017	0.006	0.004								0.087		0.010	0.143		0.042	0.023	0.010	0.007	0.011	
	Fludioxonil													0.027		0.039	0.030		0.032	0.033	0.030					
	Imidacloprid	0.007		0.016	0.026	0.022	0.021	0.020	0.015	0.014		0.018	0.011	0.028	0.026	0.011		0.016								
Nearing a pesticide state water quality standard	Isoxaben				0.003			0.002								0.032	0.013	0.075	0.022	0.006						
	MCPA				0.358			0.054										0.085								
	Malaoxon			0.003																						
	Malathion														0.155											
	Mecoprop (MCP)		0.036	0.036	0.315			0.059										0.053								
May affect fish growth or reproduction with prolonged exposure	Metalaxyl	0.073	0.072	0.135	0.351	0.093	0.090	0.135	0.070			0.095		0.085	0.060	0.067	0.059	0.053	0.064		0.063	0.056	0.055	0.052	0.057	
	Metolachlor	0.038	0.106	0.038	0.093	0.032		0.048																		
	Monuron																				0.014	0.013	0.008	0.006	0.007	
	Myclobutanil								0.005						0.007				0.007							
	DEET							0.040																		
May affect invertebrate growth or reproduction with prolonged exposure	Oxadiazon																									
	Oxamyl	0.084		0.135	0.098	0.071	0.085	0.111	0.040	0.098	0.041	0.089	0.101	0.117	0.113		0.113	0.084	0.061	0.098	0.114	0.131	0.121	0.100	0.147	
	Oxamyl oxime	0.080		0.131	0.101	0.211	0.321	0.160	0.233	0.212	0.183	0.135	0.094	0.151	0.232	0.283	0.222	0.192	0.266	0.291	0.211	0.214	0.220	0.291	0.267	
	Pentachlorophenol																						0.030	0.038		
	Propiconazole			0.035	0.171			0.065																		
May affect aquatic plant growth	Propoxur				0.008																					
	Pyraclorobin							0.011																		
	Simazine				0.800			0.367	0.089	0.106	0.069			0.055				0.342								
	Sulfentrazone								0.069	0.075	0.111	0.114	0.121	0.119		0.051	0.048		0.063	0.055	0.071	0.070	0.067		0.063	
	Terbacil				0.185			0.132																		
Below all identified criteria	Tetrahydropthalimide (THPI)																0.133		0.075	0.057						
	Thiamethoxam			0.011	0.023	0.018	0.014	0.014	0.021	0.018	0.024	0.027	0.025	0.033	0.180	0.151	0.079	0.079	0.060	0.043	0.031	0.051	0.040	0.036	0.040	
	Triclopyr acid							0.047																		
	Trifluralin				0.033																					
	Precipitation	1.38	0.16	0.58	0.81	0.37	0.39	0.84	0.03	0.06	0.00	0.20	0.22	0.07	0.24	0.21	0.09	0.32	--	--	0.11	0.01	0.01	0.00	0.25	
No published criteria available	Streamflow	151.0	99.0	81.4	138.0	76.5	38.6	54.5	32.5	21.9	16.6	17.0	13.3	12.3	13.3	10.0	10.0	11.9	8.4	6.1	5.8	5.6	6.1	5.5	6.0	
	Total Suspended Solids	7	11	5	10	4	3	5	7	2	2	3	1	1	2	1	1	1	1	1	1	1	1	1	1	

Results Summary

- There were 290 total pesticide detections at Lower Bertrand. Of these, 4 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. Azoxystrobin, dacthal, diazinon, diuron, malathion, metolachlor, pentachlorophenol, and simazine are all Pesticides of Concern that were detected in Lower Bertrand. In addition, WSDA found 2 breakdown products of Pesticides of Concern: malaoxon (a breakdown product of malathion) and THPI (a breakdown product of captan).
- Simazine was found at both the Upper and Lower Bertrand sites at concentrations higher than WSDA’s assessment criteria.
- Of the 41 total chemicals found in the Bertrand Creek watershed, 6 were unique to the Lower Bertrand site.
- Lower Bertrand had 40 more pesticide detections in 2016 than Upper Bertrand.
- 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