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Mission 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 in Washington, 3 of which were in the Wenatchee River watershed. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.

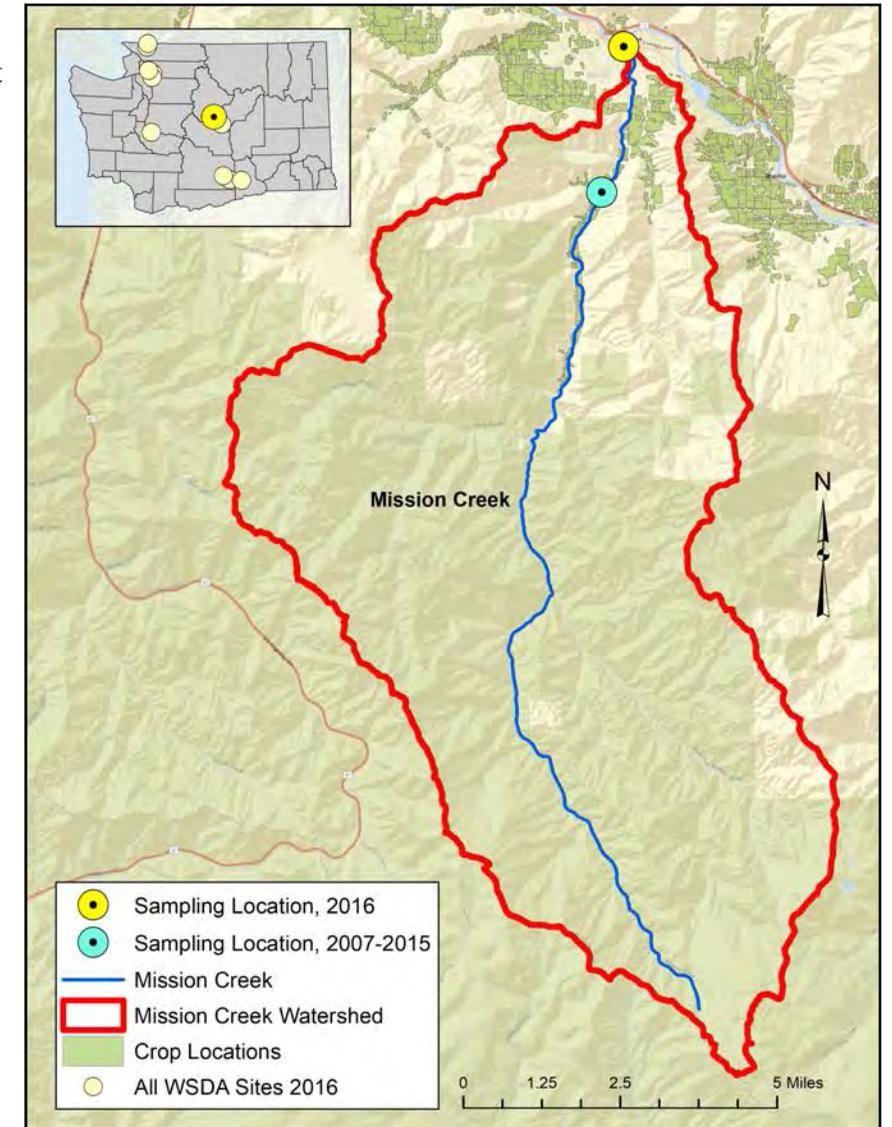
Study Area

Water has been sampled from Mission Creek from 2007 through 2016. A new sampling location was established downstream of the original Mission Creek site in 2016 to incorporate the whole Mission Creek watershed. The watershed drains approximately 52,400 total acres and about 1% (700 acres) of the watershed is used for agriculture. The main crops are pears, fallow, cherries, and apples. Mission Creek has dense riparian vegetation on its banks along most of the reach, which helps prevent pesticide contamination. Mission Creek provides habitat for summer steelhead salmon*.

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

Sampling Details

- Samples were collected for 23 weeks, from March 22 through August 29.
- Water samples were tested for 152 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide degradates.
- 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		Month	Mar		Apr				May				Jun				Jul				Aug				
		Day of the Month	22	29	5	12	19	27	3	10	18	25	1	14	21	28	6	12	19	26	3	9	16	23	29
May affect fish survival at sensitive life stages	2,4-D							0.068																	
	4,4'-DDE									0.036							0.016	0.015	0.016	0.018		0.017		0.017	
Additional level of protection for endangered species	4,4'-DDT									0.035															
	Boscalid																							0.039	
Nearing a pesticide state water quality standard	Chlorpyrifos		1.260	0.037																					
	Dicamba								0.028																
May affect fish growth or reproduction with prolonged exposure	Diuron				0.003																				
	Imidacloprid												0.012							0.030					
May affect invertebrate growth or reproduction with prolonged exposure	DEET																						0.022		
	Piperonyl butoxide (PBO)		0.696	0.052																					
May affect aquatic plant growth	Tetrachlorvinphos																								0.1
	Precipitation		0.03	0.00	0.07	0.00	0.76	0.00	0.00	0.02	0.11	0.73	0.00	0.02	0.50	0.01	0.00	0.25	0.16	0.00	0.00	0.01	0.00	0.00	0.00
Below all identified criteria	Streamflow		99.00	85.60	149.0	126.0	116.0	69.52	58.40	48.16	48.30	28.50	24.12	20.70	17.14	11.60	10.32	4.90	17.30	39.30	7.16	14.40	6.62	7.00	4.05
No published criteria available	Total Suspended Solids		23	14	119	123	42	39	19	15	8	13	6	6	7	8	6	6	599	113	34	179	26	11	25
Not detected (below detection limit)	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 20 pesticide detections in Mission Creek. Of these, 10 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 and diuron are Pesticides of Concern that were detected in Mission Creek. Only chlorpyrifos was higher than WSDA's assessment criteria at this site.
- Chlorpyrifos was only detected during the first 2 weeks of monitoring in the early spring.
- Chlorpyrifos has been detected in Mission Creek in previous years at concentrations known to negatively affect aquatic life. Common products containing this pesticide are Lorsban, Pilot, Hatchet Insecticide, and Cobalt Insecticide.
- DDT was banned in the U.S. in 1972, but DDT and its breakdown products (including 4,4'-DDE and 4,4'-DDT) are very persistent in the environment and bind strongly to soil. The total DDT detections here were likely due to sediment erosion into the stream.
- On July 19th, total suspended solids in the water were high due to debris from a landslide in the upper reaches of the Mission Creek watershed.
- When multiple pesticides are detected simultaneously the environmental effects can combine; multiple pesticides were detected 7 out of 23 sample weeks at Mission Creek (30% of the 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.
- Growers and private landowners should continue to maintain the riparian vegetation along Mission Creek.
- Properly dispose of all unneeded pesticides. Apply here to participate in a WSDA waste pesticide collection event: www.agr.wa.gov/wastepesticide