



Washington  
State Department of  
Agriculture

# Surface Water Monitoring in the Lower Yakima Valley

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Natural Resources Assessment Section  
(WSDA)

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# WSDA – Natural Resources Assessment Section



- **Research group in Directors Office**
- **11 full-time staff – Olympia and Yakima**

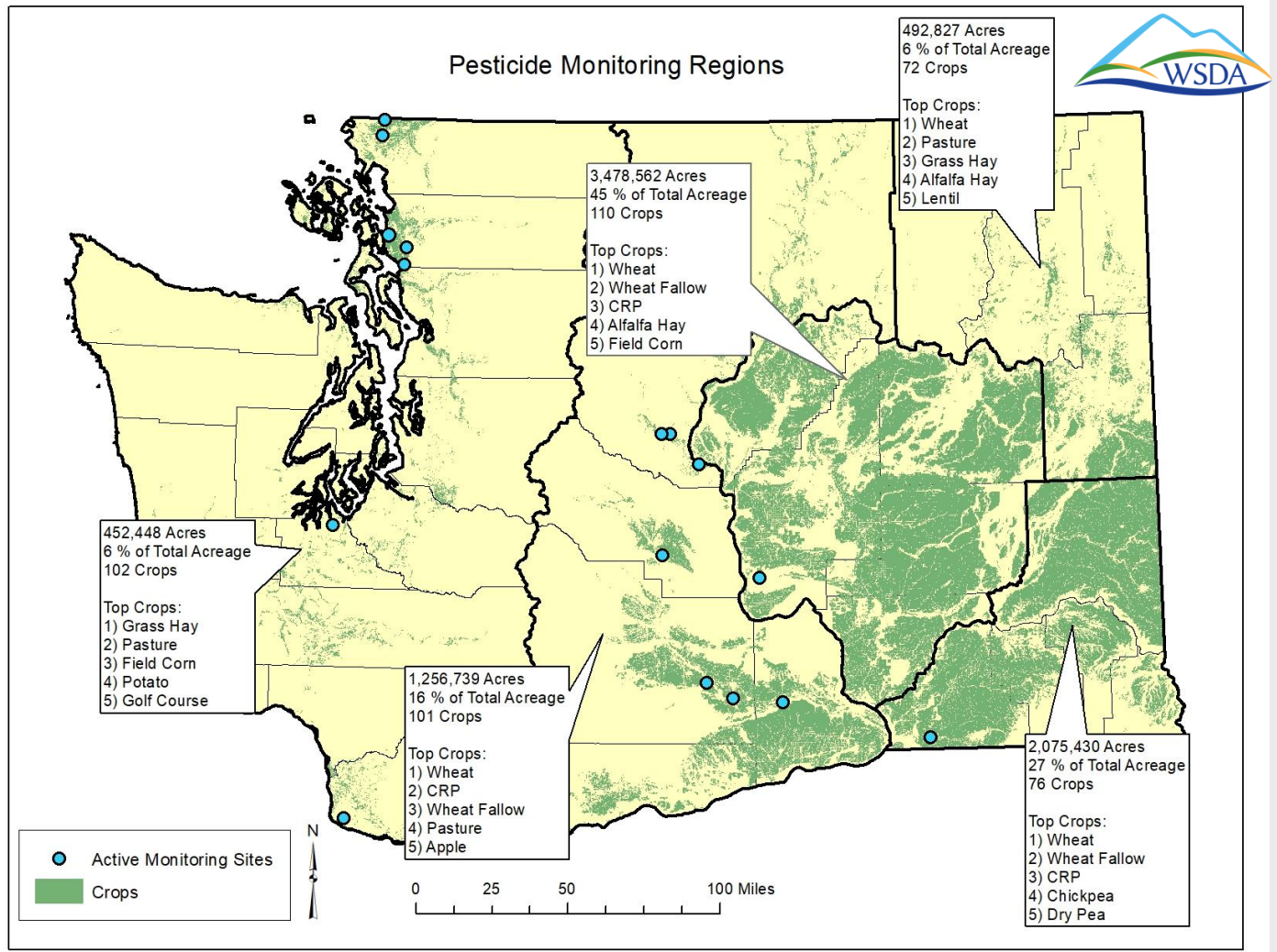
- Soil health
- Endangered Species issues
- Agricultural land use mapping
- Surface water monitoring
- Pesticide usage
- Groundwater, drought
- Voluntary Stewardship Program



3 Urban and  
13 Agricultural  
Sites in 2018 &  
2019

140+ Current Use  
Pesticides, Legacy  
Chemicals &  
Degradates

Weekly or bi-  
weekly sampling  
for 12-26 weeks  
(March –  
September)

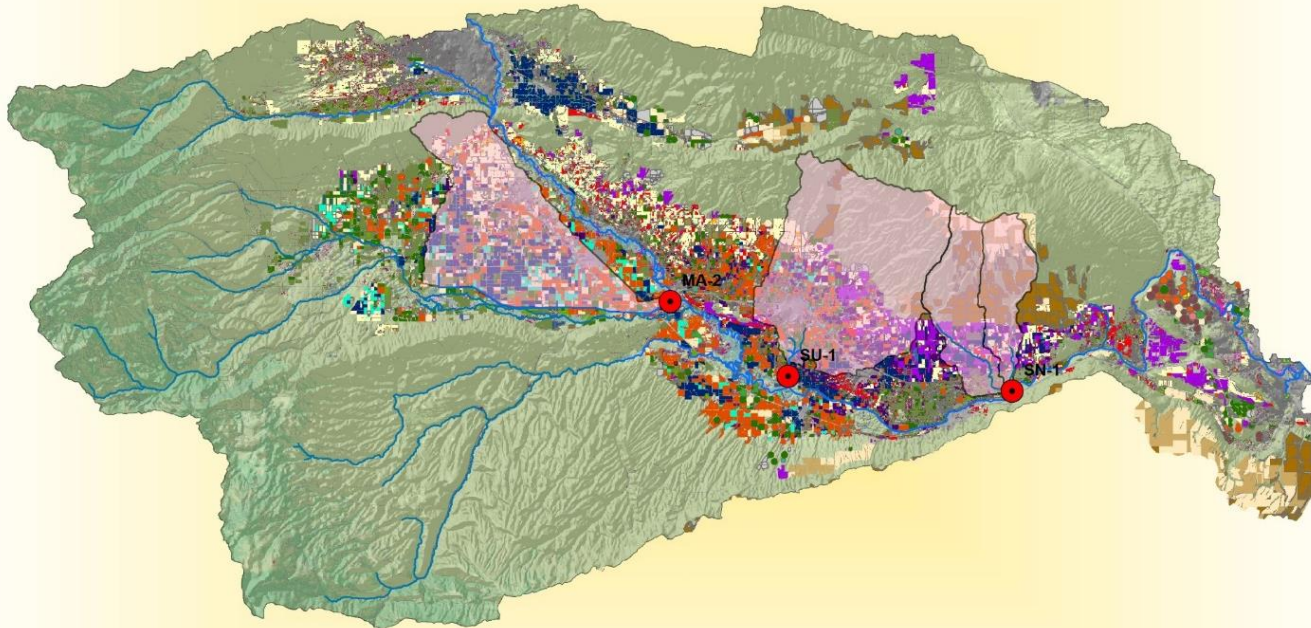


# Lower Yakima Sub-Basins



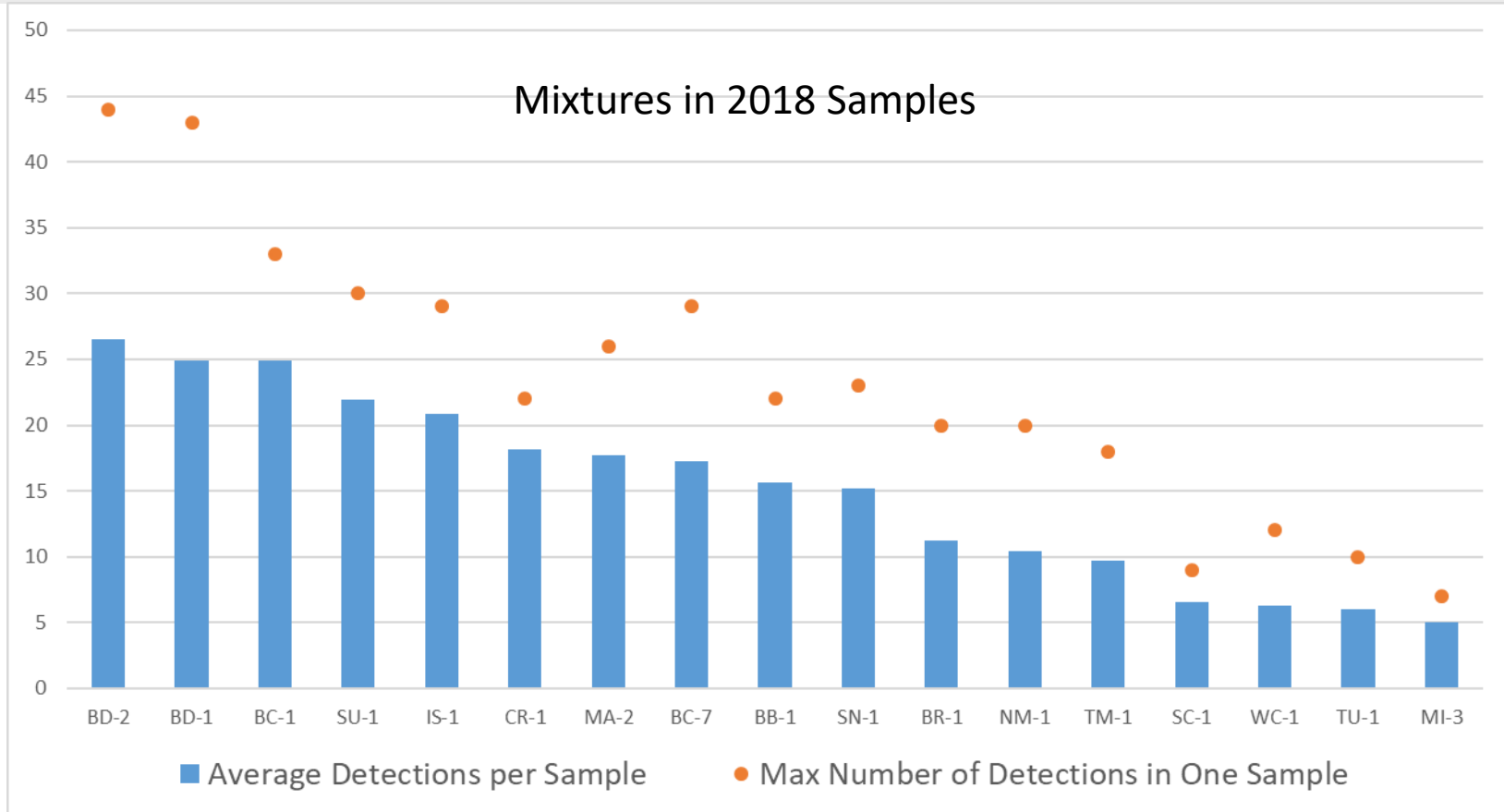
Monitored Watershed	Hydrologic Unit Code (HUC)	County	Watershed Acres	Ag/Urban Acres	Land Use	Years Monitored
Marion Drain*	1703000304	Yakima	82,400	57,200	Agriculture	2003-Present
Sulphur Creek WW	1703000309	Yakima	102,300	41,700	Agriculture	2003-Present
Spring Creek*	170300031005	Benton	28,260	20,800	Agriculture	2003-2015
Snipes Creek	1703000310	Benton	50,300	31,200	Agriculture	2016-Present
Naneum Creek	1703000104	Kittitas	113,859	20,554	Agriculture	2017-Present

\* denotes waterbody has had 2 to 3 different monitoring locations at some point during the SWMP history





# 2018 Statewide Results



# POCs in Lower Yakima Sites



EPA Aquatic Life LOC (ug/L)			
Fish		Invertebrate	
Acute	Chronic	Acute	Chronic
<b>Chlorpyrifos - OP</b>			
0.9	0.57	0.05	0.04
<b>Malathion - OP</b>			
2.05	8.6	0.049	0.06
<b>Imidacloprid - Neonic</b>			
114,500	9,000	0.385	0.01
<b>Clothionidin - Neonic</b>			
>50,750	9,700	11.0	0.05

# Snipes Creek - 2018



Number of Chemicals Detected During Season= 37

Maximum # of Detections at Once = 23

Chemical	Exceedances	Detections	Dates of Exceedance(s)	Min (ug/L)	Max (ug/L)
Snipes Creek					
<b>Chlorpyrifos</b>	8	13	Mar 21, 26, Apr 2, 10, 16, 24, June 4, 11	0.002	0.887
<b>Imidacloprid</b>	6	6	May 29, June 4, 11, 18, Aug 7, 13	0.007	0.228
<b>Malathion</b>	1	1	June 18 only		0.216

Chlorpyrifos – EPA Aquatic LOC (ug/L)			
Fish		Invertebrates	
Acute	Chronic	Acute	Chronic
<b>0.9</b>	0.57	0.05	0.04

Imidacloprid– EPA Aquatic LOC (ug/L)	
Invertebrates	
Acute	Chronic
0.385	<b>0.01</b>

Malathion– EPA Aquatic LOC (ug/L)	
Invertebrates	
Acute	Chronic
<b>0.049</b>	<b>0.06</b>

# Marion Drain – Fall Sampling





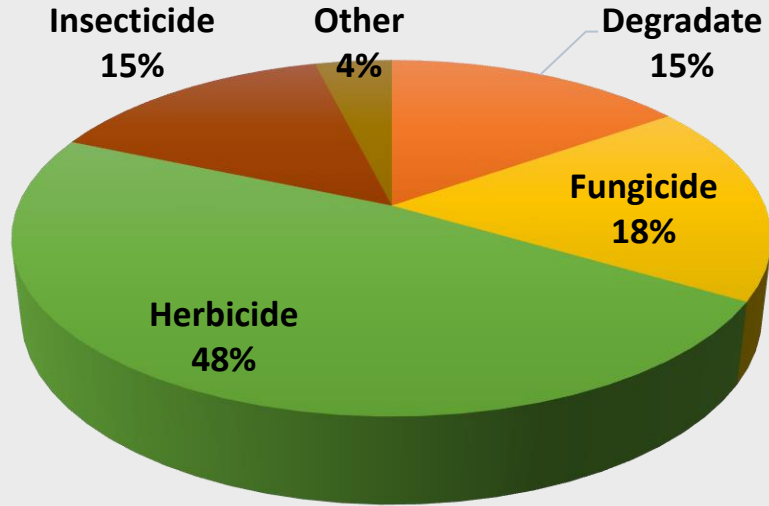


# 2018 Late Sampling

Marion Drain 2 (MA-2), 2018 - Freshwater Criteria (pesticides in ug/L)

Month		Oct		Nov
Day of the Month	Use	22	29	5
4,4'-DDD	D-OC		0.002	
Atrazine	H	0.005	0.005	0.005
Boscalid	F	0.006	0.006	0.005
<b>Chlorantranilprole</b>	I	0.015	0.012	0.011
<b>Clothianidin</b>	I-N	0.033	0.033	0.032
Diuron	H			0.003
Ethoprop	I-OP		0.002	0.066
Fenarimol	F		0.008	
Fludioxonil	F	0.013	0.006	0.004
Hexazinone	H	0.003	0.004	0.003
N,N-Diethyl-m-toluamide (DEET)	IR	0.002	0.002	
Norflurazon	H	0.007	0.007	0.007
Pendimethalin	H	0.004		
Prometon	H	0.004	0.004	0.004
Simazine	H	0.005	0.006	0.005
<b>Sodium Bentazon</b>	H	0.012		0.013
Sulfentrazone	H	0.006	0.006	0.003
Terbacil	H	0.014	0.008	0.011
<b>Thiamethoxam</b>	I-N	0.05	0.047	0.04
Triadimefon	F		0.003	
Triazine DEA degradate	D-H	0.006		0.007

# 2018 Statewide Results



## Why are herbicides detected most frequently?

- Use Patterns
- Chemical Properties = More H<sub>2</sub>O soluble
- Generally less toxic to aquatic organisms
- Frequent detections but almost no exceedances

# 2019 Glyphosate Sampling



- Samples collected every other week at most of our sites
- Samples analyzed for glyphosate, AMPA (glyphosate breakdown) and glufosinate-ammonium.

# 2019 Preliminary Glyphosate Sampling Results

Analytes	Detections	Max Concentration (µg/L)	Detection Frequency %
<b>AMPA</b> (n=192)	155	16.7	81
<b>Glufosinate-ammonium</b> (n=199)	13	0.482	7
<b>Glyphosate</b> (n=193)	156	18.4	81

Endangered Freshwater Fish Criteria = 1,075 ug/L

Aquatic Plant Criteria = 5,950 ug/L



# How do we monitor?



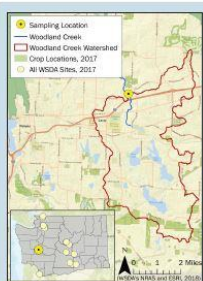


# Factsheets



## Woodland Creek

Summary of 2017 Surface Water Monitoring Program Results | November 2018



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 2017, WSDA monitored 16 sites in Washington, 1 of which was in Thurston County. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.



### Watershed and site information

**Sampling history:** New site as of 2017

**Watershed area:** 12,500 acres (~20 square miles)

**Area in agricultural use:** 500 acres (~4% of total watershed acreage)

**Main crops:** Ornamental nurseries, sod farms, golf courses, and pasture

**Fish habitat:** Fall Chinook, fall chum, and coho salmon; and winter steelhead (Washington State Department of Fish and Wildlife SalmonScope: [apps.wdfw.wa.gov/salmonscope/](https://apps.wdfw.wa.gov/salmonscope/))

**Sampling dates:** 14 sampling events, March 28th - September 25th, once every 2 weeks

#### Water testing:

- 144 chemicals (current and legacy insecticides, herbicides, fungicides, rodenticides, pesticide degradates, and other pesticide products)
- Streamflow and total suspended solids
- Air and water temperature measured every 30 minutes
- Sample analysis at Manchester Environmental Lab, Port Orchard, Washington

#### Notes:

- The creek flows through almost 5 miles of Lacey, Washington's residential, commercial, and agricultural areas.
- Adult salmon have been observed by WSDA staff at this site during spawning season.

### Results and Conclusions

- There were 31 pesticide detections in Woodland Creek. Of these, 1 was above WSDA's assessment criteria.
- Out of all the chemicals tested for, there was 1 type of insecticide, 4 fungicides, 4 herbicides, 2 degradates, and 2 other pesticide-related chemicals detected.
- WSDA identifies a pesticide as a Pesticide of Concern (POC) when it has been found somewhere in the state above WSDA's assessment criteria in recent years. Carbendazim, difenoconazole, and pyridaben are POCs that were detected in Woodland Creek.
- The detection of pyridaben at this site was higher than WSDA's assessment criteria.
- Pyridaben was only detected at the beginning of July. This insecticide is used in greenhouses and on fruit trees.

### Recommendations

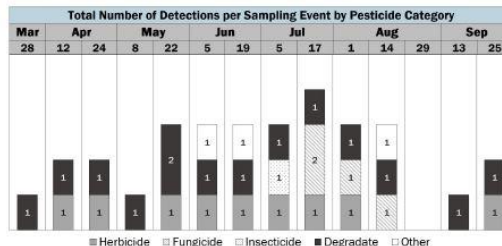
- **Make use of natural protections**
  - Use buffers, filter strips, sediment basins, ground cover, and setbacks.
- **Be informed**
  - Read and follow pesticide label directions, and be familiar with active ingredients.
  - Plan applications using the weather forecast to reduce the chances of drift or runoff.
  - Review WSDA's POCs and choose less-toxic pesticides when possible.
- **Care for your equipment and products**
  - Calibrate, maintain, and inspect application equipment regularly.
  - Properly dispose of all unneeded pesticides. Visit [agr.wa.gov/wastepesticide](https://agr.wa.gov/wastepesticide) to learn about waste pesticide collection events.

The calendar to the right shows the concentration in µg/L and date sampled of each WSDA Pesticide of Concern detected. This calendar does not include all the pesticides WSDA found during the growing season. The colors correspond to the risk each pesticide's detected concentration represents to an aquatic ecosystem. Detected concentrations that exceed WSDA's assessment criteria have a higher potential to cause harm to aquatic ecosystems. These assessment criteria are specific to each individual pesticide and are determined by applying a safety factor to state and federal water quality standards and criteria. The "-" signifies a sample or measurement that was not collected.

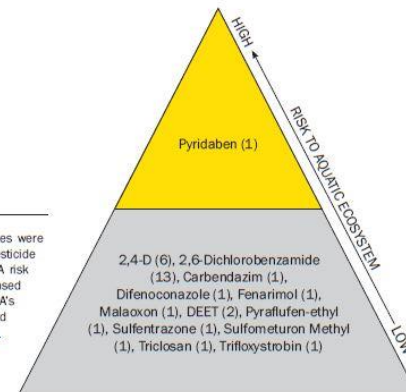
Washington State's Pesticides of Concern Detected and their Corresponding Sampling Dates and Concentrations															
Month	Mar	Apr	May	Jun	Jul	Aug	Sep								
Day of the Month	Use*	28	12	24	8	22	5	19	5	17	1	14	29	13	25
Carbendazim	F									0.023					
Difenoconazole	F										0.007				
Pyridaben	I								0.027						
Total Suspended Solids (mg/L)		6.0	6.0	6.0	5.0	7.0	4.0	5.0	5.5	4.0	3.0	2.0	2.0	1.0	2.0
Streamflow (cubic ft./sec)		-	55.3	47.2	41.7	38.3	32.1	29.8	20.3	16.5	11.2	11.2	9.6	9.3	9.4
Precipitation (total in./week)		1.75	1.54	1.06	1.77	0.95	0.16	1.07	0	0	0	0.13	0	0.07	0.82

Exceeds Assessment Criteria     Below Assessment Criteria  
 (\* F: Fungicide, I: Insecticide)

The graph below shows the total number of detections per sampling event in each pesticide category. The category "other" includes wood preservatives, an insect repellent, synergists, and antimicrobials.



The triangle to the right shows what pesticides were detected in Woodland Creek in 2017. Pesticides were categorized based on the highest detected concentration. The total number of detections for each pesticide is in parentheses next to the pesticide name. Detections have been color sorted according to WSDA risk assessment criteria that were surpassed. The risk each pesticide represents to an aquatic ecosystem is based on assessment criteria specific to each individual pesticide, not only on the concentration detected. WSDA's assessment criteria are derived by applying a safety factor to state and federal water quality standards and criteria in order to be proactively protective of aquatic life. Please see [agr.wa.gov/PestFert/natresources/SWHI](https://agr.wa.gov/PestFert/natresources/SWHI) for more information.



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WSDA

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**BACKGROUND**

# Online Results Dashboard



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The surface water monitoring for pesticides [online dashboard](#) displays locations for all of the monitoring sites from 2003 through 2018 and a monitoring results.



# Thank you - Questions?



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