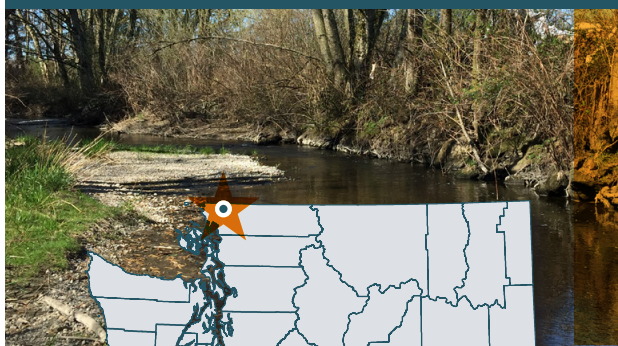


Upper Bertrand Creek

APRIL 2023

Summary of 2021 Surface Water Monitoring Program Results



WSDA monitored Bertrand Creek at two 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. Roughly 14,000 acres of this watershed are in Canada where the main crops and management practices are outside the scope of WSDA's crop mapping program.

In 2021, Washington State Department of Agriculture (WSDA) monitored 18 sites in Washington. Upper Bertrand was one of two monitoring sites located in Whatcom County.

Samples were analyzed at the Manchester Environmental Lab, Port Orchard, Washington.

WSDA compares detected pesticide concentrations to WSDA assessment criteria, which are half of state and federal water quality criteria. Each pesticide has its own assessment criteria, based on its toxicity to aquatic animals, insects, and plants.

Site information:

Years sampled: 2013 – present

Fish habitat:

Coho, fall chum, pink and sockeye salmon; bull and winter steelhead trout (SalmonScape: apps.wdfw.wa.gov/salmonscape)

Sampling dates:

23 weeks; April 6 – August 23, October 18, and November 1

Water testing:

Samples were tested for 170 current and legacy chemicals (59 insecticides, 58 herbicides, 23 fungicides, 19 pesticide degradates, 6 legacy chemicals, 2 synergists, 1 antimicrobial, 1 insect repellent, and 1 wood preservative).



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Results:

- There were 53 unique chemicals detected with a total of 488 detections in Upper Bertrand Creek. Of these, 24 detections were above WSDA assessment criteria.
- When multiple pesticides are detected simultaneously, the harmful effects can combine; multiple pesticides were detected every week Upper Bertrand was sampled. Between 8 and 41 pesticides were detected at each sampling visit.
- WSDA identifies some pesticides as Pesticides of Concern (POC) when they have been detected above WSDA's assessment criteria and above established detection frequencies.

Watershed-specific POCs in Upper Bertrand Creek:

ICONS FOR ENVIRONMENTAL HAZARDS LISTED ON PESTICIDE LABELS



Chlorpyrifos - Insecticide



- *Common trade names:* Lorsban, Pilot, Vesper
- *Example uses within watershed:* ornamental/nursery, strawberry
- As of early 2022, chlorpyrifos has been banned for use on food and feed commodities. It can still be applied to registered non-food commodities.
- A streamside no-spray buffer zone is required in Washington for chlorpyrifos to protect threatened and endangered Pacific salmon and steelhead.
- Also detected in 11 other monitored watersheds and a POC in all but one of them.

Diuron - Herbicide



- *Common trade names:* Direx, Karmex
- *Example uses within watershed:* berry, grass hay, field corn, pasture
- This chemical can transport into the environment via drift or runoff and can contaminate groundwater. Diuron has been found in groundwater in Washington State.
- Also detected in nine other monitored watersheds and a POC in six of them.

Imidacloprid - Insecticide



- *Common trade names:* Admire Pro, Gaucho, Merit
- *Example uses within watershed:* berry, corn, potato, wheat, residential
- Also detected in 13 other monitored watersheds and a POC in 10 of them.

Products listed are for descriptive purposes only and do not imply endorsement by the author or the Department of Agriculture.

The calendar at right shows the concentration in µg/L and date sampled of each watershed POC detected. The “-” identifies data that could not be collected. This calendar does not include all the pesticides WSDA found during the growing season. Detected concentrations that exceed WSDA’s assessment criteria have a higher potential to cause harm to aquatic ecosystems. The diuron detection did not exceed WSDA assessment criteria in 2021, however, it is still considered a watershed POC because of its exceeding detections in recent years at this site.

[* H: Herbicide; I: Insecticide]
 exceeds assessment criteria
 below assessment criteria

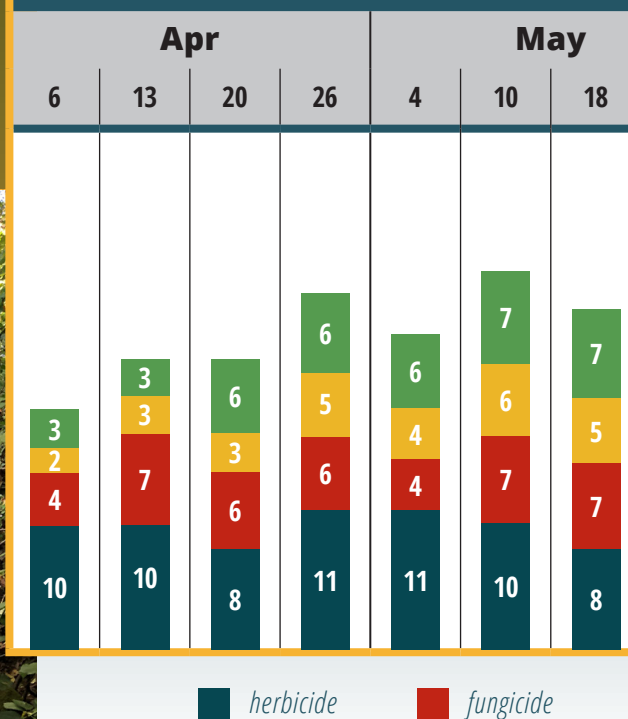
Watershed Pesticides of Concern Detected and their Corresponding Sample

Month ▶		Apr				May		
Day of the Month ▶	Use*	6	13	20	26	4	10	
Chlorpyrifos	I		0.004				0.004	
Diuron	H							
Imidacloprid	I	0.035	0.044	0.029	0.091	0.046	0.032	
Suspended sediment concentration (mg/L)		-	-	2	2	4	2	
Streamflow (cubic ft/sec)		17.9	13.4	7.2	8.9	6.4	6.2	
Precipitation (total in/week)		0.07	0.51	0	0.40	0.33	0.59	

The graph at right shows the total number of detections per sampling visit in each pesticide category. The category ‘other’ includes degradates and additional pesticide-related chemicals. Note that the number of detections between categories cannot be directly compared due to the different number of chemicals in each category and variability in analysis methods used.



Total Number of Detections per Sampling



Recommendations:

Make use of natural protections

- Use buffers, filter strips, sediment basins, ground cover, and setbacks.
- Maintain vegetation along creeks and take care during spring time applications before vegetation along streams leaves out.

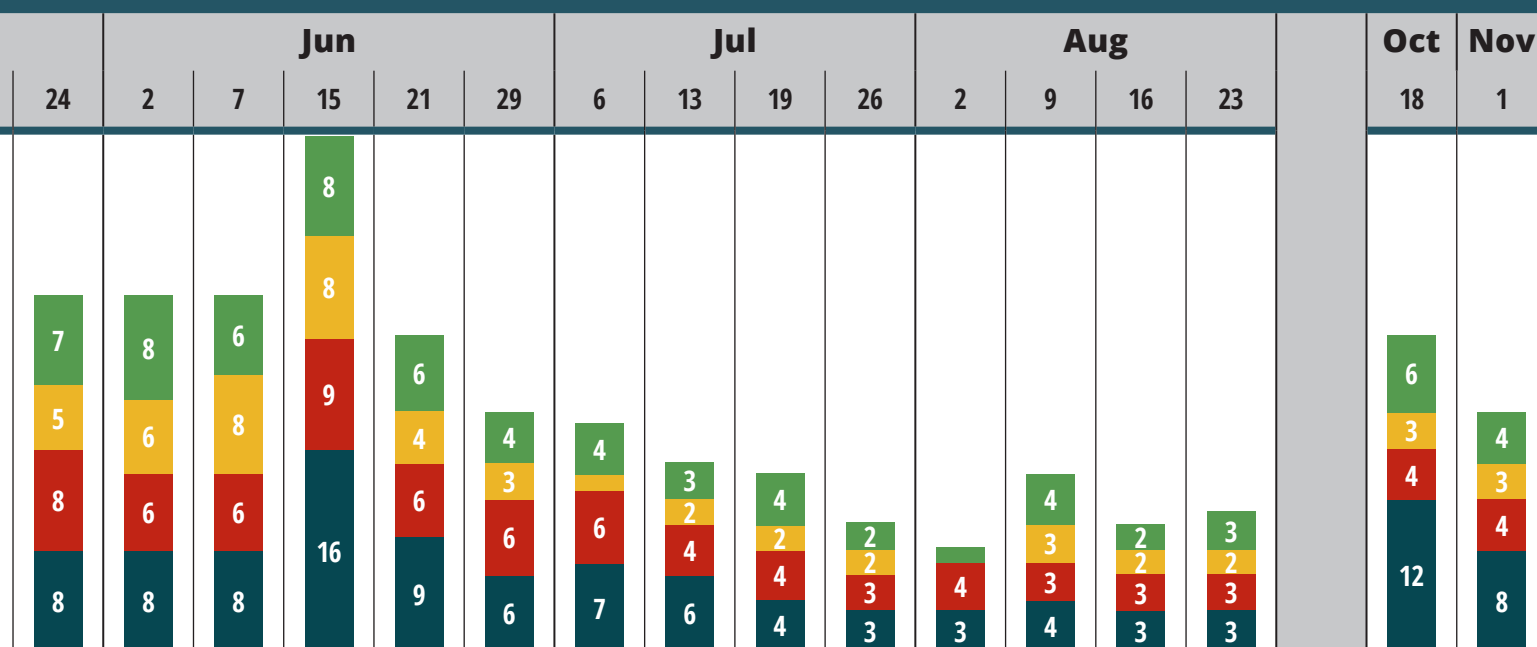
Be informed

- Read and follow pesticide label directions.
- Check the weather forecast to reduce the chances of drift or runoff.
- Review WSDA’s Pesticides of Concern and choose less-toxic pesticides when possible.

Sampling Dates and Concentrations

May		Jun					Jul				Aug				Oct	Nov
18	24	2	7	15	21	29	6	13	19	26	2	9	16	23	18	1
0.004	0.009	0.003	0.002													
				0.005												
0.019	0.017	0.021	0.021	0.056	0.02	0.017	0.011		0.011	0.008		0.007	0.006	0.005	0.044	0.046
3	2	4	2	9	2	2	3	2	2	2	7	2	2	2	5	2
4.4	4.3	4.0	5.2	20.4	2.5	1.6	1.4	0.9	0.7	0.9	0.9	0.7	0.5	0.5	62.1	29.8
0.19	0.36	0.45	0.51	0.89	0.34	0	0	0	0	-	-	-	-	-	2.39	1.91

Event by Pesticide Category



insecticide other

Please see agr.wa.gov/AgScience for more information.

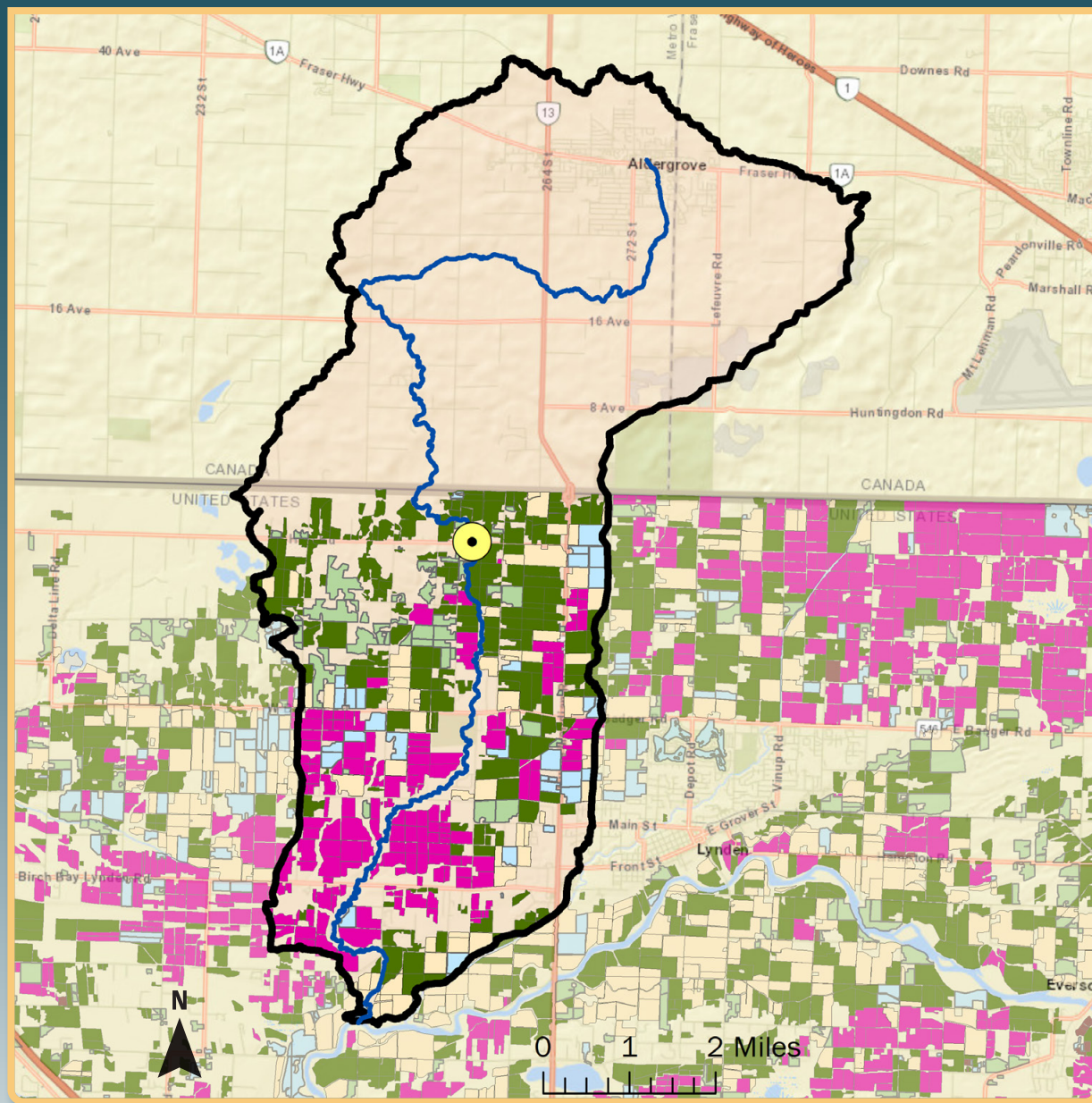
Care for your equipment and products

- Calibrate, maintain, and inspect application equipment.
- Properly dispose of all unneeded pesticides. Visit agr.wa.gov/wastepesticide to learn about waste pesticide collection events.



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Upper Bertrand crop groupings | acres

 Berry	2,334
 Cereal Grain	1,264
 Hay / Silage	3,162
 Other	157
 Pasture	702
 Vegetable	478

- Sampling Location
- Bertrand Creek
- Bertrand Watershed

Total U.S. Agriculture 8,097 acres

Total U.S. Non-Agriculture 4,733 acres

Watershed Total 26,893 acres

To view mapped crop groups at the field scale, download the WSDA Agricultural Land Use data or view the interactive web map here:
<https://agr.wa.gov/departments/land-and-water/natural-resources/agricultural-land-use>