



Pub No. 102-615 (R/2/18)

# Brender Creek

## Summary of 2016 Surface Water Monitoring Program Results

Washington State Department of Agriculture  
Natural Resources Assessment Section  
February 2018

### 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

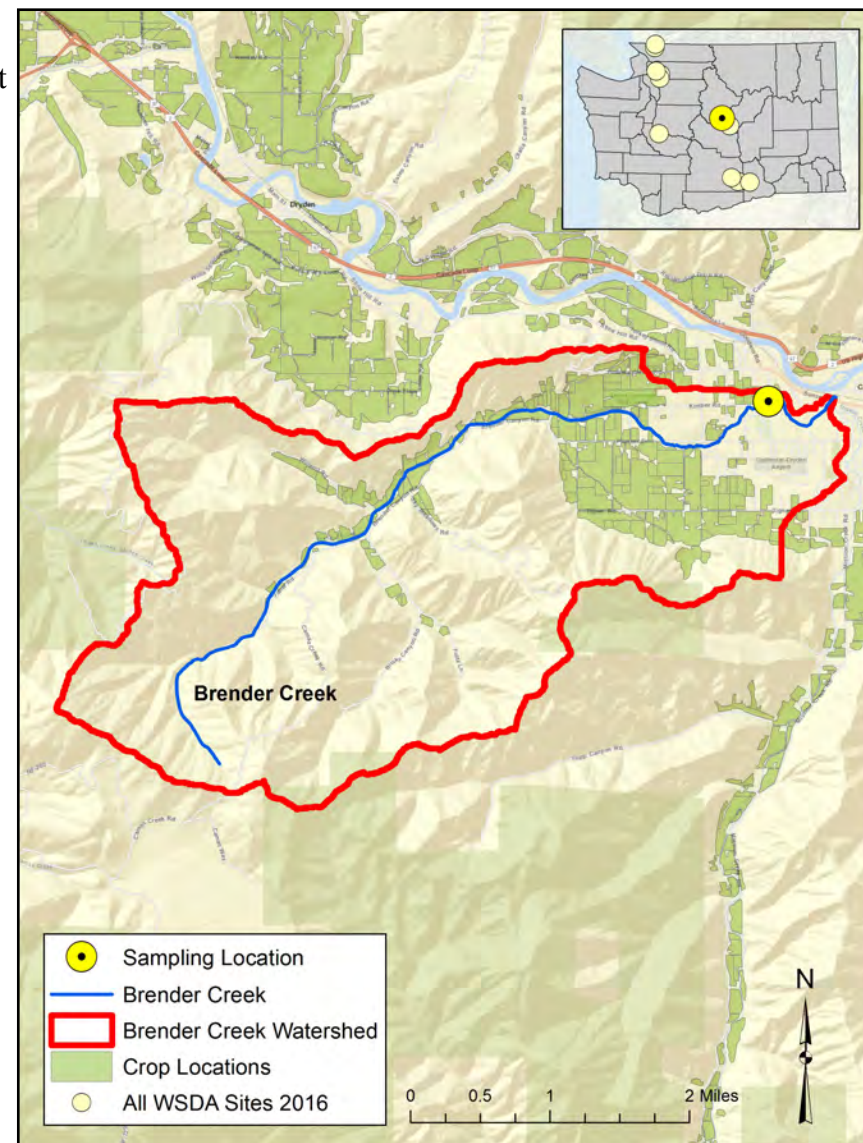
Water has been sampled from Brender Creek from 2007 through 2016. The watershed drains approximately 6,900 total acres and about 13% (900 acres) of the watershed is used for agriculture. The main crops are pears, apples, cherries, and pasture. Brender Creek below Evergreen Drive provides habitat for spring Chinook and summer steelhead salmon. Brender Creek above Evergreen Drive is blocked from fish passage\*.

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

Orchard producers in this watershed applied the insecticide DDT before it was banned by the Environmental Protection Agency (EPA) in 1972. DDT and its breakdown products are still detected in the Brender Creek watershed due to the chemical's strong soil binding abilities, combined with soil erosion into the adjacent stream. Growers in the watershed try to maintain vegetated cover along the stream and in orchards to reduce DDT loading to the stream.

### Sampling Details

- Samples were collected for 22 weeks, from March 22 through August 23.
- 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                                                                                                                                                         | 22    | 29    | 5     | 12    | 19    | 27    | 3     | 10    | 18    | 25    | 1     | 14    | 21    | 28    | 6     | 12    | 19    | 26    | 3     | 9     | 16    | 23    |
| May affect fish survival at sensitive life stages                      |  | 2,4-D                                                                                                                                                                    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 0.082 |       |       |
|                                                                        |  | 2,6-Dichlorobenzamide                                                                                                                                                    |       |       |       |       |       |       |       |       |       |       |       |       |       | 0.025 | 0.023 |       | 0.022 | 0.024 |       | 0.021 | 0.022 |       |
|                                                                        |  | 4,4'-DDD                                                                                                                                                                 |       |       |       |       |       | 0.024 |       |       |       | 0.024 | 0.024 | 0.025 |       |       | 0.016 |       | 0.015 |       |       | 0.017 | 0.017 | 0.003 |
| Additional level of protection for endangered species                  |  | 4,4'-DDE                                                                                                                                                                 | 0.039 | 0.024 | 0.036 | 0.021 | 0.028 | 0.026 | 0.029 | 0.034 | 0.016 | 0.030 | 0.048 | 0.043 | 0.041 | 0.029 | 0.033 | 0.030 | 0.027 | 0.024 | 0.023 | 0.039 | 0.029 | 0.018 |
|                                                                        |  | 4,4'-DDT                                                                                                                                                                 |       |       | 0.029 | 0.025 | 0.026 | 0.029 | 0.026 | 0.035 |       | 0.035 | 0.039 | 0.044 | 0.015 |       | 0.026 |       | 0.026 | 0.024 | 0.025 | 0.029 | 0.026 | 0.007 |
| May affect invertebrate survival                                       |  | Chlorpyrifos                                                                                                                                                             | 0.103 | 0.053 | 0.043 | 0.031 |       | 0.040 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                                                                        |  | Dacthal (DCPA)                                                                                                                                                           |       |       |       |       |       |       | 0.029 |       |       |       |       | 0.024 |       |       |       | 0.030 |       |       |       |       |       |       |
| Nearing a pesticide state water quality standard                       |  | Diazinon                                                                                                                                                                 |       |       |       | 0.043 |       |       |       |       |       |       |       |       |       |       | 0.030 |       |       |       |       |       |       |       |
|                                                                        |  | Difenoconazole                                                                                                                                                           |       | 0.005 |       | 0.009 | 0.009 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                                                                        |  | Diuron                                                                                                                                                                   |       |       | 0.004 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| May affect fish growth or reproduction with prolonged exposure         |  | Fenarimol                                                                                                                                                                | 0.083 |       |       |       |       |       | 0.041 |       |       |       | 0.084 |       |       | 0.037 |       |       |       | 0.045 |       | 0.046 |       |       |
|                                                                        |  | Imidacloprid                                                                                                                                                             | 0.006 | 0.009 | 0.010 |       | 0.012 | 0.008 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| May affect invertebrate growth or reproduction with prolonged exposure |  | Myclobutanil                                                                                                                                                             |       |       |       |       |       | 0.012 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                                                                        |  | DEET                                                                                                                                                                     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 0.033 |       |       |       |       | 0.021 |       |
|                                                                        |  | Pentachlorophenol                                                                                                                                                        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 0.017 |       |       |       |       |
| May affect aquatic plant growth                                        |  | Phosmet                                                                                                                                                                  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 0.031 |       |       |       |       |       |       |
|                                                                        |  | Piperonyl butoxide (PBO)                                                                                                                                                 | 0.079 | 0.049 | 0.079 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Below all identified criteria                                          |  | Pyriproxyfen                                                                                                                                                             |       |       | 0.321 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                                                                        |  | 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  |
|                                                                        |  | Streamflow                                                                                                                                                               | 4.33  | 3.76  | 3.67  | 3.18  | 2.91  | 6.70  | 3.74  | 2.22  | 4.16  | 4.23  | 3.68  | 4.08  | 3.19  | 2.37  | 3.24  | 3.49  | 6.41  | 1.50  | 2.49  | 5.48  | 3.66  | 2.84  |
| Not detected (below detection limit)                                   |  | Total Suspended Solids                                                                                                                                                   | 58    | 43    | 79    | 24    | 33    | 152   | 37    | 53    | 39    | 31    | 67    | 68    | 41    | 34    | 40    | 37    | 60    | 20    | 18    | 62    | 40    | 33    |
|                                                                        |  | 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 a total of 89 detections in Brender Creek. Of these, 54 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, diazinon, diuron, and pentachlorophenol are all Pesticides of Concern that were detected in Brender Creek. Only chlorpyrifos was higher than WSDA’s assessment criteria at this site.
- Every year since 2007, chlorpyrifos has been detected in Brender Creek 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 (4,4’-DDE and 4,4’-DDD) are very persistent in the environment and bind strongly to soil. The total DDT detections here were due to sediment erosion into the stream.
- Pyriproxyfen and chlorpyrifos detections were predominately observed during the height of spring application.
- When multiple pesticides are detected simultaneously the environmental effects can combine; multiple pesticides were detected almost every week Brender Creek was tested. Between 1 and 7 pesticides were detected at the same 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.
- Properly dispose of all unneeded pesticides. Apply here to participate in a WSDA waste pesticide collection event: [www.agr.wa.gov/wastepesticide](http://www.agr.wa.gov/wastepesticide)