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# Sulphur Creek Wasteway

Summary of 2015 Surface Water Monitoring Program Results
Washington State Department of Agriculture
Natural Resources Assessment Section
September 2016

**Introduction**

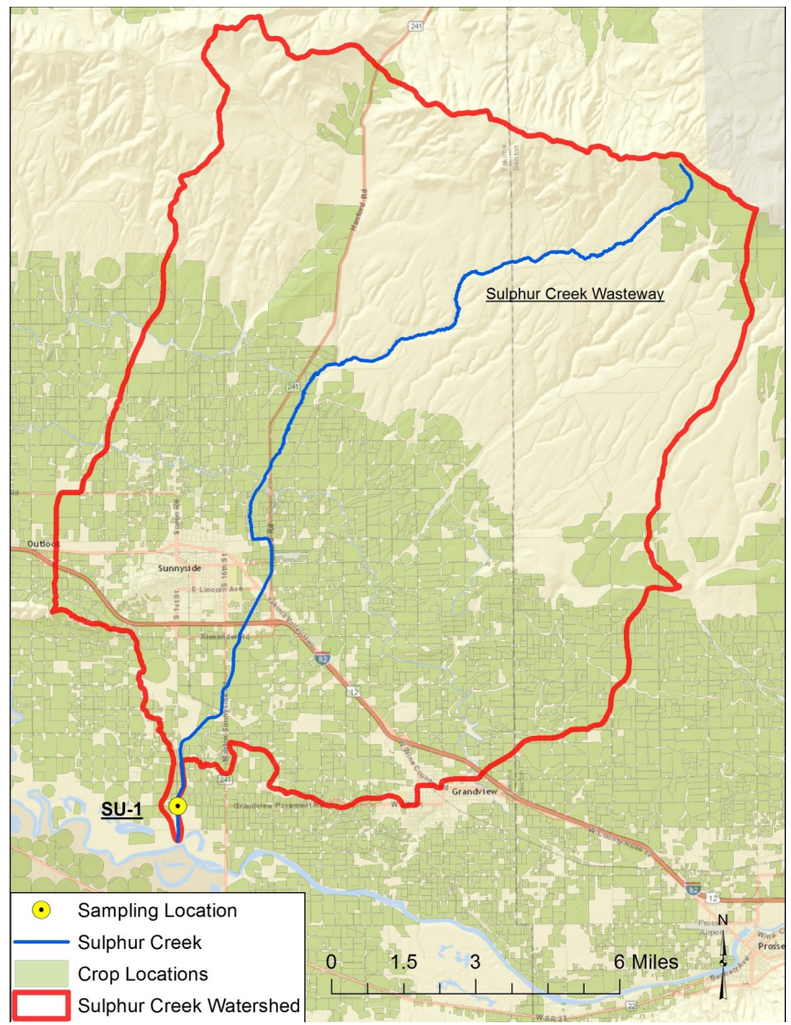
The Washington State Department of Agriculture has monitored pesticide concentrations in surface water throughout the state since 2003. WSDA staff take water samples during the typical pesticide use season (March through September). In 2015 WSDA monitored 14 sites in Washington, 2 of which are in Yakima 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**

WSDA has tested water from Sulphur Creek Wasteway from 2003 through 2015. The watershed drains about 44,840 acres of farmland. The main crops are field corn, juice grape, apple, wine grape and alfalfa hay. Chinook, coho, and steelhead have been documented downstream of the fish barrier at the Holaday Road crossing.* The fish barrier was constructed in order to restrict salmon from migrating further upstream the irrigation return channel due to unfavorable habitat conditions.
*Washington State Department of Fish and Wildlife

**Sampling Details**

- Samples were collected for 25 weeks, from March 10 through August 25.
- Water samples were tested for 206 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide degradates.
- Sample analysis for pesticides and total suspended solids was conducted at Manchester Environmental Laboratory in Port Orchard, WA.
- General water quality parameters; dissolved oxygen, conductivity, pH, water temperature, and streamflow were measured at every sampling event.
- Air and water temperature (measured every 30 minutes) was monitored for the entire sampling season.
- For a short period of time, 5 weeks, additional water samples were collected and analyzed for glyphosate and its degradate, AMPA.
- Drought conditions resulted in less than normal streamflow throughout the season.



This table shows the pesticides detected, with dates and concentrations. They are color coded to identify which assessment criteria were surpassed. The assessment criteria used here are state and federal water quality criteria, reduced by half for safety. This 0.5 safety factor is used to make sure the criteria protect aquatic life and water quality issues are found early. Watersheds with detections above the criteria are prioritized for more monitoring and educational outreach. See http://agr.wa.gov/PestFert/natresources/SWM for more information.

| Assessment Criteria | | Month and Day | | Mar | | | | Apr | | | | May | | | | Jun | | | | | Jul | | | | Aug | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Analyte Name † | Use‡ | 9 | 16 | 24 | 30 | 6 | 13 | 20 | 27 | 4 | 11 | 18 | 26 | 1 | 8 | 15 | 22 | 29 | 6 | 13 | 20 | 27 | 3 | 10 | 17 | 24 |
| May affect fish survival at sensitive life stages | | 2,4-D | H | | 0.048 | 0.048 | | 0.059 | 0.063 | 0.078 | 0.065 | 0.135 | 0.13 | 0.42 | 0.072 | 0.2 | 0.098 | 0.082 | 0.079 | 0.081 | 0.095 | 0.066 | 0.05 | 0.052 | 0.18 | 0.06 | 0.075 | 0.11 |
| | | 4,4'-DDE | D-OC | | | 0.011 | | | | | | | | | | | | | | | | | | | | 0.01 | 0.011 | |
| Additional level of protection for endangered species | | AMPA | H | -- | -- | -- | -- | -- | 0.13 | 0.057 | 0.19 | 0.18 | 0.23 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | Azoxystrobin | F | | | | | | | | | | | | 0.019 | | 0.008 | 0.005 | | 0.029 | | 0.009 | | 0.007 | | | | |
| | | Boscalid | F | | | | | | | | | | | | | | 0.13 | 0.06 | 0.074 | 0.072 | 0.068 | 0.038 | 0.032 | 0.067 | 0.023 | 0.023 | 0.023 | |
| May affect invertebrate survival | | Bromacil | H | | | | | | | | | | | 0.046 | 0.065 | 0.081 | | | | | 0.024 | | | | | | | |
| | | Captan | F | | | | | 1.2 | | | | | | | | | | | | | | | | | | | | |
| | | Carbaryl | I-C | | | | | | | 0.021 | | 0.037 | | | | 0.018 | 0.01 | | | 0.01 | | | | | | | | |
| Nearing a pesticide state water quality standard | | Chlorpyrifos | I-OP | | | 0.068 | | 0.031 | | | | | | | | | | | | | | | | | | | | |
| | | Dacthal (DCPA) | H | | 0.04 | | | | | | | | | | | | | | | | | | | | | | | |
| | | Dicamba | H | | | 0.023 | | | | 0.028 | | | | 0.038 | | 0.023 | 0.027 | 0.022 | 0.026 | 0.022 | 0.019 | 0.019 | 0.026 | | | | | |
| May affect fish growth or reproduction with prolonged exposure | | Dichlobenil | H | 0.005 | 0.013 | 0.014 | 0.012 | 0.012 | | | | | | | | | | | | | | | | | | | | |
| | | Diuron | H | 0.022 | 0.223 | 0.104 | 0.024 | 0.033 | 0.028 | 0.023 | 0.017 | 0.022 | 0.033 | 0.073 | 0.033 | 0.04 | 0.022 | 0.014 | 0.007 | 0.019 | 0.011 | | 0.008 | 0.016 | 0.007 | 0.006 | 0.01 | |
| | | Glyphosate | H | -- | -- | -- | -- | -- | 0.12 | 0.14 | 0.18 | 0.22 | 0.31 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| May affect invertebrate growth or reproduction with prolonged exposure | | Imazapyr | H | | 0.012 | | | | 0.012 | 0.012 | | 0.013 | | | | | | | | | | | | | | | | |
| | | Imidacloprid | I-N | | | | | | | | | | | | | | 0.012 | | 0.007 | | | 0.009 | 0.006 | 0.008 | | | 0.01 | |
| | | MCPA | H | | | | | | | | | | | 0.076 | | 0.028 | | | | | | | | | | | | |
| May affect aquatic plant growth | | Myclobutanil | F | | | | | | | | | | | | | | | 0.026 | | | | | | | | | | |
| | | DEET | IR | | | 0.034 | | | | | | | 0.032 | | 0.028 | 0.03 | | | | | | 0.004 | 0.01 | | | | | |
| May affect aquatic plant growth or reproduction with prolonged exposure | | Pendimethalin | H | | | | | | | 0.065 | 0.063 | | | | | | | | | | | | | | | | | |
| | | Prometryn | H | | | | | | | | | | | | | | | | | | | | 0.02 | | | | | |
| | | Propiconazole | F | | | | | | | | | | | | | | | | 0.006 | | | | | | | | | |
| Below all identified criteria | | Pyrimethanil | F | | | | | | 0.009 | | | | | 0.015 | | | | | | 0.009 | | | | | | | | |
| | | Sodium bentazon | H | 0.059 | 0.055 | | | | | | | | | | 0.047 | | | | | | | | | 0.057 | 0.039 | | 0.026 | 0.021 |
| | | Terbacil | H | | | | | | | | 0.097 | | | | 0.06 | | | 0.047 | 0.035 | | | 0.14 | 0.033 | 0.066 | 0.034 | | 0.023 | |
| No published criteria available | | Triclopyr acid | H | | | | | | | | | | | 0.041 | | | | | | | | | | | | | | |
| | | Temperature | N/A | 54.63 | 56.32 | 49.95 | 53.01 | 52.23 | 52.07 | 57.65 | 57.81 | 57.92 | 59.49 | **65.53** | 63.39 | **64.78** | **70.57** | **63.59** | **63.77** | **70.83** | **69.22** | **67.17** | **68.92** | 62.89 | **67.68** | **65.59** | **64.42** | **63.81** |
| Not detected (below detection limit) | | Dissolved oxygen | N/A | 11.52 | 11.94 | 11.28 | 10.91 | 11.71 | 11.96 | 11.29 | 11.92 | 11.30 | 11.17 | 10.44 | 10.52 | 9.49 | 10.83 | 10.11 | 9.79 | 8.50 | 9.49 | 9.45 | 9.61 | 9.54 | 9.08 | 9.24 | 9.21 | 9.49 |
| | | Percipitation | N/A | 0 | 0.18 | 0.11 | 0.1 | 0.03 | 0 | 0 | 0 | 0 | 0 | 1.45 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Streamflow | N/A | 86.9 | 86.9 | 400.5 | 203.4 | 229.6 | 229.6 | 171.4 | 115.5 | 90.5 | 93.2 | 111.2 | 86.9 | 90.5 | 86.9 | 101.1 | 106.8 | 125.1 | 111.2 | 114.1 | 114.1 | 121.9 | 120.2 | 128.3 | 147.3 | 160.1 |
| No Data | – – | Total suspended solid | N/A | 8 | 7 | 92 | 43 | 53.5 | 35 | 24 | 10 | 10 | 11 | 13 | 3 | 3 | 3 | 7 | 3 | 5 | 6 | 4 | 3 | 4 | 2 | 4 | 5 | 7 |

‡ C: Carbamate, D: Degradate, F: Fungicide, H: Herbicide, I: Insecticide, IR: Insect repellent, N/A: Not applicable, N: Neonicotinoid, OC: Organochlorine, OP: Organophosphate.†Units are as follows: pesticides, µg/L; temperature, °F; dissolved oxygen mg/L; percipitation, week total inches; streamflow, cfs; and total suspended solids, mg/L. **Bold**: Indicates a temperature or dissolved oxygen value above state water quality standards.

**Results Summary**

- There were 148 total detections during the 2015 sampling season. Only 6 detections were above an assessment criterion
- A sample in April showed captan levels above the assessment criterion for aquatic endangered species.
- Two samples in the spring had detections of chlorpyrifos above the endangered species and invertebrate assessment criteria.
- Samples collected in March and August showed levels of 4,4'DDE, a degradation product of DDT, was found to be at levels near the Washington State water quality standard.

**Recommendations**

- Eliminate drift and runoff to adjacent surface water.
- Maintain, inspect, and calibrate application equipment
- Implement best management practices, including conservation buffers, vegetative filter strips, sediment basins, and setbacks from water. Detections of DDT and its degradates are closely associated with total suspended solids originating from soil erosion.