Marion Drain is an 18-mile long irrigation ditch that releases into the Yakima River. WSDA selected this watershed to represent irrigated agricultural practices in Eastern Washington.

Results:
- There were 535 detections in Marion Drain. Of these, 27 were above WSDA assessment criteria.
- When multiple pesticides are detected simultaneously, the environmental effects can combine; multiple pesticides were detected every week Marion Drain was tested. Between 11 to 34 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 certain detection frequencies.

Watershed-specific POCs detected in Marion Drain:

- **Chlorpyrifos**
  - Common trade names: Lorsban, Pilot, Vesper
  - Example uses within watershed: alfalfa, corn, market crops, mint, orchards, wheat
  - A streamside no-spray buffer zone is required in Washington for chlorpyrifos to protect threatened and endangered Pacific salmon and steelhead.
  - Detected at 10 sites in 2019. A watershed POC at six of them.

- **Clothianidin**
  - Common trade names: Arena, Poncho
  - Example uses within watershed: orchard, cereal grain seed treatment
  - Detected at 11 sites. A watershed POC only at Marion Drain.

- **Imidacloprid**
  - Common trade names: Admire Pro, Gaucho, Merit
  - Example uses within watershed: hops, orchards, wheat, residential
  - Detected at 11 sites in 2019. A watershed POC at nine of them.

- **Tefluthrin**
  - Common trade names: Force, Precept
  - Example uses within watershed: field and sweet corn
  - Detected at six sites in 2019. A watershed POC only at Marion Drain.

Watershed and site information:

In 2019, Washington State Department of Agriculture (WSDA) monitored 16 sites in Washington. Marion Drain was one of two monitoring sites located in Yakima County.

- **Years sampled:** 2003 – present
- **Fish habitat:** Fall Chinook salmon, coho salmon, and summer steelhead (SalmonScape: apps.wdfw.wa.gov/salmonscape)
- **Sampling dates:** 28 weeks, March 27 – September 9, October 21 – November 5
- **Water testing:**
  - Samples were analyzed at the Manchester Environmental Lab, Port Orchard, Wash.
  - 159 current and legacy chemicals (56 insecticides, 58 herbicides, 21 fungicides, 19 pesticide degradates, 2 synergists, 1 antimicrobial, 1 insect repellent, and 1 wood preservative)
  - 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.

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 ppb and date sampled of each watershed POC. The “-“ identifies a sample that could not be analyzed. 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 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.

Watershed Pesticides of Concern Detected and their Corresponding Sampling Dates and Concentrations

<table>
<thead>
<tr>
<th>Month</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day of the Month</td>
<td>Use*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>I</td>
<td>0.006</td>
<td>0.004</td>
<td>0.004</td>
<td>0.006</td>
<td>0.004</td>
<td>0.003</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Clothianidin</td>
<td>I</td>
<td>0.021</td>
<td>0.022</td>
<td>0.025</td>
<td>0.022</td>
<td>0.011</td>
<td>0.011</td>
<td>0.013</td>
<td>0.019</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>I</td>
<td>0.005</td>
<td>0.008</td>
<td>0.003</td>
<td>0.009</td>
<td>0.009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tefluthrin</td>
<td>I</td>
<td>0.002</td>
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| Total suspended solids (mg/L) | 39 | 21 | 29 | 14 | 67 | 32 | 4 | 6 | 4 | 5 | 4 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 7 | 5 | 12 |
|-------------------------------|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Streamflow (cubic ft/sec)     | 253.9 | 206.3 | 223.3 | 285.3 | — | — | 26.5 | 25.5 | 30.0 | 60.5 | 48.6 | 53.8 | 14.4 | 11.6 | 12.9 | 12.3 | 12.7 | 12.9 | 12.0 | 11.1 | 17.5 | 22.8 | 24.2 | 19.5 | 22.0 | — | — | 220.5 |
| Precipitation (total in/week) | 0 | 0 | 0 | 0.41 | 0.06 | 0 | 0 | 0.03 | 0.23 | 0.17 | 0.01 | 0 | 0 | 0.04 | 0.03 | 0.11 | 0.14 | 0.17 | 0.25 | 0.19 | 0.35 | 0.92 | 0.44 | 0.15 | 0.13 | 0.02 | 0 | 0 | 0 |

Total Number of Detections per Sampling Event by Pesticide Category

<table>
<thead>
<tr>
<th>Month</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
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<th>Oct</th>
<th>Nov</th>
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</thead>
<tbody>
<tr>
<td>Day of the Month</td>
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</tr>
</tbody>
</table>

**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 leafs 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.

**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.
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