

Middle Deschutes Pesticide Stewardship Partnership: Water Quality Data 2012-2025

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In 2000, the State of Oregon established the Oregon Pesticides Stewardship Partnership Program to identify potential concerns and improve water quality through voluntarily Pesticide Stewardship Partnerships (PSPs). The PSP is co-led by the Oregon Department of Agriculture (ODA) and Department of Environmental Quality (DEQ). Over the years, the PSP program has worked with different watersheds across the state. There are currently 9 PSPs.

Water quality samples are collected in each PSP and sent to the DEQ lab for analysis and evaluation of concerns. DEQ analyses water samples for over 130 pesticides. Pesticide concentrations are compared with levels set to protect aquatic life (aquatic life benchmarks or ALBs). Pesticides in each PSP are assigned a Level of Concern annually based on the previous two years of data. DEQ annually provides detailed analyses to each PSP.

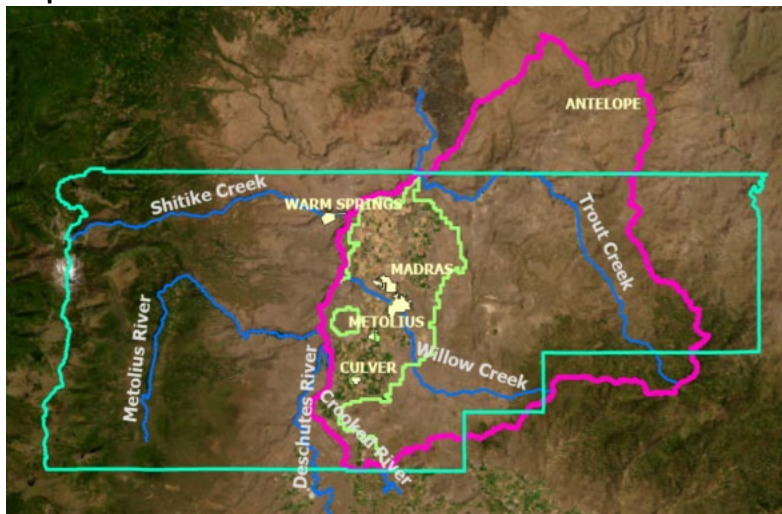
A. Background

In 2012, the Jefferson County Soil and Water Conservation District (SWCD)

agreed to facilitate a new PSP: the Middle Deschutes Pesticide Stewardship Partnership (MDPSP). The boundary (pink line) encompasses the Trout and Willow Creek watersheds and the entirety of the 58,000 acre North Unit Irrigation District (NUID) (lime green).

Frequency of Detection in Last 3 Years (%)	Reference Level Criteria			
		≥ 1 detection at or above 50% of an acute ALB	≥ 3 detection at or above 50% of a chronic ALB	1 to 2 detections at or above 50% of a chronic ALB
				No detections over 50% of any ALB
65.1% - 100%		High Level of Concern	High Level of Concern	High Level of Concern
35.1% - 65%		High Level of Concern	High Level of Concern	Moderate Level of Concern
0% to 35%		High Level of Concern	High Level of Concern	Low Level of Concern

Map 1. MDPSP

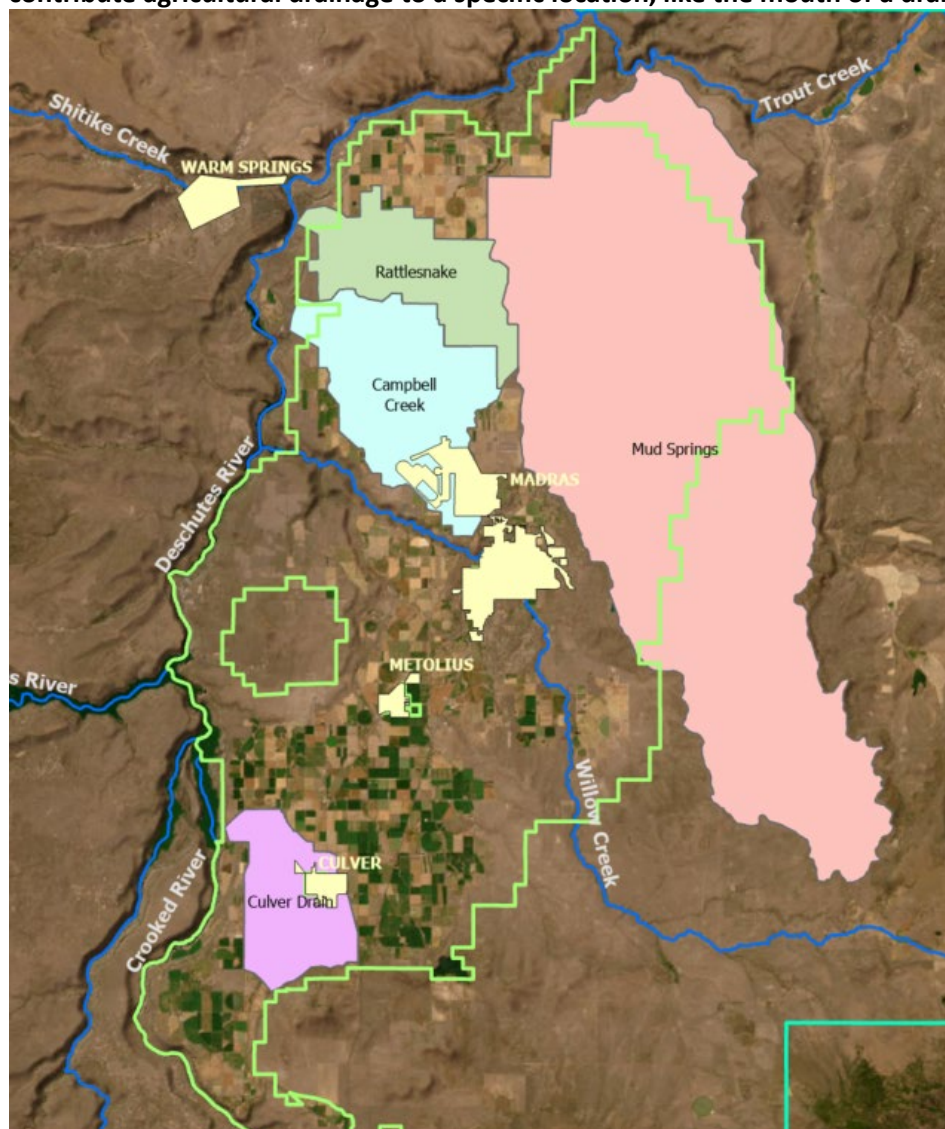


The PSP encompasses rivers that support spring chinook, fall chinook, bull trout, redband trout, and the threatened Middle Columbia steelhead. Trout Creek supports approximately 25% of the steelhead production in the Deschutes Basin.

Land use in NUID is primarily high value row crops, particularly carrot and blue grass seed. However, over 130 crops have been grown in NUID in the last 30 years. Lands outside the NUID are primarily grazed rangelands.

Irrigation efficiency is over 90% in the NUID, with about half of the acreage under pivots or linears, 40% in less efficient sprinklers, and less than 8% in flood. Field runoff is still common throughout NUID, although greatly diminished from earlier years. Much of the runoff is captured in pumpback ponds and reused, however, significant amounts reach the Deschutes River through agricultural drains and natural waterways.

Map 2. Major agricultural watersheds/drainsheds in the MDPSP. Drainsheds are the lands that contribute agricultural drainage to a specific location, like the mouth of a drain.



B. 2023-2028 MDPSP Strategic Plan

While a variety of different pesticides are applied in the MDPSP, several became of primary interest as a result of the 2023-2028 Strategic Plan, which identified 7 Pesticides of Concern. The MDPSP at the time decided to focus on all of these except for glyphosate and its derivative AMPA because they are so widespread.

Table 1. Pesticides of Concern based on the 2023-2028 MDPSP Strategic Plan

Pesticide	Common Trade Names	Type*	Common Local Uses
AMPA/Glyphosate	Roundup	H	ROWs, staging areas, cover crops
Dimethoate	Dimate	I	Grass seed, alfalfa, wheat
Diuron	Direx, Karmex	H	Bluegrass seed, alfalfa; fencerow, stackyard, right of ways (ROWs), etc.
Imidacloprid	Admire, Gaucho, Merit, Premier, Provado	I	Vegetables
Linuron	Lorox	H	Carrot seed
Oxyfluorfen	Galigan, Goal	H	Carrot seed, bluegrass seed
Prometryn	Caparol	H	Carrot seed
Sulfometuron- methyl	Oust	H	ROWs, staging areas

*H = herbicide, I = insecticide

C. Monitoring

DEQ determines the schedule across the state and focuses sampling events in the spring and fall. DEQ allots up to 5 samples per sampling event to the MDPSP; 38,395 concentrations have been recorded through 2025 in the MDPSP.

Monitoring started in 2014 at mouths of watersheds/drainsheds to narrow down the areas of greatest concern. Over the years, sampling locations have changed to answer specific monitoring questions.

Watershed	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Trout Creek	x			x								
Mud Springs	x			x	x	x	x	x	x	x		
Campbell Creek	x	x	x	x	x	x	x	x	x	x	x	x
Culver Drain					x	x	x	x	x	x	x	x
Rattlesnake										x	x	x

1. Trout Creek and Mud Springs Creek

Mud Springs Creek contributes almost all the summer flow in Trout Creek below its confluence due to irrigation withdrawals in the upper Trout Creek watershed. Therefore, its quality is of great interest to fish.

In 2014, samples were collected in Trout Creek above Mud Springs Creek (TCAMS) to determine whether the upper Trout Creek watershed contributed concerning levels of pesticides. There were only two detections out of 1373 analyses (Diuron and Terbacil) and it was decided that there was no further need to monitor that location.

Also in 2014, samples were collected at the mouth of Mud Springs Creek (MSM). There were 15 detections out of 1115 analyses, primarily of diuron. It was decided to no longer sample at that location because of greater in other locations.

The SWCD sampled Trout Creek below Mud Springs in 2017 (TCDMS). There was only one detection (Diuron) out of 559 analyses. However upstream in Mud Springs at Gateway (MSG), there were 32 detections out of 1187 analyses, mostly for glyphosate and its derivative AMPA, diuron, plus seven other pesticides. Clearly, pesticides were somehow dropping out of the water column in Mud Springs Creek between Gateway and Trout Creek.

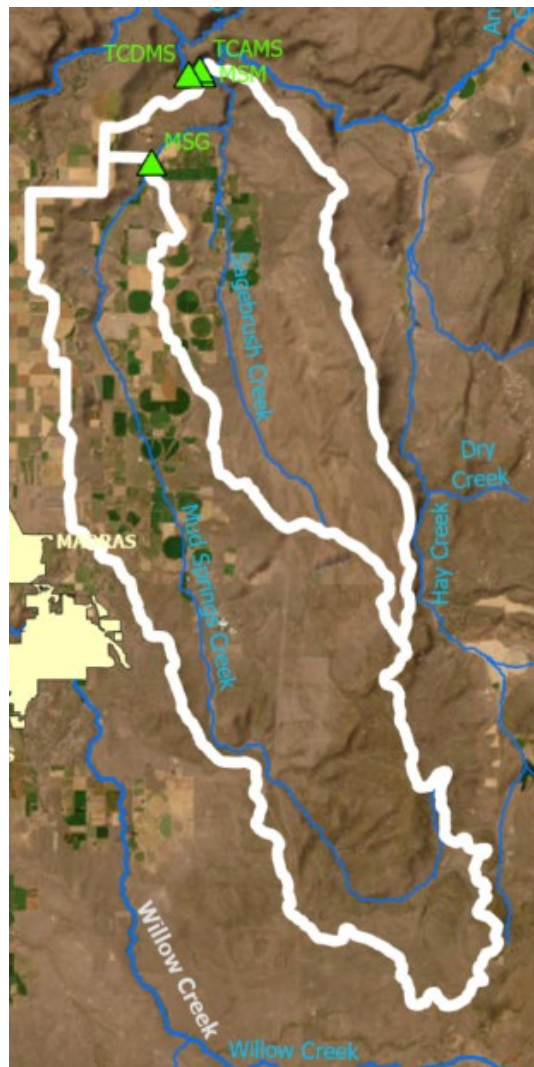
MSG was monitored annually through 2023. Out of 8,385 analyses, there were 123 detections, primarily of AMPA, diuron, and linuron. Monitoring of Mud Springs was discontinued after 2023 when it became clear that there were other drainsheds of greater concern.

2. Campbell Creek

Campbell Creek was monitored near the mouth (CCM) in 2014, 2017-2024. Campbell Creek receives water from 4 'tributaries' and multiple springs in the lower Canyon. The major tributaries carry winter precipitation and summer irrigation runoff. By 2023, only two tributaries continued to deliver irrigation return flows to Campbell Creek due to 1) raising of the culvert at Fir Road and 2) minimal runoff due to irrigation conversions upstream of Elm Road. The 59 Drain was and still is the primary contributor of runoff; the Gumwood Drain immediately to the north contributed small amounts through 2025 when those were eliminated by construction of a pumpback pond for the remaining flood irrigated fields.

No samples were collected at the mouth in 2025 due to the 5-sample limit; the MDPSP added additional sites within the 59 Drainshed.

Map 3. Mud Springs Creek watersheds (white) and monitoring sites.

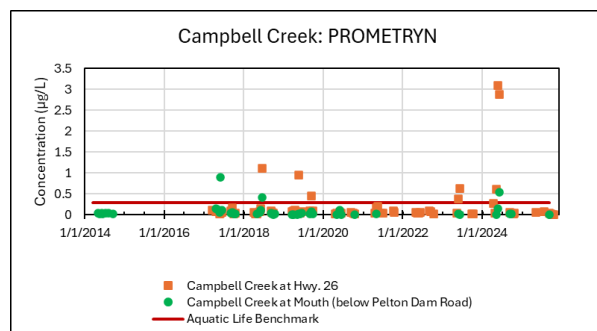
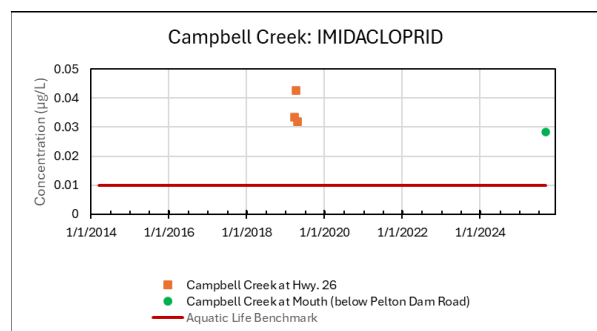
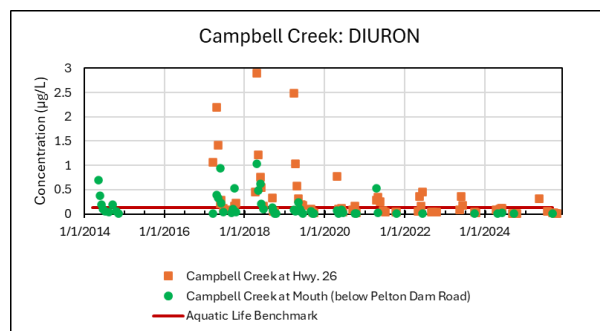
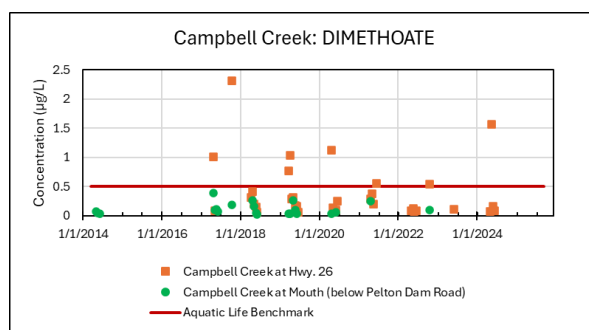
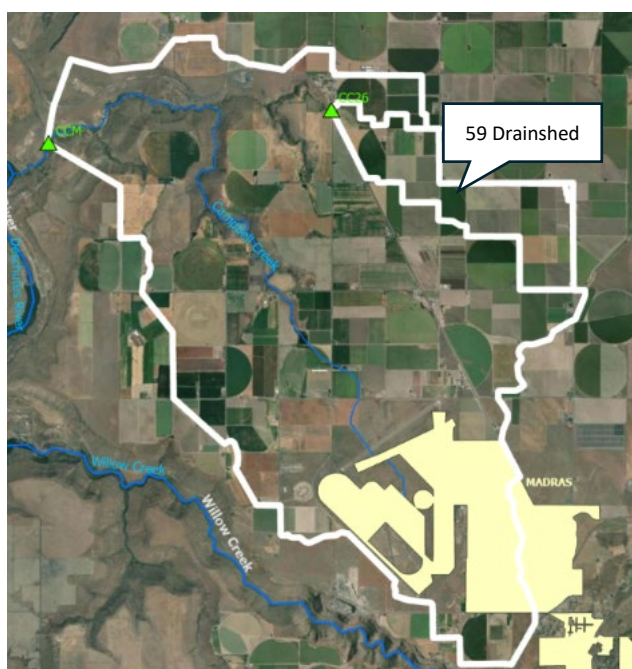


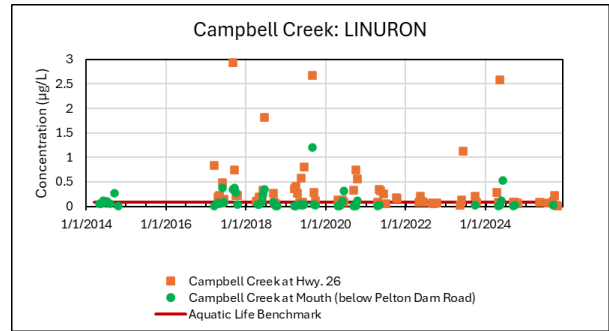
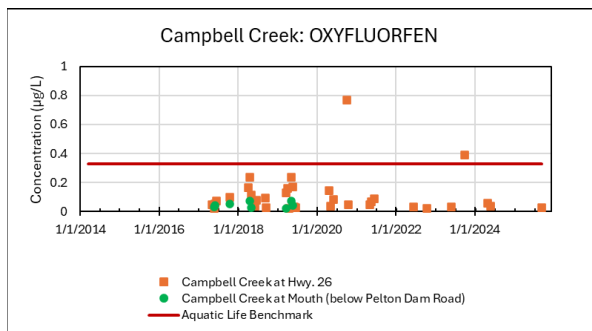
The 59 Drain was monitored in 2017-2025 and was not identified as a 'drain' until the 2025 sampling season; it is usually called Campbell Creek at Hwy 26 or Columbia (CC26/CCM). It consists of most drainage from Lateral 59 and some drainage from Lateral 60.

Monitoring has shown concentrations of dimethoate, diuron, linuron, oxyfluorfen, and prometryn exceeding the ALB. Concentrations are consistently higher at Hwy 26 than near the mouth, likely mostly due to dilution by the large number of springs that flow into Campbell Creek between the two sites.

Concentrations and detections generally decreased over time at both locations. Likely reasons are a combination of: less runoff due to conversions to more efficient irrigation, less runoff due to reduced irrigation water deliveries because of drought and the Oregon Spotted Frog Habitat Conservation Plan, and more careful pesticide applications due to technological advances and outreach from the MDPSP on pesticide concerns.

Map 4. Campbell Creek watershed with Lateral 59 drained and 2017-2024 monitoring sites.

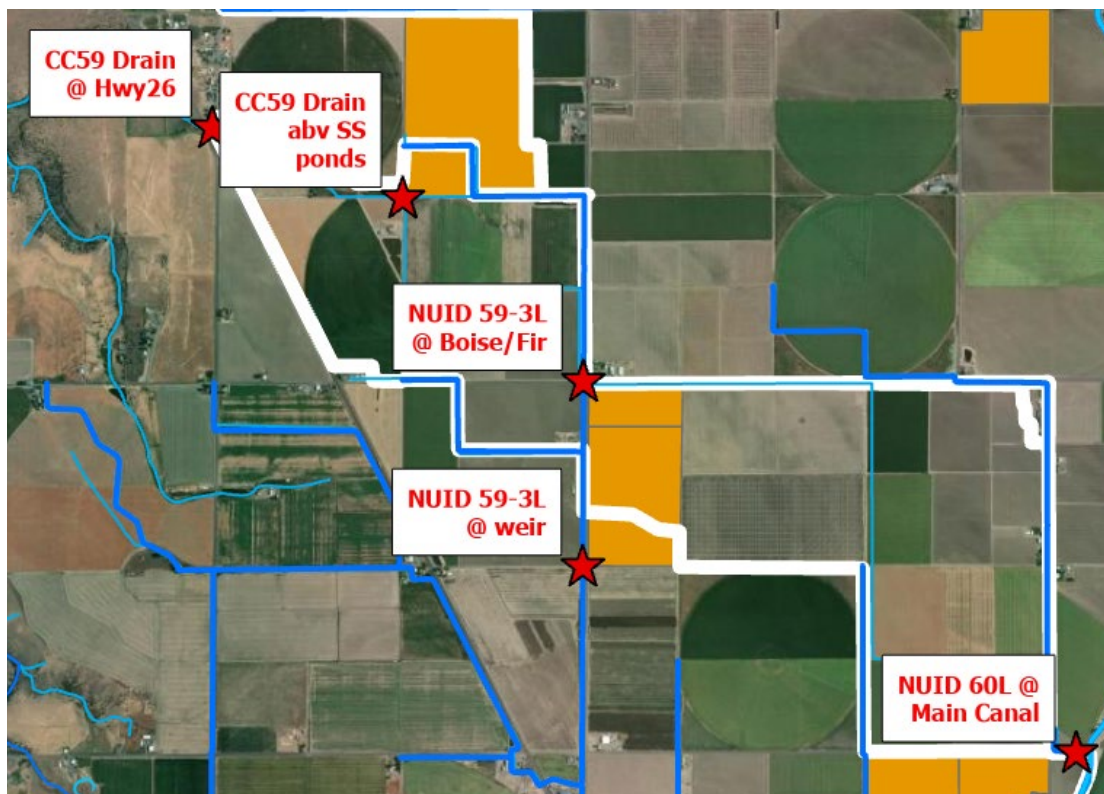




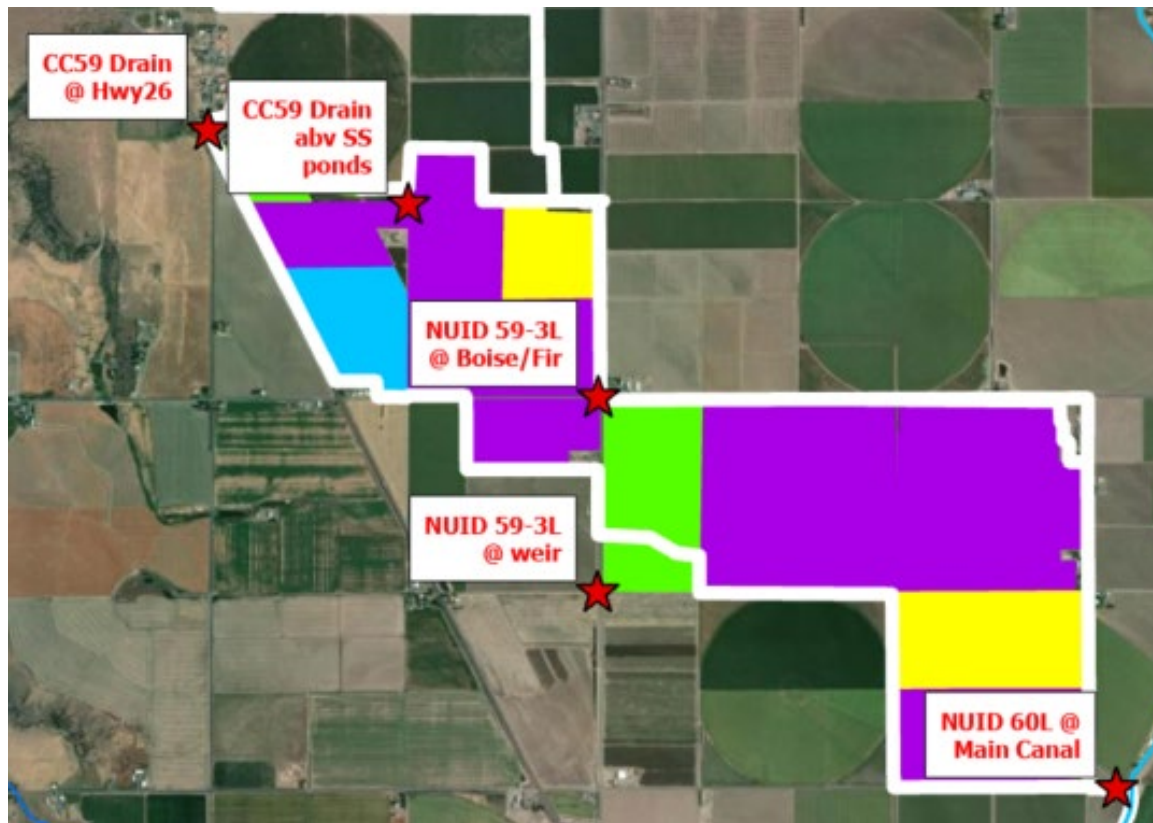
3. Campbell Creek 59 Drained

In 2025, the MDPSP decided to focus efforts on linuron in Campbell Creek and determine where it was entering waterways. They added 4 sites in the 59 Drained: 2 in the 59 Lateral (above and below a carrot seed field under pivot), 1 on the 60 Lateral at the Main Canal, and one below most of the fields (SS Ponds) but upstream of the existing Hwy 26 site. The Boise/Fir site was actually intended to monitor the adjacent drain to learn about pesticide contributions from runoff in the upper half of the watershed but was incorrectly sited on the lateral. This accident allowed the MDPSP to unexpectedly discover something about the possibility of drift at this location.

Map 5. 2025 sites in Campbell Creek, showing the carrot seed fields in the 59 Drained, which was under pivot irrigation. Dark blue = laterals; light blue = drains. Orange = carrot seed fields in 2025.

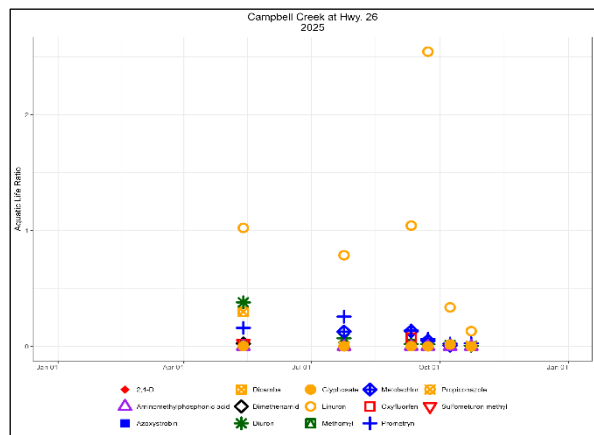


Map 6. 2025 sites in Campbell Creek, showing 2024 irrigation methods. Blue = LESA/LEPA pivot. Green = pivot. Yellow = other sprinkler. Purple = Flood.

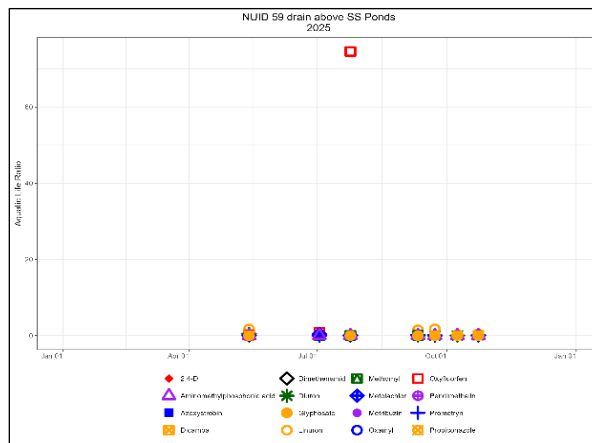


The following graphs were provided by DEQ at the February 2026 MDPSP meeting. Yellow open circles = linuron.

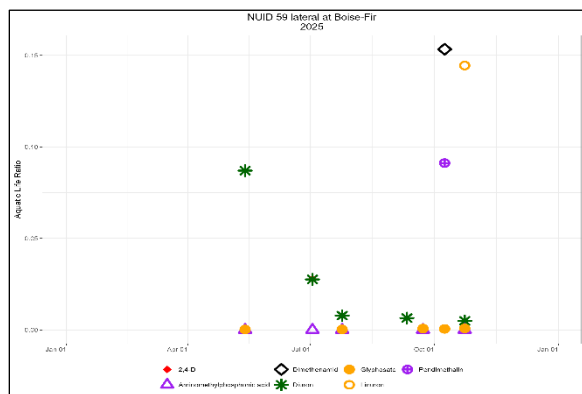
NUID 59 Drain at Hwy 26: 14 chemicals
Linuron >2x ALB in Oct.



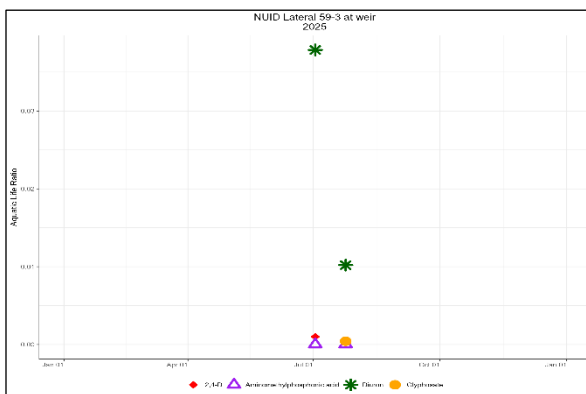
NUID 59 Drain above SS ponds: 16 chemicals
One peak of Oxyfluorfen >60x ALB in Aug.



CC: NUID 59 Lateral at Boise/Fir: 7 chemicals
Max ratio ~0.15x ALB



CC: NUID 59 lateral at weir: 4 chemicals
Max ratio < 0.04x ALB



Conclusions:

59 Drain: Pesticides enter the drain from irrigation runoff

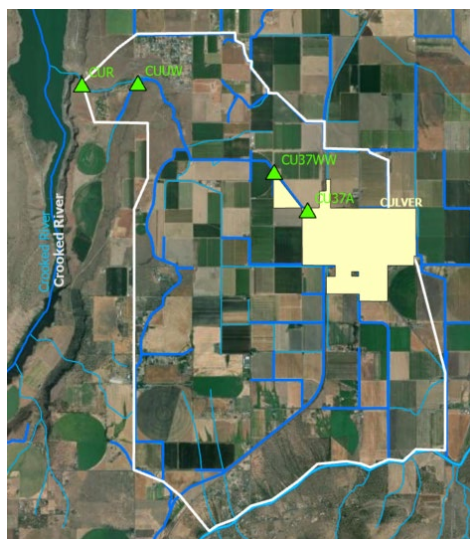
59 Lateral: Pesticide concentrations and number of chemicals decrease by orders of magnitude as you move closer to the Main Canal. Linuron is not entering the drainshed from the Main Canal; it was not detected in the 59 Lateral at the weir.

However, linuron was detected at very low concentrations ½ mile downstream at Boise/Fir immediately downstream of and across the road from a carrot field under pivot irrigation, indicating that small-scale transport mechanisms may have caused in-season movement of linuron from the field to the closely adjacent waterway. There are not enough data to identify the actual mechanism, but drift is a potential cause.

4. Culver Drain

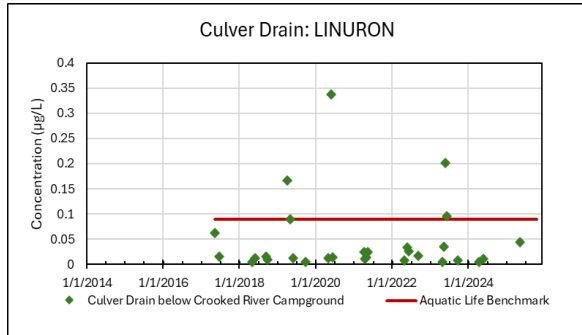
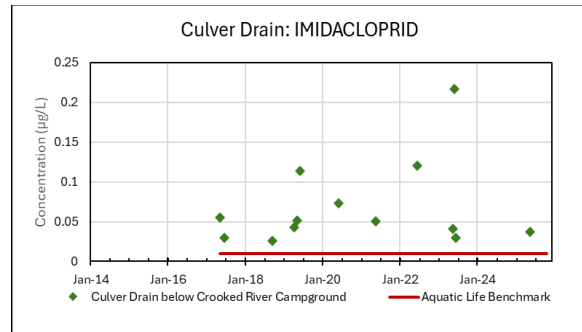
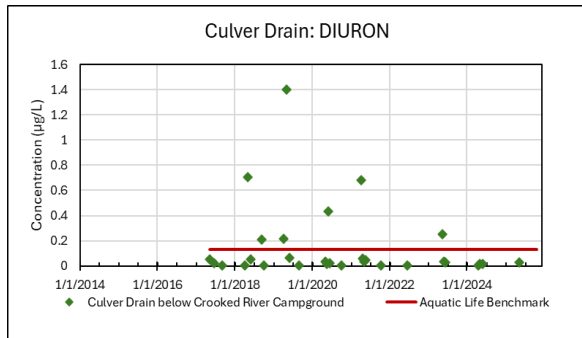
The drainshed boundary is still being refined; this map is likely accurate except for east of Culver. The drainshed includes the City of Culver and some local industries, however it is unclear whether these actually provide runoff to the Culver Drain.

Map 7. Culver Drainshed. Dark blue = Laterals. Light Blue = some drains.



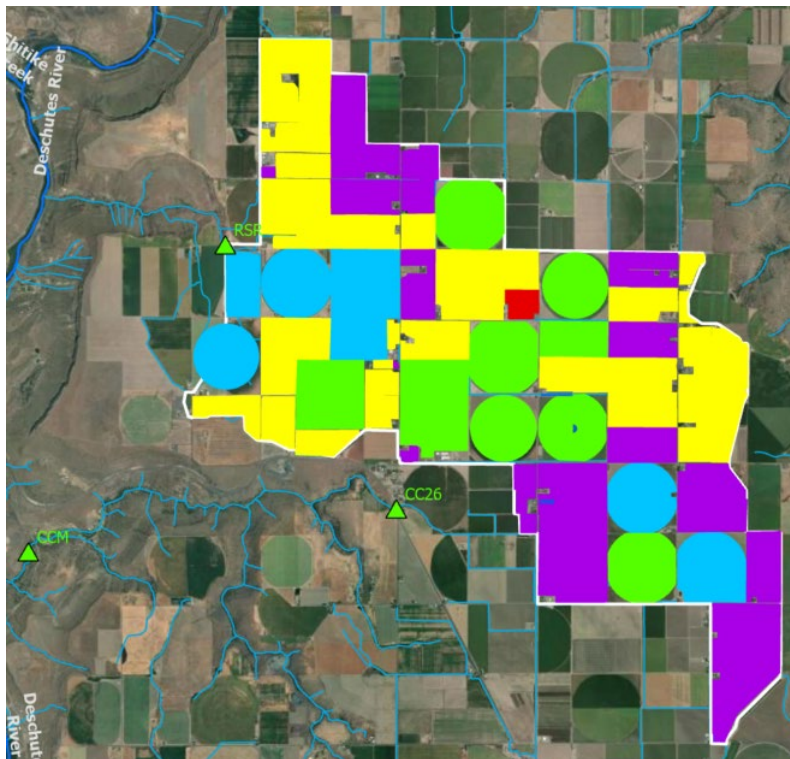
The drainshed was monitored at the rim (CUR) below the Crooked River campground annually 2017-2025. A second site was added in 2019-2023 above the wetlands just above the campground (CUUW). Attempts were made to determine whether the ponds were reducing pesticides in the water column, but the results were inconclusive and the two locations were not adequate to answer that question.

Imidacloprid is of primary concern to the MDPSP. It is an insecticide used on vegetables but also labelled for household uses. The source is currently unclear, but monitoring in 2026 is expected to begin to identify the source (monitoring sites are on the 37 Lateral below the City of Culver and below the Culver Wastewater Treatment Plant and bracket vegetable fields).

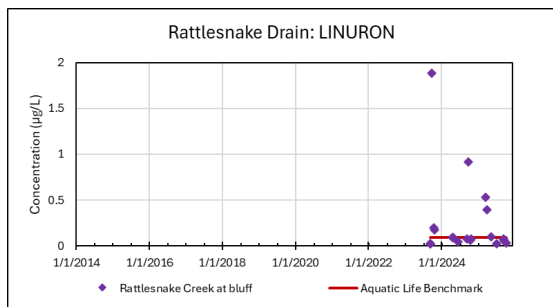
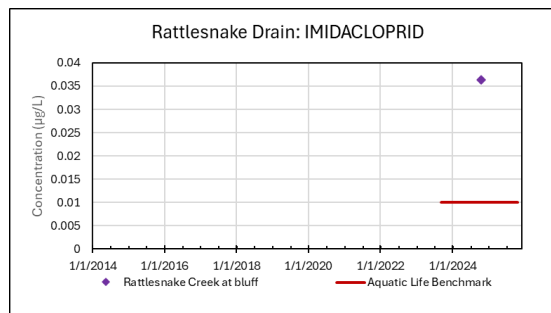
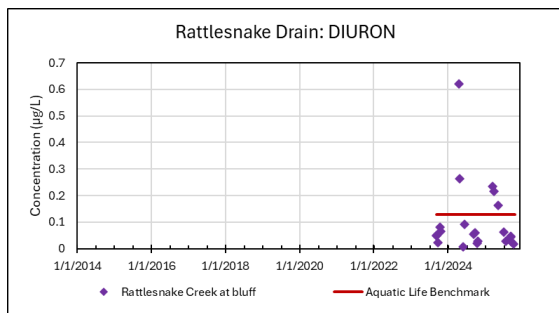


5. Rattlesnake Drain

Map 8. Rattlesnake Drain with 2024 irrigation methods. Blue = LESA/LEPA pivot. Green = pivot. Yellow = other sprinkler. Purple = Flood. Red = drip.



The drain has been monitored at the rim (RSR) since 2023.



The MDPSP discussed additional monitoring in the Rattlesnake Drain, but decided to move extra PSP sites to the Culver Drain when they realized that the Rattlesnake Drain is in the boundary of the new Middle Jefferson County Strategic Implementation Area, for which there is funding for monitoring.

D. Future Efforts

Future monitoring questions and efforts to answer them will be decided by the MDPSP at least annually. Funding from ODA's PSP program is targeted more to outreach than to monitoring activities, so the ability to use PSP funds to answer monitoring questions to target technical assistance and outreach is limited.