

# Indian Slough

APRIL 2024

## Summary of 2022 Surface Water Monitoring Program Results



**Indian Slough water releases directly into Puget Sound and is tidally influenced. The Skagit Valley (including the Indian Slough watershed) is a major pit stop for migratory waterfowl, including trumpeter swans, tundra swans, snow geese, and other birds. New Zealand mud snails, an invasive aquatic species, were observed in the slough.**

### Results:

- There were 59 unique chemicals detected with a total of 378 detections in Indian Slough.
  - Of these, 12 detections were above WSDA assessment criteria. Roughly 75% (nine detections) of exceeding detections were from DDT and its degradates.
- When multiple pesticides are detected simultaneously, the harmful effects can combine; multiple pesticides were detected every week Indian Slough was sampled. Between 20 and 39 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 Indian Slough:

#### ICONS FOR ENVIRONMENTAL HAZARDS LISTED ON PESTICIDE LABELS



#### Diuron — Herbicide

- *Common trade names:* Direx, Karmex
- *Example uses within watershed:* berry, corn, cucumber, nursery, market crops, right-of-way
- 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 11 other monitored watersheds and a POC in six of them.

#### Fipronil — Insecticide

- *Common trade name:* Termidor
- *Example uses within watershed:* ornamental tree, asphalt/cement, commercial, residential
- Also detected in six other monitored watersheds and a POC in two of them.

#### Imidacloprid — Insecticide

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

#### Indaziflam — Herbicide

- *Common trade names:* Esplanade, Marengo, Specticle
- *Example uses within watershed:* Nursery/ornamental, residential, right-of-way, turf
- This is the only monitored watershed where this chemical was a POC.

#### Malathion — Insecticide

- *Common trade names:* Malathion, Fyfanon
- *Example uses within watershed:* berry, corn, grass hay, pasture, potato, wheat
- A streamside no-spray buffer zone is required in Washington for malathion to protect threatened and endangered Pacific salmon and steelhead.
- This chemical was also a watershed POC in four other monitored watersheds.

In 2022, Washington State Department of Agriculture (WSDA) monitored 17 sites in Washington. Indian Slough was one of three monitoring sites located in Skagit 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:** 2006 – present

**Fish habitat:** Fall Chinook, coho, fall chum, and pink salmon; and winter steelhead trout (SalmonScape: [apps.wdfw.wa.gov/salmonscape](https://apps.wdfw.wa.gov/salmonscape))

**Sampling dates:**  
14 weeks; April 4 – July 5

### Water testing:

Samples were tested for 150 current and legacy chemicals (53 herbicides, 48 insecticides, 21 fungicides, 19 pesticide degradates, 5 legacy chemicals, 1 antimicrobial, 1 insect repellent, 1 synergist, and 1 wood preservative).

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



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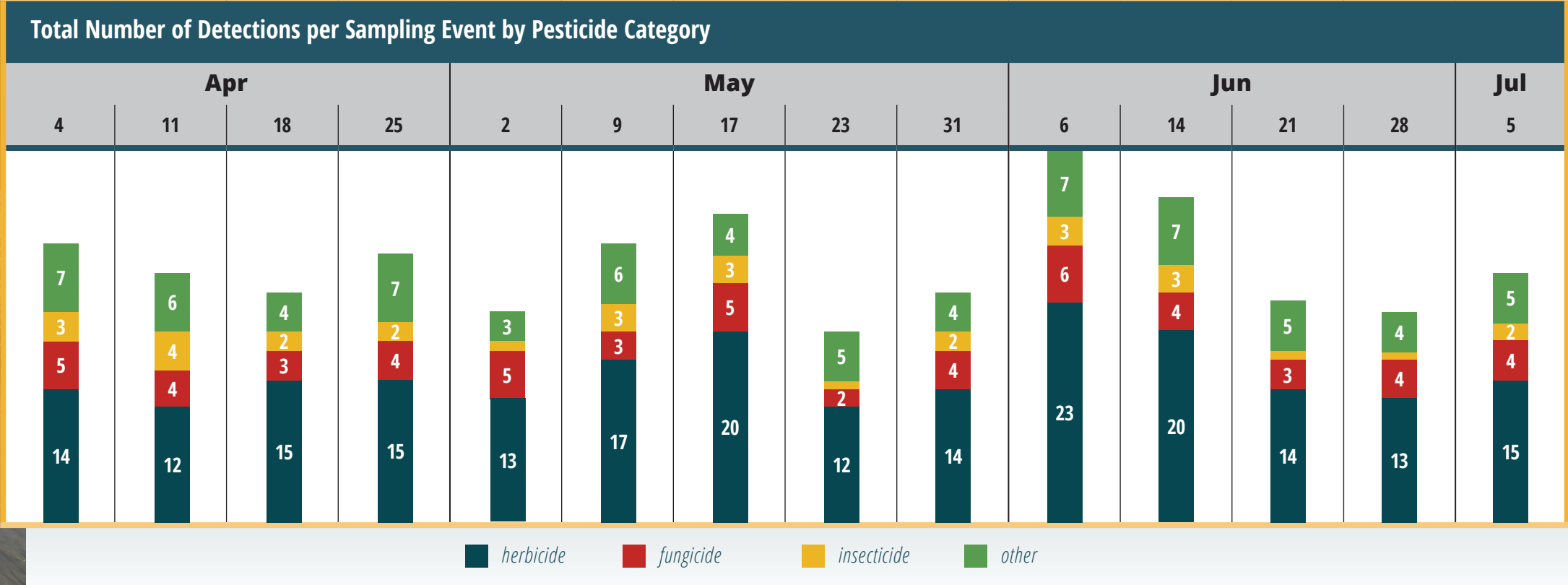
NATURAL RESOURCES AND AGRICULTURAL SCIENCES

The calendar at right shows the concentration in µg/L and date sampled of each watershed POC. The “-” identifies data that could not be collected or 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 measured streamflow varied across sampling events due to tidal influence at the site. Malathion was not detected in 2022, however, it was 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 Sampling Dates and Concentrations															
Month ▶		Apr				May					Jun				Jul
Day of the Month ▶	Use*	4	11	18	25	2	9	17	23	31	6	14	21	28	5
Diuron	H	0.007	0.006			0.004	0.008	0.008	0.005	0.004	0.009	0.007	0.057	0.028	0.085
Fipronil	I	0.005	0.006				0.003	0.005			0.002	0.005	0.002		
Imidacloprid	I											0.020			
Indaziflam	H						0.011	0.013			0.011				
Suspended sediment concentration (mg/L)		14	14	11	9	10	11	11	12	15	13	17	12	10	7
Streamflow (cubic ft/sec)		59.6	46.3	41.3	41.5	33.0	24.6	-	14.2	-	39.3	21.1	-	14.9	20.5
Precipitation (total in/week)		0.35	0.86	0.08	0.29	0.28	1.36	0.65	0.07	0.37	1.55	1.52	0.01	0.00	0.34

The graph at right shows the total number of detections per sampling visit in each pesticide category. The category ‘other’ includes legacy, 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.



### 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

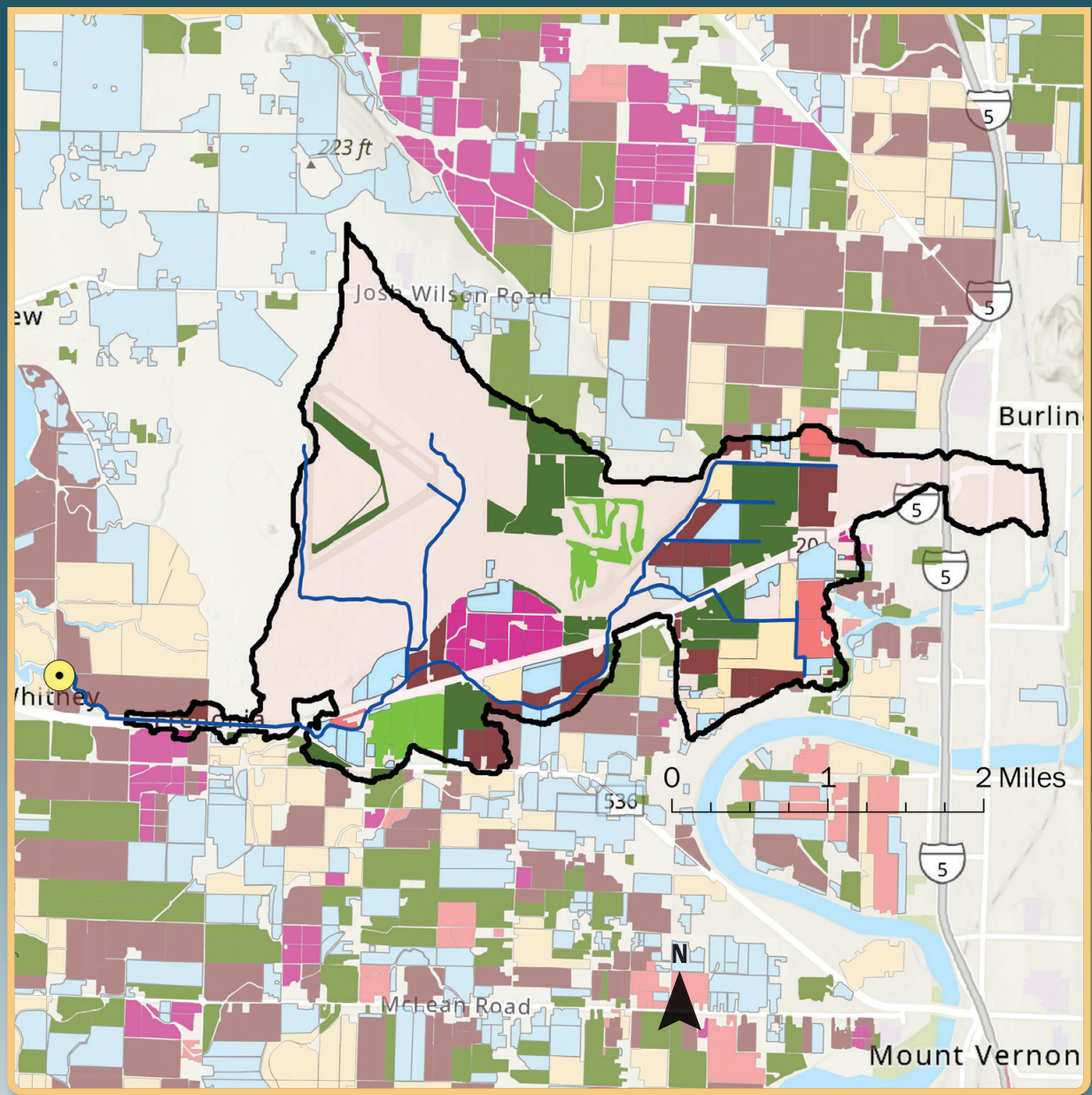
- Read and follow pesticide label directions.
- Check the weather forecast to reduce the chances of drift or runoff.
- Review WSDA’s Pesticides of Concern and choose less-toxic pesticides when possible.

#### Care for your equipment and products

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

Please see [agr.wa.gov/AgScience](https://agr.wa.gov/AgScience) for more information.





### Indian Slough crop groupings | acres

<span style="display:inline-block; width:15px; height:15px; background-color: #e91e63; border:1px solid black;"></span> <b>Berry</b>	154
<span style="display:inline-block; width:15px; height:15px; background-color: #ffeb3b; border:1px solid black;"></span> <b>Cereal Grain</b>	182
<span style="display:inline-block; width:15px; height:15px; background-color: #4caf50; border:1px solid black;"></span> <b>Hay / Silage</b>	625
<span style="display:inline-block; width:15px; height:15px; background-color: #f44336; border:1px solid black;"></span> <b>Nursery</b>	91
<span style="display:inline-block; width:15px; height:15px; background-color: #8bc34a; border:1px solid black;"></span> <b>Turfgrass</b>	175
<span style="display:inline-block; width:15px; height:15px; background-color: #a1887f; border:1px solid black;"></span> <b>Vegetable</b>	389
<span style="display:inline-block; width:15px; height:15px; background-color: #bbdefb; border:1px solid black;"></span> <b>Other</b>	331

- Sampling Location
- Indian Slough
- Indian Slough Watershed

Total Agriculture	1,947	acres
Total Non-Agriculture	3,078	acres
<b>Watershed Total</b>	<b>5,025</b>	<b>acres</b>

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>