

# Pesticide Soup: What's Cooking in Puget Sound?

A photograph of a small stream flowing through a lush green area. The stream is surrounded by tall grasses and other vegetation. In the background, there is a stone wall and a wooden fence. The water in the stream is dark and appears to be carrying some debris.

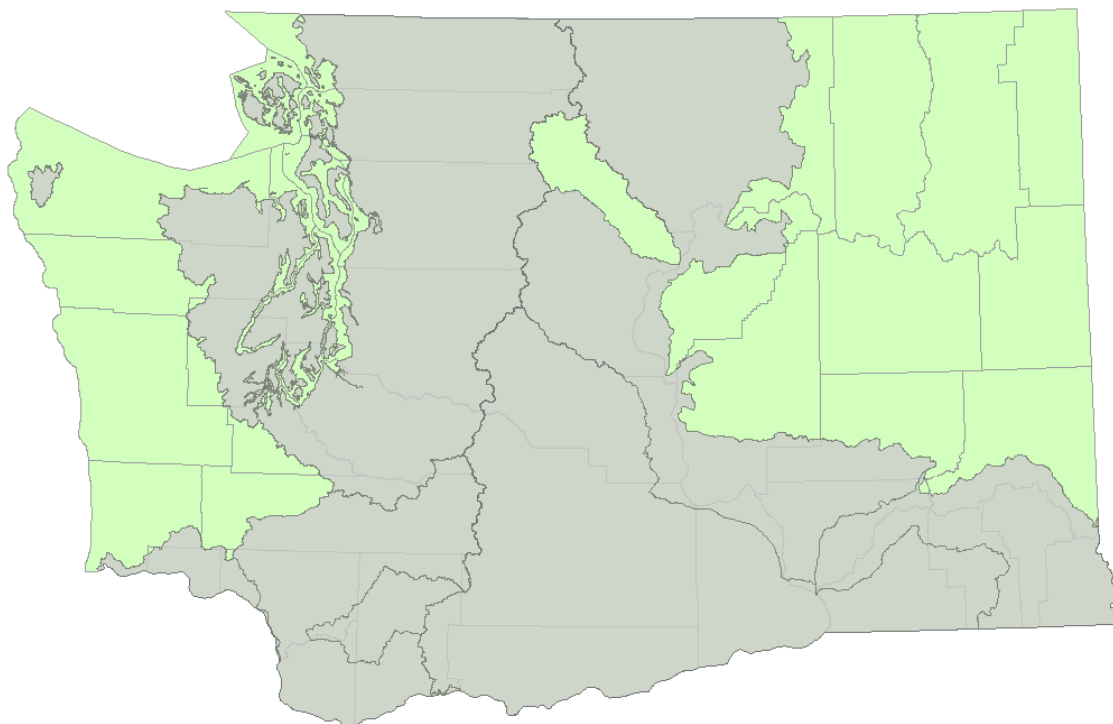
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November 2, 2011





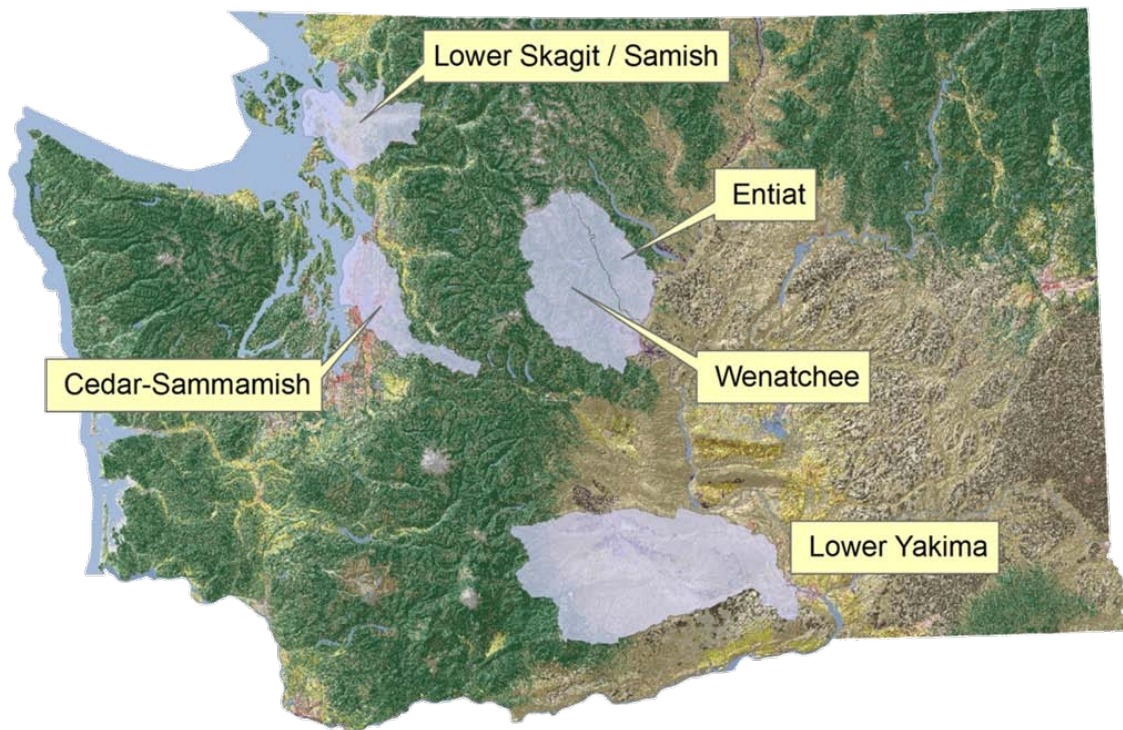
# Endangered Salmon

- **52 Evolutionary Significant Units (ESU)**
  - 28 threatened or endangered
    - 14 T/E in WA
- **Listing Cover ~60% of Washington**





# Surface Water Monitoring



- **2003 - Lower Yakima and Cedar-Sammamish**
- **2006 - Lower Skagit**
- **2007 - Entiat/Wenatchee**
  
- **Weekly sampling during typical use season (March – Sept)**
  
- **Laboratory methods include 160 pesticides – current use and legacy**



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# Why are we collecting the data?

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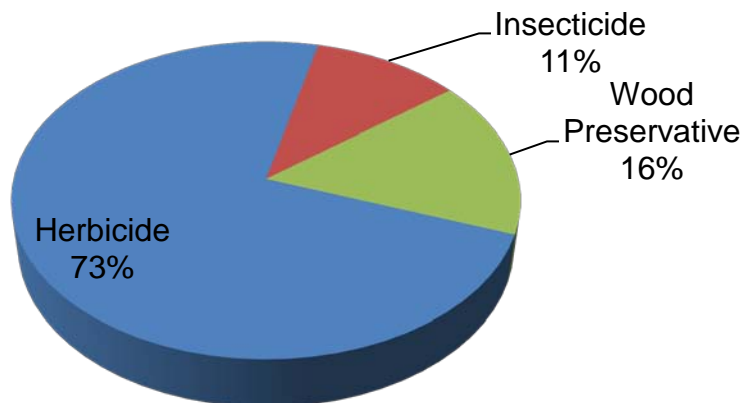
- **Pesticide usage and agricultural practices change**
- **Assess Exposure**
  - Compare and contrast with modeled values.
- **Assess the impact of any mitigation put in place**
- **Identify trends in both agricultural and urban watersheds**



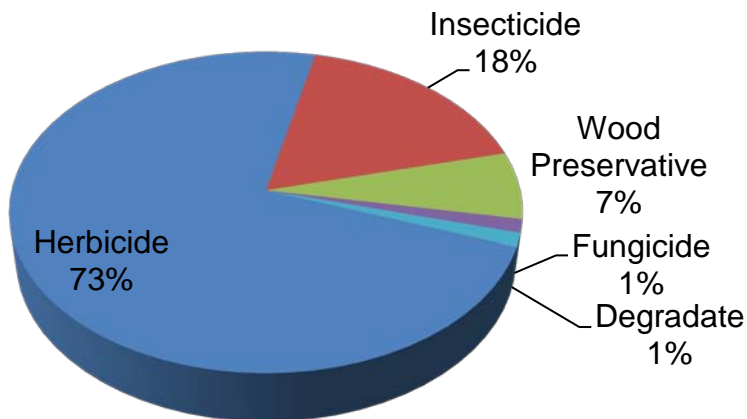


# Urban Monitoring Results

## Thornton Creek 2010



## Longfellow Creek 2010



Why are herbicides detected so frequently?

- Use
- Physical Properties
- Good news/bad news
- Generally less toxic to aquatic organisms
- More H<sub>2</sub>O soluble

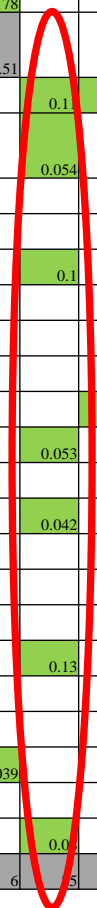
The distribution of detections in agricultural areas are similar .





# Urban - Thornton Creek 2009

Date	3/11	3/16	3/25	3/30	4/8	4/13	4/22	4/27	5/6	5/12	5/20	5/26	6/3	6/8	6/16	6/22	7/1	7/6	7/17	7/22	7/31	8/4	8/10	8/18	8/28	9/1	9/8	
Month	Mar	Mar	Mar	Mar	Apr	Apr	Apr	Apr	May	May	May	May	Jun	Jun	Jun	Jun	Jul	Jul	Jul	Jul	Jul	Aug	Aug	Aug	Aug	Sep	Sep	
Chemical	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
1-Naphthol	0.072	0.121	0.089	0.184	0.071	0.091	0.084	0.178			0.087		0.07	0.124														
2,4,6-Trichlorophenol								0.51																				
2,4-D									0.1	0.037	0.13	0.019									0.02						0.04	
3-Hydroxycarbofuran					0.027	0.018			0.054		0.076																	
4-Nitrophenol			0.12																									
Aldicarb					0.036																							
Aldicarb Sulfone	0.08	0.088			0.054				0.1		0.075	0.059	0.117	0.093														
Aldicarb Sulfoxide	0.154	0.024		0.074									0.012	0.148		0.026												
Carbaryl					0.025						0.018																	
Carbofuran					0.031																							
Dicamba I										0.01																		
Dichlobenil			0.046						0.053		0.049							0.037									0.051	
Diuron				0.057																								
MCPP			0.041						0.042		0.086																	
Methiocarb	0.099	0.215																										
Methomyl	0.065				0.042																							
Methomyl oxime											0.079																	
Oxamyl		0.141	0.06	0.011	0.072	0.065	0.033		0.13		0.019				0.024													
Oxamyl oxime					0.028																							
Pentachlorophenol												0.007													0.015		0.024	
Prometon							0.075	0.039																				
Propoxur					0.035											0.053												
Triclopyr									0.0		0.04																0.044	
Total Suspended Solids	3	7	17	5	7	6	6	6	5	4	11	7	10	5	11	4	3	4	4	4	3	3	3	2	3	3	4	





# Things to Note

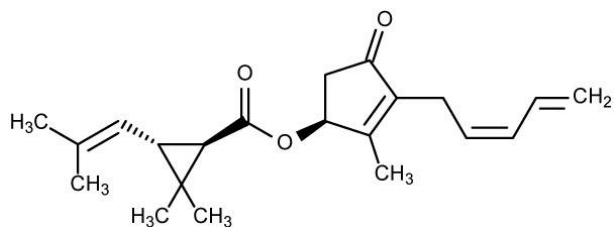
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- **Pesticides are just one component of the “chemical soup” entering our watersheds – metals, pharmaceuticals, nutrients, fecal...**
- **We typically find more than one pesticide in a sample**
- **Low individual pesticide levels, unknown effects when combined with other pesticides and contaminants**



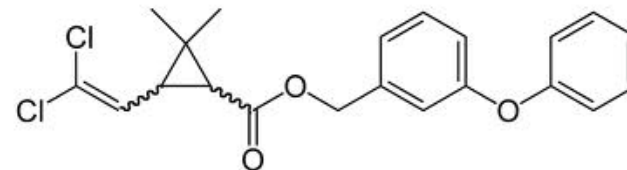
# Naturally occurring vs. synthetic pesticides

## Pyrethrin



Rainbow Trout LC50 = 5.1 ug/L  
(EPA RED 2006)

## Permethrin



Rainbow Trout LC50 = 9.8 ug/L  
(Cal DPR 2003)





# What Can You Do?

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# Applicator Participation

- Read the label
- Know your active ingredient
- Follow use instructions – minimum rates
- Minimize drift





# Applicator Participation

- **Use common sense in sensitive areas**

- **Water**

- » Rivers, streams, non-irrigation canals
    - » Reservoirs, natural ponds
    - » Wetlands, estuaries, inter-tidal areas

- **ESA-defined sites**

- **Human Exposure**

- » Housing
    - » Roads
    - » Work sites







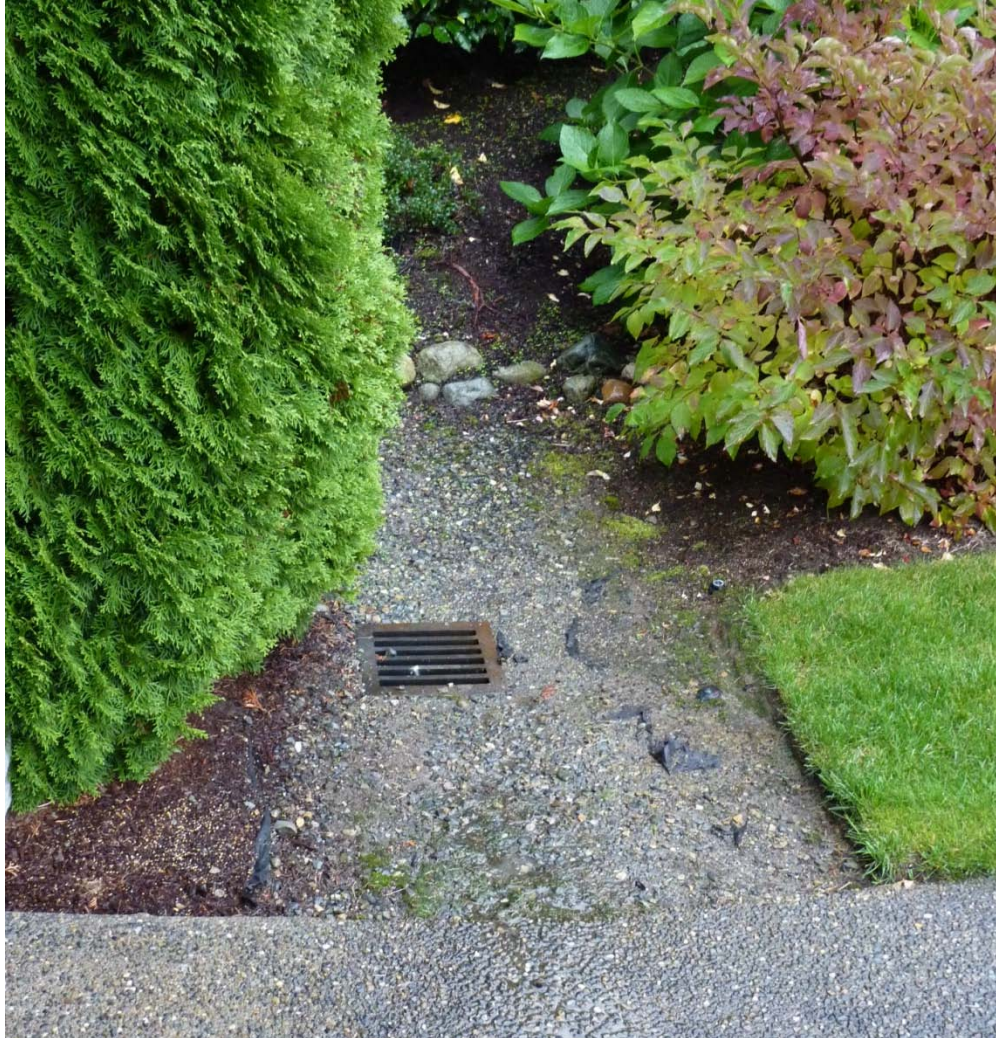
# Run off mitigation

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- **Increase residence time**
- **Drainage swales**
- **Filter strips**
- **Treatment timing**
  
- **Avoid runoff into direct connections to surface water**



# Urban drainage





# Filter strips

- <http://ucanr.org/freepubs/docs/8195.pdf>
- **Filter Strips**
  - Need to be site specific
  - Not practical for small areas
    - Slope 1-3% need 25 ft wide strip
      - » (NRCS tech guide no. 393)
    - Maintenance needed to prevent channelized flow

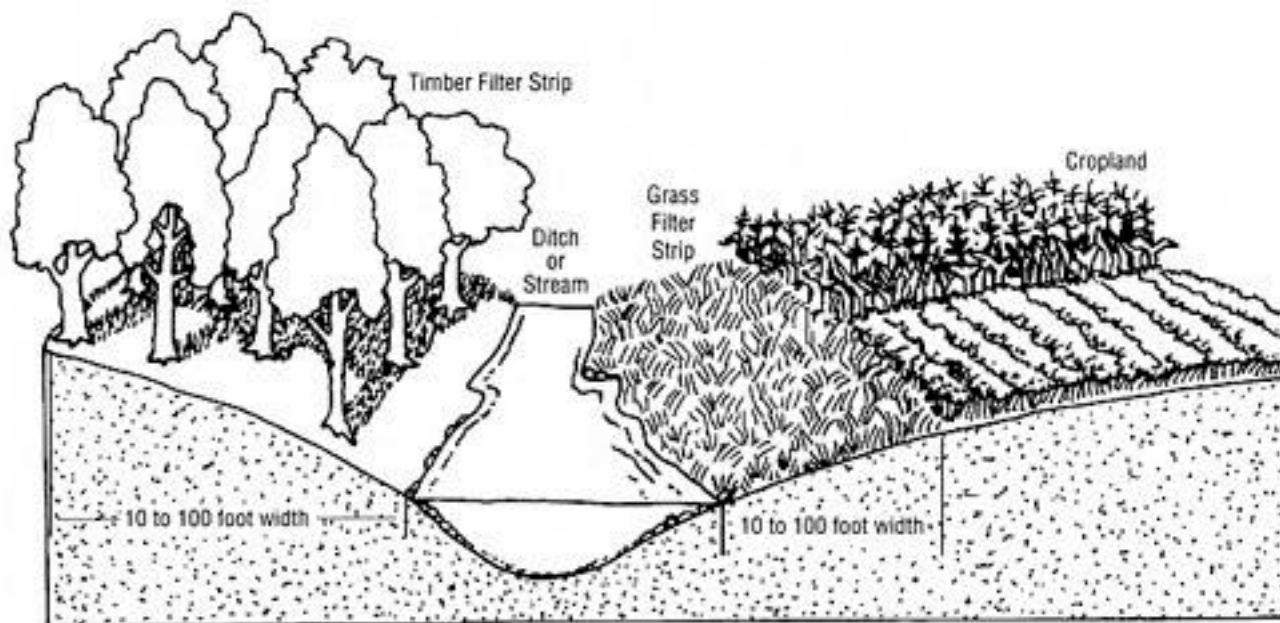




# Drainage swales



# Drainage swales





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# Follow up information

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- **Surface water monitoring program – 2010 report**  
<http://www.ecy.wa.gov/biblio/1103021.html>

## **Program Contact:**

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<http://www.agr.wa.gov/PestFert/NatResources/>

