Natural Resources Assessment Section – Office of the Director
The Washington State Department of Agriculture

Fact Sheet:
Surface Water Monitoring Program 2009-2011 Triennial Report

Introduction:

The Washington State Department of Agriculture (WSDA) has been working with the Washington State Department of Ecology over the past decade to monitor pesticide residues in surface waters from selected urban and agricultural watersheds.
The goal is to assess pesticide presence and concentrations in salmon bearing streams. The data collected over the course of the program allows WSDA to:

Figure 1 – Geographic Distribution of Agricultural and Urban Basins

- Assess potential risk to salmon and salmon-habitat, including the risk to species of aquatic life that salmon eat.
- Identify bodies of water vulnerable to pesticide contamination.
- Generate a large dataset to share with federal agencies for their ecological risk assessment process.
- Identify "pesticides of interest" and "pesticides of concern" for further evaluation due to potential human health impacts and impacts on threatened and endangered species in Washington State.
- Engage the agricultural community and assist it in implementing effective mitigation strategies that reduce pesticide levels in surface waters.

Samples are collected weekly during the peak pesticide application season in the state which runs from March through September. The samples are analyzed for more than 170 different pesticides and pesticide-related compounds. Figure 1 identifies the six study sites, located in what are called Water Resource Inventory Areas, or WRIAs. Pesticides levels were analyzed in surface water samples at sites located in:

- The Lower Skagit-Samish Agriculture Watershed (Water Resource Inventory Area 3)
- The Cedar-Sammamish Urban Watershed (WRIA 8)
- The Green-Duwamish Urban Watershed (WRIA 9)
- The Lower Yakima Agriculture Watershed (WRIA 37)
- The Wenatchee Agriculture Watershed (WRIA 45)
- The Entiat Agriculture Watershed (WRIA 46)

The 2009-2011 triennial report compares monitoring data from 2011 alongside 2009 and 2010 data to provide a multi-year analysis of surface water quality under different pesticide use scenarios. Of note, this report is the first monitoring report to include an analysis that is able to identify increasing and decreasing trends for individual pesticides where surface water samples have been collected for five or more consecutive years of the 10-year study (Figure 2).

Report Highlights:

Pesticide levels measured at most study sites were rarely found at concentrations above *aquatic life criteria* or *water quality standards,* both being measures of pesticide concentrations that may be harmful to aquatic life. For 2009-2011, pesticides that were detected at concentrations above an *aquatic life criterion* or *water quality standard* include the herbicide metolachlor; the insecticides bifenthrin, chlorpyrifos, DDVP, diazinon, endosulfan, ethoprop, malathion, methiocarb, methomyl, and an endosulfan breakdown product (endosulfan sulfate). DDT (no longer registered for use) and its breakdown products have also been detected at levels above the *aquatic life criteria* or *water quality standards*.

Figure 2 provides a summary of the trends analysis where each trend is represented by either an up arrow (increasing), or down arrow (decreasing). The values alongside the arrows represent the amount of change per year and accounts for both how often a given pesticide is detected and at what concentrations. Significant trends were observed for 26 different pesticides. Out of the 10 pesticides that were associated with increasing trends, WSDA will add five (dicamba I, hexazinone, metolachlor, terbacil, and trifluralin) to its "pesticides of interest" list. WSDA will also elevate 3 of the 10 pesticides: MCPA, pendimethalin, and dacthal (DCPA) from its "pesticides of interest" list to its "pesticides of concern" list. In contrast to a "pesticides of interest", a "pesticides of concern" simply indicates that a

more in-depth evaluation of potential environmental problems is needed. In both cases however, WSDA will focus attention on the number and magnitude of occurrences to make sure that preventable water quality issues are managed proactively using WSDA's adaptive management strategy.

The report includes pesticide detection calendars for 2009, 2010, and 2011 which show the pesticides and their concentrations (when detected) on a weekly basis for each study site.

A total of 74 pesticide and pesticide-related compounds were detected from 2009-2011. Herbicides account for the greatest proportion of pesticide detections at 11 of the 16 study sites. In contrast, insecticides account for the greatest proportion of detections at the five study sites located in the Entiat and Wenatchee agricultural basins.

Brender Creek within the Wenatchee basin had the greatest number of pesticide detections at levels above *aquatic life criteria* or *water quality standards* (exceedances) per sampling event in 2009-2011. This was due to consistent detections of the legacy pesticide DDT and DDT breakdown products as a result of use past use. As noted earlier, DDT is no longer legal for use. Monitoring sites in the Lower Yakima basin had the next greatest number of exceedances per sampling event and the two urban monitoring sites had the fewest number of exceedances per sampling event.

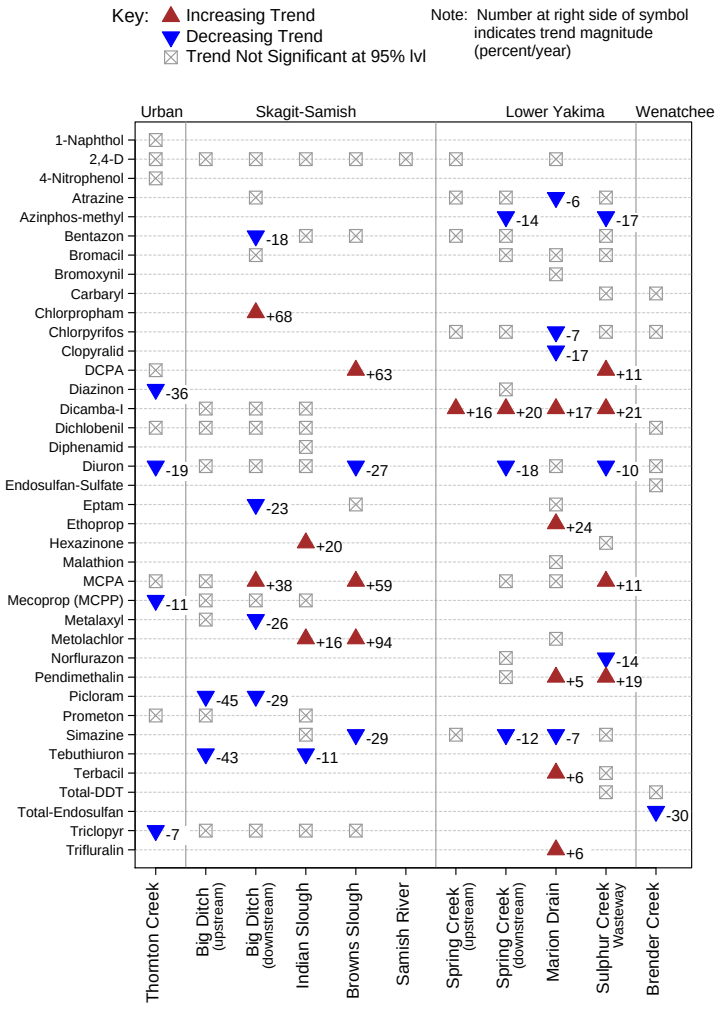

Figure 2 – Summary of increasing and decreasing trends in pesticide concentrations by location.

The 2009-2011 triennial report is consistent with past monitoring reports which show that a large percentage of surface water samples contain a mixture of different pesticide compounds. Although low levels of any given pesticide may not be a cause for concern, aggregate exposure to several pesticides together may be of concern due to additive effects. In an attempt to address the potential risk to salmon and there food source, this report included an analysis which calculated values for each pesticide called "toxic units" (TUs) and added them up to estimate a combined effect from the aggregate exposure to several pesticides. The analysis found that when pesticide mixtures presented a risk to aquatic life, it was usually due to the presence of a single pesticide at a high concentration, at or above the water quality *criterion* or *standard*.

In the last 10 years, this monitoring program has observed a consistent decline in both the presence and levels of pesticides in salmon bearing streams as shown by:

- Fewer exceedances per sample observed in 2009-2011 then in the previous 6 years (2003-2005 and 2006-2008) for all four of the agricultural watersheds.
- Fewer pesticides were associated with increasing trends (10) then were associated with decreasing trends (16).
- Mixtures of pesticides in surface waters do not signal a cause for concern at this time.

Overall, the study found good news – in most cases, pesticides were found at levels considered safe for salmon and salmon-habitat, though careful monitoring will need to continue to ensure these levels do not increase. WSDA will continue to evolve and expand the capability of this monitoring program in order to provide the public and other government agencies with valuable information on pesticides in surface waters, supported by best available science.

For more Information:

Please contact George Tuttle, WSDA Natural Resources Assessment Section at (360) 902-2066 gtuttle@agr.wa.gov for more information. The Surface Water Monitoring Program for Pesticides in Salmon-Bearing Streams, 2009-2011 Triennial Report is available on the WSDA website at www.agr.wa.gov/PestFert/natresources/SWM.

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