



FACT SHEET

Surface Water Monitoring Program 2003-2005 Summary Report

Introduction

Background: The Washington State Department of Agriculture (WSDA) and the Washington State Department of Ecology are conducting a multi-year monitoring study to characterize pesticide concentrations in selected salmonid-bearing streams during the typical pesticide use season. The first three years (2003-2005) of the study are summarized in this fact sheet.

Study Sites: Pesticide concentrations were measured in two watersheds representing urban and agricultural land-use patterns. Thornton Creek, located in Watershed Resource Inventory Area (WRIA) 8, represents the urban watershed. Spring Creek, Sulphur Creek Wasteway, and Marion Drain - drainages in Lower Yakima WRIA 37 - characterize agricultural land use patterns. (See Figure 1.)

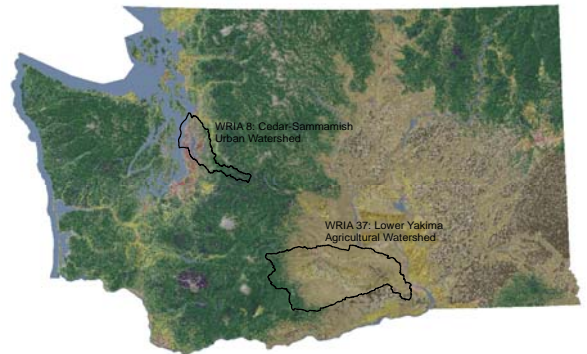


Figure 1. Agricultural & urban study watersheds

Sampling: Sampling was designed to address pesticide presence in Endangered Species Act (ESA)-listed, salmonid-bearing streams during typical pesticide use periods. Over the three-year monitoring study, approximately 160 currently registered pesticides, historical-use pesticides, and degradates were included in the study.

These compounds were selected based on the use of the pesticide, toxicity to non-target organisms, transport potential, and cost of analysis. Conventional water quality parameters – total suspended solids, pH, conductivity, temperature, and flow – were also measured to better understand factors influencing pesticide toxicity, fate and transport, and general water quality. Surface water sampling is typically conducted weekly from March through October, which is the highest application period for pesticides.

Impact on Salmonids: Temporal trends and potential impacts to salmonids are investigated through comparison to (1) U.S. Environmental Protection Agency (EPA) registration toxicological end points for fish and aquatic invertebrates, (2) Washington State Water Quality Standards, and (3) EPA National Recommended Water Quality Criteria.

Sampling Results

From 2003 to 2005, a total of 453 samples were collected from the urban and agricultural sites. During this time, a total of 51 currently registered pesticides, historical-use pesticides, and/or degradates were detected in the urban and agricultural watersheds.

Of the 51 pesticides detected: 4,4-DDE, 4,4-DDT, azinphos methyl, carbaryl, chlorpyrifos, diazinon, disulfoton, endosulfan sulfate, malathion and oxyfluorfen were numerically above an assessment endpoint. The majority of pesticide detections were low and close to analytical detection limits.

Discussion

When pesticides were detected, the most commonly found general pesticide category for both the urban and agricultural basins was herbicides, representing 75 and 80 percent, respectively (See Figures 2 and 3). Dichlobenil was the most frequently detected compound (80 percent) in the urban watershed, while 2,4-D was the most frequently detected compound (73 percent) in the agricultural basin.

Urban Watershed: Urban uses for chlorpyrifos and diazinon were restricted or cancelled during 2000-2004. The phase-out of these chemicals has resulted in reduced detection frequency and magnitude in Thornton Creek.

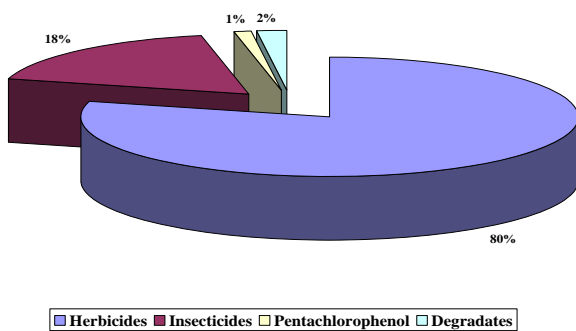


Figure 3. Pesticide detections by category – agricultural study site

The azinphos-methyl and malathion detections occurred at the same time summer maximum temperatures may restrict summer steelhead (ESA-listed) occupation of monitored stream reaches. If summer steelhead are present, other studies have shown elevated water temperatures may make the steelhead more susceptible to pesticide toxicity.

The frequency and magnitude of 4,4-DDE and 4,4-DDT residue detections appear to have declined compared to the historical data of nearby drainages. This reduction is likely due to efforts of Lower Yakima Valley producers to reduce erosion in the watershed.

The assessment criteria used for the 3-year report are based on assessing the effects of a specific chemical on an organism and do not take into account the additive or possibly synergistic effects of mixtures or sub-lethal effects; for example, the olfactory response of salmonids to certain pesticides.

Future Direction

WSDA is working cooperatively with applicators to implement mitigation measures to reduce pesticide exposure in salmon habitat. Future monitoring efforts will evaluate the success of the mitigation strategies at reducing pesticide levels in surface waters and determine if further action is needed.

For More Information

Contact Jim Cowles, WSDA Natural Resources Assessment Section at (360) 902-2066 or jcowles@agr.wa.gov or Chris Burke, Ecology Environmental Assessment Program at (360) 407-6139 or cbur461@ecy.wa.gov. The complete 3-year report, *Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams, 2003-2005*, can be found on the WSDA and Ecology Web sites at agr.wa.gov/PestFert/EnvResources/SWM/default.htm and ecy.wa.gov/programs/eap/toxics/pesticides.html

Inquiries regarding the availability of this publication in alternative formats should be directed to the WSDA Receptionist at (360)902-1976 or Telecommunications Device for the Deaf at (360) 902-1996.

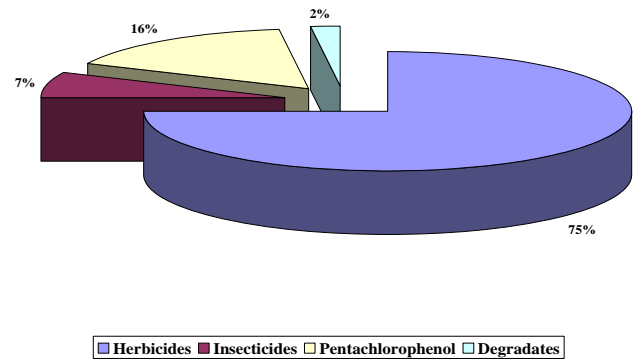


Figure 2. Pesticide detections by category – urban study site

Agricultural Watershed: In the agricultural drainages, azinphos-methyl, chlorpyrifos, and malathion residues were detected numerically above either the surface water or aquatic species assessment end points.

Chlorpyrifos, malathion, and azinphos-methyl were detected in all 3 agricultural drainages. Chlorpyrifos residues were detected in the spring in all agricultural drainages and in the fall in Marion Drain.