Watershed-based Pesticide Risk Assessment
Watershed-based Pesticide Risk Assessment

Land Use (crops and acreage)

Crop/pest complex

Percent Acres Treated
Pesticide use in the Hood River Basin

- 61 active ingredients, totaling 1.1 million pounds, applied annually to roughly 21,000 acres (mostly pears, cherries, apples.)

- Sulfur and oil account for nearly 3/4 of the annual pesticide usage.

- Of the top 10, 3 are organophosphate (OP) insecticides.
Where are the water resources of concern?

The Hood River basin contains ~400 miles of perennial streams.

~100 miles is accessible to anadromous fish.
Why are there concerns about pesticides in the Hood River Basin?

- OP’s very toxic to aquatic life, including T&E species
- Some applications during rainy season
- Application when salmonid early life stages present
- Limited monitoring data
Hood River Watershed Timeline

- 1998: Winter Steelhead listed under the Endangered Species Act (ESA)
- 1999: Oregon DEQ reconnaissance study – pesticides above Clean Water Act standards
Hood River Monitoring Study Timeline

- 2000: Coordinated monitoring effort
  - OSU/Hood River Extension and Exp. Station
  - Oregon Department of Environmental Quality
  - Oregon Department of Agriculture
  - Hood River Soil and Water Conservation District
  - Hood River Irrigation Districts
  - Hood River Watershed Group
  - Hood River Growers and Shippers IFP
  - Confederated Tribes of Warm Springs
Hood River Watershed Timeline

2000-2003:

- Monitor tributaries to better define nature of stream loading.
- Outreach at grower and watershed group meetings.
- Implementation of best management practices (BMPs)
Monitoring activities 2000-2003

- **Chlorpyrifos** during the delayed dormant season (April-May)
- **Azinphos-methyl** during the early codling moth season (June-July)
- Samples analyzed: ~1400
Monitoring activities

Monitor 3 streams:
- Indian (urban-ag)
- Neal (agriculture)
- Evans (upper valley: ag)

Collect triplicate 1 liter water samples 3 times per week for approximately 6 weeks.
Chlorpyrifos Dissolved Residues in Hood River Tributaries
March 01- April 20, 2002

Mean (min/max)
- △ Evans
- ♦ Neal
- ○ Indian

Water quality criteria 0.041 ug/l
Azinphos-Methyl Dissolved Residues in Hood River Tributaries
June 6- July 10, 2002

Mean (min/max)
- Evans
- Neal
- Indian

Water quality criteria 0.010 ug/l
Percent of sampling dates with chlorpyrifos detections (>0.001 ug/l) for water samples collected from Neal, Evans, and Indian creeks

The bar chart shows the percentage of sampling dates with chlorpyrifos detections for Neal, Evans, and Indian creeks over the years 2001, 2002, and 2003. The chart indicates a significant decrease in detections over the years from Neal and Evans creeks, while Indian Creek shows a trend of increasing detections.
Percent of sampling dates with azinphos-methyl detections (>0.001 ug/l) for water samples collected from Neal, Evans, and Indian creeks.
Pesticide Dissolved Residues in Hood River River Tributaries

Percent chlorpyrifos detections > 0.042 ug/L
- 2001: 18%
- 2002: 10%
- 2003: 6%

Percent azinphos-methyl detections > 0.010 ug/L
- 2000: 37%
- 2001: 44%
- 2002: 40%
- 2003: 42%

¹Clean Water Act Standard protective of aquatic life
BMPs for Orchards:

- Unsprayed buffers
- Eliminate OP application in sensitive areas during pre-bloom period.
- Direct spray application to tree foliage and turn off outside nozzles at the ends of rows and at field edges to reduce drift.
- Tree rows parallel to sensitive areas.
- Consider drift reduction technologies such as air induction nozzles, spray adjuvants.

http://community.gorge.net/hrgsa/BMPproject.html
BMPs for Orchards

- Perform pesticide mixing and loading operations in areas that confine runoff (and leaching) and are far removed from surface water.

- Accurately calibrate sprayers to reduce likelihood of over-application.

- Use of web-based crop phenology models.

- Consider alternatives to OPs, including pheromones.

http://ippc.orst.edu
BMP Implementation

- Grower-Shipper Association and OSU Extension Joint effort:
  - protect water quality
  - effective orchard pest management

- Outreach efforts focused on
  - BMPs for pesticide handling and application
  - IPM programs for key orchard pests

- Outreach activities included:
  - presentations during annual grower meetings
  - field days
  - pesticide applicator training
  - one-on-one field visits
  - Newsletters
  - Website (http://community.gorge.net/hrgsa/BMPproject.html)
Hood River Watershed:
Water Quality & Pesticides

Needham: OSU and DEQ Joint Publications

Fact Sheet

Hood River Watershed:
Water Quality & Pesticides

Introduction
This fact sheet summarizes information on water quality in the Hood River Watershed. Although there have been concerns about runoff from agricultural activities in the watershed, the majority of data available are not sufficient to determine the extent of the impact.

Objectives
The objectives of this publication are to:

- Identify the major sources of water pollution in the watershed
- Provide information on the impact of pesticides on water quality
- Highlight the importance of best management practices to reduce pollution

Locations
The Hood River Watershed is located in the central Oregon Cascades, covering approximately 400 square miles. The watershed includes the Hood River and its tributaries, as well as the surrounding agricultural lands.

Methodology
The study was conducted using a combination of field observations and laboratory analyses. Water samples were collected from various locations within the watershed and analyzed for various parameters.

Results
The results indicate that water quality in the Hood River Watershed is generally good, with the following observations:

- Nutrient levels (Nitrate-N and Phosphorus) are within acceptable limits.
- Pesticide levels are below the maximum residue limits for most pesticides.
- Sediment concentrations are generally low, indicating good water clarity.

Recommendations
To protect water quality in the Hood River Watershed, the following recommendations are suggested:

- Implement best management practices to minimize pesticide runoff
- Use integrated pest management practices
- Monitor water quality parameters regularly
- Educate the public about the importance of water quality and best management practices

For more information, contact:
Steve Castignoli, OSU Extension
Kristin Kerwin, Hood River Growers and Shippers Association
Results

- A survey of growers conducted in 2004 indicated increased knowledge and adoption of BMPs.

- Water quality monitoring subsequent to 1999 indicated generally reduced frequency and concentration for chlorpyrifos detections.

- However, azinphos-methyl detections continue to exceed water quality standards.
Pesticides in the Hood River Watershed: The Future

- Continued monitoring?
- Continued refinement of BMPs
- Greater focus on watershed level impacts:
  - Pesticide use and use patterns
  - Irrigation practices
  - Sensitive areas
  - Buffer zones and the ESA
- Strategic planning: IPM and BMPs
Pesticide BMPs for Water Quality

BMPs – Proactive measures to reduce vulnerability to regulation

Emerging regulatory environment
(not just FIFRA and FQPA)

Endangered Species Act
Clean Water Act
Safe Drinking Water Act
Clean Air Act
State Laws and regulations
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