Pesticide Best Management Practices in the Hood River Watershed

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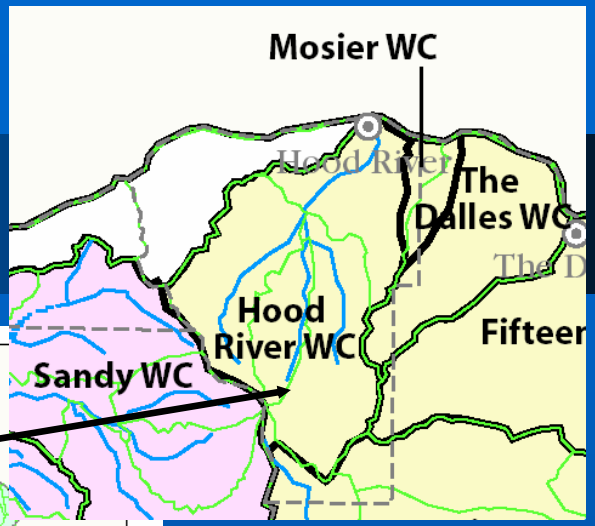
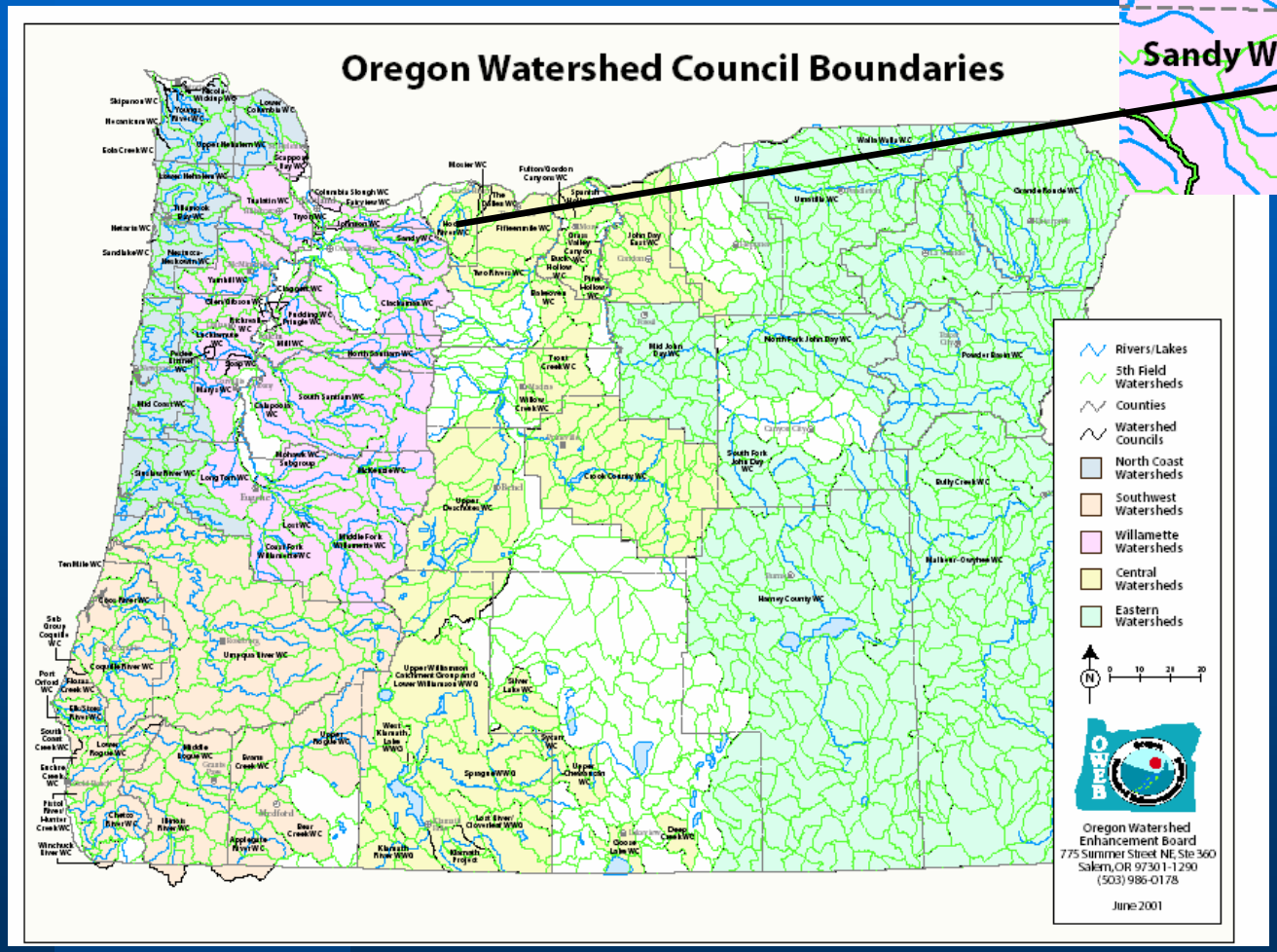
Watershed-based Pesticide Risk Assessment





Watershed-based Pesticide Risk Assessment

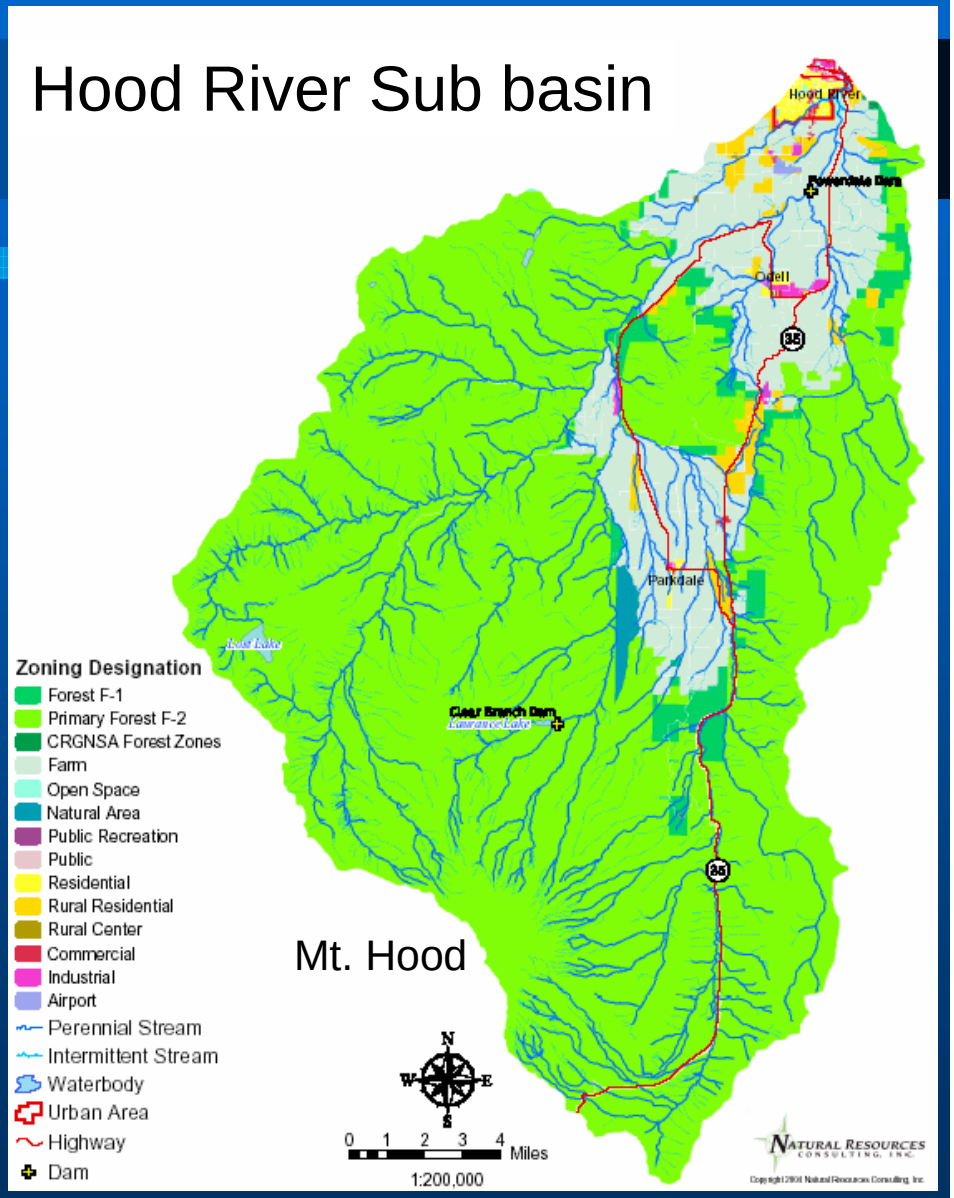
Land Use
(crops and acreage)

↓

Crop/pest complex

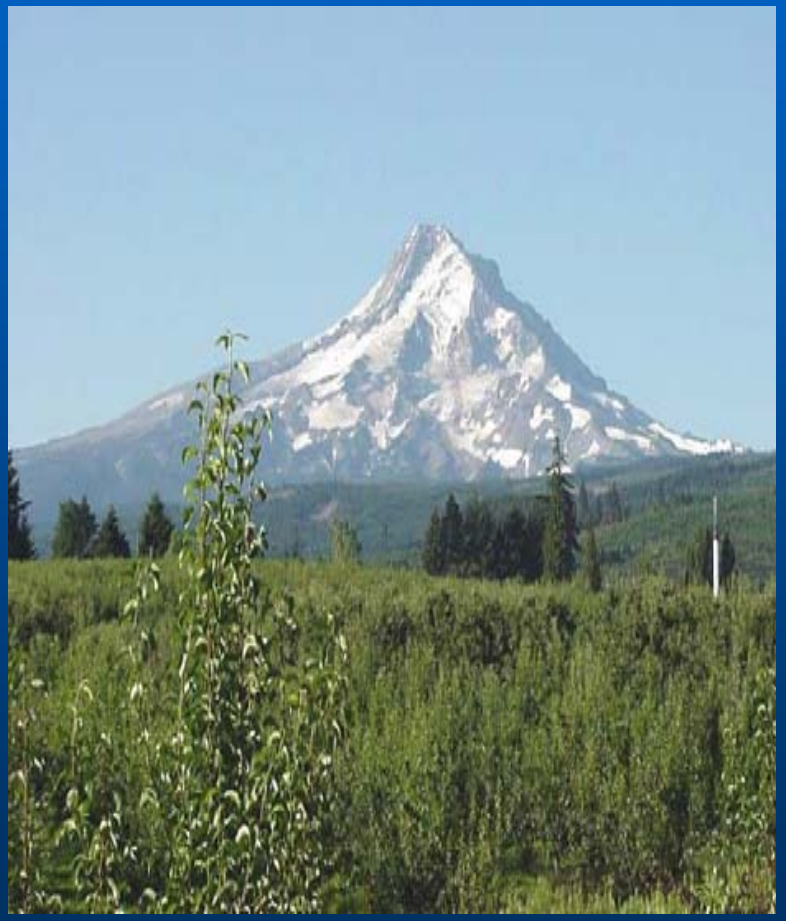
↓

Percent Acres Treated



Pesticide use in the Hood River Basin

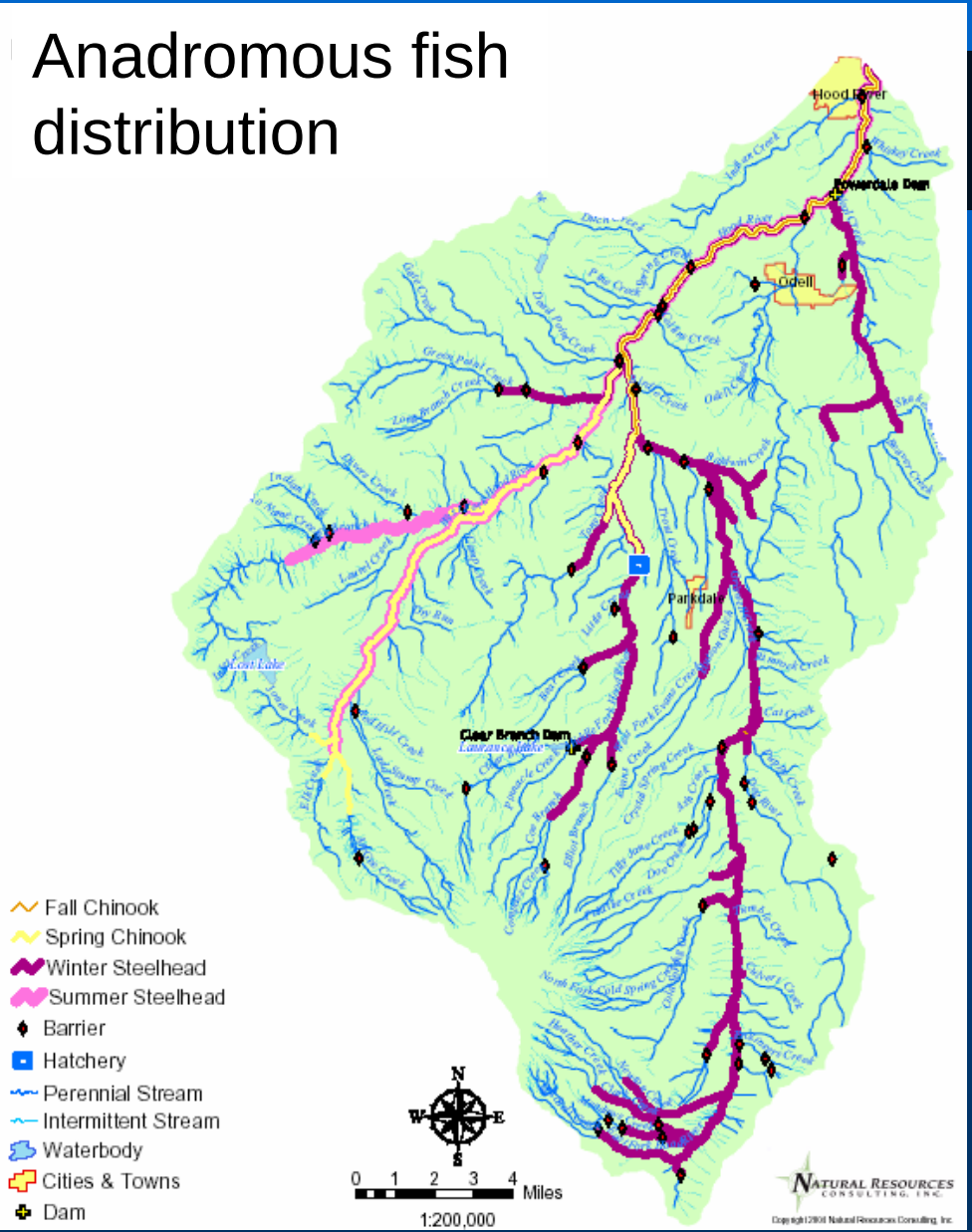
- 61 active ingredients, totaling 1.1 million pounds, applied annually to roughly 21,000 acres (mostly pears, cherries, apples.)
- Sulfur and oil account for nearly 3/4 of the annual pesticide usage.
- Of the top 10, 3 are organophosphate (OP) insecticides.



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
- 2000: Meet with stakeholders - develop Field Sampling Plan and Quality Assurance Project Plan for monitoring Hood River tributaries.

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

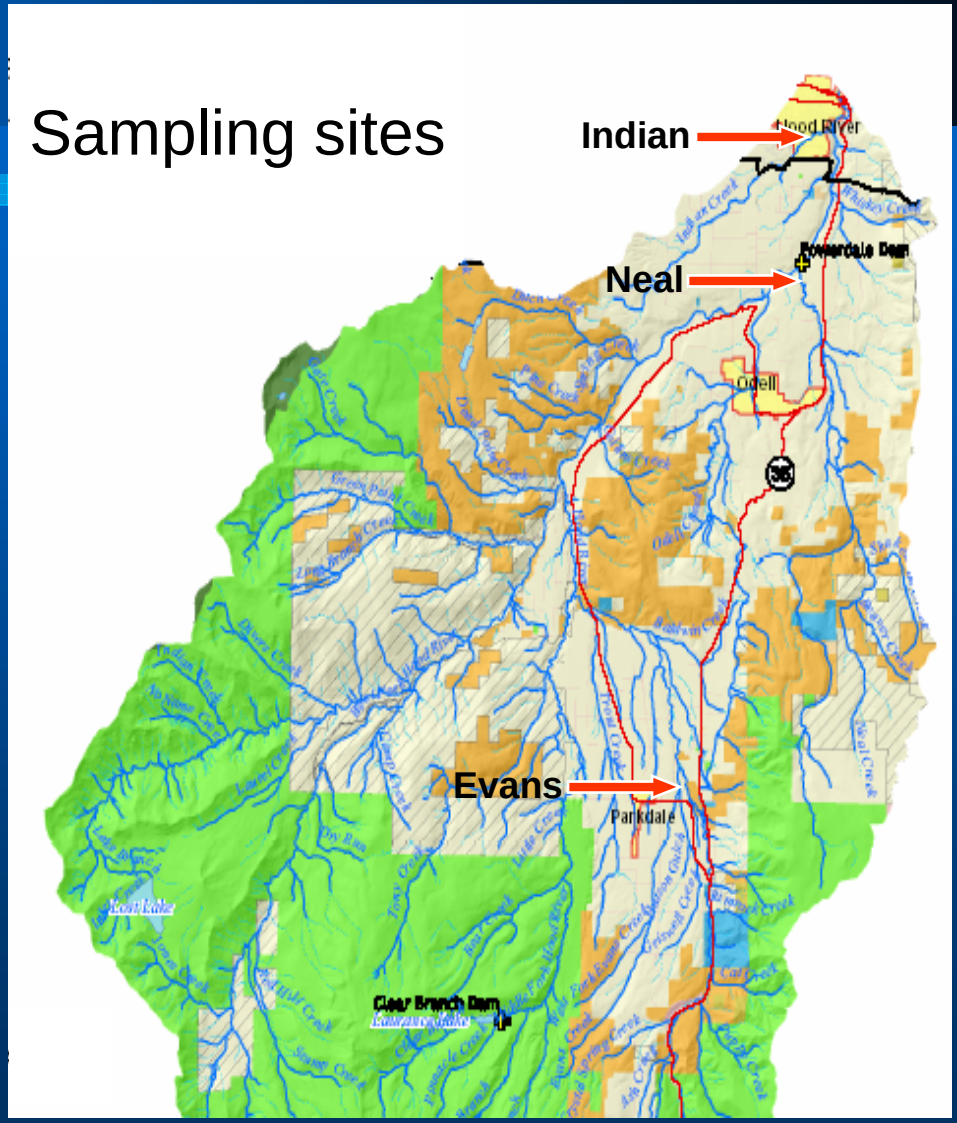
Monitor 3 streams:

Indian (urban-ag)

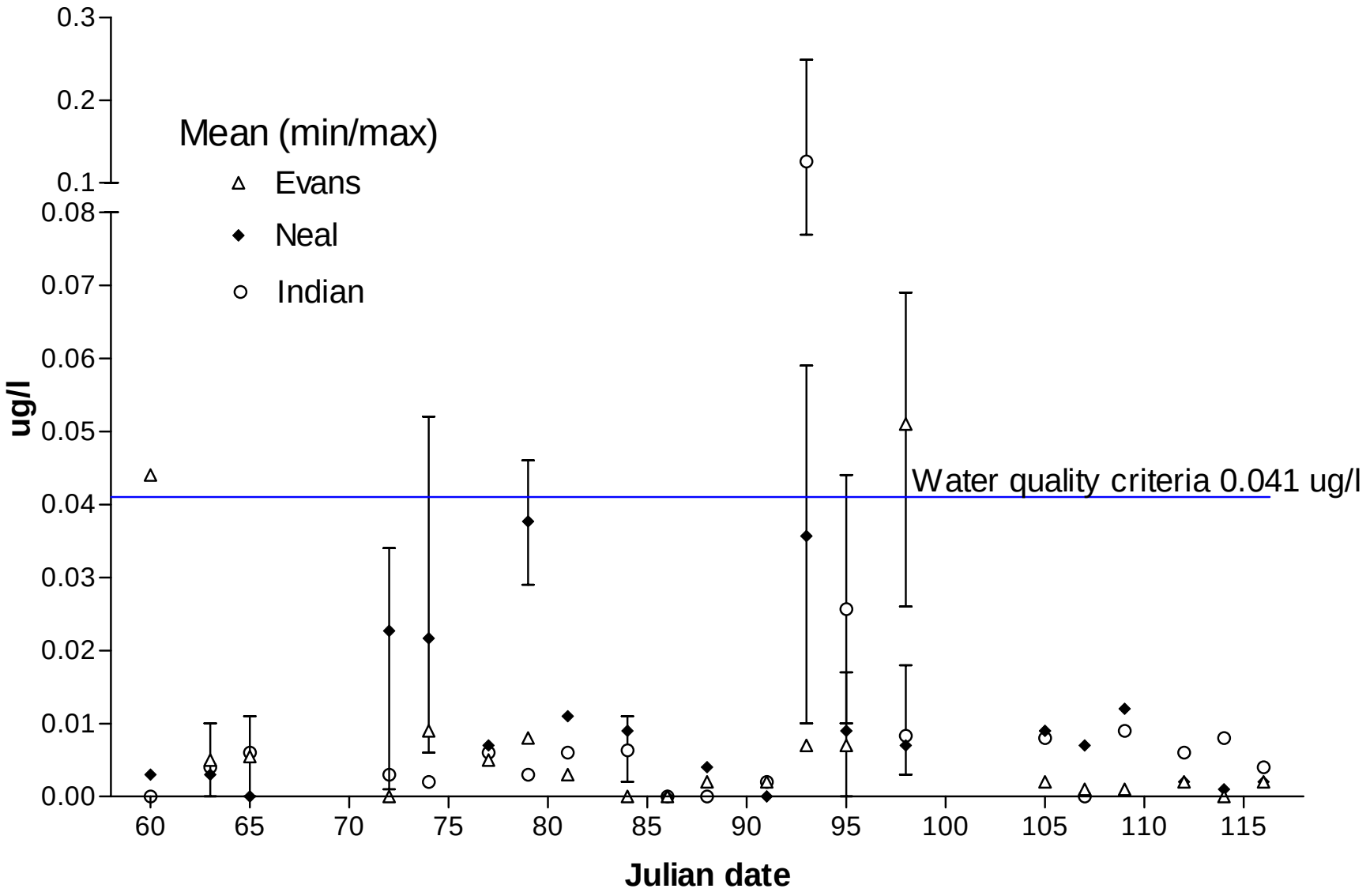
Neal (agriculture)

Evans (upper valley: ag)

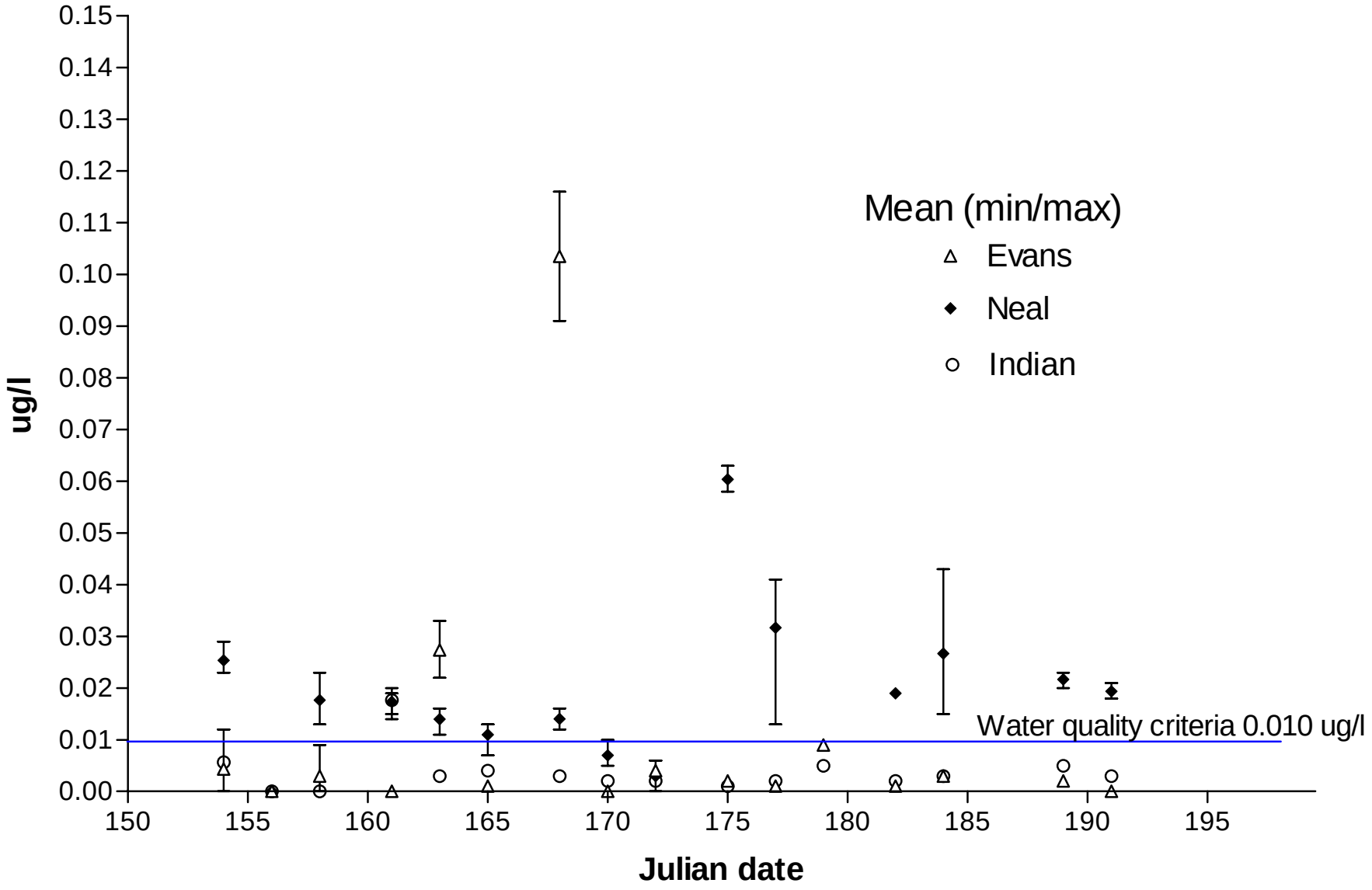
Collect triplicate 1 liter water samples 3 times per week for approximately 6 weeks.



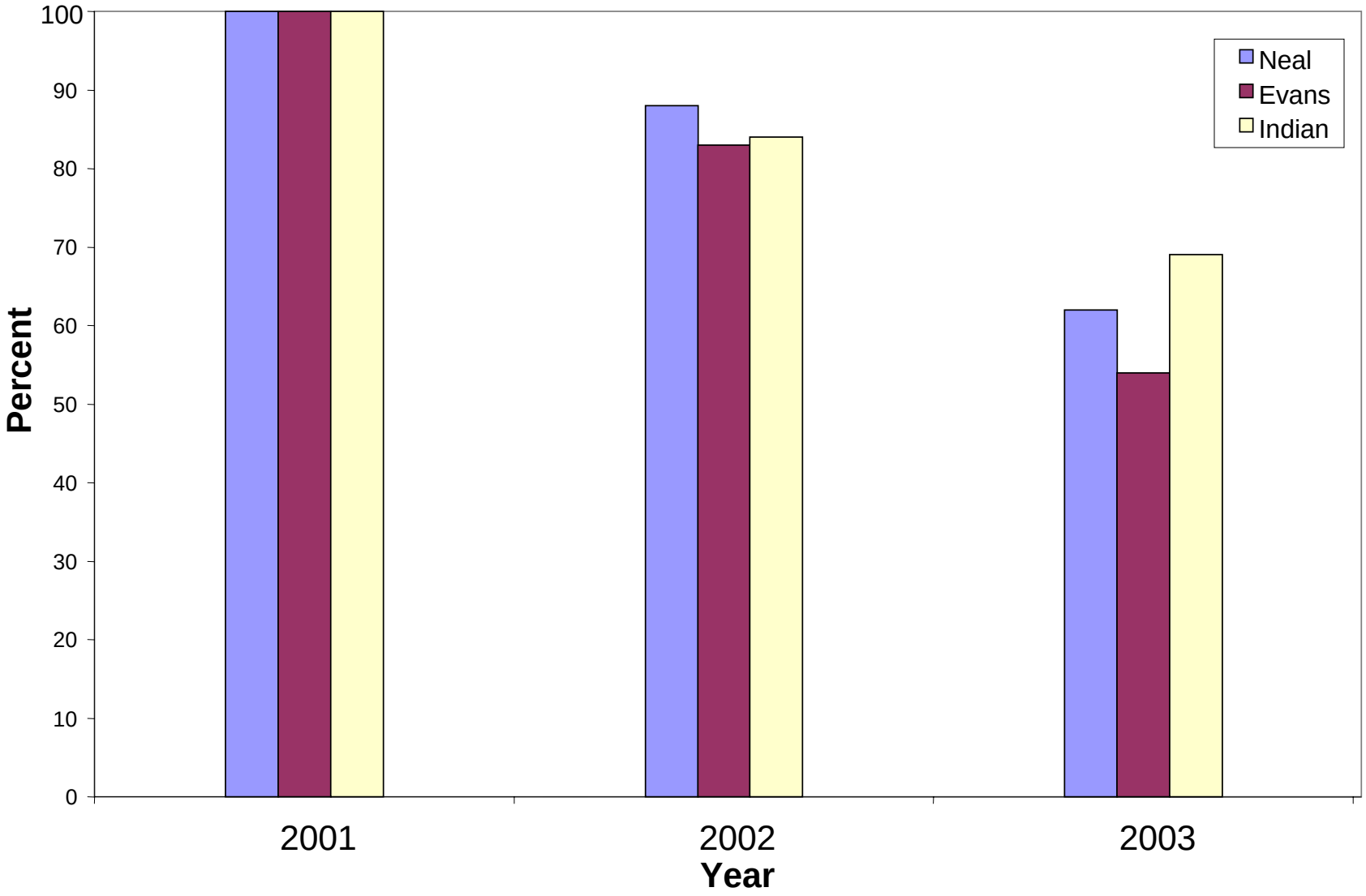
Chlorpyrifos Dissolved Residues in Hood River Tributaries
March 01- April 20 , 2002



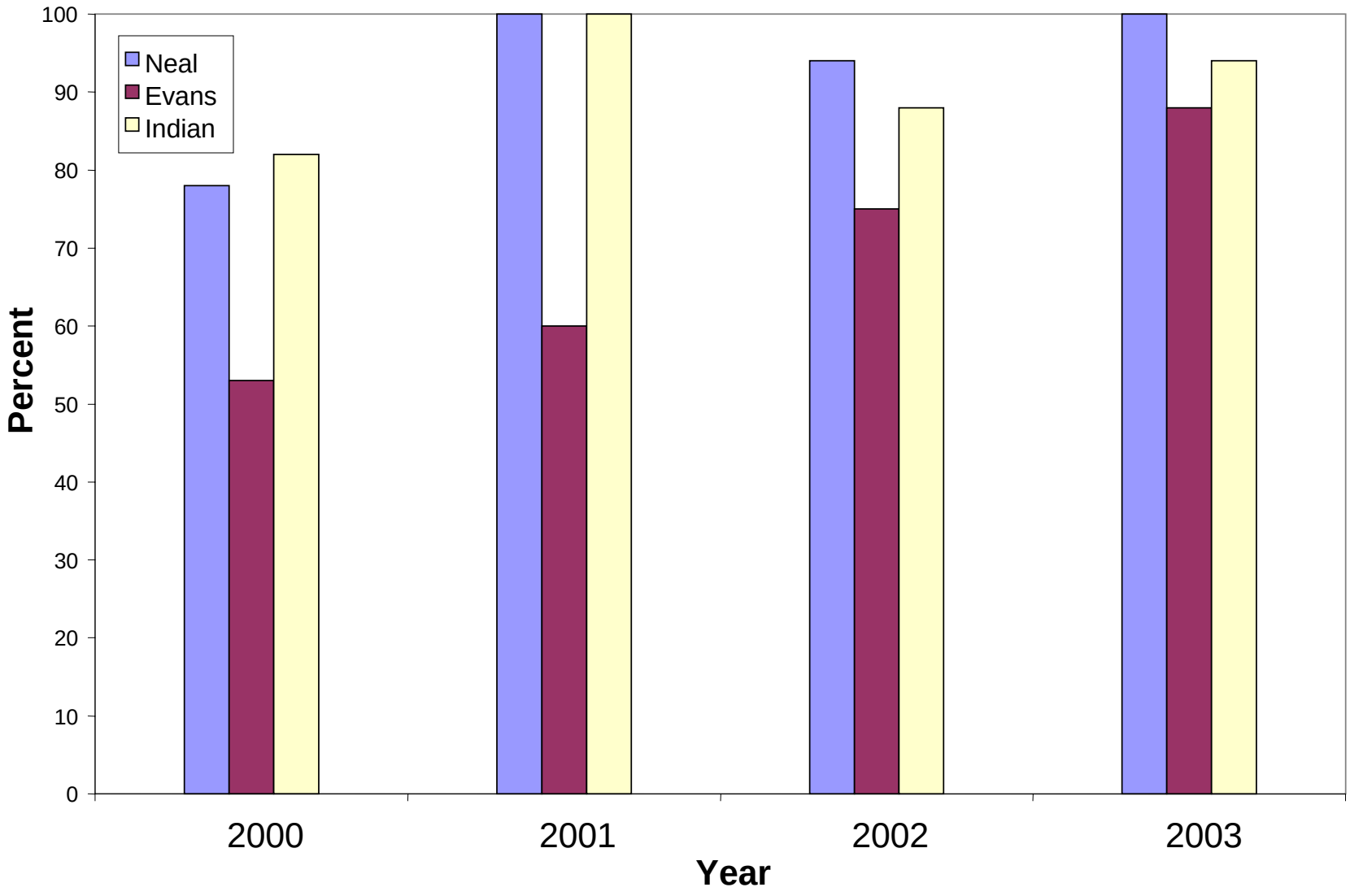
Azinphos-Methyl Dissolved Residues in Hood River Tributaries
June 6- July 10 , 2002



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



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 Tributaries

Percent chlorpyrifos detections > 0.042 ug/L[1]

2001- 18%

2002- 10%

2003- 6 %

Percent azinphos-methyl detections > 0.010 ug/L[1]

2000- 37%

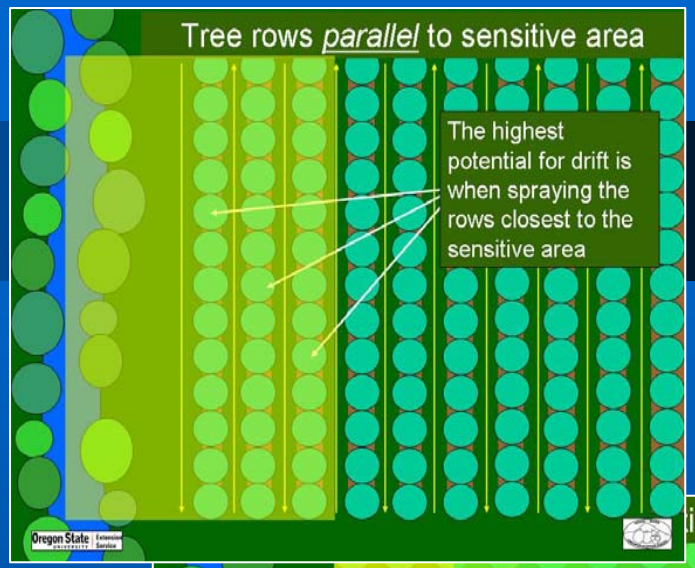
2001- 44%

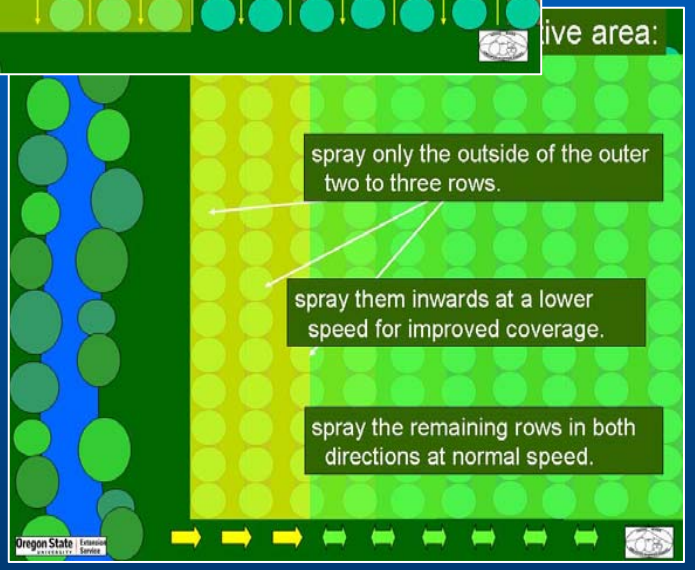
2002- 40%

2003- 42%.

[1]Clean Water Act Standard protective of aquatic life

BMPs for Orchards:



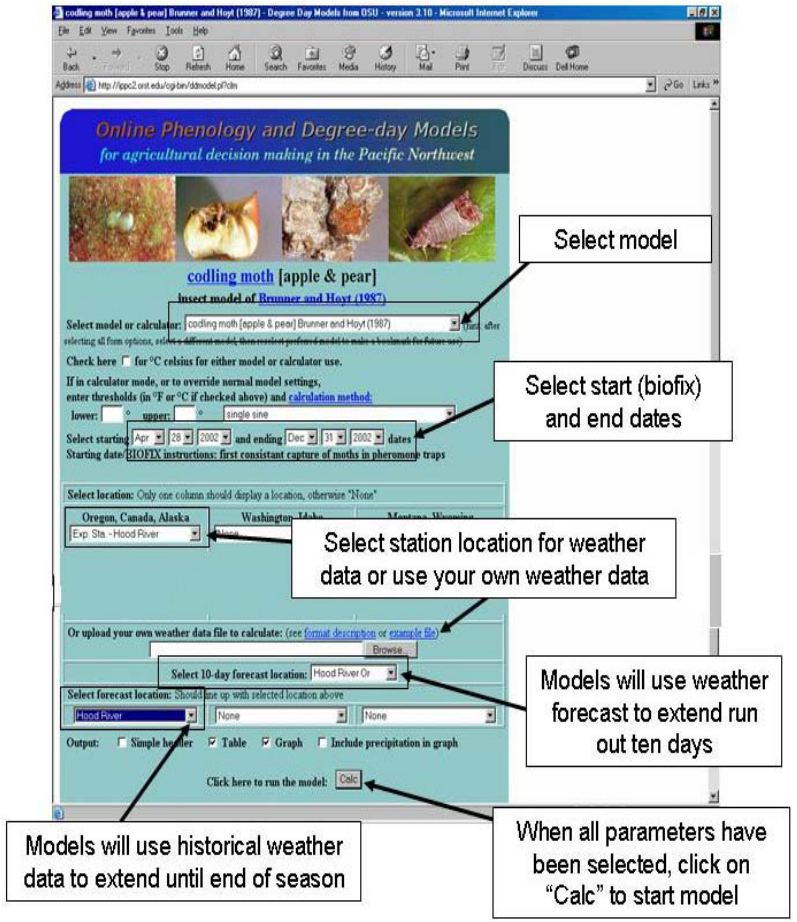


- Unsprayed buffers
- Eliminate OP application in sensitive areas during pre-bloom period.
- Direct spray application to tree foliage and turn off outside nozzles at the ends of rows and at field edges to reduce drift.
- Tree rows parallel to sensitive areas.
- Consider drift reduction technologies such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



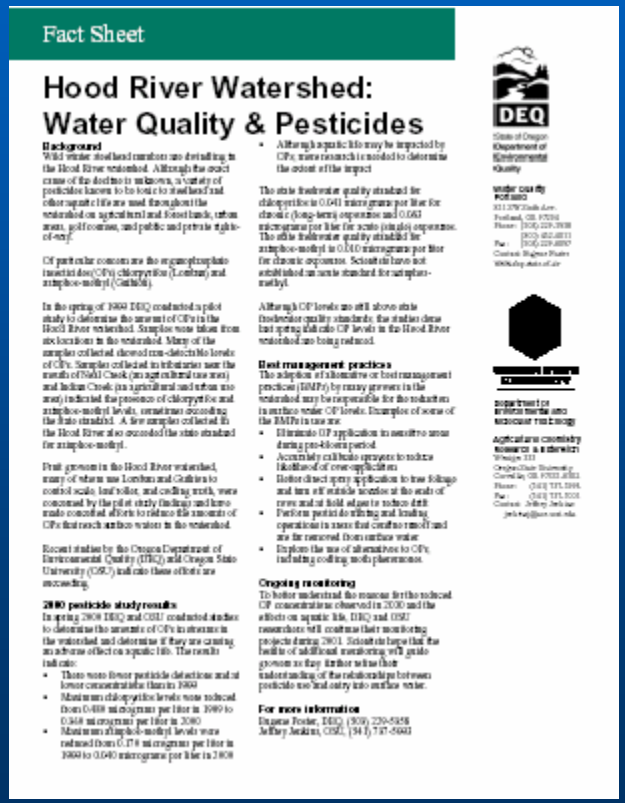
http://ippc.orst.edu

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)

Publications

OSU and DEQ
Joint Publication



Fact Sheet

Hood River Watershed: Water Quality & Pesticides

Background

Wild winter steelhead numbers are dwindling in the Hood River watershed. Although the exact cause of the decline is unknown, a variety of pesticides known to be toxic to steelhead and other aquatic life are used throughout the watershed on agricultural and forest lands, urban areas, golf courses, and public and private rights-of-way.

Of particular concern are the organophosphate insecticides (OPs) chlorpyrifos (Lorsban) and azinphos-methyl (Guthion).

In the spring of 1999 DEQ conducted a pilot study to determine the amount of OPs in the Hood River watershed. Samples were taken from stock locations in the watershed. Many of the samples collected showed non-detectable levels of OPs. Samples collected in tributaries near the mouth of Neal Creek (an agricultural use area) and Indian Creek (an agricultural and urban use area) indicated the presence of chlorpyrifos and azinphos-methyl levels, sometimes exceeding the State standard. A few samples collected in the Hood River also exceeded the state standard for azinphos-methyl.

Fruit growers in the Hood River watershed, many of whom use Lorsban and Guthion to control scale, leafroller, and codling moth, were concerned by the pilot study findings and have made concerted efforts to reduce the amounts of OPs that reach surface waters in the watershed.

Recent studies by the Oregon Department of Environmental Quality (DEQ) and Oregon State University (OSU) indicate these efforts are succeeding.

2000 pesticide study results

In spring 2000 DEQ and OSU conducted studies to determine the amounts of OPs in streams in the watershed and determine if they are causing an adverse effect on aquatic life. The results indicate:

- There were fewer pesticide detections and at lower concentrations than in 1999
- Maximum chlorpyrifos levels were reduced from 0.488 micrograms per liter in 1999 to 0.068 micrograms per liter in 2000
- Maximum diazinon-methyl levels were reduced from 0.176 micrograms per liter in 1999 to 0.040 micrograms per liter in 2000
- Although aquatic life may be impacted by OPs, more research is needed to determine the extent of the impact

The state freshwater quality standard for chlorpyrifos is 0.041 micrograms per liter for chronic (long-term) exposures and 0.083 micrograms per liter for acute (single) exposures. The state freshwater quality standard for azinphos-methyl is 0.010 micrograms per liter for chronic exposures. Scientists have not established an acute standard for azinphos-methyl.

Although OP levels are still above state freshwater quality standards, the studies done last spring indicate OP levels in the Hood River watershed are being reduced.

Best management practices

The adoption of alternative or best management practices (BMPs) by many growers in the watershed may be responsible for the reduction in azinphos-methyl OP levels. Examples of some of the BMPs in use are:

- Eliminate OP application in sensitive areas during pre-bloom period
- Accurately calibrate sprayers to reduce likelihood of over-application
- Better direct spray application to tree foliage and turn off pesticide nozzles at the ends of rows and at field edges to reduce drift
- Perform pesticide filling and loading operations in areas that confine runoff and are far removed from surface water
- Explore the use of alternatives to OPs, including codling moth pheromones

Ongoing monitoring

To better understand the reasons for the reduced OP concentrations observed in 2000 and the effects on aquatic life, DEQ and OSU researchers will continue their monitoring projects during 2001. Scientists hope that the results of additional monitoring will guide growers as they further refine their understanding of the relationship between pesticide use and entry into surface water.

For more information

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Jeffrey Jenkins, OSU, (541) 737-5643

DEQ

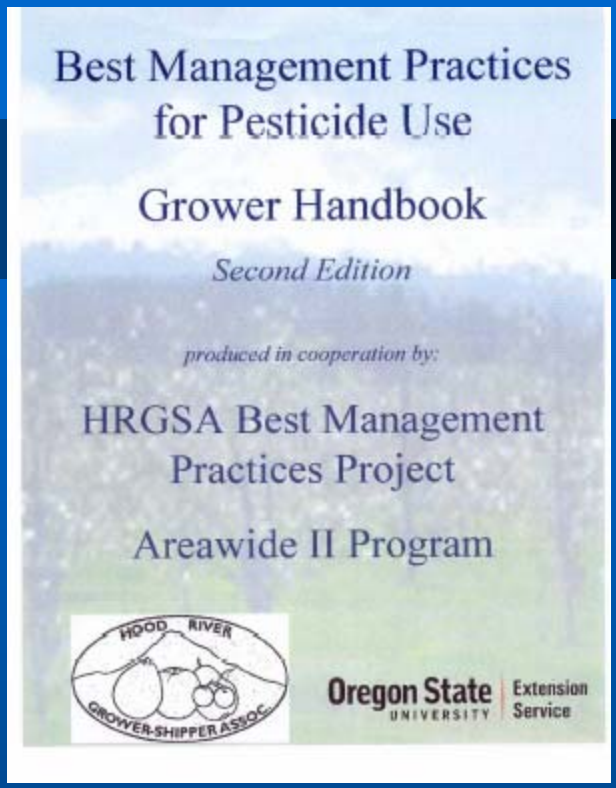
State of Oregon Department of Environmental Quality

water quality
fact sheet

Oregon State University

department of crop and soil science

agricultural chemistry research & extension



Best Management Practices for Pesticide Use

Grower Handbook

Second Edition

produced in cooperation by:

HRGSA Best Management Practices Project

Areawide II Program

HOOD RIVER GROWER-SHIPPER ASSOC.

Oregon State UNIVERSITY | Extension Service

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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  - Oregon Watershed Enhancement Board
- Best Management Practices
  - American Farmland Trust/Region 10 EPA
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