OSU Chemical Applicator Course

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Oregon Pesticide Stewardship Partnerships

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Overview

- Background and overview of Pesticide Stewardship Partnerships
- Pesticide Monitoring in Watershseds
  - Where and when was monitoring conducted?
  - Monitoring Results
- Stewardship Activities and Future Plans and Challenges

Pesticide Stewardship Partnership Approach

Using collaborative partnerships, local expertise and voluntary actions to produce measurable water quality improvements

Pesticide Stewardship Partnerships: Overview

KEY STEPS IN PARTNERSHIP PROJECTS

Monitor for current use pesticides in surface waters from drift & runoff

↓

Identify streams with elevated pesticide concentrations

↓

Collaborate to implement voluntary best management practices

↓

Follow-up monitoring to determine water quality improvements over time

Origins of Pesticide Partnerships: Hood River Experience

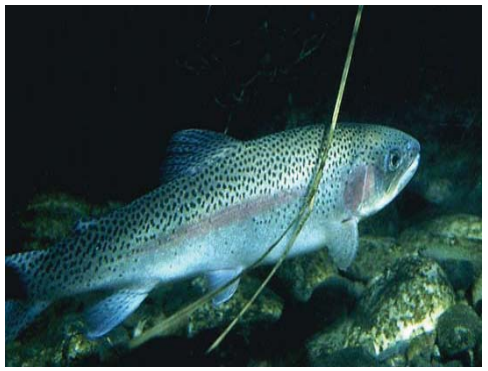
- DEQ working on temperature issues in the Hood Basin in late 1990s
- Concerns raised about pesticide impacts on Steelhead and other fish species
- Fruit orchards = dominant ag land use
  - *Used organophosphate insecticides: chlorpyrifos (Lorsban) and azinphos-methyl (Guthion)*

Origins of Pesticide Partnerships: Hood River Experience

- The insecticides chlropyrifos (Lorsban) and azinphos-methyl (Guthion) were above Oregon water quality criteria at multiple locations

- Decreased macroinvertebrate density and diversity

- Acetylcholine Esterase inhibition was observed in fish at stream locations with elevated organophosphate levels

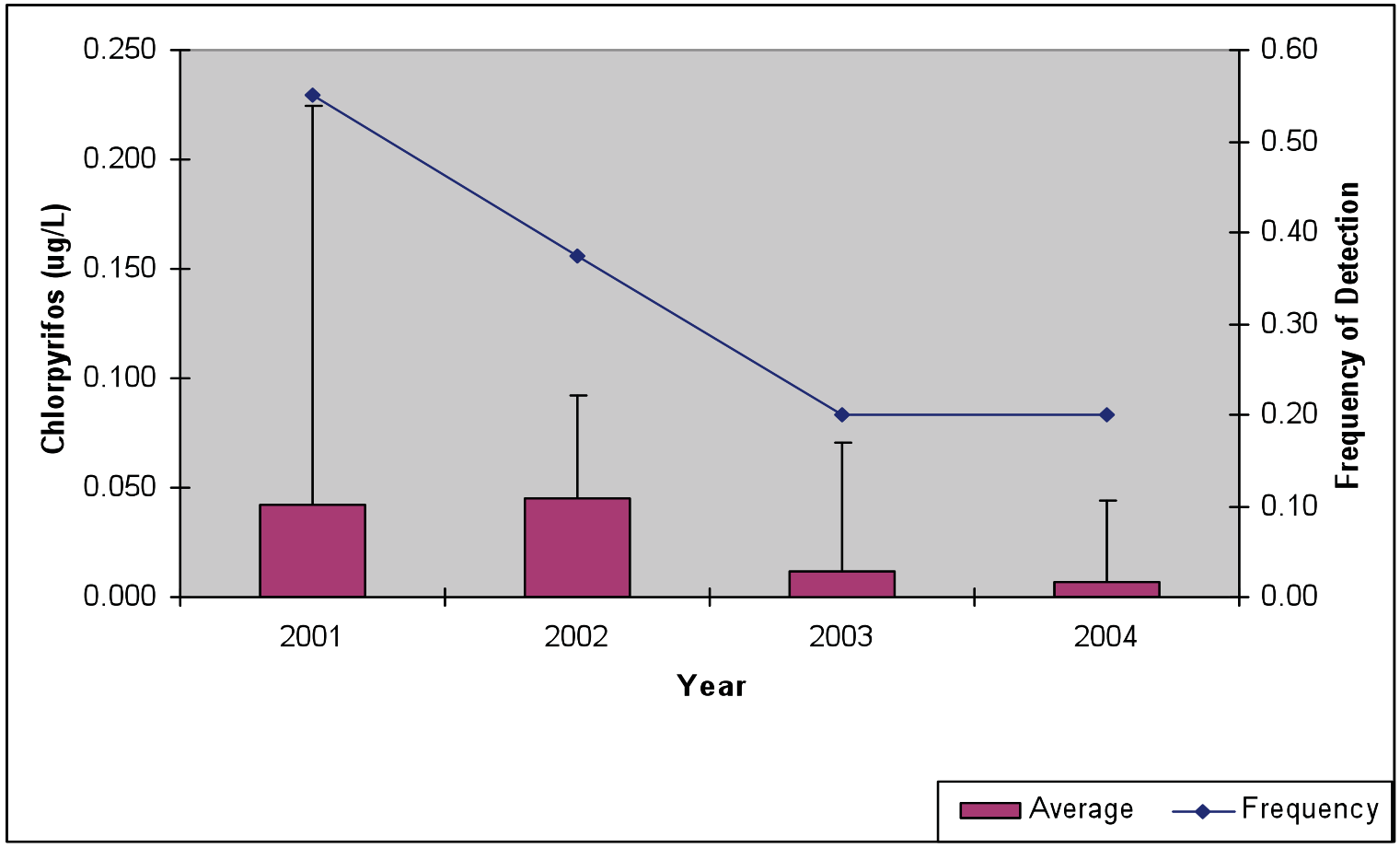


Response to Monitoring: Collaborating on Best Practices

- Hood River Grower-Shipper Association BMP Handbook
  - *Providing information on pesticide drift reduction practices and equipment*
  - *Encouraging the reduction in the amount of organophosphates used in the Hood River Valley*
  - *Protecting and enhancing the quality of natural resources, especially local waterways*
- Training and Outreach
  - *Workshops and demonstration trainings, videos, newsletters in partnership with OSU Extension Service*

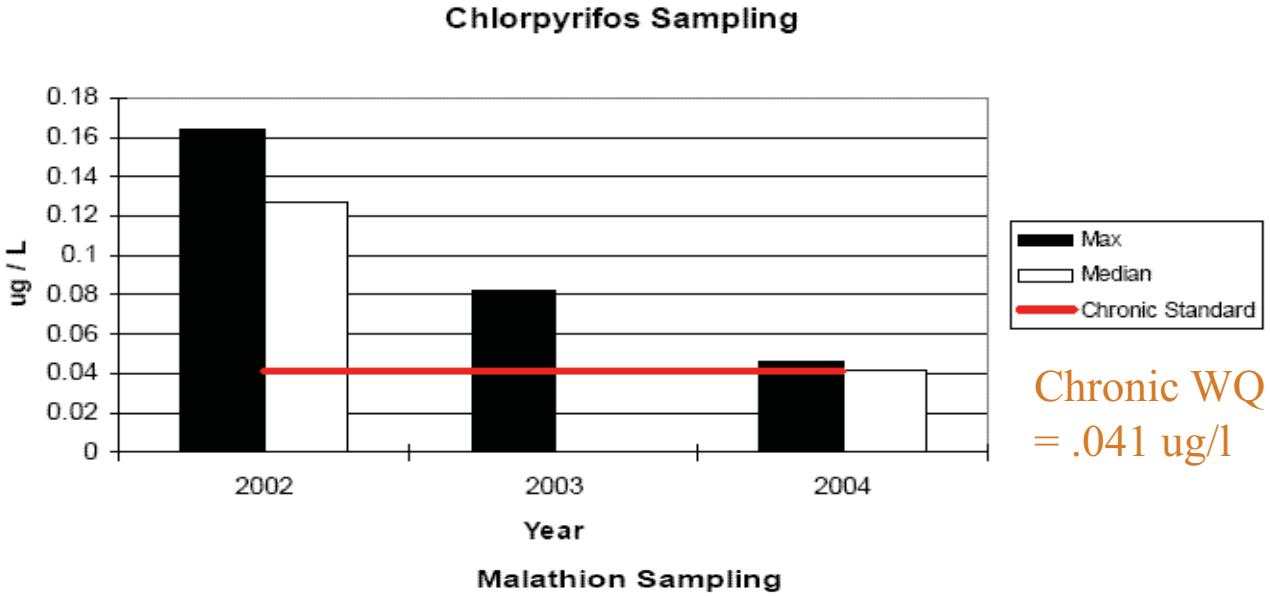
Hood River Pesticide Partnership: Effectiveness Monitoring

CHLORPYRIFOS MONITORING – LOWER NEAL CREEK

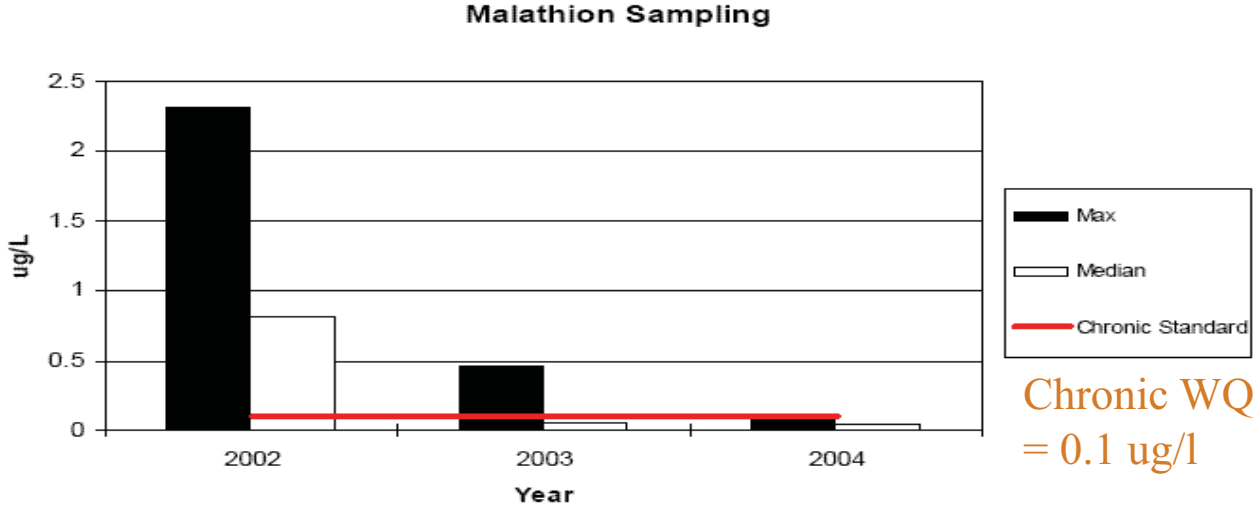


Expanding Partnership Model: Mill Creek (The Dalles)

Fifteen Mile Creek Monitoring Results

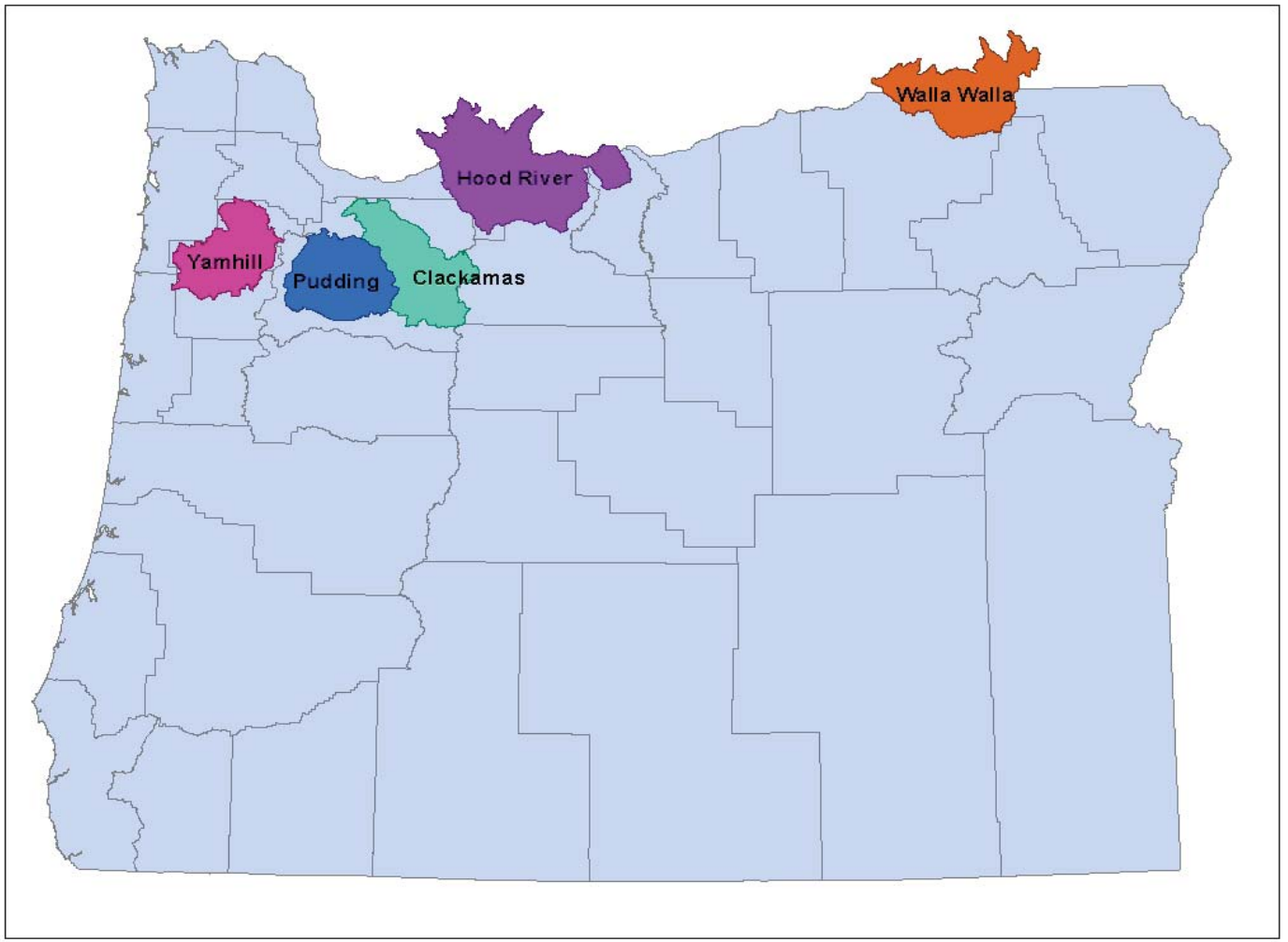


Chronic WQ standard = .041 ug/l



Chronic WQ Standard = 0.1 ug/l

Expanding Partnership Model: Four New Projects Since 2005



Pesticide Stewardship Partnerships: Who are the Partners?

- *Oregon Department of Environmental Quality*
- *OSU Extension Service*
- *Grower groups*
- *Departments of Agriculture & Forestry*
- *Soil and Water Conservation Districts*
- *Watershed Councils*
- *Tribes*
- *Agricultural Product Suppliers*

DEQ Pesticide Monitoring Overview through 2008

- What was sampled for?
  - Organophosphate (OP) insecticides and 2 triazine herbicides
- Why sample for these?
  - Current use products
  - OP pesticides very toxic to aquatic life

Ethoprop (Mocap)	Chlorpyrifos oxon
Dimethoate	Phosmet Oxygen Analog
Simazine	Azinphos-methyl (Guthion)
Atrazine	Azinphos-methyl Oxygen Analog
Methylparathion	Diazinon
Malathion	Imidan
Malathion Oxygen Analog	Pyriproxyfen
Chlorpyrifos (Lorsban, Dursban)	Fenvalerate + Esfenvalerate

DEQ Pesticide Monitoring Overview

- Starting in 2008
  - Lower detection limits
    - OP pesticides /Triazine herbicides: from 0.025 ug/l to 0.010 ug/L
- Starting in 2009
  - Expanded number of pesticides analyzed → From 15 to over 100
    - Phenoxy herbicides (e.g., 2,4-D)
    - Carbamates (e.g., Carbaryl)
    - Neonicotinoids (e.g. Imidacloprid)
    - Fungicides (eg. Chlorothalonil)

2005 – 2008 Pesticide Monitoring Activity

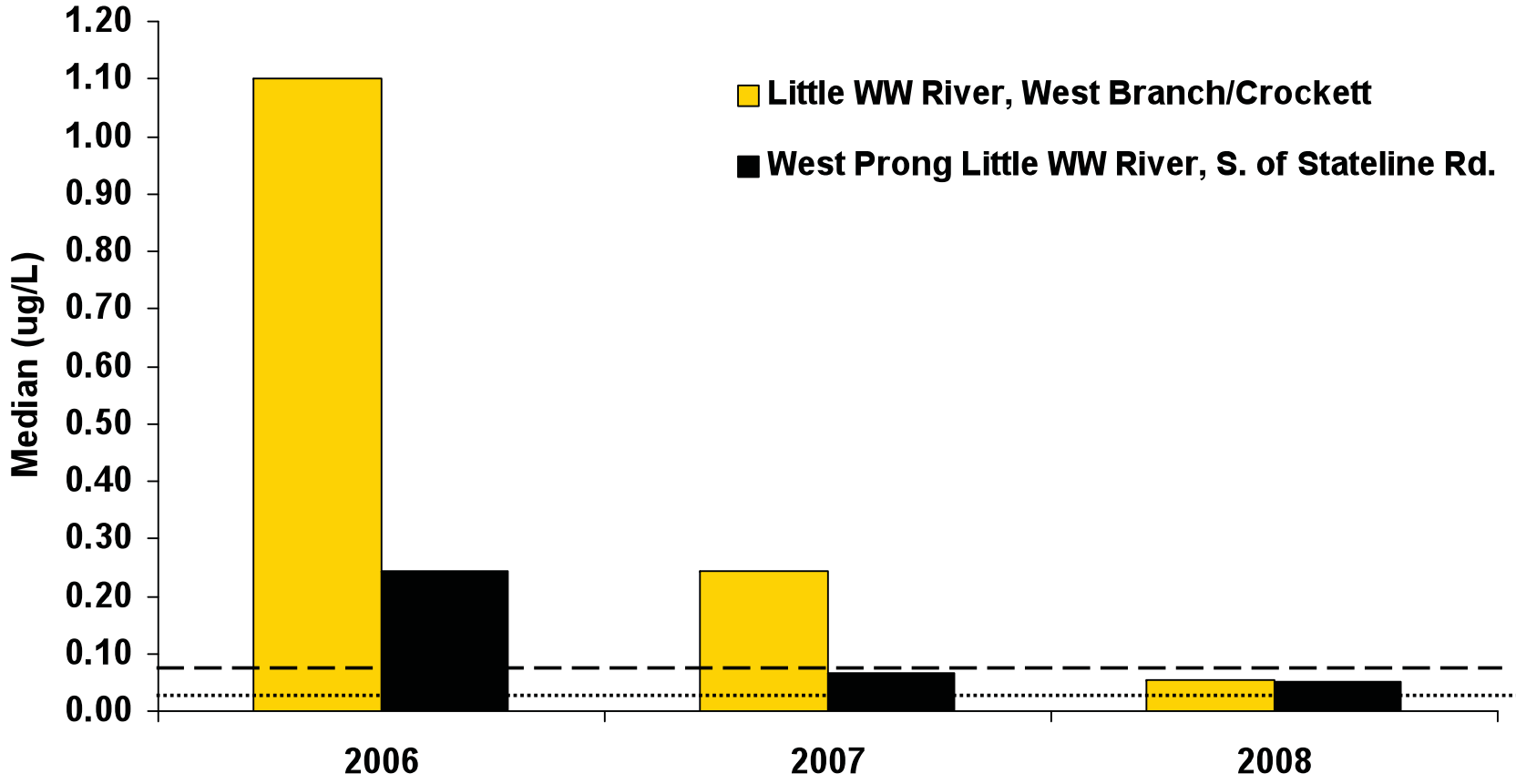
- General monitoring time frames and frequency
  - *Spring: April – June (weekly or every other week)*
  - *Fall: September – November (1 – 3X)*
- 2005-2008 monitoring data comparison considerations
  - *"Grab" samples at times when pesticide application is likely to occur*
  - ***Approximately 250 samples** per watershed collected and analyzed between 2005-2008*

What Do The Latest Monitoring Results Show?

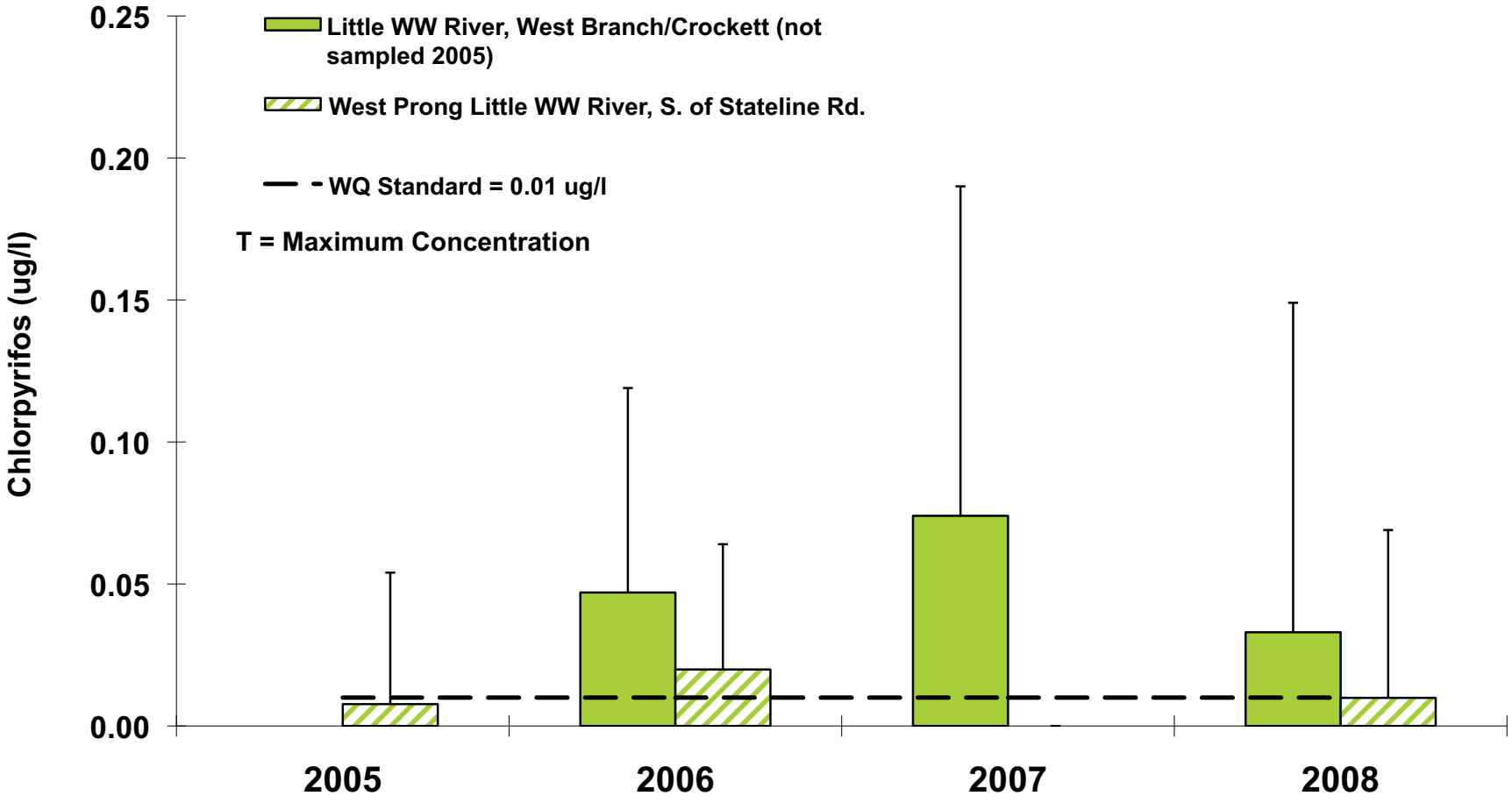
Eastern Oregon Monitoring

- Walla Walla, Hood and Mill Creek (The Dalles) all in fruit orchard areas
- One dominant ag land use allows for more focused short-term actions & results

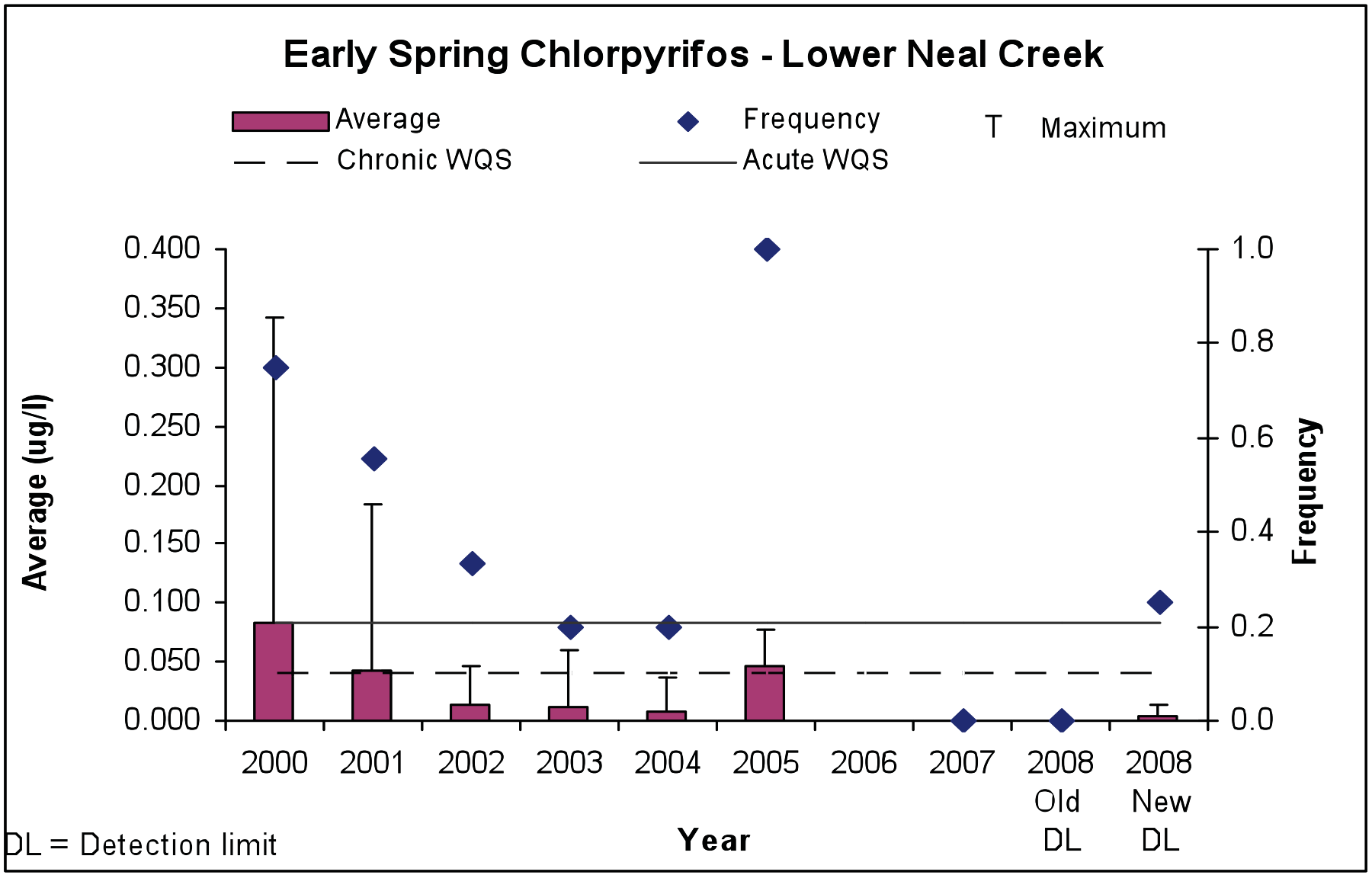
2006-2008 Walla Walla Basin Monitoring
Median of Chlorpyrifos Detections

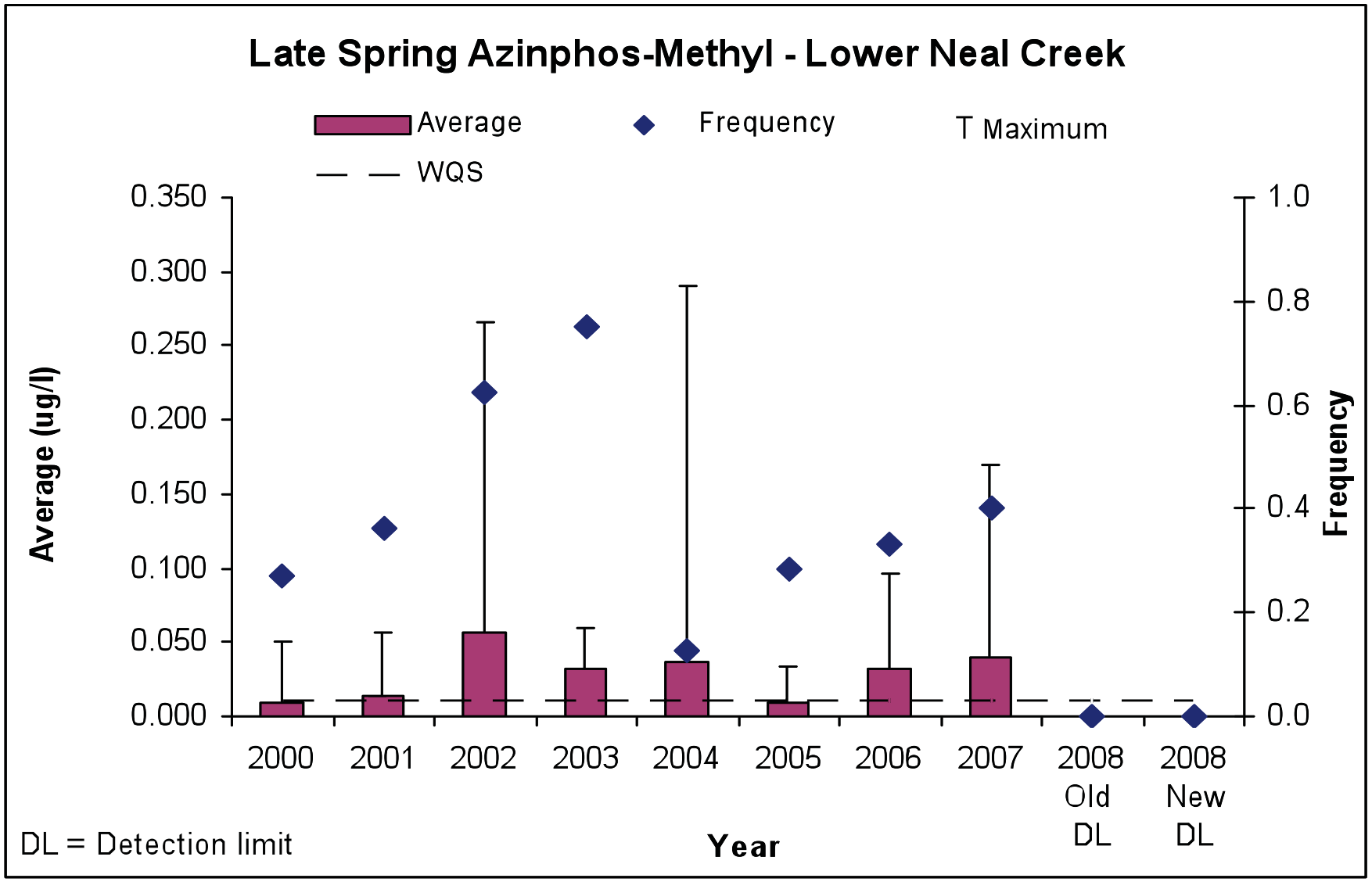


Walla Walla Basin: Average and Maximum Azinphos-Methyl Detections 2005-2008



HOOD RIVER WATERSHED

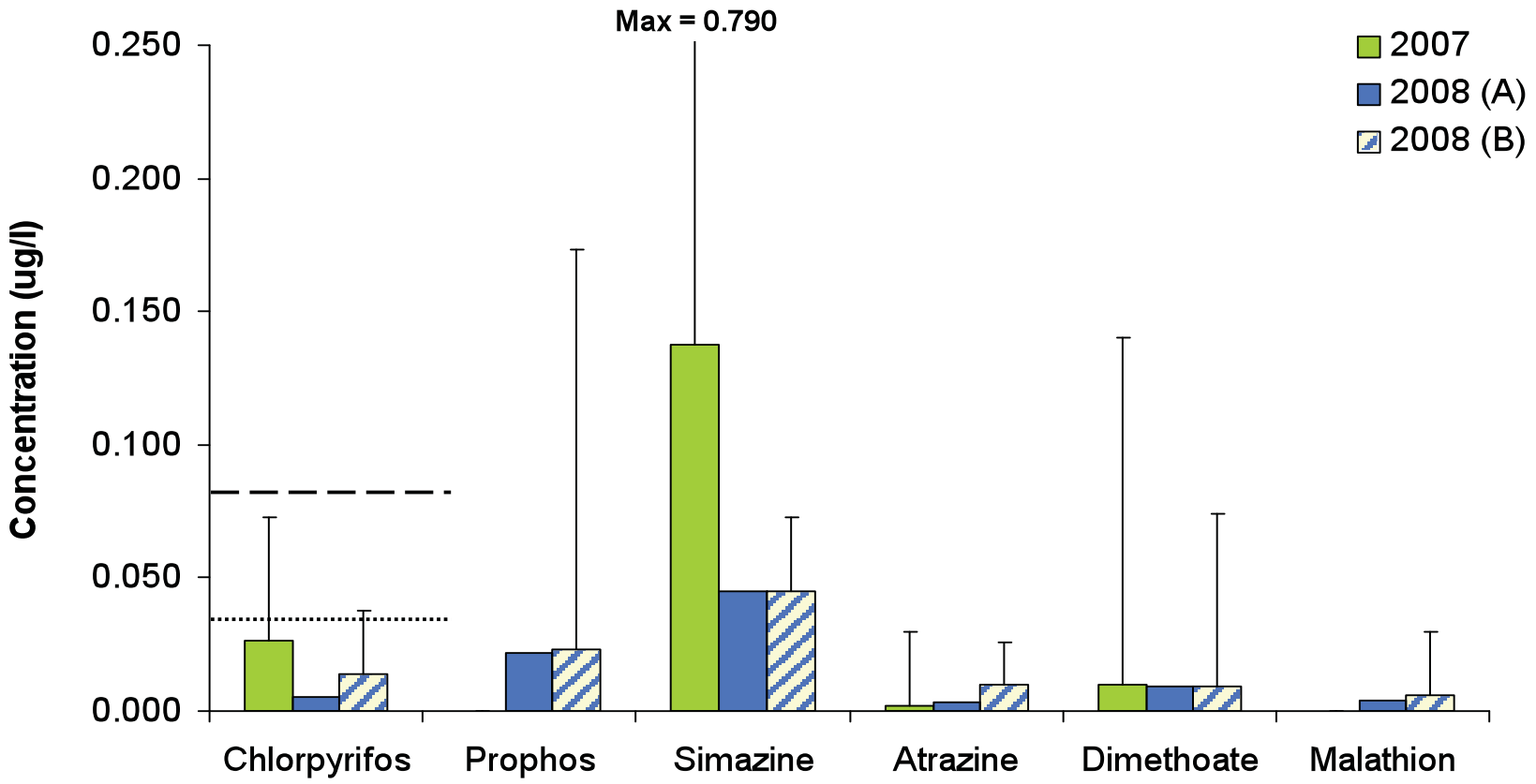



Late Spring Azinphos-Methyl - Lower Neal Creek
Average
Frequency
T Maximum
WQS
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Average (ug/l)
1.0
0.8
0.6
0.4
0.2
0.0
Frequency
2000
2001
2002
2003
2004
2005
2006
2007
2008 Old DL
2008 New DL
Year
DL = Detection limit

Willamette Valley Monitoring

- Yamhill, Pudding, and Clackamas watersheds encompass very diverse ag, urban and forest land uses
- Determining sources and conducting outreach to multiple entities is more resource intensive
- May take longer to see discernable improving trends

West Fork Palmer @ Webfoot Bridge
Average and Maximum Concentrations

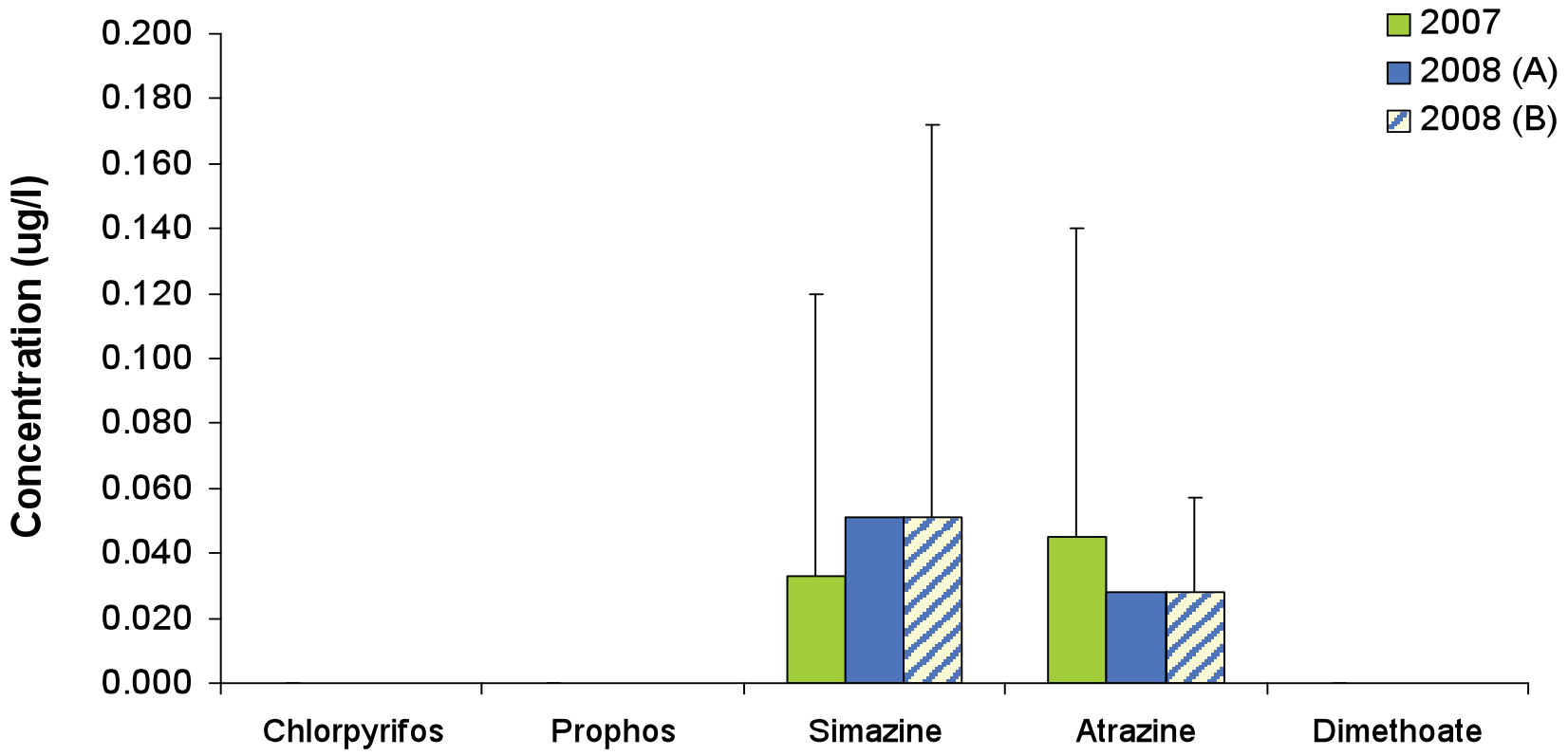


(A) = Includes Detections > old limit of 0.025 ug/l
(B) = New Detection Limit of 0.01 ug/l

Acute WQS = 0.083 µg/l (ppb)

Chronic WQS = 0. 041 µg/l (ppb)

Salt Creek at RM 1.5
Average and Maximum Concentrations



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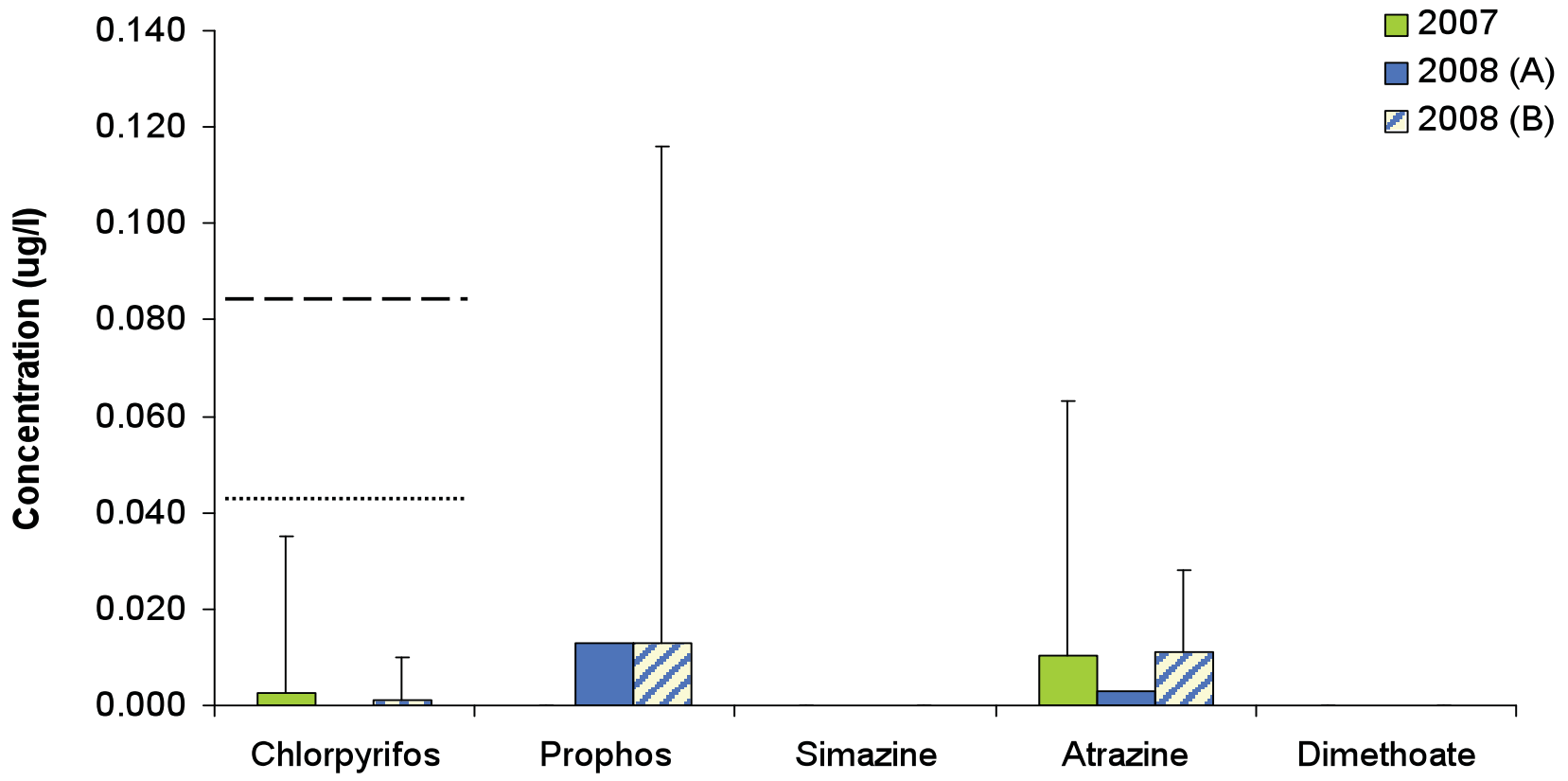
Yamhill River @ Lafayette Locks
Average and Maximum Concentrations



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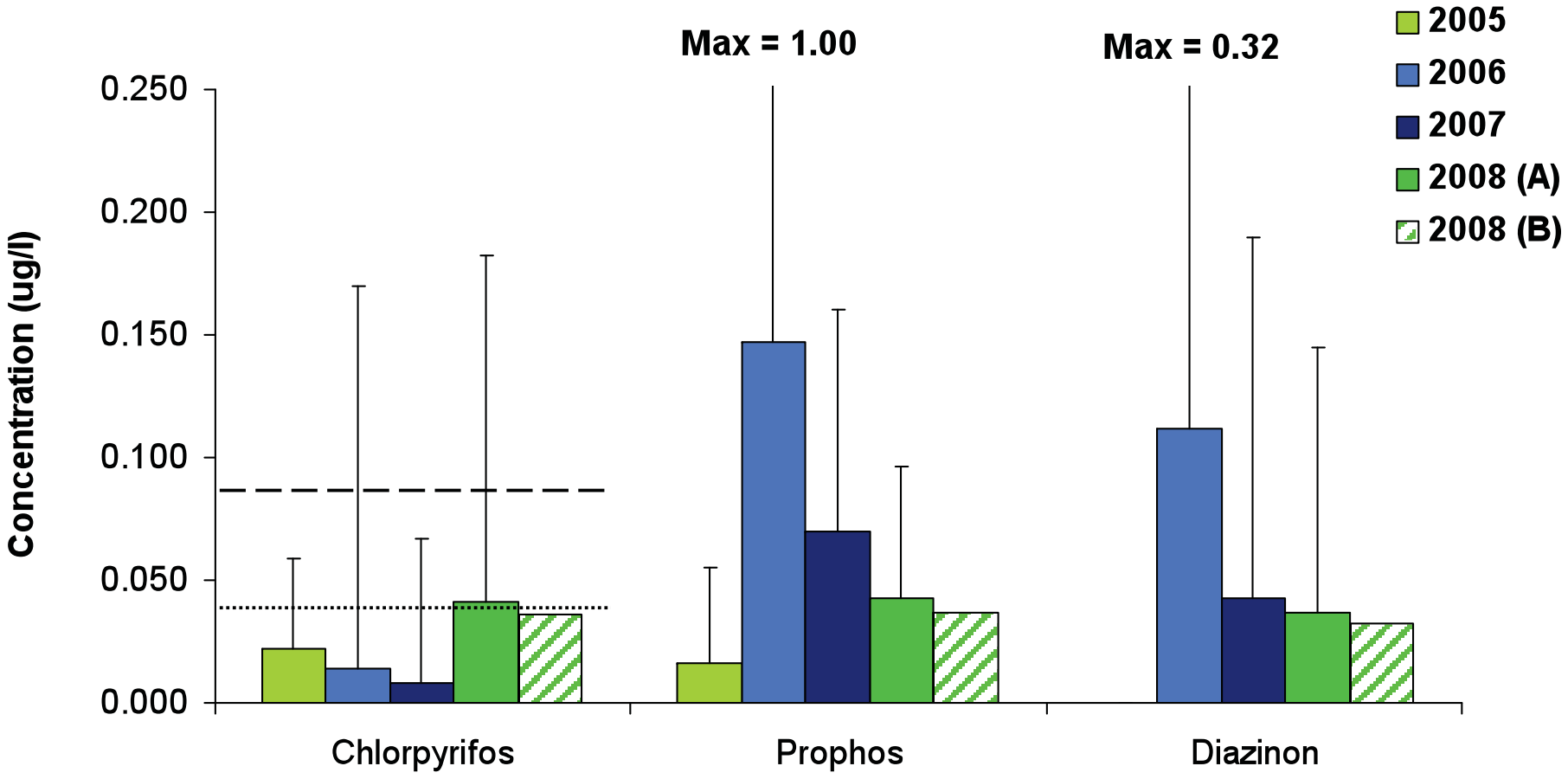
Pudding River Watershed

Zollner Creek at USGS Gauge
Average and Maximum



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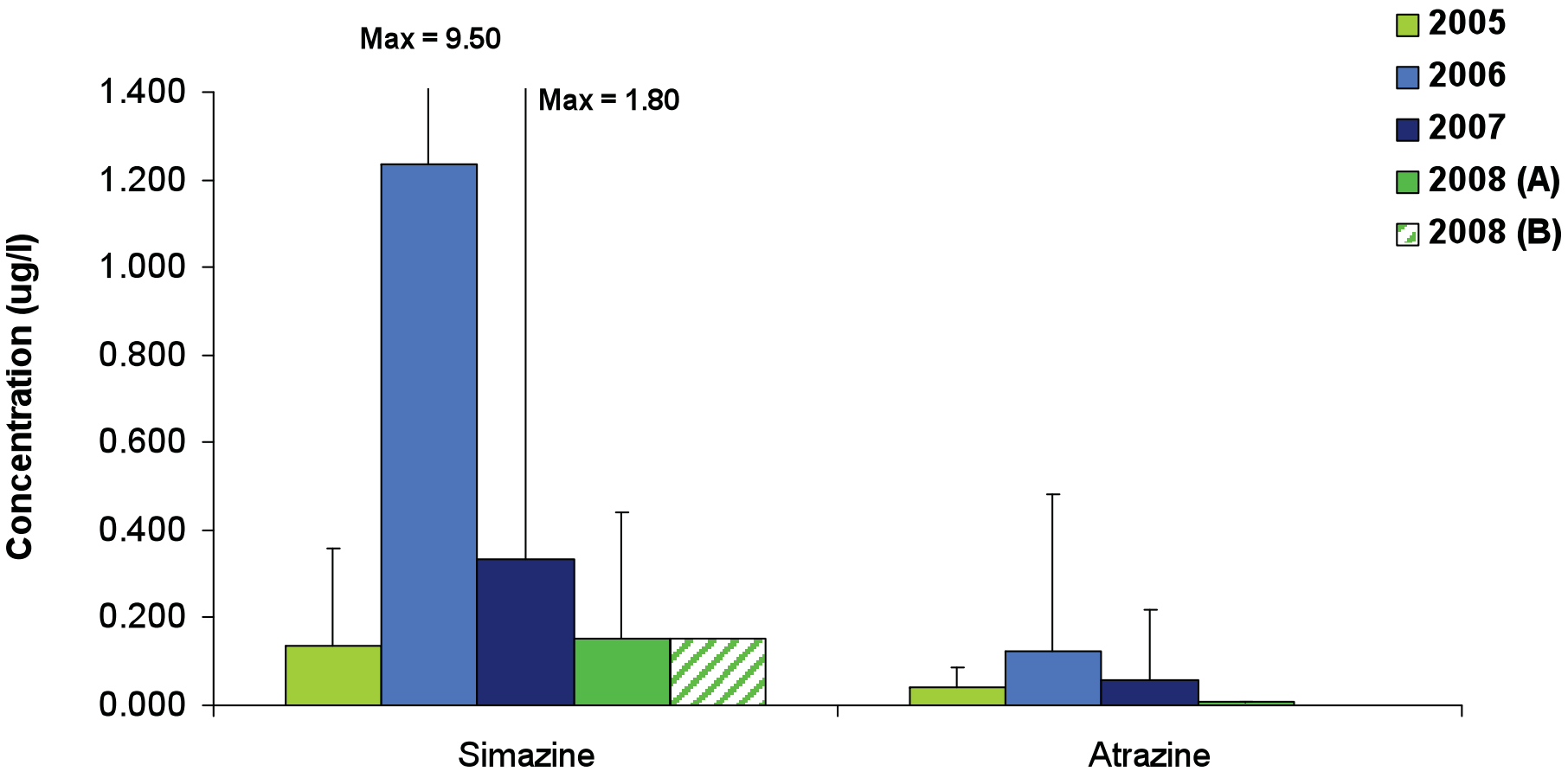
Zollner Creek at USGS Gauge
Average and Maximum



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Early 2009 Preliminary Results: New Analytes Detected

- Data from only 3-5 sampling
- **15** additional pesticides detected in Willamette watersheds
  - Carbaryl
  - Baygon (Proproxur)
  - DEET
  - Diuron
  - Imidachloprid
  - Linuron
  - Metolachlor
  - Metribuzin
  - Napropamide
  - Norflurazon
  - Pendimethalin
  - Prometon
  - Propicozanole
  - Pyraclostrobin
  - Terbacil
- No water quality standards for these pesticides

What Types of Watershed Actions Have Been Implemented?

- *Spray Drift Reduction Trainings & Practices*
- *Installation of Weather Stations*
- *Use of Biological Controls (e.g., mating disruption)*
- *Integrated Pest Management Training & Technical Assistance*

- *Use of Less Toxic Pesticides*
- *Buffer Strips & Minimize Spraying near Streams*

Ag Pesticide Collections: Removing Unusable Pesticides

- Results from Events in PSP Watersheds
  - *Over 72,000 pounds of waste pesticides collected and properly disposed from 6 events since 2006*
  - *Mix of "legacy" and current use pesticides*
  - *Over 6,000 pounds of rinsed empty plastic containers for recycling*

OR Agencies: Team Approach

FIFRA - CWA - SDWA - FPA "Integration" (2008)

Pesticide Water Quality Management Team

- Environmental Quality (DEQ)
- Human Services (DHS)
- Forestry (ODF)
- Agriculture (ODA)

Team's Scope & Role

Scope: **Non-Point Sources / Labeled Uses / Ag. & Non-Ag.**

Role**: (1) Design & Implementation of WQ Pesticide Plan ;**
(2) help coordinate local efforts to prevent, detect & reduce pesticides in surface and ground water

Key Partners & Stakeholders

SWCD / OSU Extension / Growers / Applicators / Water Providers / etc.

Remaining Challenges for Pesticide Partnerships

- Getting better data on pesticide usage in the watersheds
- Establishing Benchmark" concentrations for pesticides without WQ standards
  - *Only 6 of 800 active pesticide ingredients registered in the state have WQ standards*
  - *More drinking water standards, but still a small fraction*
- Inclusion of more urban and forestry lands
- Identifying more incentives and resources for best management practices