Applying knowledge to improve water quality

Pacific Northwest

Regional Water Program

A Partnership of USDA NIFA
& Land Grant Colleges and Universities

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Pesticides, Water Quality, and Endangered Species

Pesticide use in the Pacific Northwest (PNW) can potentially impact water quality by direct contamination of water resources. Pesticides are also known to have deleterious effects on the many species of salmonids that inhabit PNW waters. Pesticide and water quality monitoring studies have detected pesticide residues in water bodies throughout the region, impacting water quality and potentially causing harm to these endangered and threatened salmonid species and their habitats.

Endangered salmonids in the Pacific Northwest. Photo by Dr. John Stark, WSU. Used with permission.

Use of pesticides in the PNW is a common and important pest management tool for commercial agricultural and ornamental producers, landscapers, and homeowners. Pesticide use is responsible for increased agricultural and ornamentals production, impacting all residents of the PNW. Pesticides enter water by:

- Drift
- Runoff
- Leaching

Once in the water, pesticides affect endangered salmonids two ways:

- Direct effects – impacts the organism's physiological and nervous systems; this can be lethal or sub-lethal
- Indirect effects – impacts the organism's food supply and habitat

Risk assessments are conducted on all pesticides, by the U.S. Environmental Protection Agency (EPA), to support a registration decision as part of the pesticide registration and review process. These risk assessments are conducted to determine the impact on human health and the environment, including endangered species and their habitats. EPA utilizes several models to predict the environmental impacts of these pesticides. However, there are still many unknown factors regarding pesticides and their impact on aquatic organisms. Research is continuing by PNW land grant universities to determine the types and amounts of pesticides in water bodies, the impact of multiple sub-lethal effects of pesticides, effects of pesticide mixtures, effects of formulated pesticide inert ingredients, and the effects of formulated pesticide breakdown products.

Under the Endangered Species Act (ESA), EPA is required to work in conjunction with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to ensure that pesticide registrations and use do not jeopardize endangered species. EPA does have the authority to place restrictions on pesticide use in order to avoid unreasonable adverse effects. EPA evaluates extensive toxicity and ecological effects data to determine how a pesticide will move through and break down in the environment. Their decision regarding the potential risks a pesticide may pose to endangered and threatened species and habitat results in an "effects determination." EPA will issue endangered species protection bulletins. These bulletins will specify protective measures needed when using a certain pesticide that "may effect" the species. The pesticide use limitations specified in these bulletins are supplemental pesticide label language enforceable for the county or geographical area specified. (http://www.epa.gov/oppfead1/endanger/bulletins.htm).

Interested parties can file federal lawsuits to force compliance with the ESA if they believe either EPA or the Services (Fish and Wildlife Service and National Marine Fisheries Service) have not met their statutory obligations under ESA. Litigation on pesticide registration has focused on EPA's obligation to consult with the Services after determining

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UAF University of Alaska Fairbanks
United States Environmental Protection Agency
National Institute of Food and Agriculture
USDA

Pacific Northwest Regional Water Quality Coordination Project Partners

Land Grant Universities

Alaska
Cooperative Extension Service
Contact Fred Sorensen:
907-786-6311
http://www.uaf.edu/ces/water/
University Publications:
http://www.alaska.edu/uaf/ces/publications/

Idaho
University of Idaho
Cooperative Extension System
Contact Bob Mahler: 208-885-7025
http://www.uidaho.edu/wq/wqhome.html
University Publications:
http://info.ag.uidaho.edu/Catalog/catalog.htm

Oregon
Oregon State University
Extension Service
Contact Mike Gamroth: 541-737-3316
http://extension.oregonstate.edu/
University Publications:
http://extension.oregonstate.edu/catalog/

Washington
Washington State University
WSU Extension
Contact Bob Simmons:
360-427-9670 ext. 690
http://wawater.wsu.edu/
University Publications:
http://pubs.wsu.edu/

Northwest Indian College
Contact Charlotte Clausing:
360-392-4319
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http://www.nwic.edu/

Water Resource Research Institutes

Water and Environmental Research Center (Alaska)
http://www.uaf.edu/water/

Idaho Water Resources Research Institute
http://www.boise.uidaho.edu/

Institute for Water and Watersheds (Oregon)
http://water.oregonstate.edu/

State of Washington
Water Research Center
http://www.swwrc.wsu.edu/

Environmental Protection Agency

EPA, Region 10
The Pacific Northwest
http://www.epa.gov/r10earth/

Office of Research and Development,
Corvallis Laboratory
http://www.epa.gov/wed/

For more information contact
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The Project

Land Grant Universities, Water Research Institutes, and EPA Region 10 have formed a partnership to provide research and education to communities about protecting or restoring the quality of water resources. This partnership is being supported in part by the USDA's National Institute of Food and Agriculture (NIFA).

Our Goal and Approach

The goal of this Project is to provide leadership for water resources research, education, and outreach to help people, industry, and governments to prevent and solve current and emerging water quality and quantity problems. The approach to achieving this goal is for the Partners to develop a coordinated water quality effort based on, and strengthening, individual state programs.

Our Strengths

The Project promotes regional collaboration by acknowledging existing programs and successful efforts; assisting program gaps; identifying potential issues for cross-agency and private sector collaboration; and developing a clearinghouse of expertise and programs. In addition, the Project establishes or enhances partnerships with federal, state, and local environmental and water resource management agencies, such as by placing a University Liaison within the offices of EPA Region 10.

potential effects to listed species may occur. Utilizing the citizen suit provision of the ESA, a coalition of Pacific Northwest environmental organizations and fishing organizations filed suit against EPA alleging they failed to consult with the Services on 54 pesticides potentially impacting salmon listed for protection. The various lawsuits brought against EPA focused on pesticides registered and lack of protective measures to protect salmon and steelhead from pesticide impacts are:

- 2003 – 37 pesticides were determined they "may effect" listed salmonid species and no-spray buffer zones were established in Washington and Oregon
- 2008 – a biological opinion was issued for the pesticides chlorpyrifos, diazinon, and malathion determining they may impact endangered salmonid species
- 2009 – three more pesticides were added to the list of pesticides impacting endangered salmonids: carbaryl, carbofuran, and methomyl
- 2010 – a lawsuit to force EPA to implement no-spray buffer zones to decrease levels of pesticides in salmon-bearing waters

Impacts from pesticides on water quality and endangered species can be reduced by:

- Reducing pesticide use on crops and ornamental plantings by using integrated pest management techniques
- Implementing best management practices in sensitive areas to reduce off-site movement of pesticides to critical water resources
- Selecting the proper pesticide to do the job, while not impacting the water resource.

National Water Quality Program Areas

The four land grant universities in the Pacific Northwest have aligned our water resource Extension and research efforts with eight themes of the USDA's National Institute of Food and Agriculture.

1. Animal Waste Management
2. Drinking Water and Human Health
3. Environmental Restoration
4. Nutrient and Pesticide Management
5. Pollution Assessment and Prevention
6. Watershed Management
7. Water Conservation and Management
8. Water Policy and Economics

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