



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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PNWWATER 188

10 Years of Regional Progress:

Nutrient Management

In the last 10 years the Pacific Northwest Regional Water Resources Team has worked closely with nutrient management scientists at the region's land grant institutions to improve nutrient management in crop production. This improvement in nutrient management results in both cleaner and safer surface and groundwater supplies.

Specific progress with nutrient management has been accomplished in the following areas: (1) better fertilizer guidelines for major crops grown in the region, (2) the development of regional fertilizer guides, (3) the development and implementation of nutrient management planning, (4) improved nitrogen use efficiency in crop production, and (5) improved fertilizer phosphorus management resulting in cleaner surface waters. A run down of progress follows:



Fertilizer Guides

The land grant institutions in the Pacific Northwest have invested a significant amount of money conducting research over the last 60 years in developing fertilizer rate guidelines for major crops grown in the region. These research-based guidelines, known as fertilizer guides, suggest nitrogen and phosphorus fertilizer application rates based on soil testing information and good science. These guidelines, if followed, will result in maximum economic yields when coupled with good agronomic practices. In the last 10 years over 40 university fertilizer guides (Idaho, Oregon, Washington, Alaska) for commonly grown crops in the region have been revised and updated resulting in improved scientific fertilizer recommendations. In addition regional fertilizer guides (Oregon, Washington, Idaho) have been developed for the rain-fed cereal crops of the Inland Pacific Northwest.

Improving Nitrogen Use Efficiency (NUE)

Urea, the most commonly applied nitrogen fertilizer, has increased in price from \$200 per ton in 2000 to \$448 per ton in 2010. This price increase (more than 110 percent) has resulted in a decline of about 6 percent in nitrogen application rates to crops. However, this application rate decline has been offset by a 5 percent increase in nitrogen use efficiency. This increase in nitrogen use efficiency is in part due to Extension-led programs that have promoted better timing of application and better placement of nitrogen fertilizers in soils. The combination of reduced nitrogen fertilizer use and improved efficiency of the fertilizer that is applied has reduced the introduction of nitrogen into both surface and groundwater in many parts of the Pacific Northwest.

Protecting Surface Waters from Phosphorus

Phosphorus (P) fertilizers do NOT leach through soils and because of this cannot contaminate groundwater; however, P can runoff the surface of soils via erosion or water runoff and contaminate surface waters. The net result of phosphorus introduction into surface waters is called eutrophication. Extension professionals associated with our Regional Team have conducted extensive programming to reduce this form of water pollution. A significant portion of this training has been conducted through the iSNAP Program. As long as P fertilizer is not put on the soil surface – rather placed into the soil through incorporation or banding, it does not runoff fields and therefore can't pollute surface waters. Even though P fertilizer application rates in the region have remained stable over the last 10 years, because of improved fertilizer



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:
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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/>

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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.

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Outcomes

- ◆ Nitrogen fertilizer application rates have declined by approximately 6 percent on major crops in the Pacific Northwest over the last 10 years
- ◆ Despite the decline in fertilizer nitrogen application rates in the region, nitrogen use efficiency (NUE) by the region's major crops has increased by at least 5 percent
- ◆ Even though phosphorus fertilizer application rates in the region have remained stable over the last 10 years, because of improved fertilizer placement technologies, additions of P to surface waters via runoff from croplands have actually declined by more than 10 percent
- ◆ Over 40 university fertilizer guides (Idaho, Oregon, Washington, Alaska) for commonly grown crops in the region have been revised and updated resulting in improved scientific fertilizer recommendations
- ◆ Nutrient recommendations for cereal crops have improved for rain-fed cereal crops produced in the Inland Pacific Northwest because nutrient management scientists have updated and produced regional fertilizer guides that cross state lines
- ◆ A new generation of planners have been trained to develop whole farm nutrient management plans
- ◆ Producers are able to access NRCS cost-share funding for nutrient management practices that enhance water quality
- ◆ Because of training programs Certified Crop Advisors and Technical Service Providers provide better nutrient management advice to clientele today than they did in 2000

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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