



Applying knowledge to improve water quality

Pacific Northwest

Regional Water Program

A Partnership of USDA CSREES
& Land Grant Colleges and Universities

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PNWATER 162

Do We Have Water Security?:

Climate Change and Western Water Law

In much of the western USA water has been allocated under the prior appropriation doctrine with the notion that first in time means first in right. In many areas of the West, streams and rivers have been fully allocated since the early 1900s. These rights were issued in perpetuity under the assumption that average water availability would remain relatively constant. To further complicate matters, private wells and stock watering activities have been exempt from regulation. Unfortunately, the water allocations were made before much consideration was given to stream ecology and the endangered species act or without concern for growing populations, changing water priorities for economic development, or climate change.

Current climate change models present dire predictions for many parts of the western USA. With stream flows trending downward in many parts of the USA, there has been considerable debate about potential remedies. Companies in the USA have already lost millions of dollars because they didn't foresee the risks posed by floods and droughts linked to global warming and climate change. The current scientific prognosis points to worsening water conditions in the West. Dr. Michael Barber, a Washington State University faculty and PNW Resources Team member made a presentation on potential impacts of climate change at an International Water meeting in Prague, Czech Republic in June 2009. His presentation examined the challenges faced by policy and decision makers with regard to climate change factors and he discussed the consequences of various proposed actions. The state of Washington is used as an example of the plight facing many western states in the USA.

Since 1917 Washington State has followed the prior appropriation doctrine, which basically states, "First in time is first in right." The first water users to make "beneficial" use of the water have the most senior water rights. In water short years, those who have more junior water rights get their water use cut back first and can lose their entire water allocation before more senior water rights holders will lose any. Unfortunately, water rights were granted assuming stationarity of stream flows. By examining gaging records throughout Washington, it can be seen that this is not the case. Furthermore, current climate change predictions show less water during dry summer months when it is most needed. This will place even more challenges on water policy and planning as water demands for endangered species and economic growth collide.

A team led by G. Fu and Michael Barber at Washington State University examined 35 long-term USGS gaging stations in the state. Mixed monthly results produced a decreasing trend in annual stream flow over the state

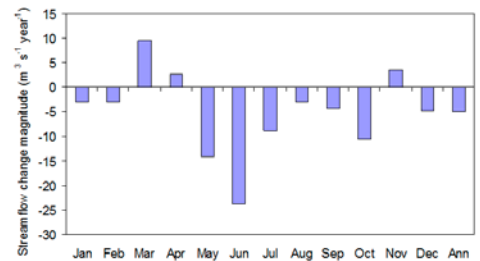


Figure 1. Monthly and annual stream flow trend magnitudes for Washington State (1952–2002)

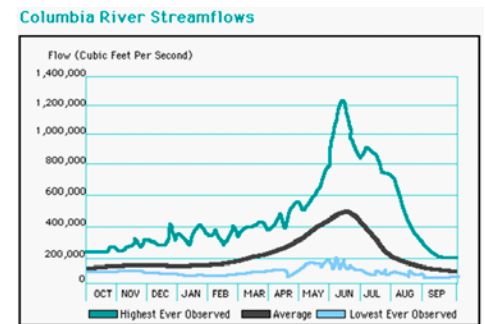


Figure 2. Columbia River hydrograph at Dalles, Oregon.



Pacific Northwest Regional Water Quality Coordination Project Partners

Land Grant Universities

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<http://www.uaf.edu/ces/water/>

University Publications:

<http://www.alaska.edu/uaf/ces/publications/>

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University Publications:

<http://info.ag.uidaho.edu/Catalog/catalog.html>

Oregon

Oregon State University
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University Publications:

<http://extension.oregonstate.edu/catalog/>

Washington

Washington State University
WSU Extension
Contact Bob Simmons:
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University Publications:

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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,
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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 Cooperative State Research, Education, and Extension System (CSREES).

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.

with 32 out of 35 stations showing a decreasing trend (Figure 1). The dramatic change in May, June, and July flows when reservoirs are filling for late summer demands is troublesome. In the big picture, if we look at the Columbia River watershed, we can see that June was historically the peak discharge month for the Basin. Climate change impacts shift the hydrograph to spring periods (March and April) (Figure 2). This shift can have significant impacts on salmon migration, water availability for irrigation, hydropower production, recreation, and even for population growth.

Significance. Allocation of water resources in the United States involves a complex mixture of legal, scientific, and political factors. Short-term economic considerations should be tempered with long-term strategies involving national security, environmental integrity, and historic legal precedents. A purely market-driven allocation system will likely lead to unintended consequences.

From a purely scientific point of view, better models are needed coupling climate change and land use decisions. As mean hydrologic conditions appear to be changing, a mechanism for long-term integrated water resources planning must be established. Moreover, the current level of uncertainty is currently too high for most people to take action. We must strive for advancement in that area. Finally, enhanced education and awareness campaigns are needed to help translate science into policy.

There are no easy answers to addressing this complex problem. As noted American author Mark Twain put it, "whiskey is for drinking; water is for fighting over." It seems we have just begun the fight.

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 Cooperative State Research, Education, and Extension System.

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

CSREES is the Cooperative States Research, Education, and Extension Service, a sub-agency of the United States Department of Agriculture, and is the federal partner in this water quality program.