

Public Health Responds to Drought

*Drought does not just mean brown lawns and dirty cars in the summer.
Drought poses significant threats to safe, reliable drinking water.*

Richard Hoey

Public health agencies in Washington State spent spring and summer 2001 working with communities to protect the quality and availability of drinking water supplies.

According to the National Weather Service, the Pacific Northwest is in the midst of its worst drought since 1976-1977. Although the current rainfall patterns are similar to 1977, the conditions facing our region today make the effects of this drought much more severe. In every area the competition over water has increased. Irrigation competes with the needs of migrating salmon; burgeoning urban populations compete with rural farms. The combination of these competing priorities places huge demands on our finite water resources.

Drinking water threatened

The 2001 drought is hitting small communities as well as large. The City of Goldendale, in Washington's Klickitat County, for example, is a small community of approximately 3400 residents. Built on the bluffs above the Columbia Gorge, at the foot of the Simcoe Mountains, it relies on a series of mountain springs for its water supply. During a normal year, summer water flows to the city range from 1500-1600 gallons per minute, originating from a 20-foot snow pack that feeds the city's springs. During this past winter, only 2 feet, 8 inches of snow pack accumulated, limiting July 2001 flows to fewer than 600 gallons per minute, a reduction of more than 60 percent from normal.

Goldendale's level of stored water began to decline rapidly in July, diminishing by 25 percent the water normally stored for fire fighting. In response, the community quickly moved to prohibit all outdoor water use. Even with such measures, the city still had difficulties replenishing its stored water. The drought, which already posed a public safety risk to residents through reduced fire-fighting capability, began to threaten public health as the community moved deeper into the hot, dry summer months. With additional declines in stored water, Goldendale may soon see pressure fluctuations in the water system and could ultimately be facing water

outages. These outages would not only affect outdoor and ancillary uses, but could also cause the loss of Goldendale's drinking water supply.

The loss of drinking water threatens public health in a very basic way, but in addition, the pressure fluctuations and water outages create ideal conditions for contamination through a phenomenon known as *backflow* (the flow of water or other material from an outside source back into a potable water supply). Under a backflow condition, contaminants can be siphoned back into the water system from a number of possible sources called cross-connections (ranging from industries and medical facilities to lawn irrigation systems). Backflows are usually invisible to the people who consume the water.

Backflow incidents have and can lead to some of the most harmful, even deadly, waterborne disease outbreaks. In fact, the only *confirmed* case of death in Washington State from drinking water is the result of a backflow incident in the 1920s. Backflow contamination is an indirect, but very significant, public health threat of drought.

In agricultural areas of the Pacific Northwest, it is common to find two independent water systems serving a single community—a potable supply for inside domestic use and a non-potable supply for irrigation needs. The effects of drought on these communities also raise concern over backflow contamination through the cross-connection of these water systems. With shortages in irrigation supplies, some homeowners may "cross-connect" potable and non-potable systems to augment the non-potable irrigation supply with drinking water. In the vast majority of cases this would be done without knowledge of the health risks. Health officials in Washington State are working with public water system operators in eastern Washington to educate residents about the risks of connecting their potable drinking water and non-potable irrigation systems.

Yet another potential risk to the public's health from drought stems from the use of auxiliary or emergency sources of water to

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augment a primary water supply. Of foremost concern are the wells, springs, and surface water supplies that generally sit idle and are only used in an emergency event. In Washington State, drinking water regulations do not require emergency sources to be routinely tested or treated for contaminants. In many cases, little is known about the quality of water from these water sources. Indeed, many of these sources were originally put into emergency status *because* of some type of water quality problem.

Goldendale has few emergency supply options. The community's only source of emergency water is Bloodgood Springs, a water source determined by the Washington Department of Health (WDOH) to be at risk of microbial contamination. In response to the drought, the city recently installed surface water filtration treatment for the springs, just before the water supply situation reached a critical stage. Without adequate treatment, the use of this emergency water source would have posed a health risk to consumers and required a health advisory to the public. Fortunately Goldendale's foresight ensured that its public water remains safe.

As demand for water reaches and sometimes even exceeds our finite resources, the question of priority of use also begins to raise concerns for public health. The Washington State Water Code (the law governing allocation of the state's water resources) establishes priority based on "first in time, first in right." Strict application of this principle requires existing domestic or municipal rights to be restricted in favor of more senior (older) water rights during drought or other low water periods. Taken to the extreme, restriction or temporary interruption of these rights could mean a lack of water for the most basic of uses (human consumption and sanitation) or for public safety purposes such as fire protection. A recent court case highlights this issue.

Earlier this year, after being notified that their ability to use water from the Yakima River was being restricted to 30 percent of its normal water supply, the Roza Irrigation District (located in the Yakima Basin) sued the Department of Ecology to require all water rights junior to (after) Roza's to also share the burden of water restrictions. The affected water-right holders, however, included the cities of Roslyn and South Cle Elum, as well as a number of other public drinking water supplies. Seeing the potential health risks, the WDOH entered into the case, submitting a declaratory statement to raise the court's awareness of the public health and safety effects of domestic water shut-off.

Although this case ended with a provision of water for public health and safety, the public health concerns raised in the case will no doubt be seen again elsewhere as demands on limited water supplies continue to increase.

What does drought preparedness mean?

WDOH clearly recognized that addressing the public health implications of drought should not be limited to just reactive measures. Drought *preparedness* is just as important for public health protection. Earlier this year, WDOH outlined two principle goals for its drought response plan:

1. Help public water systems manage and conserve water to lower the risk of water shortages or outages
2. Work to restore safe and reliable water in the event of water shortages or outages

Steps public water systems can take to prepare for drought and lessen its effects include monitoring water levels, finding and repairing leaks, educating customers on conservation, preparing water shortage response plans, and identifying safe sources of emergency water.

One of the major challenges facing health officials in outreach and technical assistance is the difficulty in identifying those water systems most likely to face shortages. Given the unique circumstances of each utility, neighboring water systems can experience drought very differently. Drought effects can vary dramatically based on the type of water sources, the condition of the facilities, and how close to the supply capacity the utility is operating. Commonly, the water sources most vulnerable to drought are surface waters (lakes, rivers, etc.) because of reliance on rainfall and snow pack runoff. Also vulnerable are shallow wells and springs served by aquifers that are reliant on *recent* rainfall for aquifer recharge. As a start, health officials should target systems and individuals with these types of water sources for assistance.

Now is the time for public health officials to learn from the present drought in order to anticipate the public health effects of future droughts. And now is the time to engage the public in a conversation about the vulnerability of drinking water supplies and the measures necessary to limit the damage of future droughts on drinking water supplies throughout the region. 🐾



John Vachon

County supervisor inspecting a water well on a farm in Flathead Valley, Montana, 1942.

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