# Bond Case Briefs

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## The Rising Pressures on the Water We Drink.

**We need to know more about how agricultural practices, extreme weather and aging infrastructure affect our water systems.**

With large areas of the United States suffering through severe drought, it is understandable that policymakers should be focused so intensively on the *availability* of water for agricultural, industrial and drinking uses. Yet, as our recent study of Nebraska water resources suggests, there are equally challenging and closely related issues for managing the *quality* of the water supply.

The costs of managing drinking-water quality are substantial and rising. The federal Environmental Protection Agency estimated last year that the nation may need to spend upwards of $380 billion in capital costs alone to upgrade its drinking water systems. Investing in our water infrastructure is certainly important. But what is equally important is a more integrated and balanced approach to managing the water supply that recognizes the interconnection of land-use and agricultural practices with surface- and ground-water quality.

For Nebraska, there are three main pressures on water quality that are likely to resonate across the United States, especially in farm states: the ever-increasing intensification of agriculture in response to increasing demands for food; the increasing frequency of extreme weather events as climate changes; and an aging infrastructure of drinking-water and sewage-treatment systems.

Without improved management practices at the source, intensification of agriculture will inevitably lead to increased contamination from runoff into surface waters and leaching into ground waters. The adverse human-health effects of nitrates and traces of pesticides in drinking water in agricultural areas are well known, but there are possibly more subtle effects that are less well understood and yet potentially more serious. For example, there is evidence that increasing levels of nitrates can lead to a change in chemical conditions in which naturally occurring contaminants such as uranium and selenium can be mobilized and as a result find access to the drinking-water supply. Combinations of nitrate and other difficult-to-treat and potentially toxic chemicals increasingly have been identified in both public and private drinking-water supplies.

Add to this the expected increase in the variability of precipitation events — from drought to flood in a short space of time — and there is the possibility of episodic events that overwhelm the drinking-water system. Some states, such as Iowa, have already experienced surges of nitrates from fertilizers that accumulate in dry soils during drought and then are washed out when rains return. These kinds of changes in source water quality have only recently come under study.

Finally, an aging treatment and distribution infrastructure is unlikely to meet the technological demands of more challenging clean-up requirements and may also contribute to contamination, especially from bacteria, through leakage and cross-connections. Water-supply and sewage systems are closely linked in many communities, both above and below ground.

If we expect to solve these problems by cleaning up contaminated waters at the point of release, then the costs are likely to be considerable. If treatment alone is viewed as the only solution, then costs are unfairly passed on to communities not responsible for the contamination. These costs can be particularly serious for small rural communities, where the technology required to remove both uranium and nitrate could cost as much as $5 million and require substantially increased operational costs.

Potable drinking water supplies are especially vulnerable and increasingly expensive to maintain in an agricultural landscape. There must be a balance between the costs and benefits of using chemicals that can impact water quality at different points of the water system. For example, how do the costs of managing fertilizer applications at the farm stack up against lost agricultural yield? And how do these compare with the costs of treating for nitrates and related contaminants at the water-treatment plant?

Studies of questions like these are few and far between. Yet if we are going to respond efficiently and equitably to the complex and intensifying pressures on our water supplies, we will need to do it through dialogue that uses this kind of evidence as a basis for developing sound policy.

BY DANIEL SNOW,PETER CALOW | APRIL 17, 2014