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# Nation's water challenges are many, but so are the solutions

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**M**any of the nation's water-supply systems need expensive improvements. And in the West and elsewhere, utilities are focused on finding enough water to meet demand. Although the problems are complex, experts generally agree on some basic solutions:

## **Protect water supplies**

Providing clean drinking water starts at the source — whether it's an underground aquifer, a lake or a river.

Many water system operators say it's cheaper to protect water from contaminants than to commit hundreds of millions of dollars to build or improve treatment plants.

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States in the Midwest, where agricultural runoff is a chief concern, are beginning to limit where crops can be planted and when fertilizers can be spread on fields. The idea is to reduce the nitrates and phosphorus that seep into waterways.

In southwest Minnesota, for instance, the town of Worthington and conservation groups spent \$2 million turning 520 acres of farmland near its wells into wildlife areas. The water under neighboring towns had become polluted by nitrates, which are common in farming regions, and the community of nearly 13,000 wanted to avoid the same fate.

On a much larger scale, New York City has spent \$1.7 billion on programs to protect the watersheds around its drinking water reservoirs in upstate New York, some of which are 125 miles from the city. A new treatment plant, by comparison, could cost the city \$10 billion or more.

## **Tap new sources**

Climate change and drought have stretched water supplies from coast to coast. The vast majority of 50 state water officials surveyed by the federal government expect shortages to affect them over the next 10 years.

While conservation is a critical part of the solution, finding new and reliable ways to get water is no less important in many areas.

California has been a pioneer in tapping both the ocean and wastewater as sources.

Later this year, residents of San Diego County will begin drinking water that the Western Hemisphere's largest desalination plant has strained of salt. Other desalination projects have been proposed up the coast and into the San Francisco Bay Area.

Not long ago, the city of San Diego squashed a proposal to purify sewer water to drinkable quality. Now the city's water agency is exploring heavy investments in "toilet-to-tap" projects.

Desalination and "toilet-to-tap" cleansing are not cheap, yet they've become more attractive as California endures a fourth year of drought. The state is a leader domestically, but it can learn from countries where water supplies are chronically stressed.

In Israel, for example, desalination plants provide about a quarter of the drinking water. The national water company says that about three-quarters of the country's sewage water is recycled, often to be used on crops.

### **Wire the pipes**

Wireless sensors can warn of leaks or cracks in water mains, allowing crews to patch or replace pipes before they begin gushing uncontrollably. An early warning system saves water and money by preventing property damage.

To know "when something is starting to degrade and be able to address it before it becomes a failure would be really fantastic," said Chris Crockett, deputy commissioner of the Philadelphia Water Department.

### **Federal loan programs**

The U.S. Environmental Protection Agency is creating a new loan program to supplement its existing Drinking Water State Revolving Fund. While the revolving fund already offers loans, supporters hope the new program will promote private-sector investment.

If Congress approves funding, the program will provide low-interest loans for up to 49 percent of projects that are of "national or regional significance" and cost more than \$20 million. Private investors and municipalities would contribute the rest.

The existing EPA state revolving fund often gives priority to smaller projects that are more urgent

from a public-health standpoint. The idea behind the new program is to fund more routine upgrades and larger projects.

## **Consolidate systems**

More than 80 percent of public water systems nationwide serve fewer than 3,300 people. The cost of building and maintaining the equipment needed to treat and deliver that water can be an enormous burden, especially in communities that lack the tax base needed for new investments.

One solution is to have larger water systems absorb smaller ones. The larger the water district, the greater the revenue and capacity to raise money through bond sales.

Along those lines, California Gov. Jerry Brown this summer signed a measure that would let the state force consolidation in poorer communities where clean drinking water is not available.

In some rural areas, consolidation has already happened, especially in Western states dealing with a prolonged drought. Some water districts have hesitated, unwilling to give up control or share resources.

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