Water Supply, Quality, and Infrastructure Issues in the U.S.

New York - New Jersey
Intergovernmental Audit Forum

(May 4, 2016)

Overview

- Water in the United States
- Water quantity
- Water quality
- Infrastructure

Water use in the U.S.

- Thermoelectric power
- Irrigation
- Public supply and domestic use
- Aquaculture and livestock
- Industrial
- Mining

Water governance in the U.S.

- Primarily managed at the state and local levels
- Many federal agencies play a role in water management
  - Data collection and forecasting (e.g., U.S. Geological Survey and the National Aeronautics and Space Administration)
  - Water management agreements (e.g., Bureau of Reclamation and the International Boundary and Water Commission)
  - Water storage and conveyance facilities (e.g., Bureau of Reclamation and the U.S. Army Corps of Engineers)
  - Water rights (e.g., Bureau of Indian Affairs and the Forest Service)
  - Environmental protection (e.g, Environmental Protection Agency and the National Marine Fisheries Service)

Climate change challenges to water

- Fiscal exposure from climate change added to GAO's High Risk List in 2013.
- Treatment plants and pipes will be subjected to extremes—flooding or drought.
- Planning and adaptation are local and state responsibilities.
- Decision makers use different types of climate information.

Nationwide supply issues

Too much – Hurricane Sandy

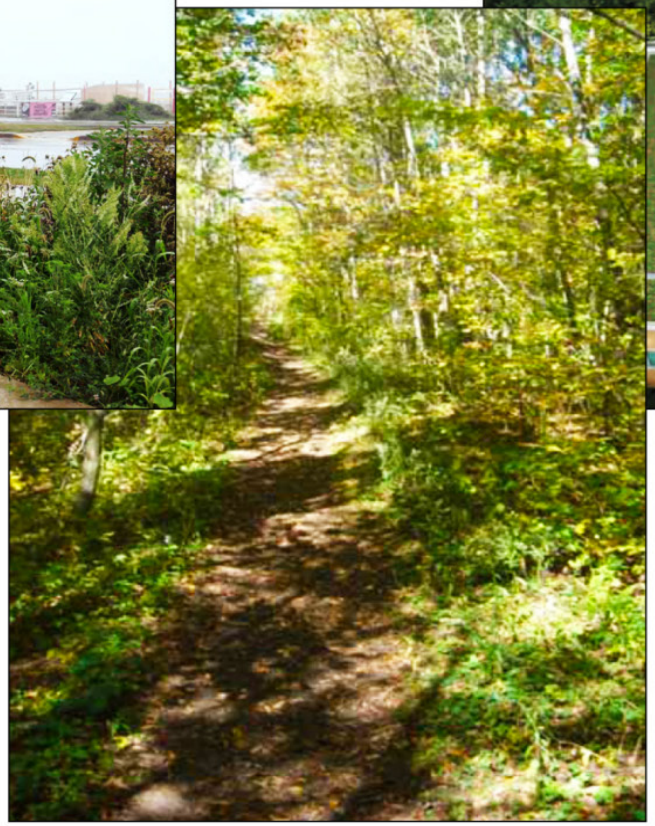
Source: Official White House Photo by Sonya N. Herbert.

Too little – Lake Mead

Source: Bureau of Reclamation.

Flooding can result in erosion and infrastructure damage

Bio-swale – a depressed catchment area planted with vegetation that captures and infiltrates runoff.



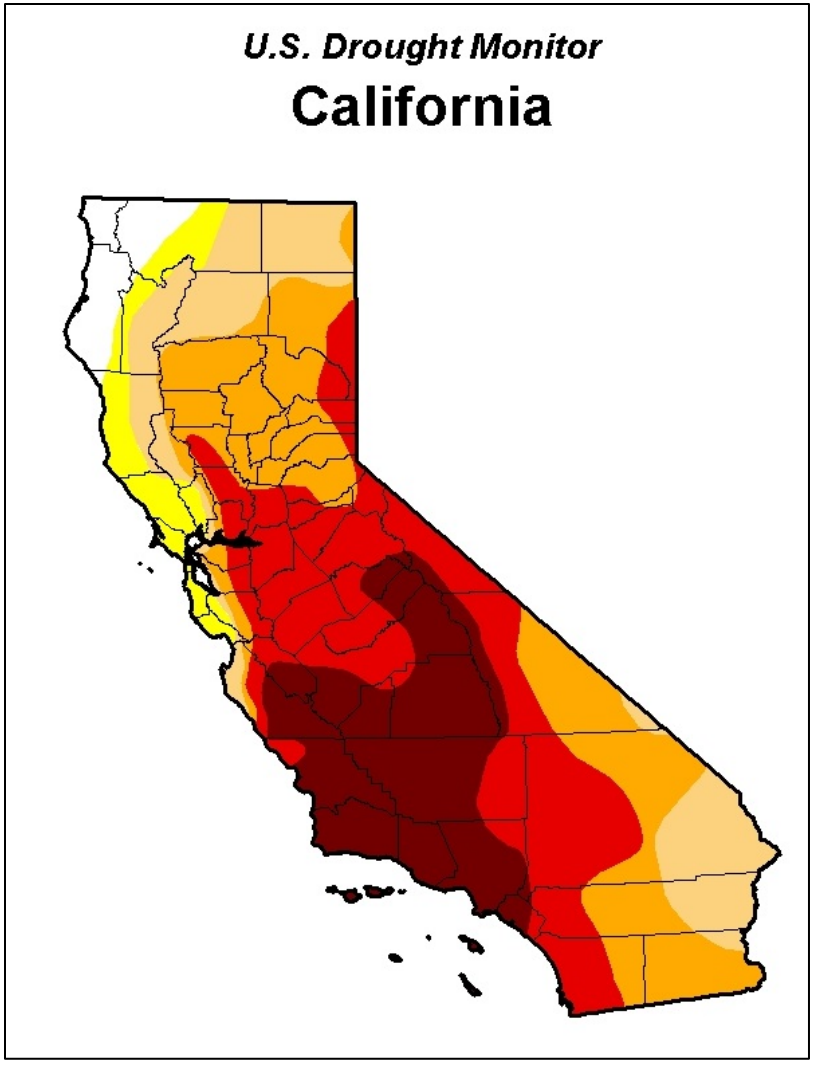
Purchase of undeveloped property – land areas preserved in a natural state to store and drain stormwater runoff into the ground naturally.

Green roof – a roof either partially or completely planted with vegetation growing in soil (or a growing medium) to hold rainwater.

Source: Milwaukee Metropolitan Sewerage District.

Source: GAO-13-242.

The California drought



Source: U.S. Drought Monitor.

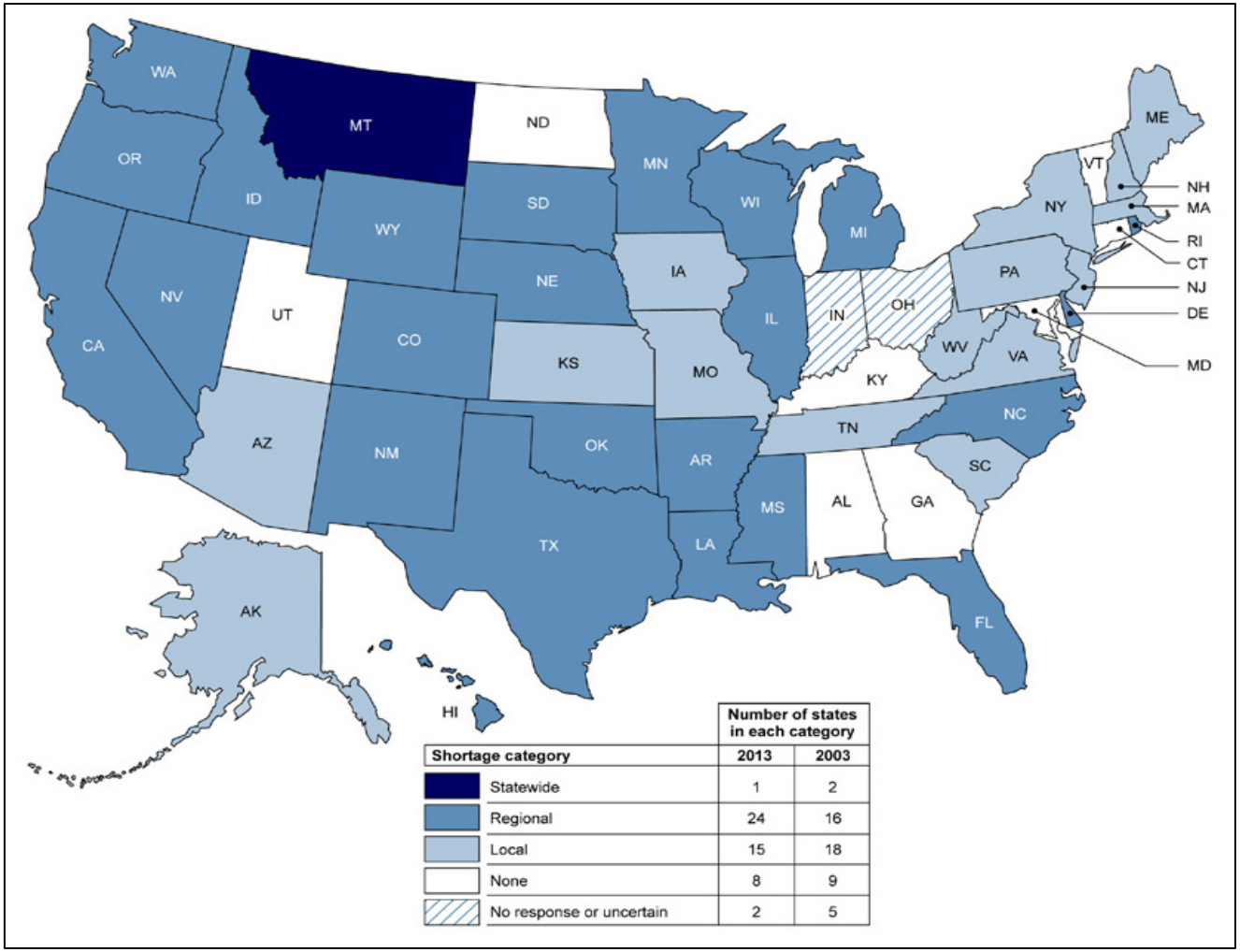
- As of April 19, 2016, 21 percent of the state is still in “exceptional drought.”
- State water conservation mandate of 25 percent since April 1, 2015.

The unseen crisis - groundwater

Source: USGS.

- Over pumping and subsidence
- Saltwater intrusion and other contaminants
- Affects nearby surface water bodies

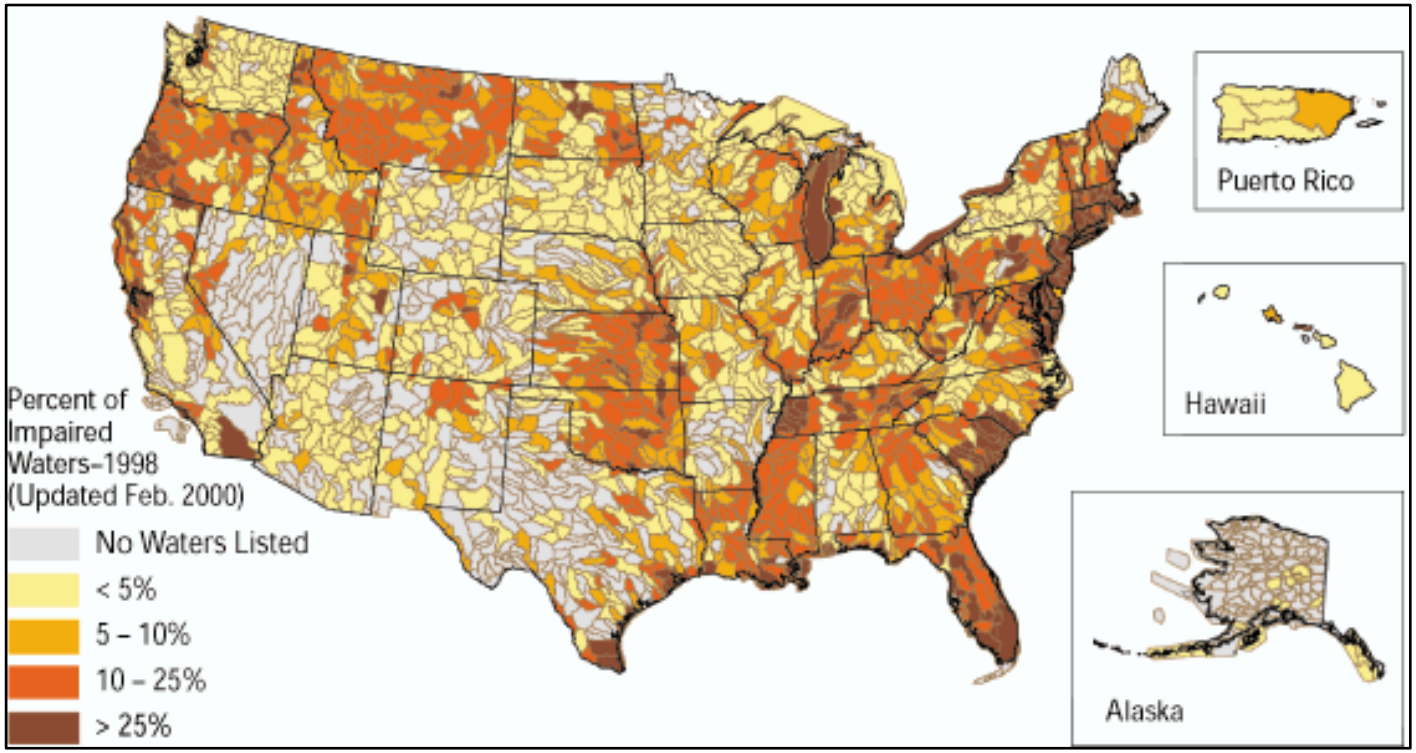
More widespread shortages are expected in the future



Source: GAO-14-430.

Decreased supply affects water quality

- Concentrated pollutants leads to impaired waters, more permit violations, and increased treatment costs for dischargers.



Source: EPA.

Efforts to reduce impaired waters have been limited

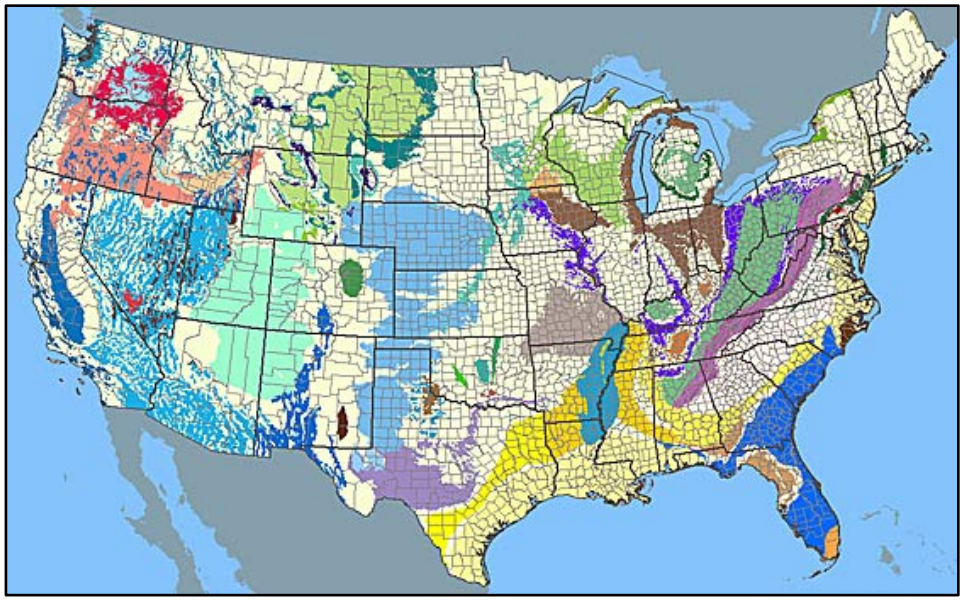
- Nonpoint sources of pollution, such as agricultural and stormwater runoff from some areas, are the greatest source of impairment.

- Under the Clean Water Act, states develop pollutant limits or targets, called TMDLs, for impaired waters.

- States have developed 50,000 TMDLs including nonpoint sources, but implementing them is voluntary.

Water quality underground

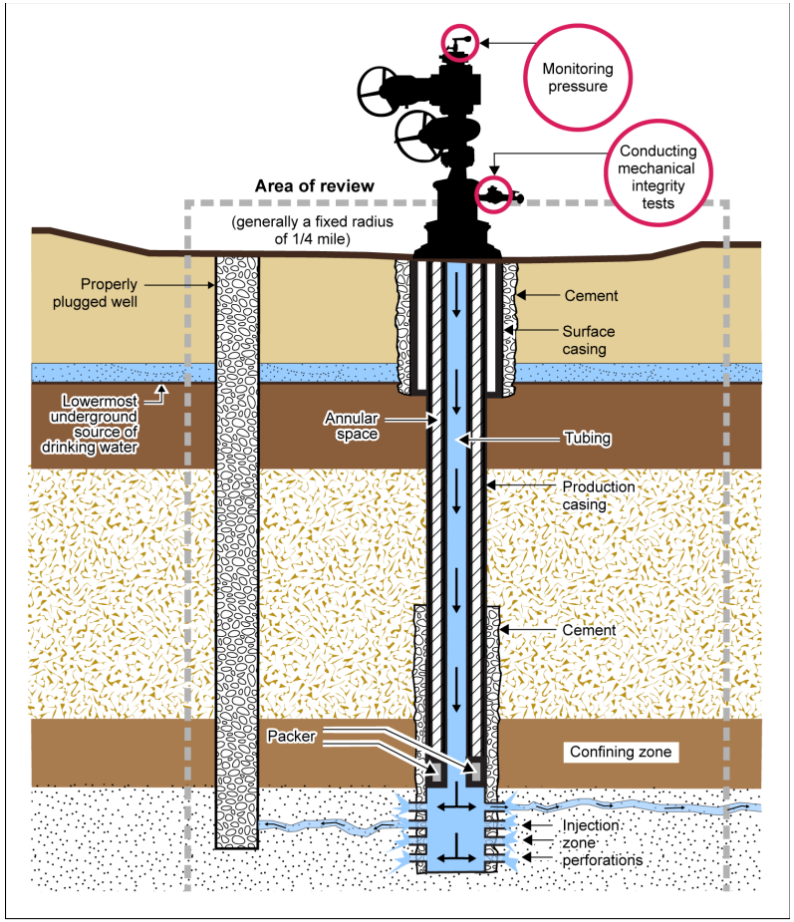
- About 40 percent of drinking water comes from underground aquifers.
- Over 650,000 injection wells for wastewater disposal—170,000 are oil- and gas-related.



Source: USGS.

EPA regulates injection of fluids underground

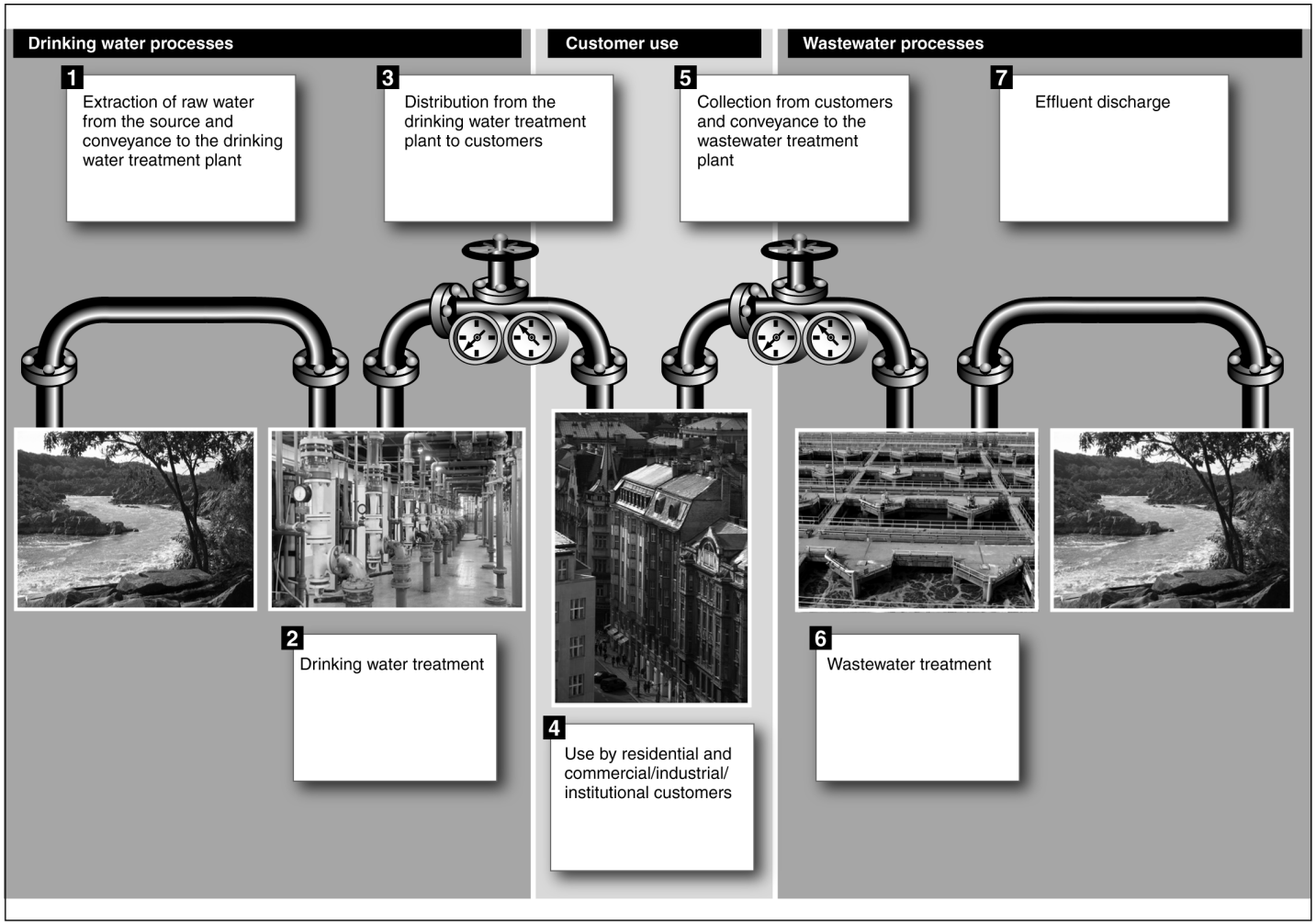
Including wells associated with oil and gas wastewater



Sources: GAO analysis of EPA and Ohio's information. | GAO-14-555

- Underground Injection Control (UIC) program protects six classes of wells.
- Most states manage UIC wells associated with oil and gas production, with EPA oversight.
- EPA's UIC program cannot ensure protection of aquifers.

Key stages of the urban water lifecycle



Sources: GAO analysis. Photos from left to right: GAO; US EPA Photo, Eric Vance; Art Explosion; DC Water; and GAO.

Deteriorating infrastructure exacerbates water loss

Source: EPA.

ASCE 2013 infrastructure report card

- Dams: D
- Drinking water: D
- Levees: D-
- Wastewater: D

And water quality problems like lead in drinking water

- Washington, DC
- Flint, MI
- Newark, NJ

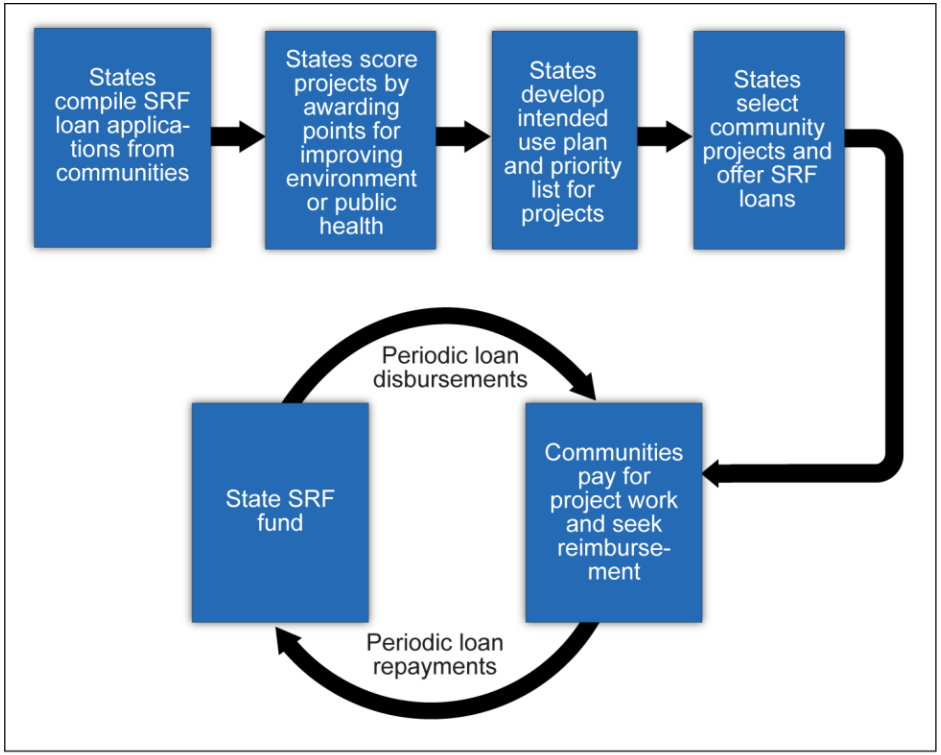
Source: EPA.

Funding water and wastewater infrastructure is critical

- EPA estimates $655 billion in water and wastewater needs over 20 years.
- Most funding is local, by utilities and ratepayers.
- Asset management helps utilities manage the costs and replacement of their infrastructure and avoid emergency repairs and replacement.

EPA is the largest source of federal funds for drinking water and wastewater infrastructure

- States receive federal funds to set up state revolving funds (SRF).
- $57 billion since 1997, $133 billion in loans.
- State officials said they cannot maintain SRFs without federal funding.



Source: GAO analysis of State Revolving Funds (SRF) program documents. | GAO-15-567

Related GAO reports

- Freshwater: Supply Concerns Continue, and Uncertainties Complicate Planning (GAO-14-430)
- Water infrastructure
  - Water Infrastructure: EPA and USDA Are Helping Small Water Utilities with Asset Management; Opportunities Exist to Better Track Results (GAO-16-237)
  - State Revolving Funds: Improved Financial Indicators Could Strengthen EPA Oversight (GAO-15-567)
  - Rural Water Infrastructure: Federal Agencies Provide Funding but Could Increase Coordination to Help Communities (GAO-15-450T)
  - Water Infrastructure: Approaches and Issues for Financing Drinking Water and Wastewater Infrastructure (GAO-13-451T)
- Drinking Water: EPA Program to Protect Underground Sources from Fluids Associated with Oil and Gas Production Needs Improvement (GAO-14-555)
- Clean Water Act: Changes Needed if Key EPA Program Is to Help Fulfill Nation's Water Quality Goals (GAO-14-80)
- Climate Change: Future Federal Adaptation Efforts Could Better Support Local Infrastructure Decision Makers (GAO-13-242)