Determining Our Groundwater Resources

Ground-Water Availability in the United States

U.S. Geological Survey

Groundwater provides half the country’s drinking water and is essential to agriculture and industry, as well as to the health of rivers and wetlands. Declines in groundwater levels have led to concerns about its future availability. This report examines what is known about U.S. groundwater resources and briefly outlines a strategy for future studies to support water-availability decisions.

The report describes the challenges in determining groundwater availability—and why the answer to the often-asked question, “How much groundwater do we have?” is not straightforward. It also addresses what we do know, including information on about 30 regional principal aquifers and five case studies (including the Middle Rio Grande Basin and California’s Central Valley aquifer system) that illustrate various water-availability issues.

How can we improve our assessment of groundwater resources across the country? The report advises first synthesizing the data that have been and will be collected across agencies at all levels. Then local and regional studies should be scaled up to extend into areas where less information is available, and regional studies should be scaled down to levels useful for local decision makers.

The 70-page report, USGS Circular 1323, is available at pubs.usgs.gov/circ/1323/.

CO Climate Change: Hydro Implications

Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation

Colorado Water Conservation Board

This report, prepared by the University of Colorado’s Western Water Assessment, synthesizes climate change science relevant to Colorado’s water supply. It covers observed trends of climate change; attributes of climate and climate-related change; projections of temperature (warmer), precipitation (unclear), snowmelt (less), and runoff (earlier) for the state; and implications of those changes to water management.

A primer on climate models, emission scenarios, and model downscaling provides useful information for managers in any state trying to understand how to respond to climate model predictions. Projections of temperature and precipitation for the Upper Colorado River Basin are made to about 2050, a relevant time frame for allowing adaptation strategies to be developed.

The 58-page report is available at www.colorado.edu/CO_Climate_Report/

Mine Impacts on Big Bend-Area Streams

Quality of Water and Sediment in Streams Affected by Historical Mining, and Quality of Mine Tailings, in the Rio Grande/Rio Bravo Basin, Big Bend Area of the United States and Mexico, August 2002

U.S. Geological Survey

Through a multi-agency effort, streamwater, streambed sediment, and mine tailings were collected to determine if trace elements from abandoned mines near Big Bend National Park have affected the water and sediment quality in the Rio Grande/Rio Bravo Basin of the United States and Mexico. Mines operating from the late 1800s through at least the late 1970s produced fluorite, germanium, iron, lead, mercury, silver, and zinc.

Of the trace elements analyzed in water samples from 12 sites, only lead (at one site) and mercury (at 10 sites) were detected at concentrations exceeding the Texas Surface Water Quality Standards for human health (fish consumption use). Stream-sediment concentrations of antimony, arsenic, cadmium, lead, silver, and zinc exceeded Texas Commission on Environmental Quality screening levels at one of the 12 locations. The leaching potential for the sites was found to be less than the U.S. EPA Toxicity Characteristic Leaching Procedure limit.

The 55-page report is available at pubs.er.usgs.gov/usgspubs/sir/sir20085032.

Video: Water Wars Rare; Water Woes Real

Water Wars or Water Woes? Water Management as Conflict Management

Woodrow Wilson International Center for Scholars

Newspapers and politicians constantly warn of impending “water wars,” but water rarely leads to interstate violence, according to Geoff Dabelko, director of the Environmental Change and Security Program at the Woodrow Wilson International Center for Scholars. By focusing on water wars rather than cooperative water management efforts, we “are missing a lot of what is important around conflict management around water,” argues Dabelko in this video available on YouTube. He says cooperative water management can in fact even help resolve conflicts caused by other problems, such as those between India and Pakistan or Israel and Palestine.

Drinking Water Primer

Drinking Water: Understanding the Science and Policy Behind a Critical Resource

The National Academies

This 28-page booklet provides a basic yet useful introduction to drinking water for the lay audience. It addresses sources of drinking water; processing and treatment; managing, conserving, and recycling water supplies; public health concerns such as microbes and arsenic; and the federal and state regulatory framework. Good graphics and several examples from the Southwest add appeal. It’s free, and multiple copies can be ordered for distribution.

Visit dels.nas.edu/dels/rpt_briefs/drinking_water.pdf
Protecting Water Quality
Under Climate Change

National Water Program Strategy: Response to Climate Change

U.S. EPA

EPA outlines 40 specific actions that water managers can take to adapt their clean water, drinking water, and ocean protection programs to the potential effects of climate change. The actions cover five areas: mitigation of greenhouse gases; and adaptation to, research on, education, and water program management of climate change.

Potential climate change impacts reviewed in the strategy include increases in certain water pollution problems, changes in availability of drinking water supplies, and collective impacts on coastal areas. The strategy reflects input provided during a public comment period earlier this year.

The 119-page report is available at www.epa.gov/ow/climatechange/.

Simulated effects of ground-water withdrawals and artificial recharge on discharge to streams, springs, and riparian vegetation in the Sierra Vista Subwatershed of the Upper San Pedro Basin, southeastern Arizona, by S.A. Leake, D.R. Pool, and J.M. Leenhouts
http://pubs.usgs.gov/sir/2008/5207/

Use of superposition models to simulate possible depletion of Colorado River water by ground-water withdrawal, by S.A. Leake, William Greer, Dennis Watt, and Paul Weghorst
http://pubs.usgs.gov/sir/2008/5189/

Hydrologic and water-quality responses in shallow ground water receiving stormwater runoff and potential transport of contaminants to Lake Tahoe, California and Nevada, 2005-07, by J.M. Green, C.E. Thodal, and T.L. Welborn

Quantifying ground-water and surface-water discharge from evapotranspiration processes in 12 hydrographic areas of the Colorado Regional Ground-Water Flow System, Nevada, Utah, and Arizona, by G.A. DeMeo, J. LaRue Smith, N.A. Damar, and Jon Darnell
http://pubs.usgs.gov/sir/2008/5116/

Estimating the effects of conversion of agricultural land to urban land on deep percolation of irrigation water in the Grand Valley, Western Colorado, by J.W. Mayo
http://pubs.usgs.gov/sir/2008/5086/

Summary and evaluation of the quality of stormwater in Denver, Colorado, October 2001 to October 2005. by C.R. Bossong and A.C. Fleming
http://pubs.usgs.gov/sir/2008/5134