

*“When the well is dry, we learn the worth of water.” – Ben Franklin, Poor Richard's Almanac 1733*

## Water: Facts, Trends, Threats, and Solutions

On the subject of water, three key trends confront us: Global Warming will likely change rainfall and runoff patterns and seriously impact our water supplies both in the United States and abroad; 1.2 billion people in the developing world still don't have access to clean drinking water and pressure from pollution, wetland destruction, and climate change is threatening to make this worse; the dangers of water privatization demand greater scrutiny from governments and the public.

New approaches to the way we manage water are key to meeting these challenges. Water managers, policy-makers and the general public must recognize that today's threats will become tomorrow's tragedies without swift action to combat climate change, protect wetlands, guard against the dangers of privatization, and reduce our use of water. The good news is by improving how efficiently we use water we can protect the environment, provide for agriculture and industry, and ensure there is plenty of clean drinking water for people around the world.

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### Facts on the World's Water

- The Earth has 1,386,000,000 km<sup>3</sup> of water total but only 2.5 percent of that is fresh water (35,029,000 km<sup>3</sup> or 9,254,661,800 billion gallons of fresh water).<sup>1</sup>
  - Less than 1 percent of the world's fresh water (or 0.01 percent of all water) is usable in a renewable fashion.
  - The average person needs a minimum of 1.3 gallons (5 liters) of water per day to survive in a moderate climate at an average activity level. The minimum amount of water needed for drinking, cooking, bathing, and sanitation is 13 gallons (50 liters).
  - The average person in the United States uses between 65 to 78 gallons of water (250 to 300 liters) per day for drinking, cooking, bathing, and watering their yard. The average person in the Netherlands uses only 27 gallons (104 liters) per day for the same tasks.
  - Many people in the poorest nations survive on far less than the recommended amount. The average person in Somalia uses only 2.3 gallons (8.9 liters) of water per person per day.
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### Trend: Global Warming Threatens U.S. Water Supplies and Economy

Delaying action to combat global warming could threaten U.S. water supplies. Global warming won't just result in higher temperatures, it also threatens to disrupt traditional weather and run-off patterns and could increase the frequency and severity of drought and floods. This is one reason why taking effective action now to slow global warming is so important.

“The Pacific Institute's research indicates that climate change will likely pose a serious threat to the United States,” said Dr. Peter H. Gleick, President of the Pacific Institute. “One of the most troubling impacts of unchecked global warming involves the U.S. water supply. Global warming will change when and where we get snow and rain. If our snow pack melts too quickly or if water that falls as snow turns to rain, we'll see more flooding in the winter and less water during the summer when we need it most.”

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<sup>1</sup> All the data here is taken from The World's Water 2000-2001, Chapter One “The Human Right to Water”

### **Facts about global warming in the United States:**

- There is an increased risk of severe floods and droughts associated with climate change.<sup>2</sup>
- Snowfall and snowmelt will be significantly affected in the Sierra Nevada, Rocky Mountains, and the Pacific Northwest, leading to changes in the timing and amount of runoff.
- Rising sea levels will threaten coastal aquifers and water supplies. Vulnerable regions include Cape Cod, Long Island, the coastal aquifers of the Carolinas, and the central coast of California.
- Global warming, by increasing temperatures in lakes and streams, melting permafrost, and reducing water clarity, could seriously threaten fish and other animals that live in water as well as harming critical habitat like wetlands.

Information on the impacts of climate change on water can be found at: <http://pacinst.org/naw.html>

### **Trend: Growing Threats to World's Water Demand New Approach**

Freshwater is essential for human survival, for agriculture and for the survival of our planet's plants and animals. But pollution, climate change, water-related disease, and the destruction of our natural world all threaten the purity and availability of our most precious resource. Despite the pressing nature of these threats, water institutions and policymakers have, so far, been largely unable to develop the tools and approaches needed to address these problems.

"The best way to solve emerging threats to the world's fresh water is by rethinking how we use and manage our scarce resources," said Dr. Peter H. Gleick, President of the Pacific Institute. "We must look at ways to increase our efficiency of use, instead of just building more dams and reservoirs. Improving the efficiency of our water systems, taking real steps to tackle global warming, and opening the policy debate over water to new voices can help turn the tide."

### **Facts about emerging threats to the world's water:**

- An estimated 1.2 billion people do not have access to clean drinking water.<sup>3</sup> Lack of clean drinking water leads to nearly 250 million cases of water-related disease each year and between 5 and 10 million deaths.
- In the past century over half of all wetlands on the planet have been lost to development and conversion. Wetlands are important to the health of natural systems and people because they act as filters and flood buffers.
- Water pollution is a serious threat to the world's water. Microbes, salts, and pollution from agriculture and industry all contribute to the problem.
- Global warming will likely have major impacts on the world's freshwater resources. Some areas will suffer more frequent and severe droughts; other places will face more frequent and severe floods.

For more information or to obtain an electronic copy of "Threats to the World's Freshwater Resources" please visit: [http://pacinst.org/reports/freshwater\\_threats.htm](http://pacinst.org/reports/freshwater_threats.htm)

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<sup>2</sup> All data is from "Water: The Potential Consequences of Climate Variability and Change," A Report of the National Water Assessment Group authored by the Pacific Institute, 2000

<sup>3</sup> All data is from "Threats to the World's Freshwater," Peter H. Gleick, 2002

## **Trend: Dangers of Water Privatization Demand Greater Scrutiny**

Water privatization – turning the operation, control, or ownership of public water supplies over to corporations – is increasing both overseas and in the United States. In the U.S., cities like Stockton, California, Jersey City, New Jersey, New Orleans, and Atlanta have all experimented with water privatization. Though certain types of privatization can help water utilities become more efficient or provide water – especially to those in the developing world who currently lack basic services – there are a host of dangers.

“There is little doubt that the headlong rush to private markets has failed to address some of the most critical issues and concerns about water,” said Dr. Peter H. Gleick, President of the Pacific Institute. “Our assessment shows that rigorous, independent review of water privatization efforts are necessary to protect the public. Water is far too important to human health and the health of our natural world to be placed entirely in the private sector.”

### **Facts about water privatization:**

- Communities around the nation are experimenting with water privatization including: Lee County, Florida; Atlanta, Georgia; New Orleans; Jersey City, New Jersey; Chattanooga, Tennessee; Peoria, Illinois.
- 14.8 billion gallons of bottled water (57 billion liters) were sold worldwide in 1996 and sales of over 37 billion gallons (143 billion liters) are expected by 2006.<sup>4</sup>
- People in the United States consumed over 4.4 billion gallons (17 billion liters) of bottled water in 1999 at a cost of nearly \$5 billion.

For more information, to read our principles, or to obtain an electronic copy of “The New Economy of Water” please visit: [http://pacinst.org/reports/new\\_economy.htm](http://pacinst.org/reports/new_economy.htm)

## **Solution: Using Water More Efficiently Key to Meeting Future Demands**

As the trends show, there are many serious threats to the world’s supply of fresh water. But the good news is that we have a solution that can help us solve, or at least make headway, on all of these problems: improving efficiency. Work at the Pacific Institute indicates that California residents are using almost 35 percent more water than they need to be. And, previous work has shown that there are a host of innovative techniques that can be applied to the residential, commercial, and agricultural sectors to improve our efficiency and conserve water.

“Using water more efficiently is critical to meeting the challenges of the future: preserving habitat, protecting water quality, and providing for urban and rural needs,” said Dana Haasz, Research Associate with the Pacific Institute. “We’ve got to start planning for tomorrow today.”

### **Facts about efficiency:**

- Many technologies that are already available can help us save enough water to hedge against climate change and reduce stress on threatened natural resources while still allowing us to meet our needs for agricultural, industrial, and residential use.
- By 2020, enough water can be saved from indoor residential use to meet the needs of over 5 million people.<sup>5</sup>
- Proper irrigation can save another 450 thousand-acre-feet (TAF) of water per year. This is enough to satisfy the needs of another 3.6 million people (1 acre-foot supplies two households of four people for a year).

For more information, or to obtain an electronic copy of “California Success Stories” please visit: [http://pacinst.org/reports/water\\_efficiency.htm](http://pacinst.org/reports/water_efficiency.htm)

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<sup>4</sup> Bullet points two and three from “The New Economy of Water,” Peter H. Gleick, 2002, page 12

<sup>5</sup> Bullet points two and three from Pacific Institute research in progress

## About Our Organization

Founded in 1987 and based in Oakland, California, **The Pacific Institute for Studies in Development, Environment and Security** is a nonpartisan, independent organization that conducts research on issues at the intersection of sustainable development, environmental protection, and international security.

Topics we are currently working on include: global threats to fresh water, environmental terrorism and environmental security, sustainable development, new approaches to regulation, water efficiency, environmental justice, and global warming.

Specific projects we are working on include: The West Oakland Environmental Indicator project, improving water efficiency in California, preservation and enhancement of the Colorado River delta and Salton Sea, encouraging sustainable agriculture in California, responding to the impacts of climate change on water supplies in the United States and abroad. More information on all of our programs, projects, and research can be found online at: <http://www.pacinst.org>

## About Our Experts

Part of the Pacific Institute's mission is to provide information and analysis to reporters, researchers and advocates. The Pacific Institute's Research Associates and Affiliates on water issues are available for interview and comment on current research and topics of expertise.

To arrange an interview or obtain comment, please contact Nicholas L. Cain, Communications Director: <mailto:ncain@pacinst.org>, 1 (510) 251-1600

**Dr. Peter H. Gleick** is co-founder and President of the Pacific Institute for Studies in Development, Environment, and Security. Dr. Gleick is an internationally recognized expert on global freshwater resources, including the hydrologic impacts of climate change, sustainable water use, privatization and globalization, and international conflicts over water resources.

Dr. Gleick serves on the boards of numerous journals and organizations and was elected an Academician of the International Water Academy, in Oslo, Norway, in 1999. In 2001 he was appointed to the Water Science and Technology Board of the National Academy of Sciences, Washington, D.C. Dr. Gleick is the author of many scientific papers and four books, including the biennial water report *The World's Water* published by Island Press (Washington, D.C).

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**Michael J. Cohen** is a Senior Research Associate with the Pacific Institute. He is based in Boulder, Colorado and focuses on the lower Colorado River and the Salton Sea. Mr. Cohen is one of the non-governmental representatives on the International Boundary and Water Commission Minute 306 Implementation planning committee and drafted an alternative set of interim surplus criteria for the lower Colorado River. Mr. Cohen also authored the only independent proposal for the Salton Sea to be reviewed by the Salton Sea Science Office. Mr. Cohen is the author of several journal articles and Pacific Institute reports on the Salton Sea and the hydrology of the Colorado River border region.

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**Dana Haasz** is a Research Associate with the Pacific Institute who specializes in water efficiency and conservation. She is on the steering committee of the California Urban Water Conservation Council and the Western Water Alliance. She is currently at work on a study of the potential for improved water efficiency in California.

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**Gary Wolff, P.E., Ph.D.**, is Principal Economist and Engineer at the Pacific Institute. He has extensive experience in sanitation and water supply issues, including work for the World Bank, Sandia National Laboratories, and municipal water and wastewater service providers. Most recently, he reviewed the economics of the controversial Cadiz water project in Southern California and co-authored the “The New Economy of Water.” He is also analyzing the economics of water conservation in California for a forthcoming report.

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## Online Resources and Ordering Reports

“The Human Right to Water” is available online (as an Adobe pdf) at: <http://pacinst.org/gleickrw.pdf>

Information on the impacts of climate change on water can be found at: <http://pacinst.org/naw.html>

“Threats to the World’s Freshwater Resources” is available online at:  
[http://pacinst.org/reports/freshwater\\_threats.htm](http://pacinst.org/reports/freshwater_threats.htm)

“The New Economy of Water: The Risks and Benefits of Globalization and Privatization of Fresh Water” is available online at: [http://pacinst.org/reports/new\\_economy.htm](http://pacinst.org/reports/new_economy.htm)

The Executive Overview of “Sustainable Use of Water: California Success Stories” is available online at: [http://pacinst.org/reports/water\\_efficiency.htm](http://pacinst.org/reports/water_efficiency.htm)

Information from The World’s Water series is available online at: <http://www.worldwater.org/>

“Haven or Hazard: The Ecology and Future of the Salton Sea” and more information on the Pacific Institute’s Salton Sea improvement proposal are available at: [http://pacinst.org/salton\\_sea.html](http://pacinst.org/salton_sea.html)

“Missing Water: The Uses and Flows of Water in the Colorado River Delta Region” is available online at: [http://pacinst.org/missing\\_water.htm](http://pacinst.org/missing_water.htm)

Our economic analysis of the Cadiz project can be found online at: <http://pacinst.org/cadiz.html>

“Threats to the World’s Freshwater Resources,” “The New Economy of Water,” “California Success Stories,” and “Missing Water” are also available in print. Please send a check or money order for \$20 (\$16 for nonprofits) with the publication name to the Pacific Institute:

Pacific Institute – [Publication Name]  
Preservation Park  
654 13th Street  
Oakland, CA 94612

The World’s Water 2000-2001 and The World’s Water 1998-1999 are both available from Island Press (<http://www.islandpress.com/>). The World’s Water 2002-2003 will be available in early summer.

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