

US needs to plan for climate change-induced summer droughts

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The western United States has experienced increasing drought conditions in recent years – and conditions may worsen if global climate change models are accurate – yet the country is doing little to prepare for potential catastrophe, a group of scientists said today.

The U.S. should consider a national drought policy to help achieve sustainable water for drinking, agriculture and fisheries, said the scientists at the annual meeting of the American Association for the Advancement of Science.

They also pointed out the need to manage water supplies to protect environmental values and to protect urban property from sea level rise and extreme weather events.

Though many climate change models predict warmer and wetter weather for parts of the Earth, the potential for drought in regions like the southwestern U.S. is actually greater, said Jim Coakley, a professor of atmospheric sciences at Oregon State University and a co-organizer of the AAAS symposium.

Most western rivers and streams are more dependent on snowmelt for sustained flows than regular rainfall – and declining snow packs have already become an issue throughout much of the West, Coakley pointed out.

"We're already seeing snow packs dwindle and spring runoffs coming

earlier and earlier," Coakley said. "The dry summers that we've experienced recently may pale in comparison to what could happen in the near future. There is a kind of domino effect as temperatures warm. Precipitation that would have fallen as snow will come as rain and run off more quickly. Spring runoffs begin earlier. Summers lengthen and evaporation increases."

During the last three decades, temperatures have risen 1-2 degrees (Fahrenheit) and many scientists believe the pace of that warming is accelerating. Drought is a reality facing many western states, yet the governmental and societal response is through ad hoc crisis management, pointed out Shaun McGrath, of the Western Governors' Association.

"Providing adequate supplies of clean water is a challenge when there is normal precipitation," McGrath said, "and extended times of drought and water shortages create further stresses for our water systems. Yet in marked contrast to the myriad federal programs that report, prevent and mitigate the damage of other extreme events – like floods, hurricanes and tornadoes – we accept drought's effects as an unavoidable natural hardship."

Science has the ability to help inform potential policy, yet there is reluctance by many water managers to integrate new climate information into decision processes, said Katharine L. Jacobs, executive director of the Arizona Water Institute.

Barriers to using new scientific information may come from a combination of technical, cognitive, financial, institutional and cultural factors, she said.

"Many water managers have a fixed view of the environmental record," Jacobs said. "They use historic data for managing surface water reservoirs, designing infrastructure and assessing groundwater

availability, instead of incorporating new data on climate change, probabilistic climate forecasts and ensemble stream flow predictions.

"New forms of scientific and interdisciplinary training can improve the opportunities for managers to use these new tools," she added.

Science can help, agreed Dennis Lettenmaier of the University of Washington. Improved hydrologic forecasting, new climate observation and data collection technologies, better models for predicting the impact of climate change on water supplies, and advances in water use technologies all offer valuable tools for management.

"Many of the issues posed by water scarcity and water demand are not scientific in nature and have roots in water law, economics and marketability," Lettenmaier said, "but science can play a more central role in western water management."

It is "long past time" to integrate climate change into water planning and management, said Peter Gleick, a MacArthur Fellow and president of the Pacific Institute for Studies in Development, Environment and Security.

"Climate change is a reality," Gleick said, "and we must begin planning for those impacts that will be unavoidable. We must do a better job of evaluating the potential for water efficiency and conservation in planning for future needs. And new ways of thinking about supply are needed, including water reuse, conjunctive groundwater and surface water management, and smart desalination."

One purpose of the AAAS symposium was to draw attention to the increases in water stress associated with climate change in the western U.S. – and what needs to be done about it, said Oregon State University's Coakley.

"To achieve sustainable water supplies, we'll need a combination of sound science, new technologies, creative management and a coherent policy that weaves all the elements together," Coakley said. "And it won't come without a price – both economic and social. But given our future, it is a must."

Source: Oregon State University

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