Effects, continued from page 17

are expected to decrease the ability of our mountain "water towers" to reliably deliver water in the quantities we have come to expect and when we most need it.

Society and Water in the Southwest

It would be short-sighted to consider climate change in isolation from other aspects of the human-environment system. We need to consider the confluence of population growth, agricultural and recreational values, power generation needs, environmental laws, and other societal priorities. Our bountiful groundwater supplies built up over hundreds to thousands of years but, in the Southwest's major urban areas, it has taken less than a century to deplete these supplies to levels that require active and vigilant management. Groundwater is renewable on relatively long time scales, and is considered by many water managers to serve as a back-up for fully renewable surface water supplies.

Increasing temperatures, due to expanding urban heat islands as well as regional climate trends, will increase power and water demands during the time of year when our water supplies are most vulnerable. The National Renewable Energy Laboratory estimates that, nationally, thermoelectric freshwater use for power generation roughly equals freshwater use for irrigation. For each kilowatt-hour of power consumed, Arizona and Nevada consume more than 7 gallons of water, Utah and California between 3 and 5 gallons, and Colorado and New Mexico about 1 gallon (Torcellini and others, 2003). Thus, increases in cooling system use as temperatures rise must be considered part of the effects of climate change and population growth on the water supply.

What Does it Mean for Me?

According to the best science to date, we can reasonably expect changes in the timing of peak streamflow (earlier), rates of evapotranspiration (higher), and the duration and severity of future droughts (longer, more severe). We can also expect water and energy demand to increase as a result of increased temperatures, longer heat waves, and urban warming. The combination of these changes, as well as others that are less predictable, will require resource management that is flexible and that can incorporate the latest scientific knowledge. From the imperfect but valuable body of information that bridges observed and projected climate changes, we can develop plausible scenarios to guide management options.

Contact Gregg Garfin at gmgarfin@email.arizona.edu.

Reference

Torcellini, P., N. Long, and R. Judkoff, 2003. Consumptive Water Use for U.S. Power Production. National Renewable Energy Laboratory report, NREL/CP-550-35190, www.nrel.gov/docs/fy04osti/35190.pdf.

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