Desert Water Harvesting Initiative

Quick Resource

December 2013

Climate Change Impacts on the American Southwest

The Southwestern United States has been acknowledged as a "climate challenged" area of the country due to its high rate of population growth, limited water resources and rainfall, and a recent long-term drought. Climate change will likely exacerbate this situation. Recent research has suggested several types of climate change impacts the Southwestern states can expect, though some predictions are more certain that others. According to the *Assessment of Climate Change in the Southwest United States* the Southwest is already experiencing several observed recent climatic changes: a warming trend, unusually severe recent drought, and lower flows in the four major drainage basins (Sacramento/San Joaquin, Upper Colorado, Rio Grande, and Great Basin) in the Southwest.

Projected future climatic changes in the Southwest have varying levels of certainty associated with them, depending on how many models are in agreement about the predicted changes and with changes that are already being observed. The *Assessment* predicted the following climate changes:

Level of Confidence	Predicted Changes
High level of confidence	• Increase in average annual temperature • Increase in average seasonal temperature • Increase in freeze-free season length • Increase in incidence of heat waves • Decrease in mountain snowpack • Earlier snowmelt and streamflow timing
Medium-high level of confidence	• Decrease in incidence of cold snaps • Decrease in spring precipitation • Increase in drought severity
Medium-low level of confidence	• Decrease in average annual precipitation • Increase in extreme daily precipitation
Low level of confidence	• Increase in flooding

Climate scientists have further predicted some of the effects that these changes could have on various ecosystems and natural resources, including terrestrial and freshwater ecosystems, coastal systems, human health, water, and others. Effects on water resources could include even greater water scarcity throughout the Southwest, warmer and longer periods of drought, decreases in water quality, and a lessening of the ability to use the past to predict the future (the idea that "stationarity is dead.") Changes to the climate could affect water harvesting in several ways. Less precipitation would obviously lead to a decrease in the amount water available for harvesting. Hotter temperatures mean higher plant water demand. Using native plant species can help mitigate these impacts.

Further reading and resources:

- http://wrrc.arizona.edu/publications/water-harvesting/assessment-climate-change-southwest-united-states-technical-report-pre
- http://wrrc.arizona.edu/publications/water-harvesting/literature-synthesis-climate-change-implications-water-and-environment
- http://www.swcarr.arizona.edu/

U.S. Department of the Interior Bureau of Reclamation

WRRC Water Resources Research Center

The University of Arizona College of Agriculture & Life Sciences

Desert Landscape Conservation Cooperative