

Global warming and Western water

Science-based analyses of America's key environmental issues

Center for Science &
Public Policy
www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *Global warming will drastically reduce water resources in the West.*

First, such exaggerated claims, produced only by climate models, are **dead wrong** when measured against real-world observations. Secondly, reputed climate change has and does occur without any human inducement.

This fanciful claim stems from a report (L. Ruby Leung) in the journal *Climatic Change* which examines the implications of a warming climate for water resources in the western United States, finding that the amount of water stored in the snow pack in the coastal mountain ranges of the western United States will decline by up to 70 percent as a result of global warming in just the next 50 years. Dr. Leung described this as the “best case scenario” warning that things could potentially be even worse.

A closer examination of Dr. Leung's report uncovers a **strange definition of “best case scenario.”** The climate model that the results were based upon **assumed** an atmospheric concentration increase of greenhouse gases of 1 percent per year through the year 2100. One would think that “best case” would in some sense be grounded in reality, but this is not the case in this report. **Reality shows** that the observed atmospheric growth rate of carbon dioxide—the primary greenhouse gas—in the atmosphere is actually constant, that is, the rate of growth is not increasing at all. This fact is supported by the grow rate of atmospheric carbon dioxide measured at Mauna Loa observatory since 1958. The average growth amount during the past 25 years or so has been 1.57 parts per million per year. Starting from a year 2000 value of 370 ppm, using the observed linear increase of 1.57 ppm/yr produces a value of 527ppm by the year 2100, while using the growth rate assumed as “best case” by Dr. Leung produces a carbon dioxide concentration by the year 2100 of a whopping 1000ppm—**nearly twice as great as the projection based upon the observations!**

Since the warming effect of carbon dioxide is roughly proportional with the percentage increase in its concentration, a quick back of the envelop calculation shows that had Dr. Leung been using as a “best case scenario” one that was a simple extension of the past 25 year's behavior, the warming produced by her model would have been about **75 percent less**. Instead of a warming of 1.5 to 2°C in the next 50 years, as she reported, a value of 0.375 to 0.50°C would have been a more appropriate “best case.”

Such a slight warming would have **far less impact** on the hydrology of the Western United States; and when combined with enriched atmospheric CO₂, water conservation will be achieved in agriculture use.

An analysis of the peer-reviewed literature of the past decade of experiments on over 150 individual plants found that atmospheric CO₂ enrichment **increased plant water-use efficiency** more than 90% of the time. In addition, elevated CO₂ **reduced total water uptake** in more than 50% of the studies, while slowing the development of water stress as indicated by plant water potential data.

Thus, as the authors conclude, plants growing in future atmospheres of higher CO₂ concentration “will probably **survive eventual higher drought stress** and some species may even be able to extend their biotope into less favorable sites.” (Pospisilova, J. and Catsky, J. 1999. Development of water stress under increased atmospheric CO₂ concentration. *Biologia Plantarum* **42**: 1-24.)