Overview – Climate Change and Western Deserts

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The Southwestern US has been warming since about the mid 1970s, by a total of about one degree C. Relative to historical variability, no part of the US has warmed more over this recent third of a century. The past 8-9 years, starting about 1999, have been particularly and unusually warm. With respect to precipitation, there are few indications of systematic trends. Any such trends will be hard to detect in the face of very large natural variability. Since 1999 much of the region has experienced significant and in some places unprecedented drought. Recent temperature rises have been consistent with changes projected by climate models, but by most opinions within the climate research community, this warming cannot be definitively attributed to climate change at this time. There is much more confidence in projections of temperature than of annual precipitation. Annual and winter precipitation is generally projected to decrease modestly over the next several decades. Summer monsoon precipitation amount is much harder to project. Temperature and precipitation projections imply, individually and jointly, greater moisture stress. The ongoing Southwest drought may simply be another of the major natural droughts that affect the region once or twice a century, or it may be a harbinger of a more permanent alteration in climate. Night appears to be warming more than day, and higher elevations appear to be warming somewhat more than lower. Extremes of temperature are expected to increase, in an area where extremes already approach lethal values at certain times of year. The rare cases of high precipitation rates are also expected to be seen more frequently, despite the current expectation that annual totals will show a modest decrease. Even if precipitation amount does not change, temperature rise would make that precipitation less effective. Changes in other precipitation characteristics are also likely: in addition to amount, the peak intensity, likelihood of extreme values, timing, duration, frequency, and type (rain or snow) are very important as well. Desert vegetation is adapted to all these characteristics. One property that invasive species seem to share is opportunism and ability to exploit disturbance or departure from long-term mean conditions. In general, warming and attendant drying effects would favor fire disturbances, but the relationship between climate change and fire regimes may not be necessarily straightforward where vegetation density is low, as in drier locations.

Kelly Redmond was raised in Montana, and educated at MIT and UW-Madison. He was State Climatologist for Oregon until 1989, and is now Regional Climatologist at the Western Regional Climate Center (DRI, Reno). His interests span every facet of climate and climate behavior: physical causes and variability, interactions with human and natural processes, and how such information is acquired, used, communicated, and perceived.