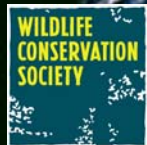


# Southwest Climate Change Initiative

Building Understanding, Accelerating Adaptation



# Species move individualistically

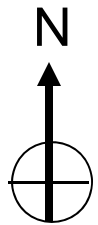


1 2 3 4 5 6

A B C D E

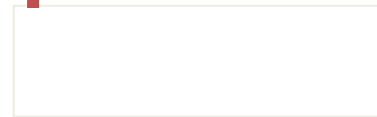
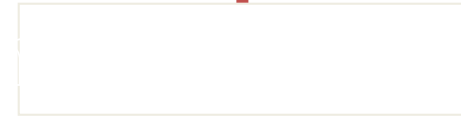


# Species move individualistically

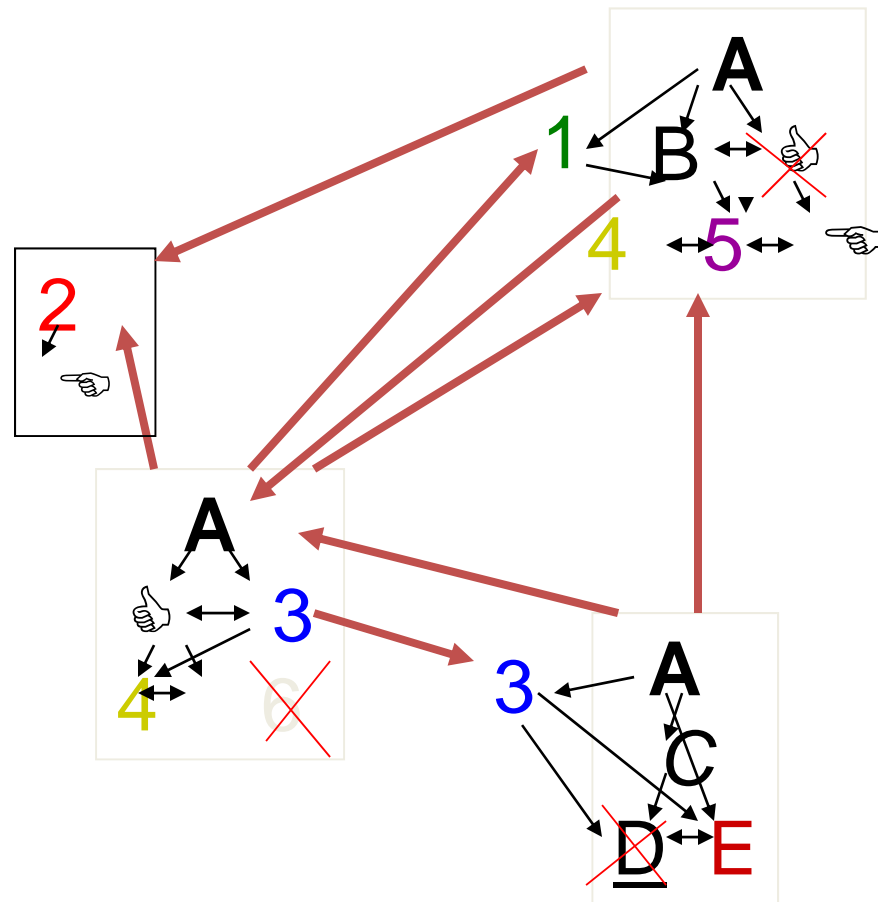
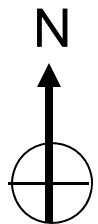


1 2 3 4 5 6

A B C D E



# Species move individualistically



October 2002

May 2004

## Regional vegetation die-off in response to global-change-type drought

(PNAS 2005)

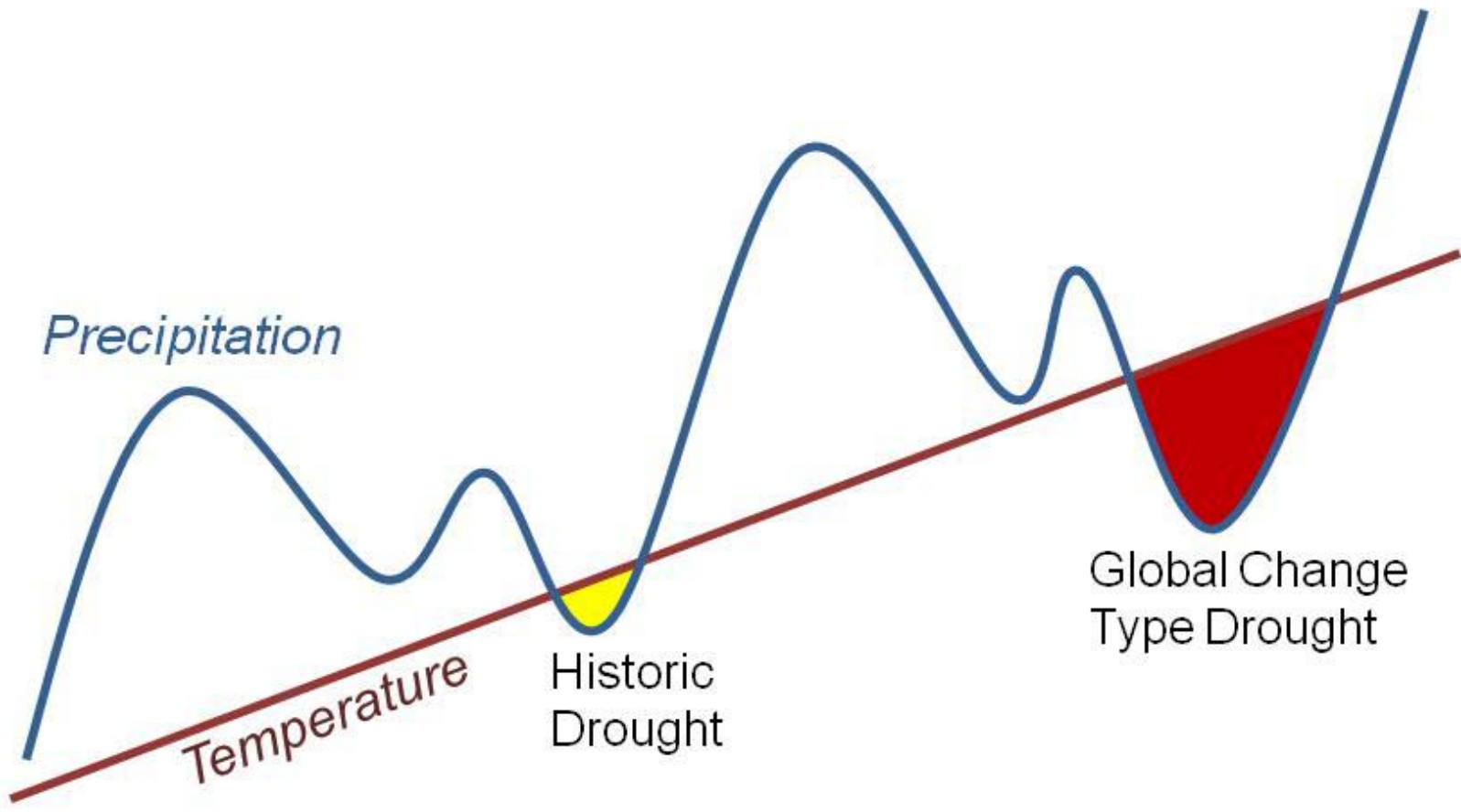
David D. Breshears<sup>a,b</sup>, Neil S. Cobb<sup>c</sup>, Paul M. Rich<sup>d</sup>, Kevin P. Price<sup>e,f</sup>, Craig D. Allen<sup>g</sup>, Randy G. Balice<sup>h</sup>, William H. Romme<sup>i</sup>,  
Jude H. Kastens<sup>j,k</sup>, M. Lisa Floyd<sup>k</sup>, Jayne Belnap<sup>l,m</sup>, Jesse J. Anderson<sup>c</sup>, Orrin B. Myers<sup>n</sup>, and Clifton W. Meyer<sup>d</sup>

## Temperature sensitivity of drought-induced tree mortality portends increased regional die-off under global change-type drought

(PNAS 2009)

Henry D. Adams<sup>a,b,1</sup>, Maite Guardiola-Claramonte<sup>a,c</sup>, Greg A. Barron-Gafford<sup>a,b</sup>, Juan Camilo Villegas<sup>a,d,e</sup>,  
David D. Breshears<sup>a,b,d,f</sup>, Chris B. Zou<sup>g</sup>, Peter A. Troch<sup>a,c</sup>, and Travis E. Huxman<sup>a,b,f</sup>

Photos: C.D. Allen, USGS



Precipitation

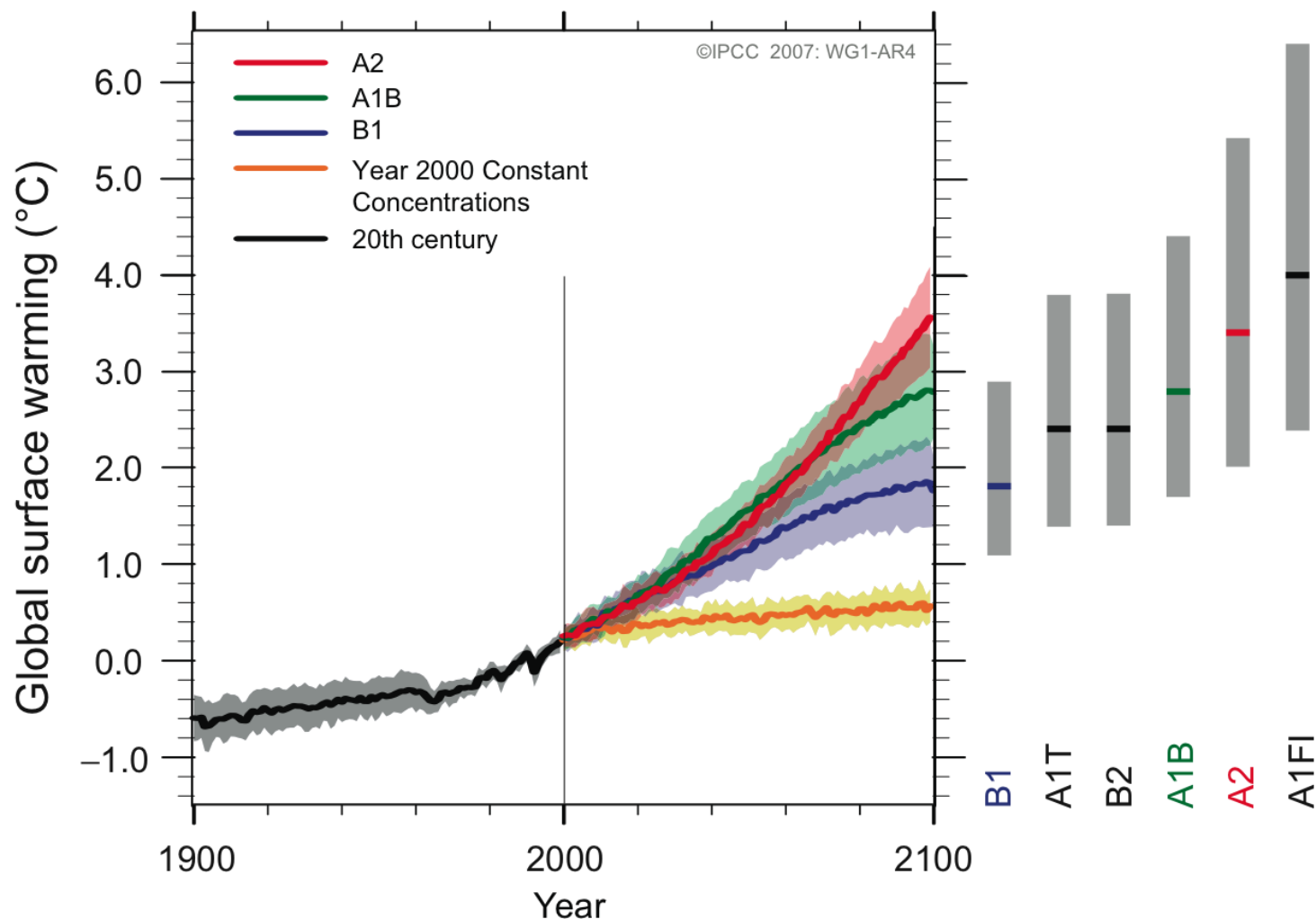
Temperature

Historic Drought

Global Change Type Drought

Year

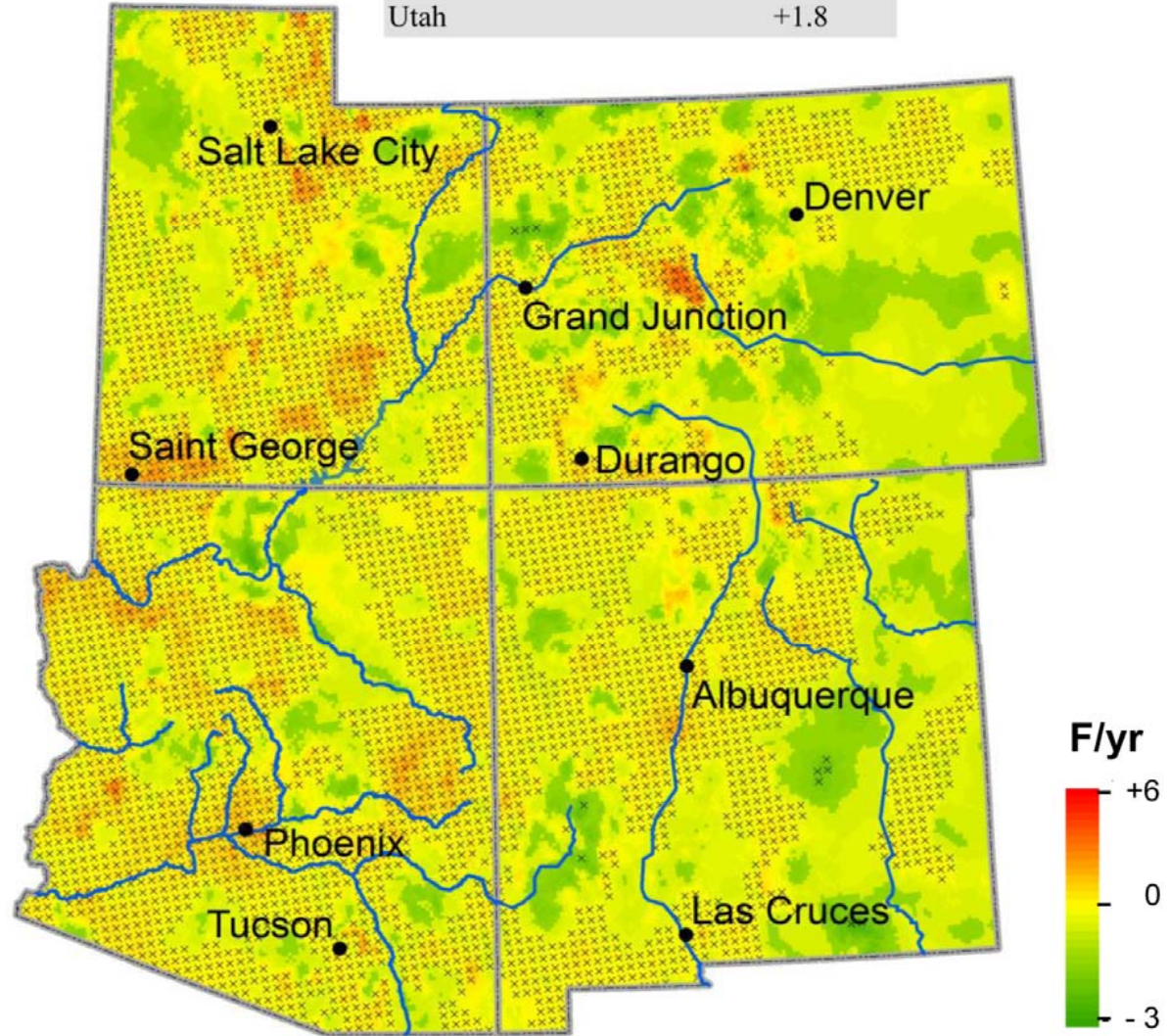
## Multi-model Averages and Assessed Ranges for Surface Warming



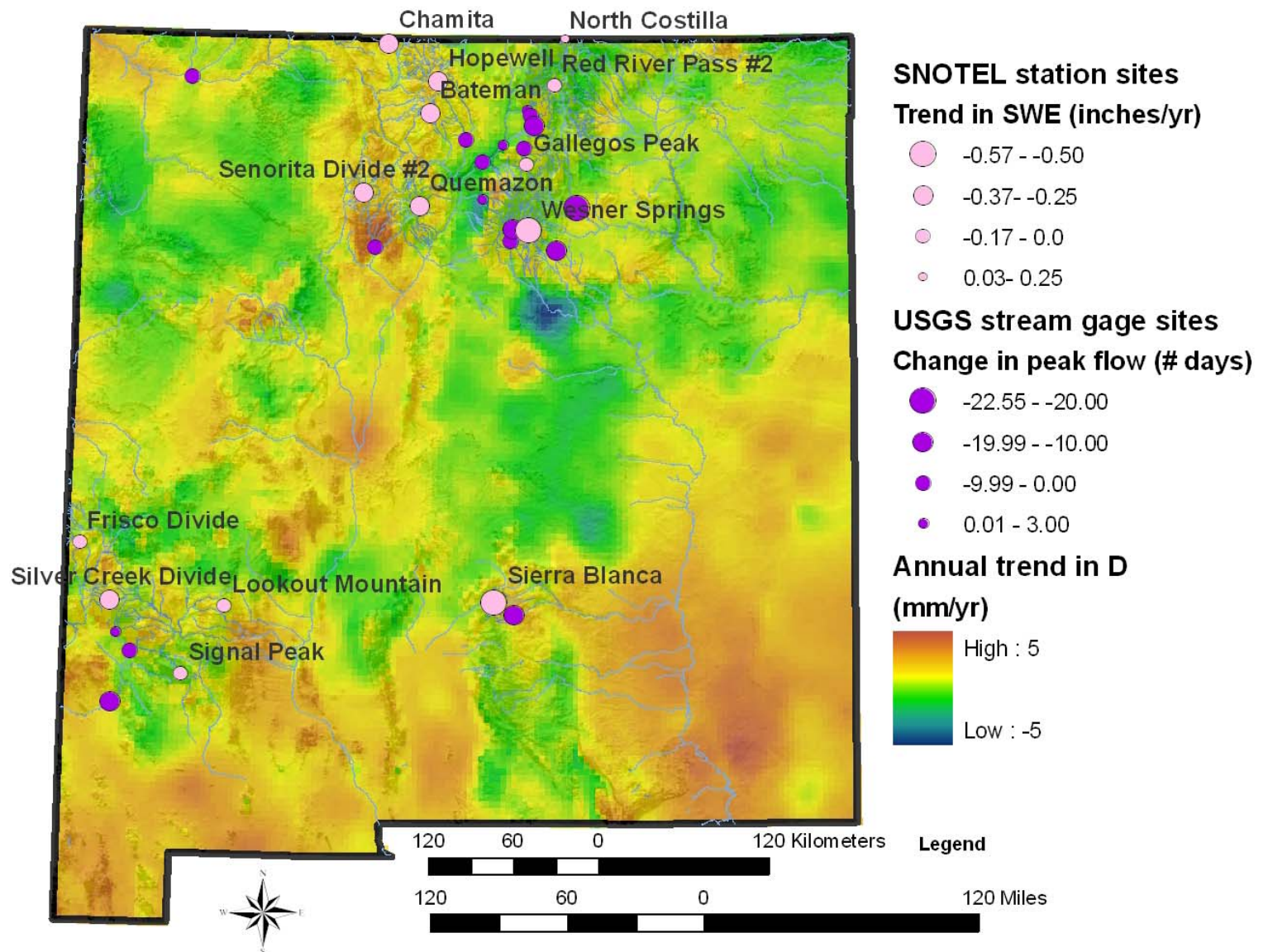
“The climate change that takes place due to increases in carbon dioxide concentration is largely irreversible for 1,000 years after emissions stop.”  
-- Solomon et al. 2009 PNAS

# Change in mean annual T(°F) 1951-2006

4-Corner States	+1.5
Arizona	+1.9
Colorado	+1.1
New Mexico	+1.2
Utah	+1.8



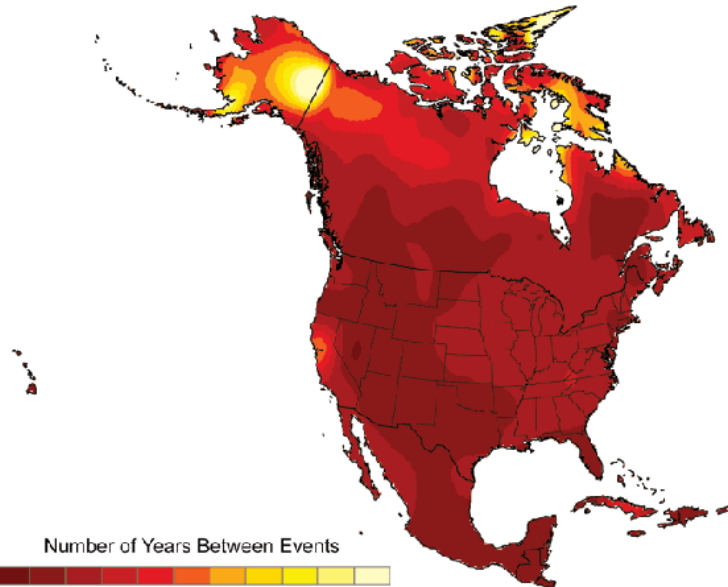
# Changes in snowpack and peak runoff 1980-2006



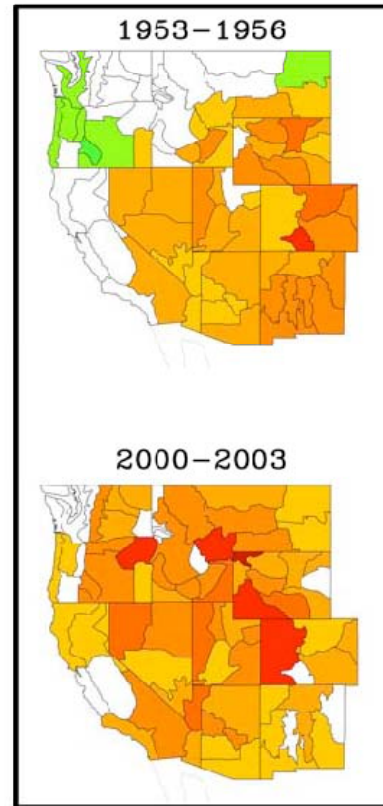
# Projected Frequency of Extreme Heat & Drought

**2080-2099**

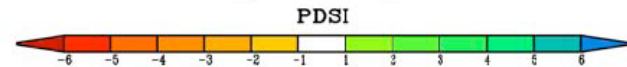
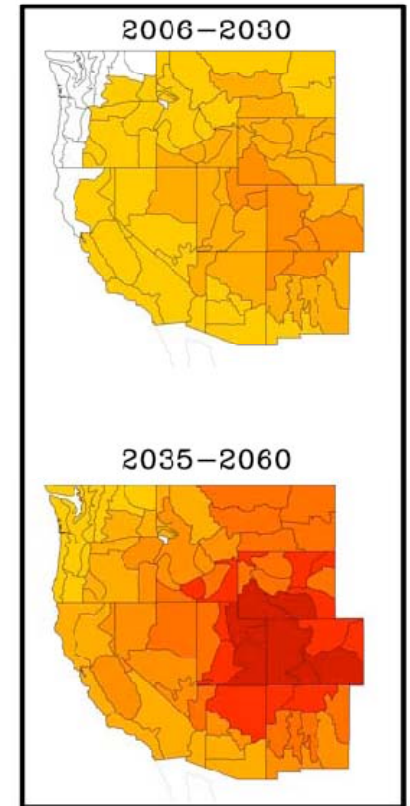
**Number of years between extreme heat events**



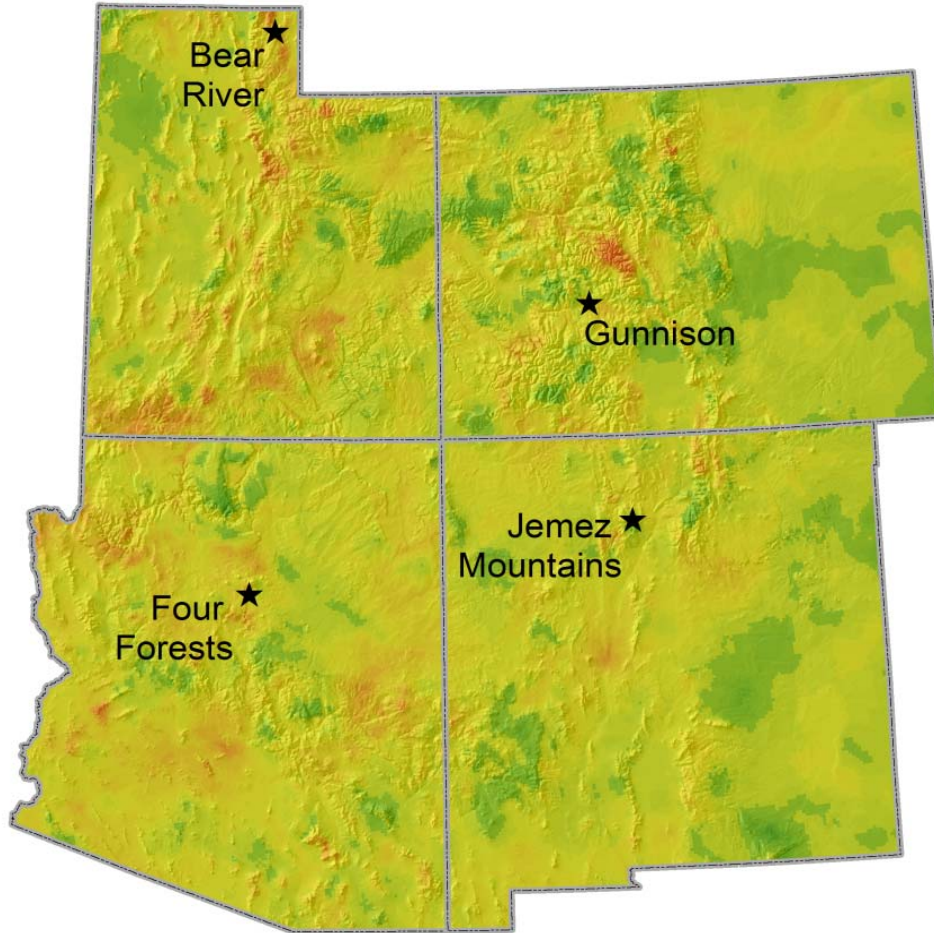
Historical



Future



# Southwest Climate Change Initiative



1. Identify vulnerable places, habitats and species
2. Promote adaptation action; build resilience
3. Share information and tools in a regional network

