



Colorado's Water Resources: Past, Present, and Future

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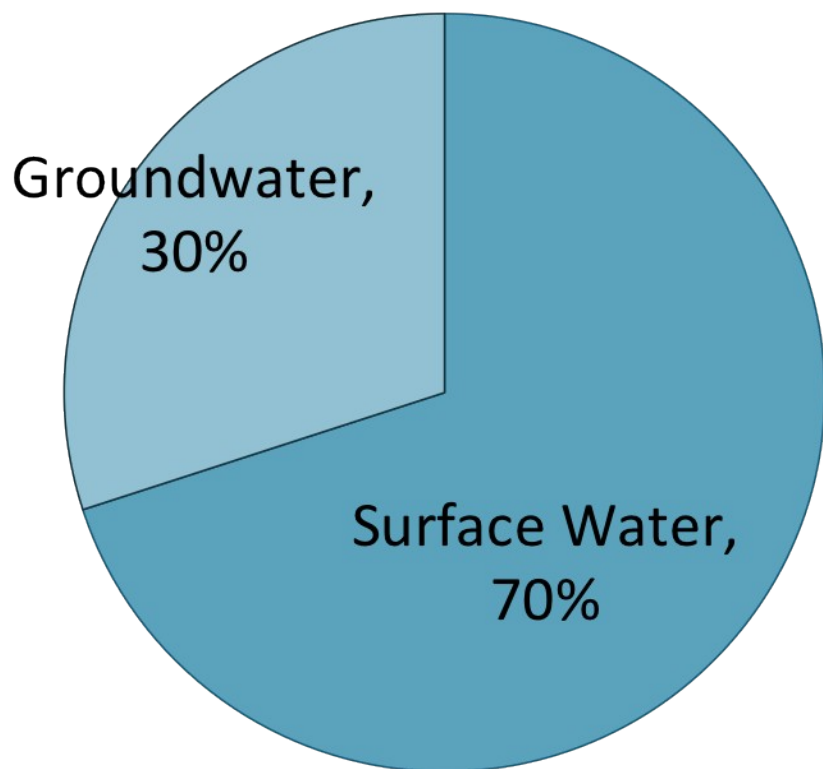
Cooperative Institute for Research in Environmental Sciences

Director

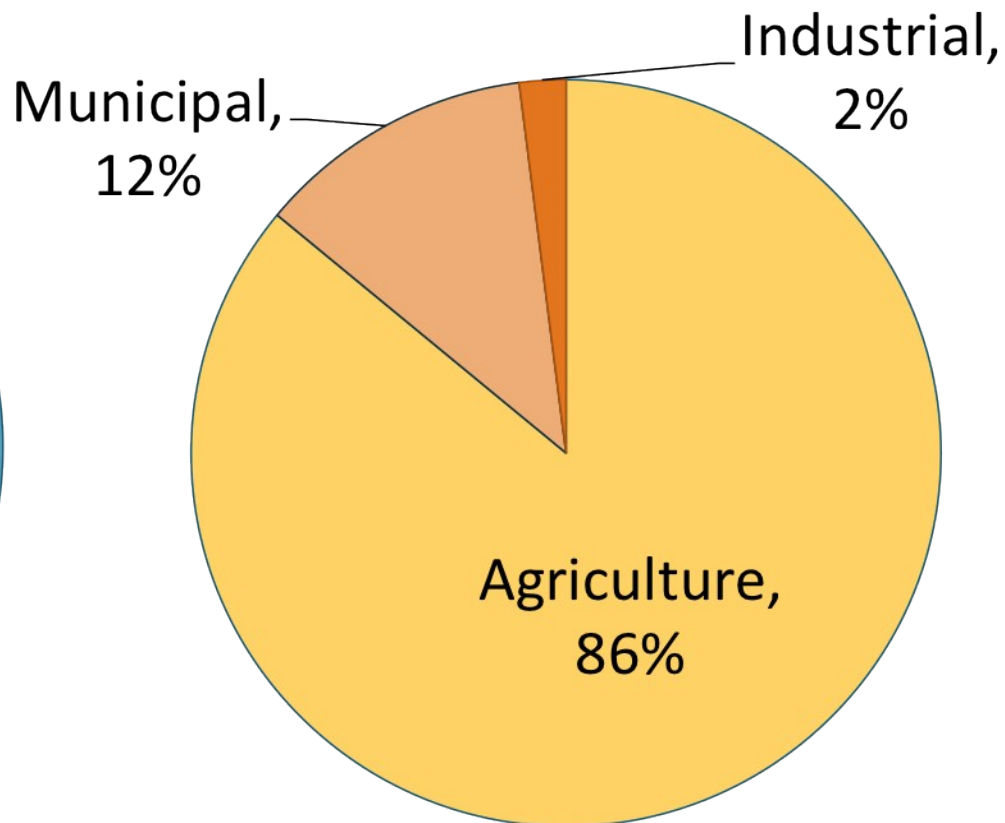
Western Water Assessment

The Present: Water Availability in Colorado

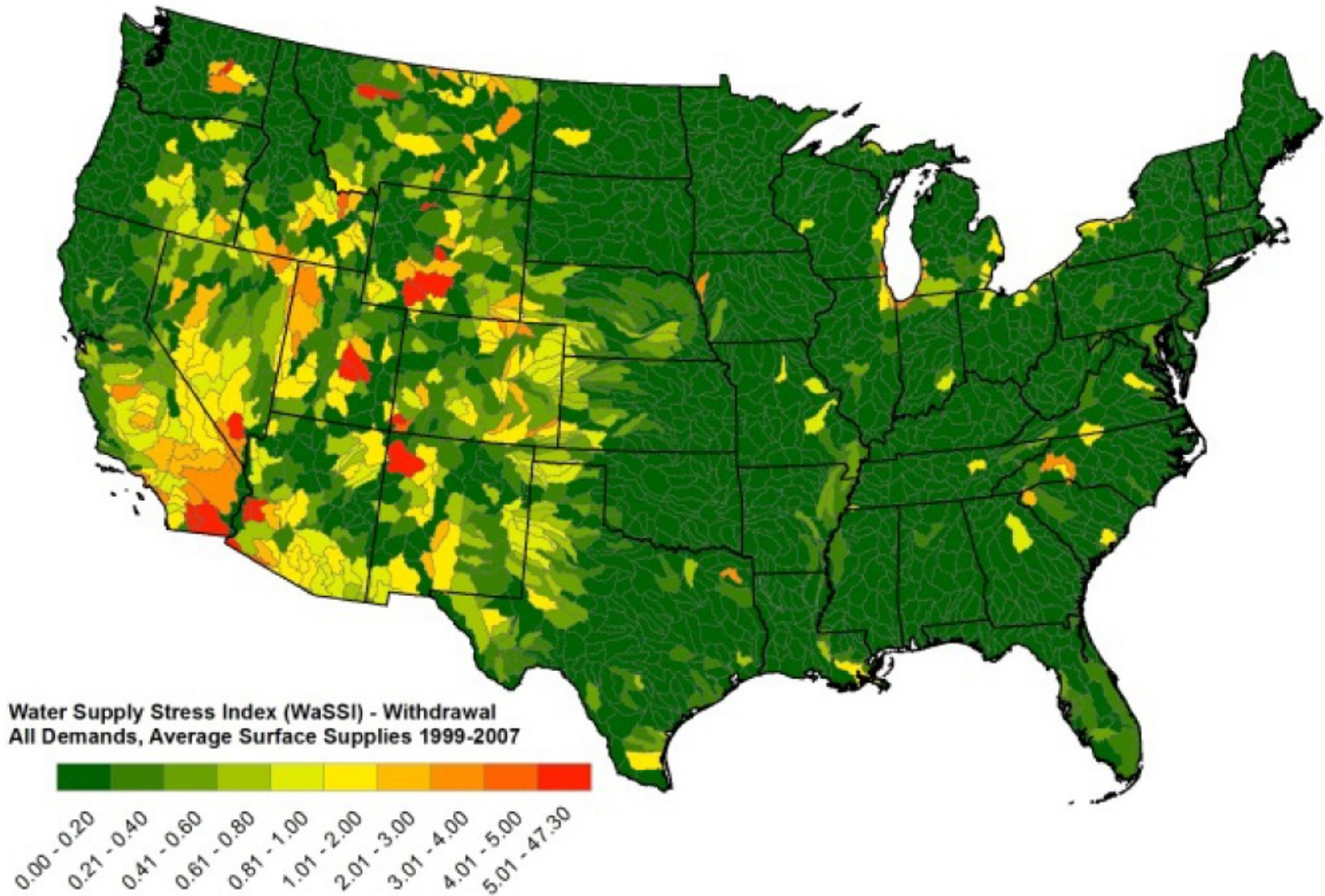
SUPPLY



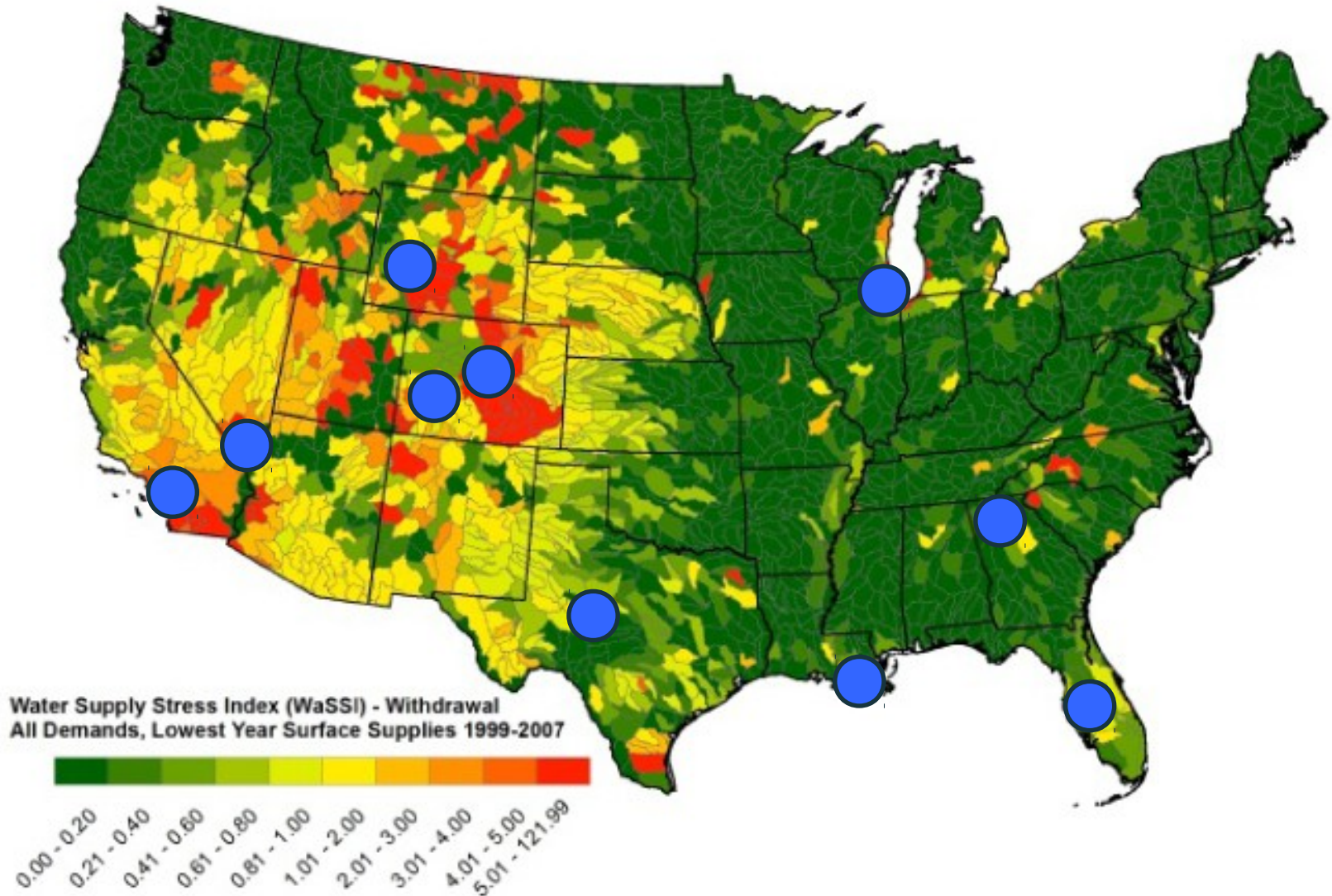
DEMAND



The Present: Water Stress (1999–2007)

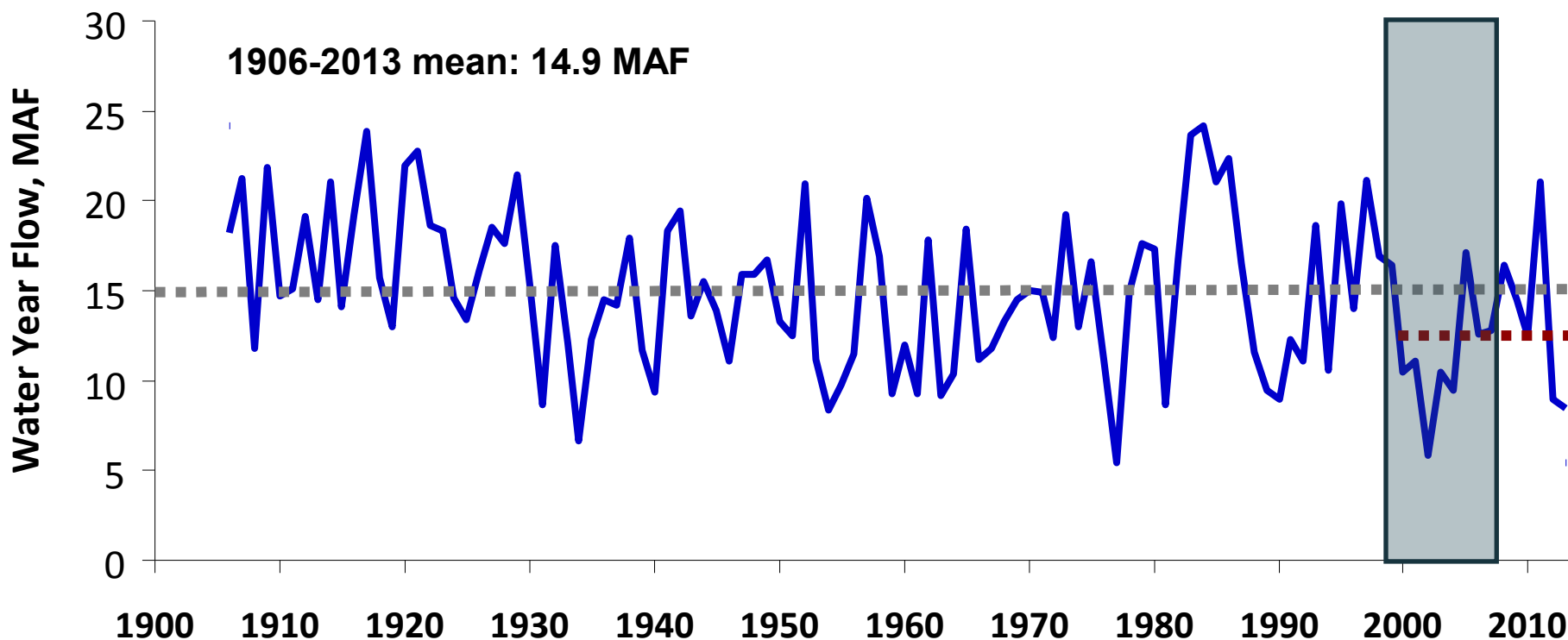


The Present: Water Stress (1999–2007)



The Past: 1906–2013

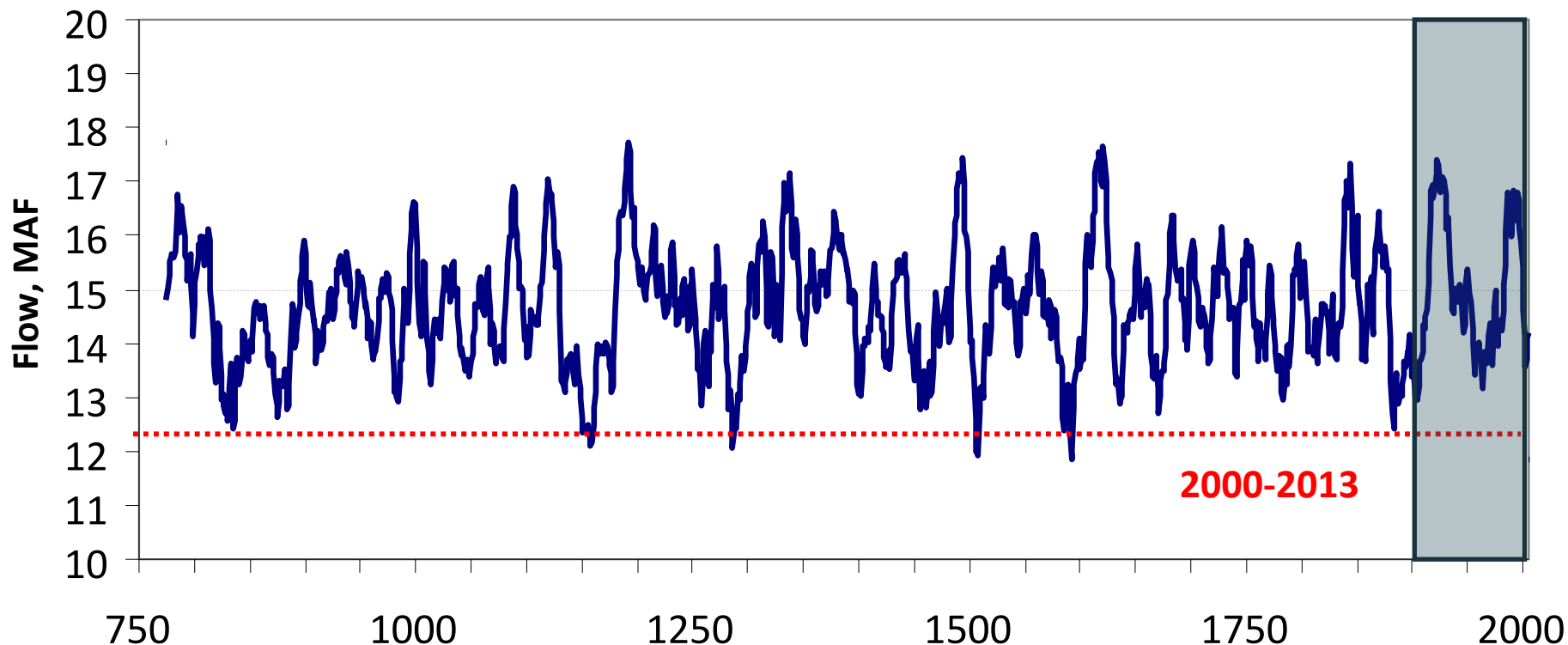
Naturalized water-year flow, Colorado River at Lees Ferry



- **Lowest 14-year flow: 2000–2013, 12.3 MAF**
- **Lowest 10-year flow: 2000–2009, 12.1 MAF**
- **Lowest 5-year flow: 2000–2004, 9.5 MAF**

The Past: 762–2005

Tree-ring reconstructed annual flows, Colorado River at Lees Ferry with **14-year** running mean



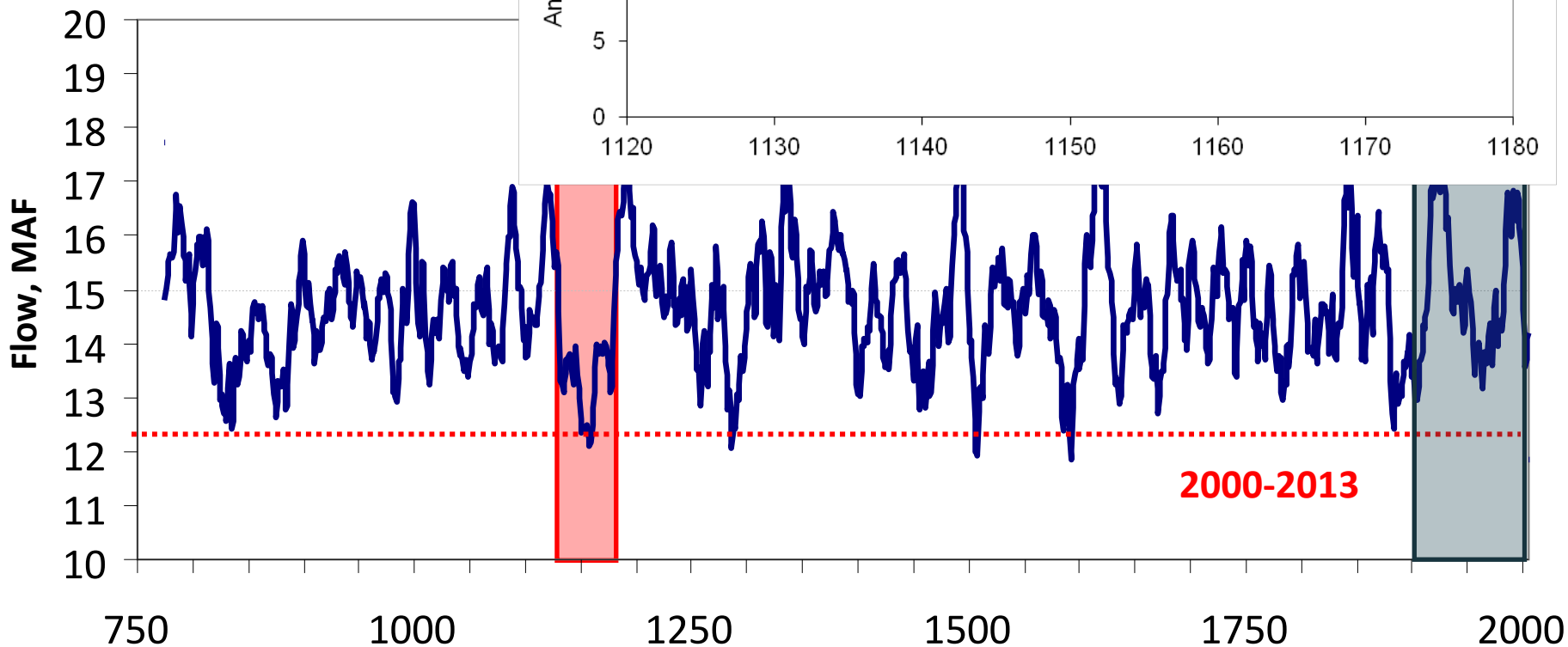
Source: Meko et al. 2007. Medieval Drought in the Upper Colorado River Basin, *Geophysical Research Letters*; data available at <http://treeflow.info>. Analysis by Jeff Lukas, WWA

The Past: 762–2005

46 of 57 years

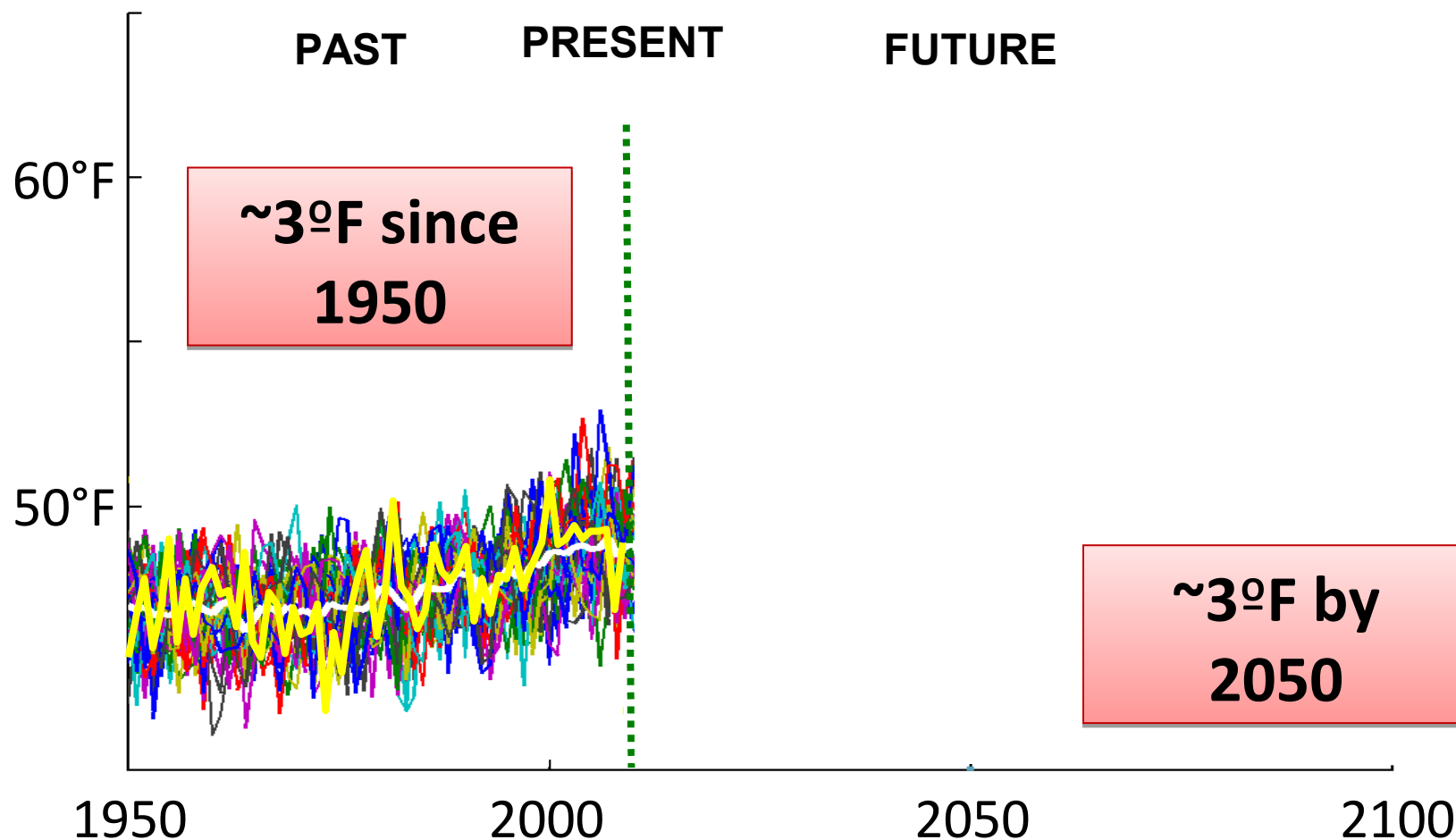
tree-ring reconstructed annual flows, Colorado River at Lees Ferry, 762–2005, with 14-year running mean

Mid-1100s megadrought



Source: Meko et al. 2007. Medieval Drought in the Upper Colorado River Basin, *Geophysical Research Letters*; data available at <http://treeflow.info>. Analysis by Jeff Lukas, WWA

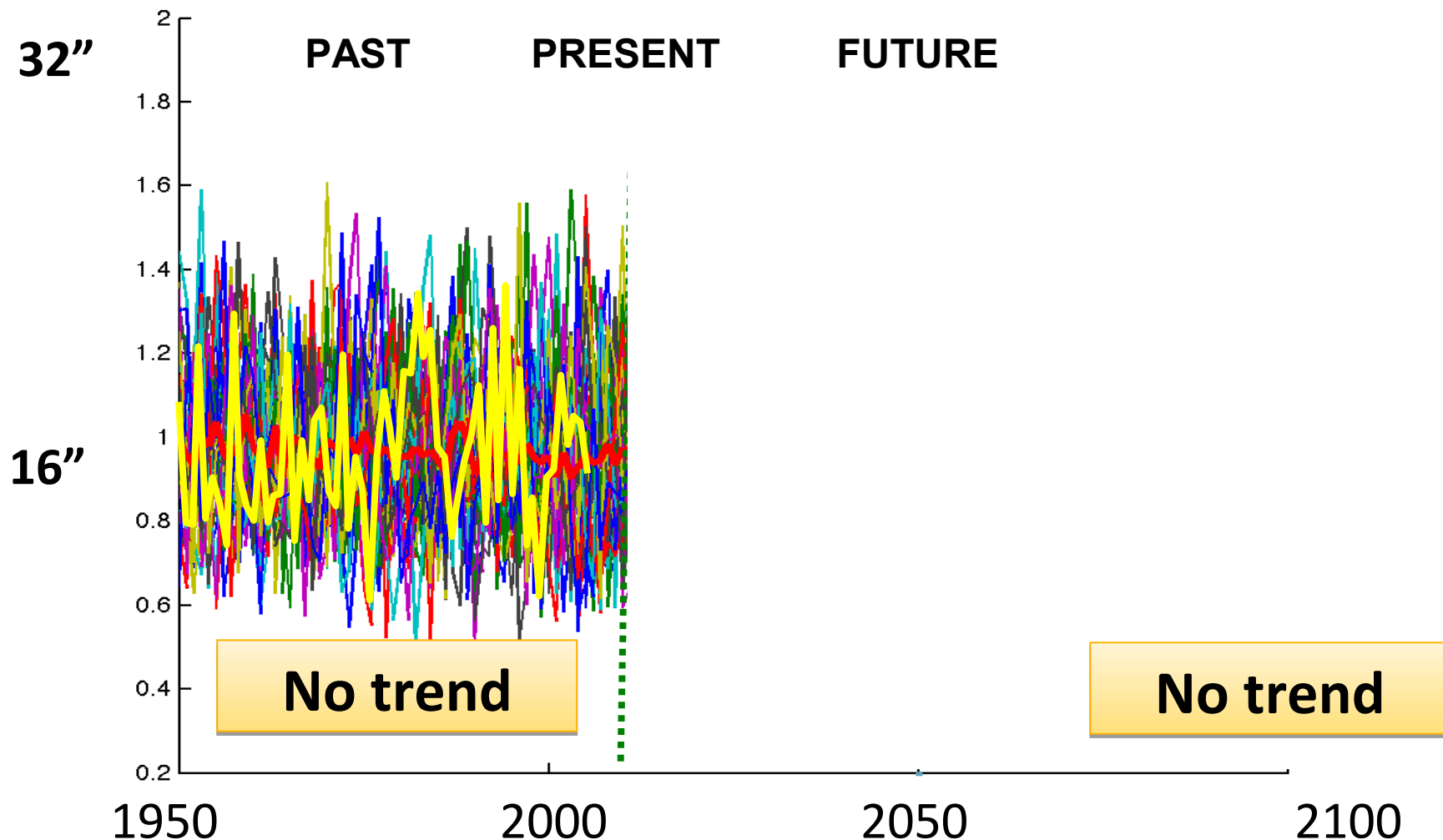
The Future: W. CO Annual Average Temperatures



Source: CMIP3; data available from <http://gdo-dcp.ucllnl.org/>

16 GCMs, high emissions scenario

The Future: W. CO Annual Average Precipitation

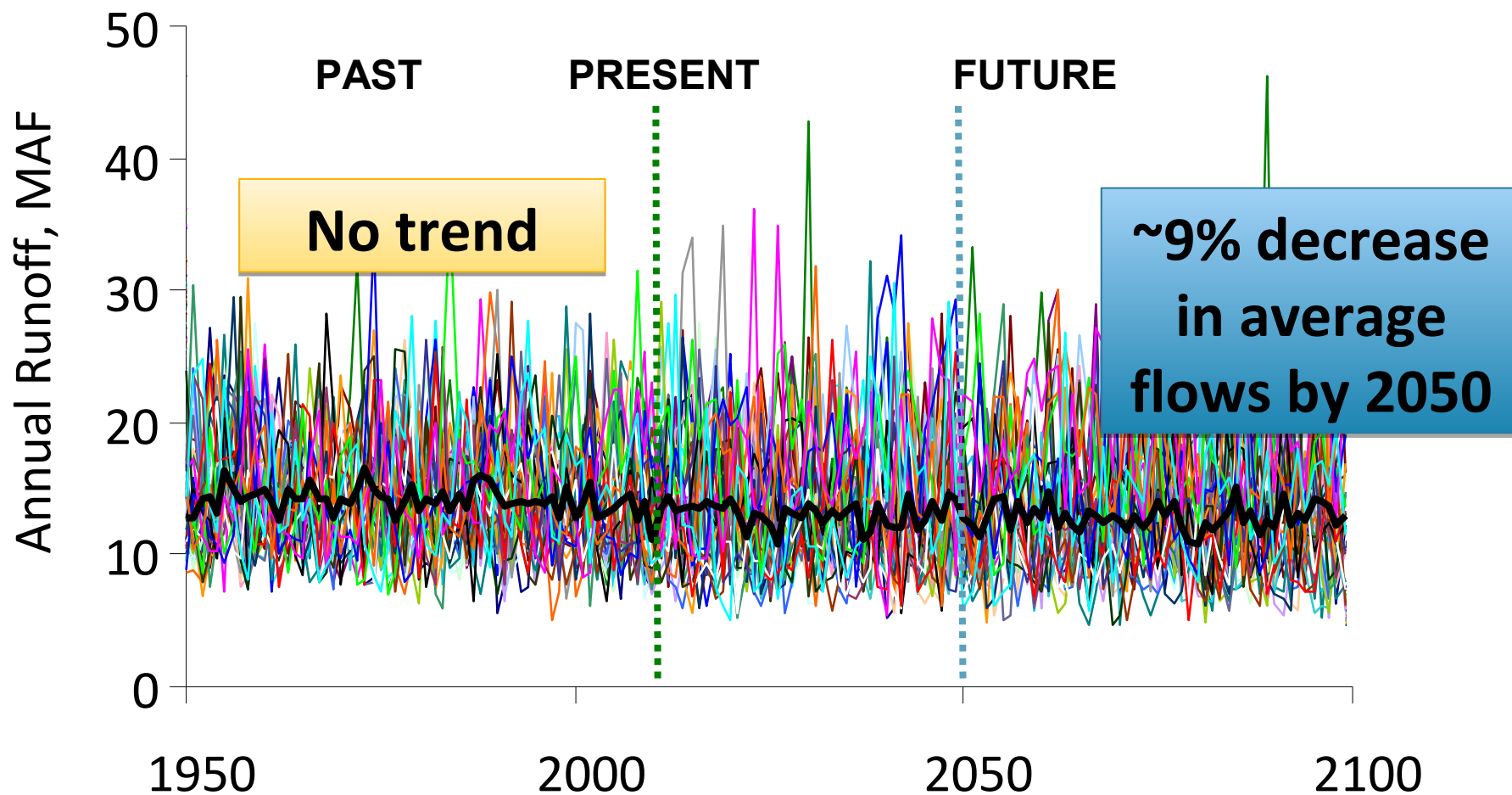


Source: CMIP3; data available from <http://gdo-dcp.ucllnl.org/>

16 GCMs, high emissions scenario

The Future: Upper Colorado River Basin

Annual Runoff between 1950–99 to 2035–64

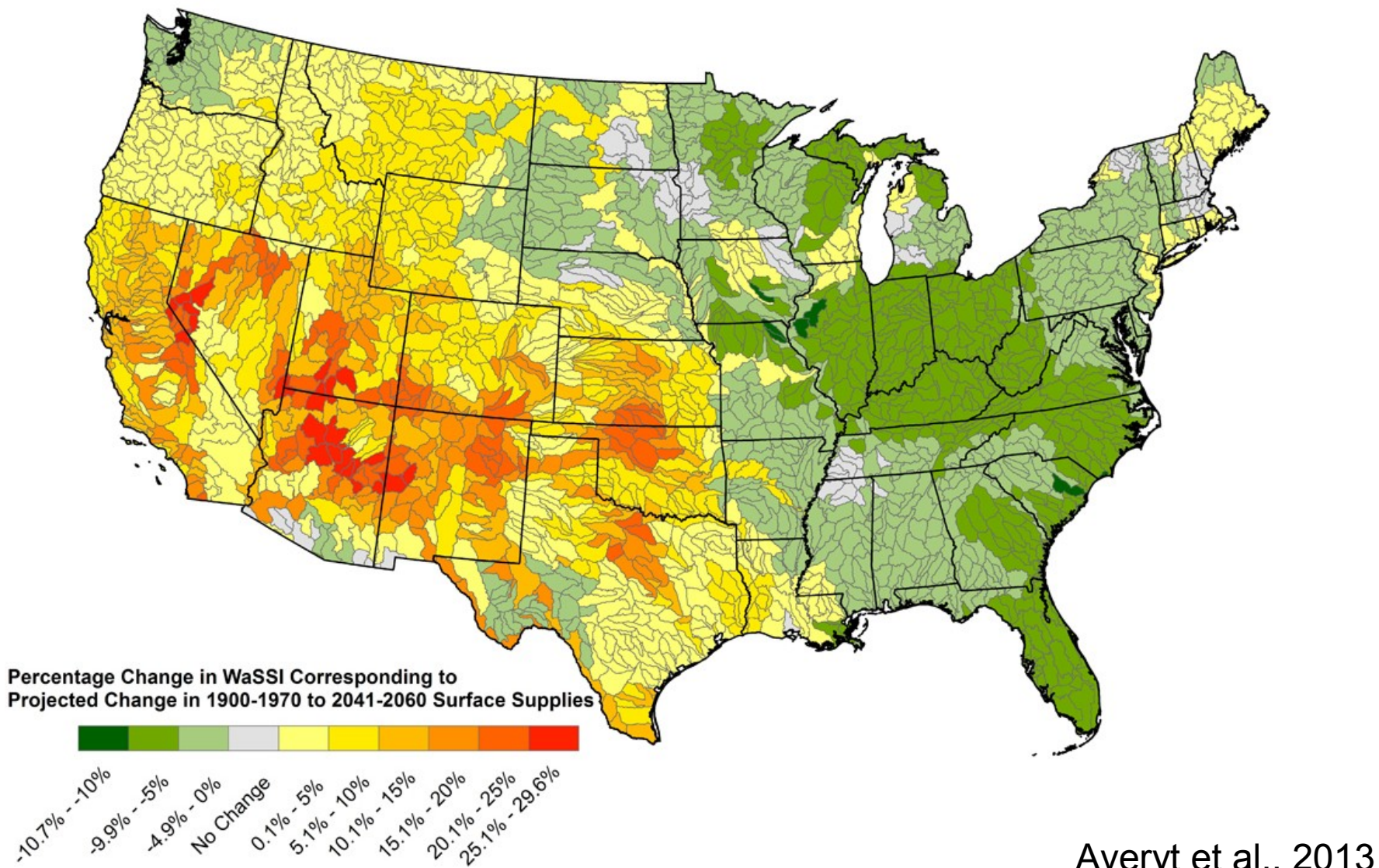


Data: Reclamation, based on BCSD CMIP3 projections; http://gis.usbr.gov/Streamflow_Projections/

39 projections from 16 GCMs, medium emissions

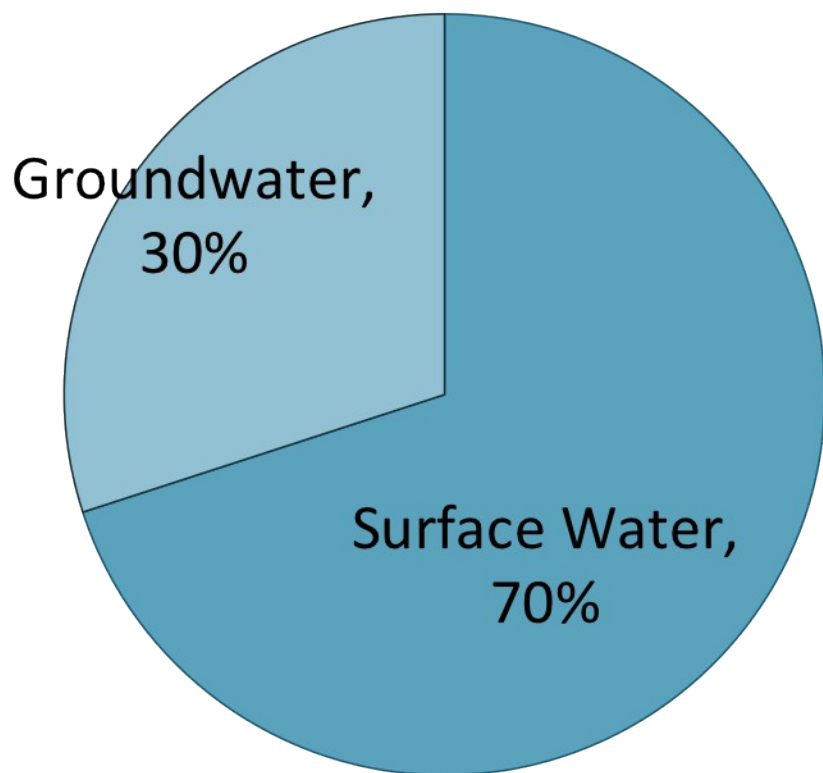
The Future: Water Stress by 2050

Figure 7 from K Averyt et al 2013 Environ. Res. Lett. 8 035046



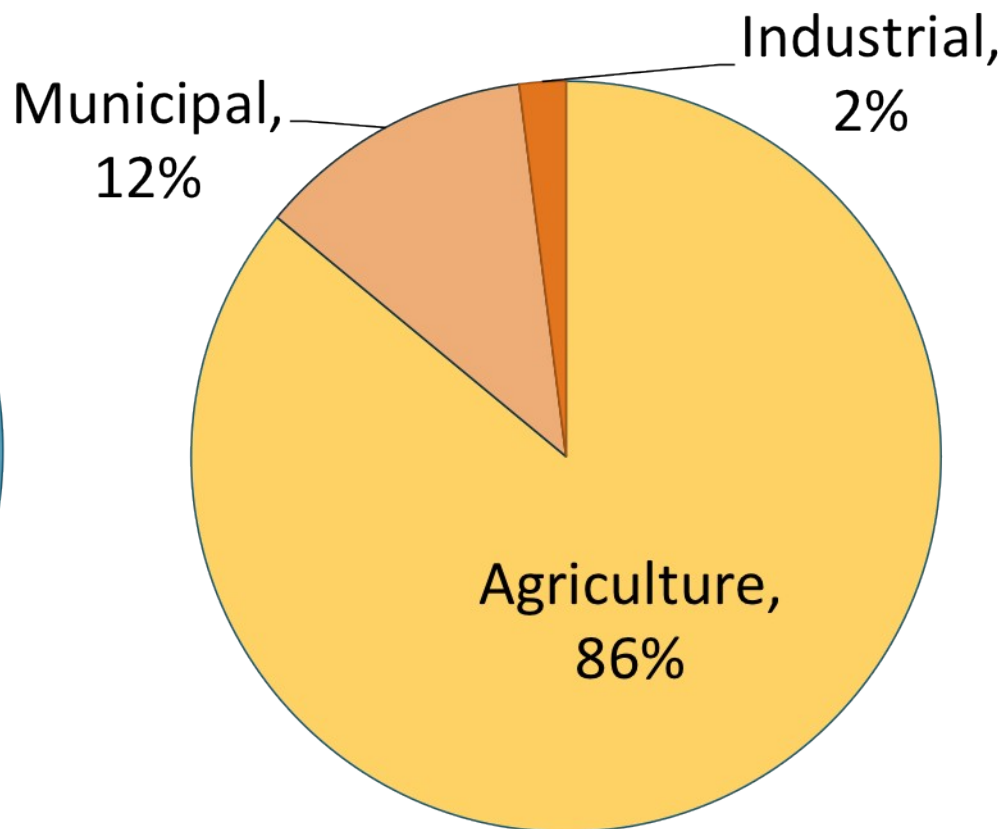
The Future: Water Availability

SUPPLY



~15% decrease in SW by 2050

DEMAND



53% increase by 2030

Closing Thoughts...

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Whether considering paleo, historic, current conditions, or projections of water availability, we shouldn't fixate on the



THANK YOU!

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