

Water, Ecosystem Services, and Society in the Changing Western United States

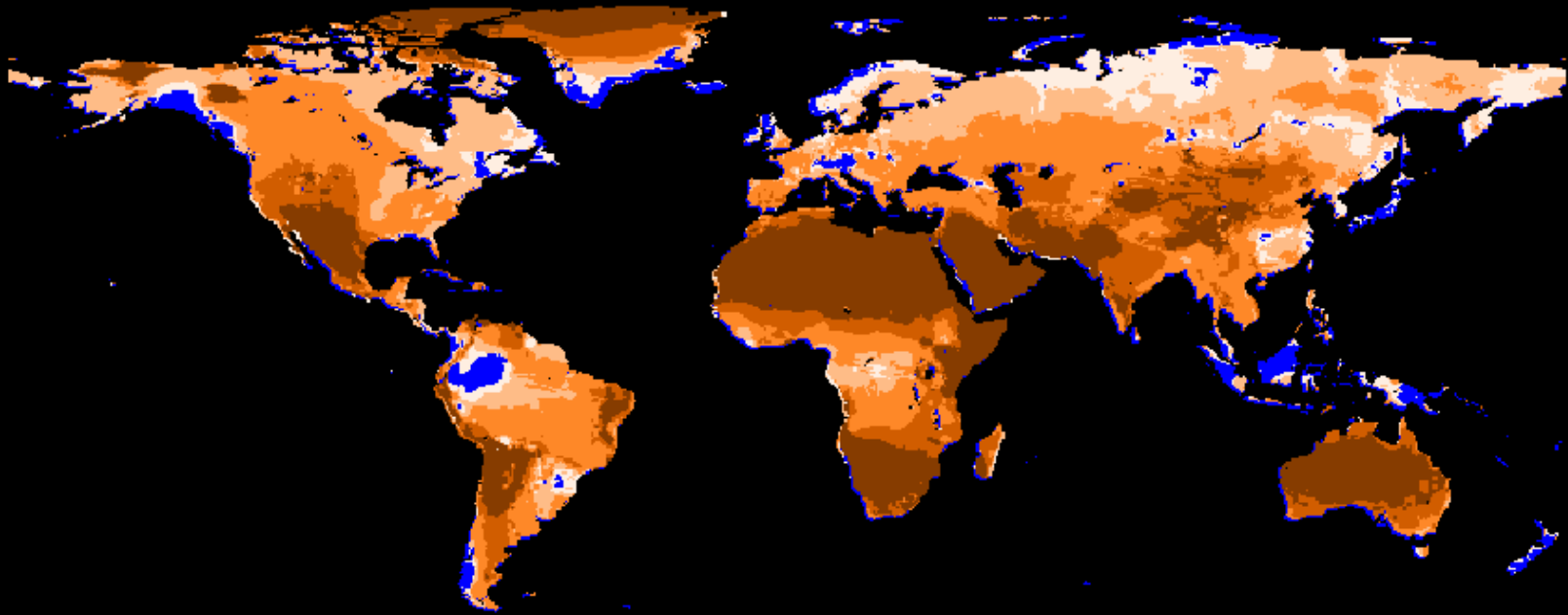
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Historical Terrestrial Water Limitation

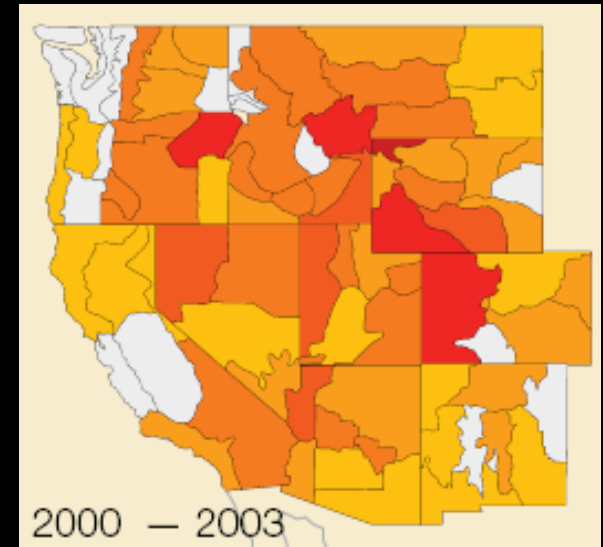
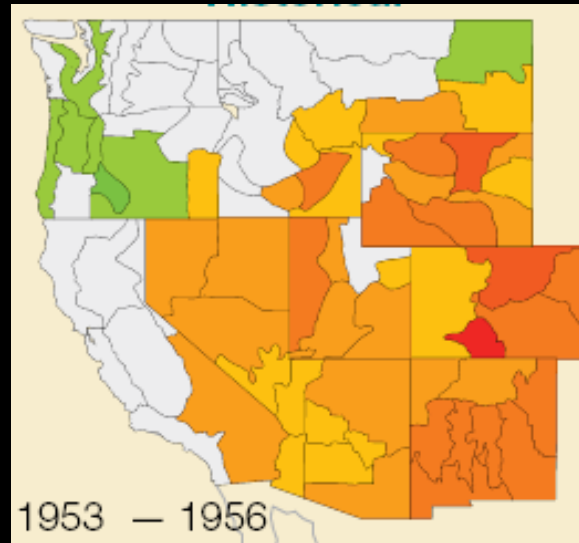


Months where Precipitation < Potential Evapotranspiration (30 year average)
(Blue = Never)

*Data from Ahn and Tateishi
1994; Cramer on going*

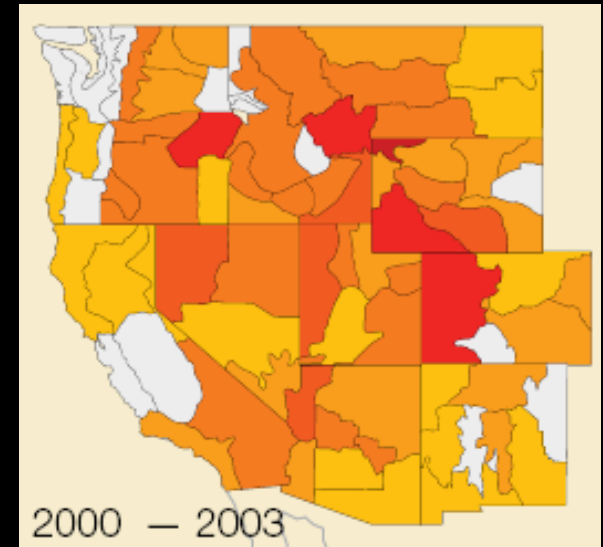
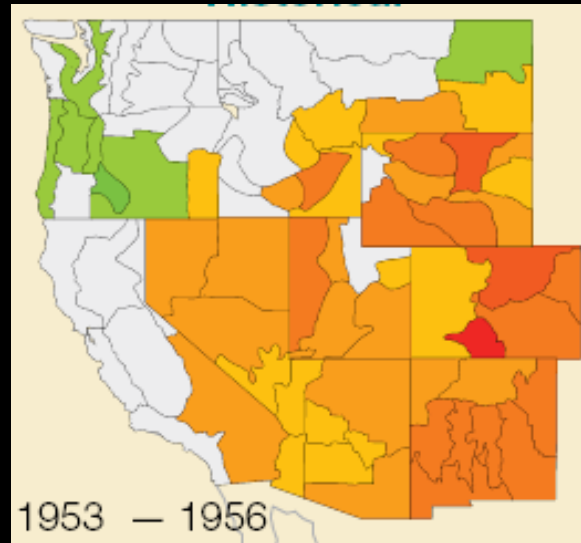
Future Western Climate Projections

Recent Droughts

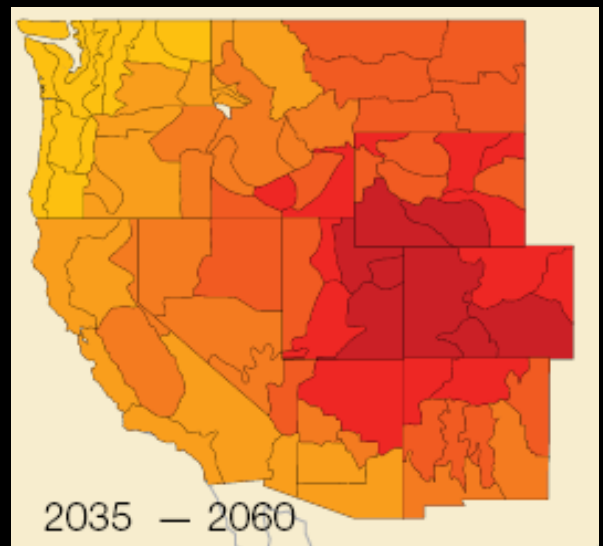
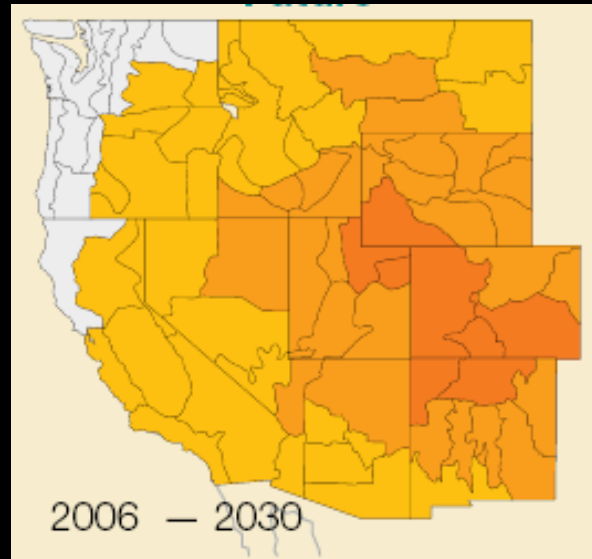


Future Western Climate Projections

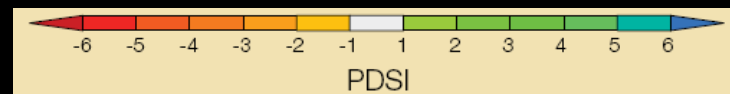
Recent Droughts



Future Average Conditions



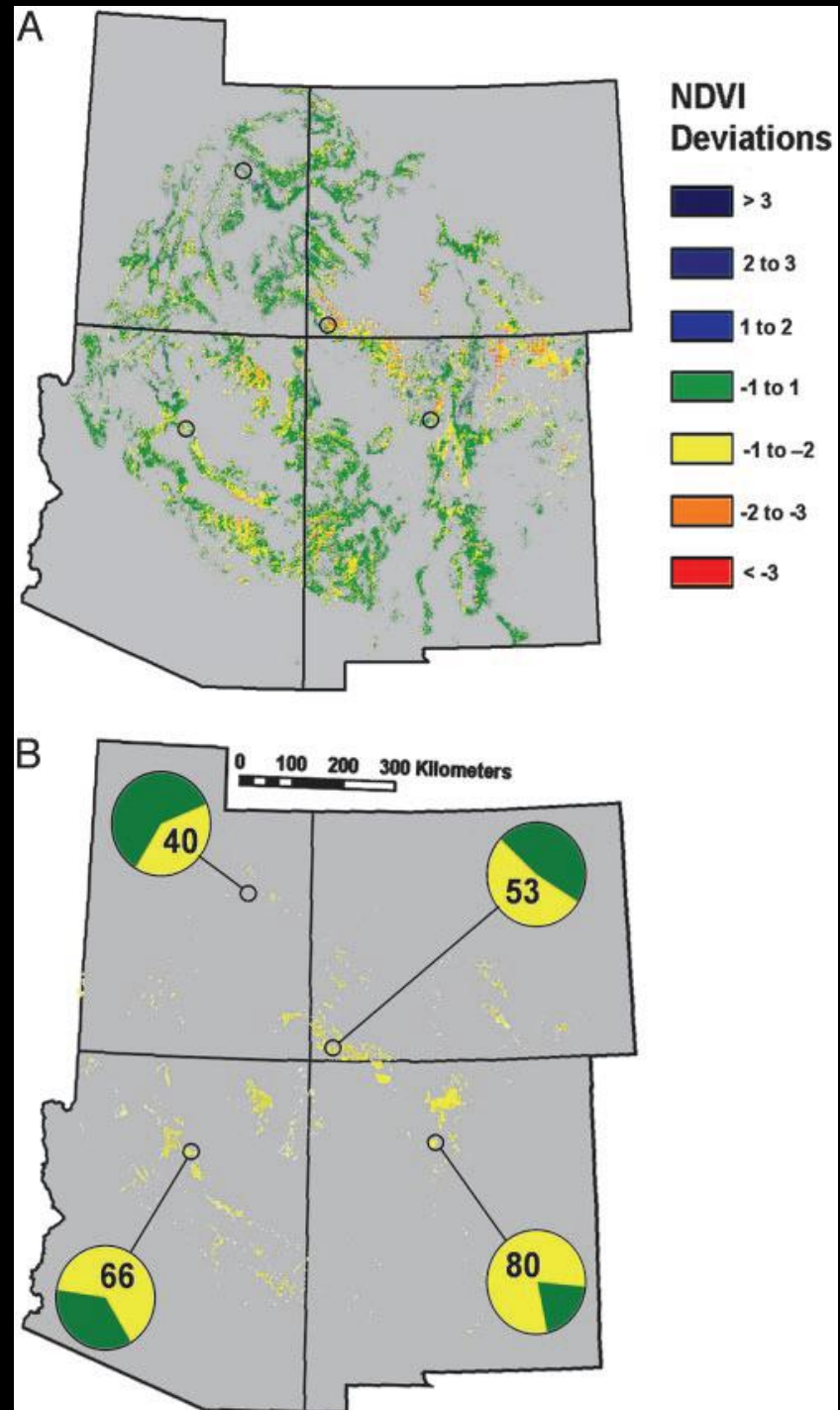
Hoerling 2007



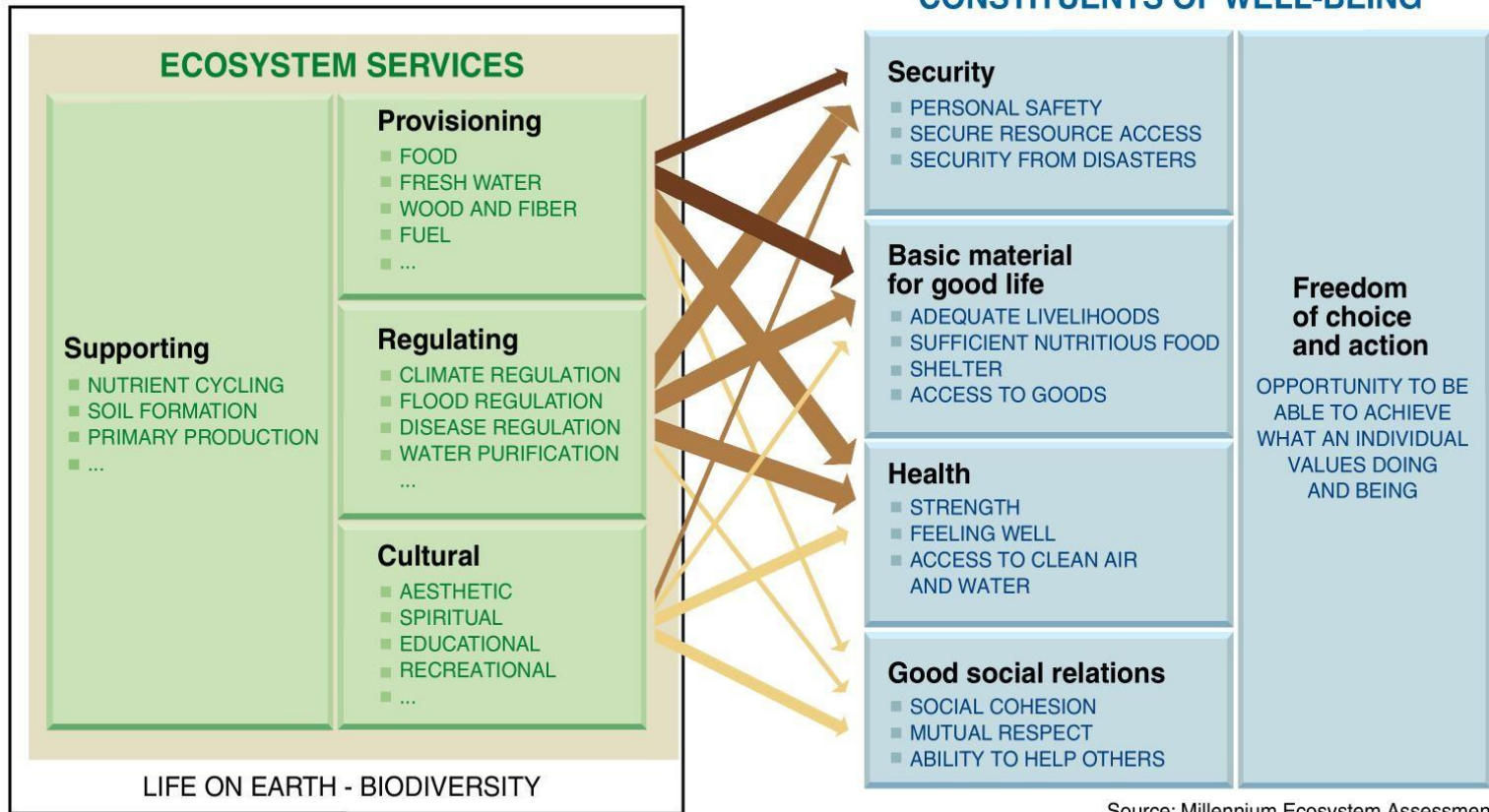
Mortality Impacts of Recent Drought

Change in Vegetation (NDVI): Pre-drought (1989-1999) Post-drought (2002-2003)

Local Estimates of Mortality 2003



Ecosystem Services



Source: Millennium Ecosystem Assessment

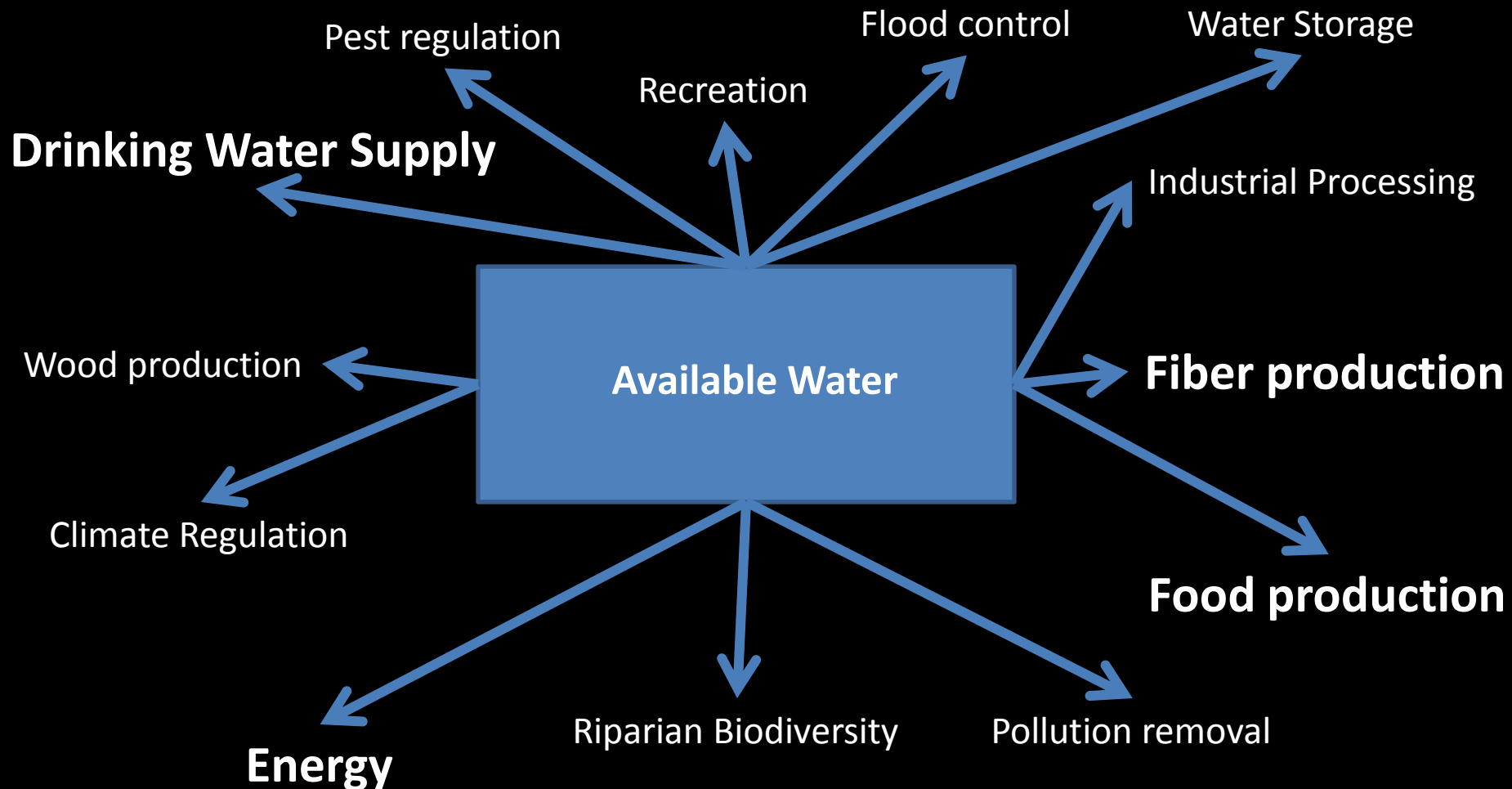
ARROW'S COLOR
Potential for mediation by socioeconomic factors

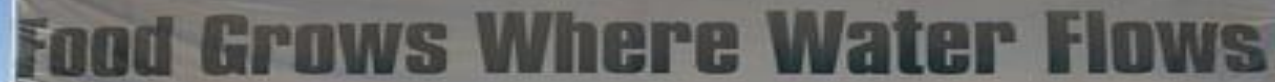
- Low
- Medium
- High

ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

Ecosystem Services and Water Distribution



A photograph of a white banner with the text "Food Grows Where Water Flows" in bold, black, sans-serif font. The banner is attached to a truck trailer and is positioned in a dry, arid landscape with sparse, low-lying vegetation under a clear blue sky.

Food Grows Where Water Flows

Trade-offs in Ecosystem Service Production and Water Management Decisions

- Water management decisions leads to changes in ecosystem services
- Ecosystem service decisions leads to altered water needs

Policy Options For Adaptation

- Water pricing
- Agricultural policy
- Housing policy
- Virtual water

Role of Ecological Research in Addressing Water Issues

- Predict future vegetation and soil responses and likely feedbacks to altered water availability
- Quantify the mix of ecosystem services produced by allocated water
- Improve efficiencies in the delivery of ecosystem services from water use