Climate LINKages of UPland—Lowland Environments (LINKUP)

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Socio-demographic Setting

The western United States has experienced tremendous population growth, which is changing the fabric of the urban and rural landscapes across the region.

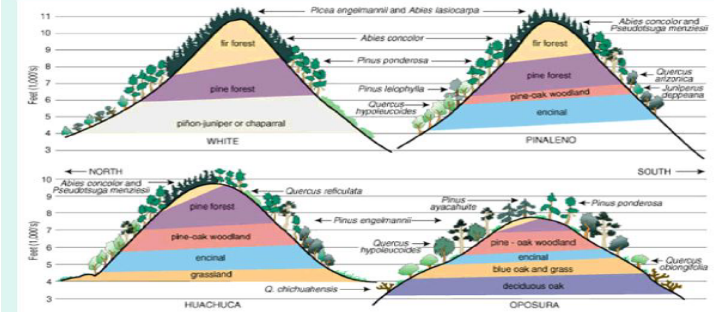
Linking Factors

Water and the lack of it is a fundamental and recurrent theme of western history. Reservoirs built to overcome this physical limitation.
Climate change may enhance the sensitivity and vulnerability of Western society.

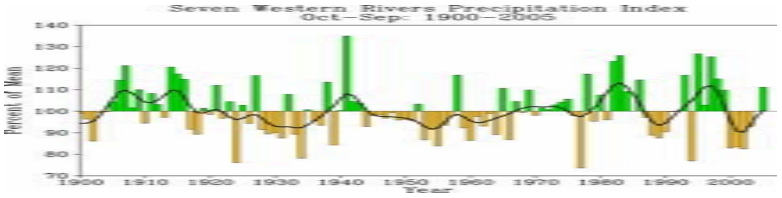
Climate Change Impacts

- Measurable changes in plant phenology,
- In the seasonal cycle of snowmelt and streamflow,
- In the rate of growth and disturbance of high elevation forest conifers,
- and amplified drought impacts (pest infestations)

Cross-sections of Sky Islands "stacked" biotic communities



Vertically stacked ecosystems may experience large and irreversible impacts from climate change.

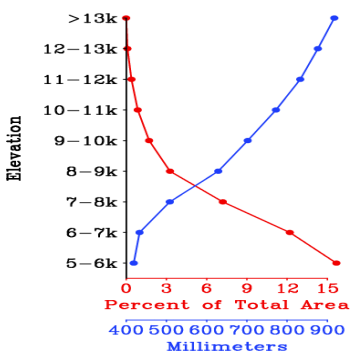


Index of 7 western rivers basin precipitation for the last 106 years

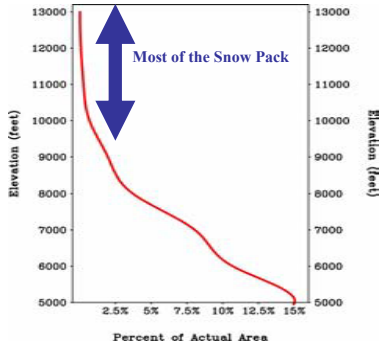
Vertically-Challenged: A Climate Program to Fit the Western Landscape

What do we need to know?

- ✓ *How have surface temperature and precipitation changed in high relief areas of the West?*
- ✓ *Are these changes, if any, variable with respect to ground elevation?*
- ✓ *Are there north-south and east-west differences in the temporal behavior of the temperature and precipitation fields across the western landscape?*



Mean precipitation in the western United States as a function of elevation. Also shown is the percentage of the total area within the indicated ground elevation segments



A conservative estimate of the percentage of actual area as a function of elevation intervals covered by station observations in the West. Values calculated assuming each station is representative of a 100-km² area.

Documented Changes in Western Climate

- ✓ **Overall rise of ~1–3°F (0.5–1.5°C) throughout the elevational ranges of the Western Cordillera during the last 50 years.**
- ✓ **Precipitation changes are more variable, with increases in some areas and declines in others.**
- ✓ **These changes exhibit elevational differences.**
- ✓ **It appears that a shift toward a drier climate regime may have taken place in the West in the late 1990s.**

What is needed?

CIRMOUNT
Consortium for Integrated Climate Research in Western Mountains
www.fs.fed.us/psw/cirmount

Anticipating Challenges to Western Mountain Ecosystems and Resources