**LECTURES 24. Climate and California Ecosystems**

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| David Ackerly | Monday, March 27, 2016 |

Outline

* Energy (= temperature) and water as limits to plant growth
* Terrestrial ecosystem **water balance**
  + **Potential evapotranspiration**
  + **Actual evapotranspiration**
  + **Climatic water deficit**
  + ‘**Surplus’** flow to rivers and groundwater
  + Impact of higher temperatures on these factors
* How plants deal with summer dry season
  + Deciduous/ephemeral life history
  + Deep roots
  + **Drought tolerance**
* Climate and limits to species distributions
  + **Abiotic vs. biotic limits**
  + Example: Sierran mixed conifer forest
    - Too cold above and too dry below
  + **Tradeoffs** between growth rate and stress tolerance

Key Points

* Plant growth may be limited by energy (i.e. warmth) or water
* Rain that falls onto ecosystems is partitioned into different components
  + Some is used for plant growth, or evaporated
  + Rest can runoff into rivers or penetrate groundwater
* Plants exhibit contrasting strategies to survive hot, dry weather

Terms

* You should know terms and concepts in bold above

Learning Goals

* Explain how energy or water can limit plant growth, and how those limits relate to climatic gradients in California
* Explain how rainfall is partitioned in terrestrial ecosystems, and what is meant by the climatic water deficit
* Explain different strategies for plants to survive hot, dry weather
* Explain what is meant by abiotic vs. biotic limits to plant distributions

Readings:

Dallman, Mediterranean Ecosystems of the World (reader, pp. 67-97)

*For Wednesday*: Field et al. 2016. Climate Change Impacts. Chapter in Ecosystems of California book (uploaded to bspace)