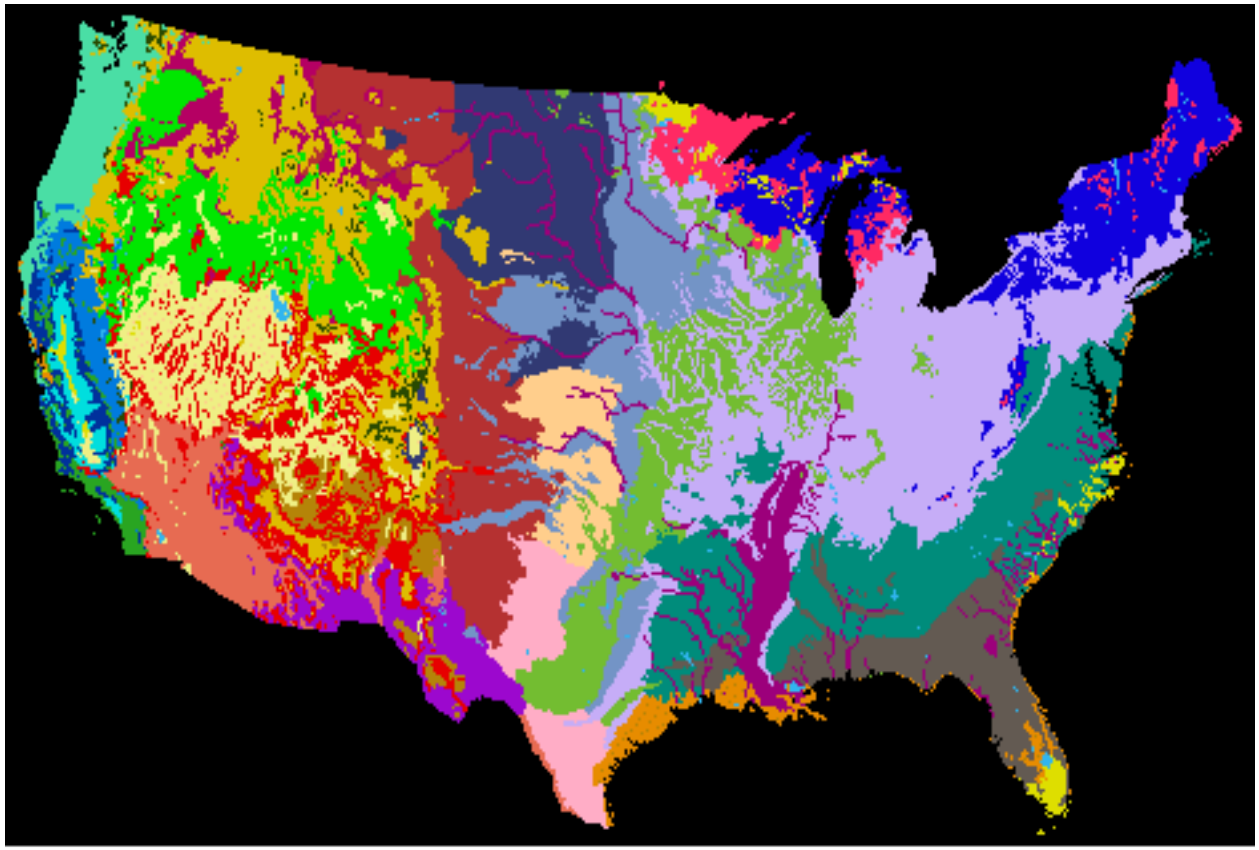
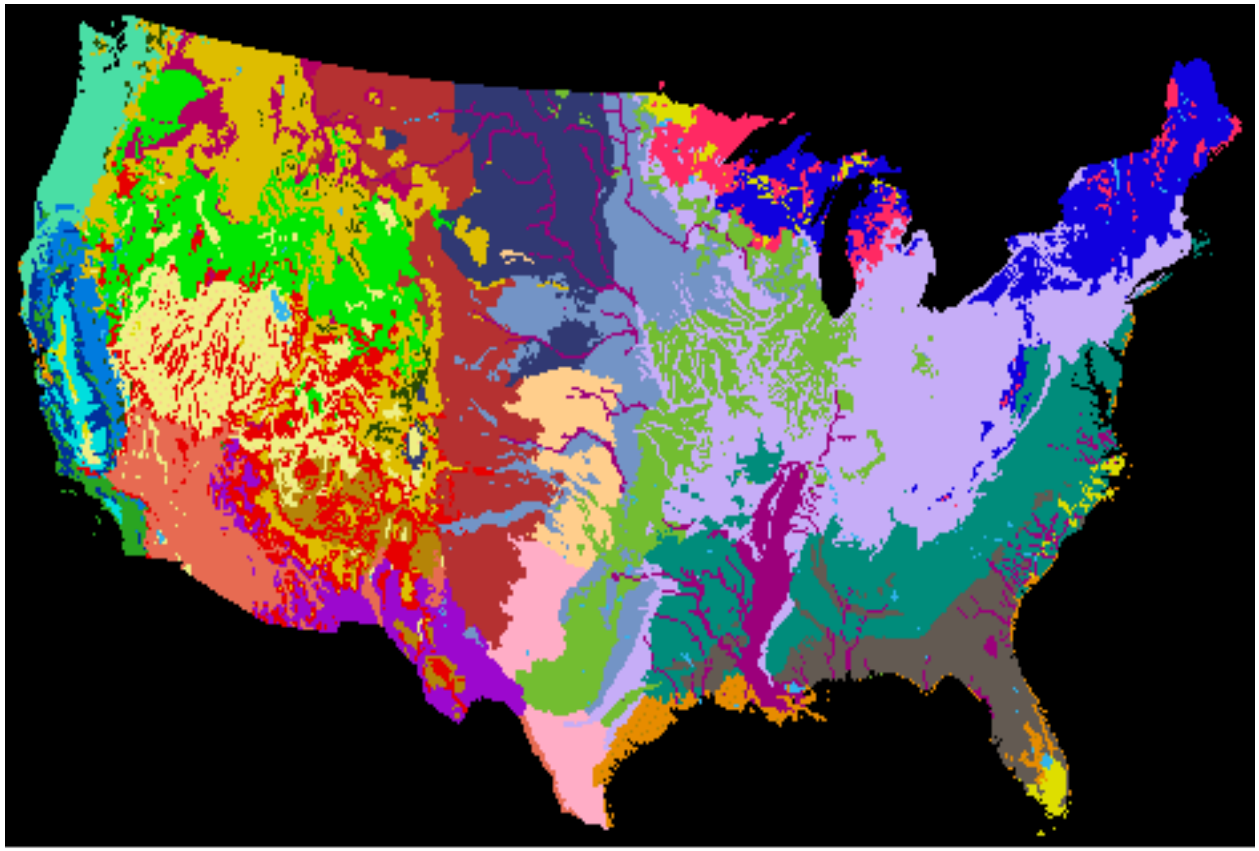
Climate change and potential natural vegetation



Kuchler 1964

Climate change: *An attack on the foundation of range management!*



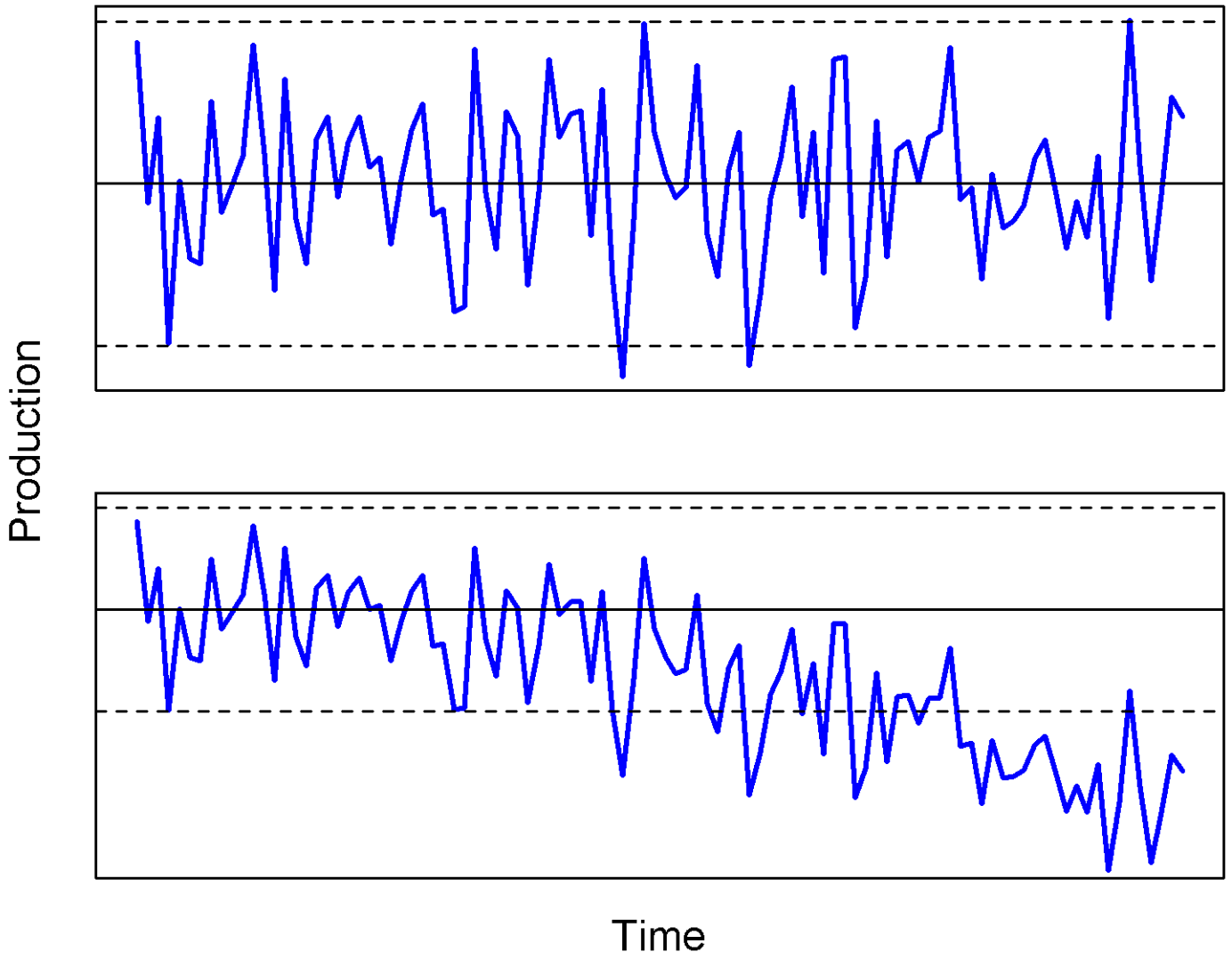
Kuchler 1964

Traditional management

- Retrospective concepts:
  - Potential vegetation
  - Reference conditions
  - Historical range of variability

Ecological site descriptions (ESDs)

Stationarity



CLIMATE CHANGE

Science 2008

Stationarity Is Dead: Whither Water Management?

P. C. D. Milly,[1]* Julio Betancourt,[2] Malin Falkenmark,[3] Robert M. Hirsch,[4] Zbigniew W. Kundzewicz,[5] Dennis P. Lettenmaier,[6] Ronald J. Stouffer[7]

"Stationarity Is Dead"– Long Live Transformation: Five Principles for Climate Change Adaptation Law

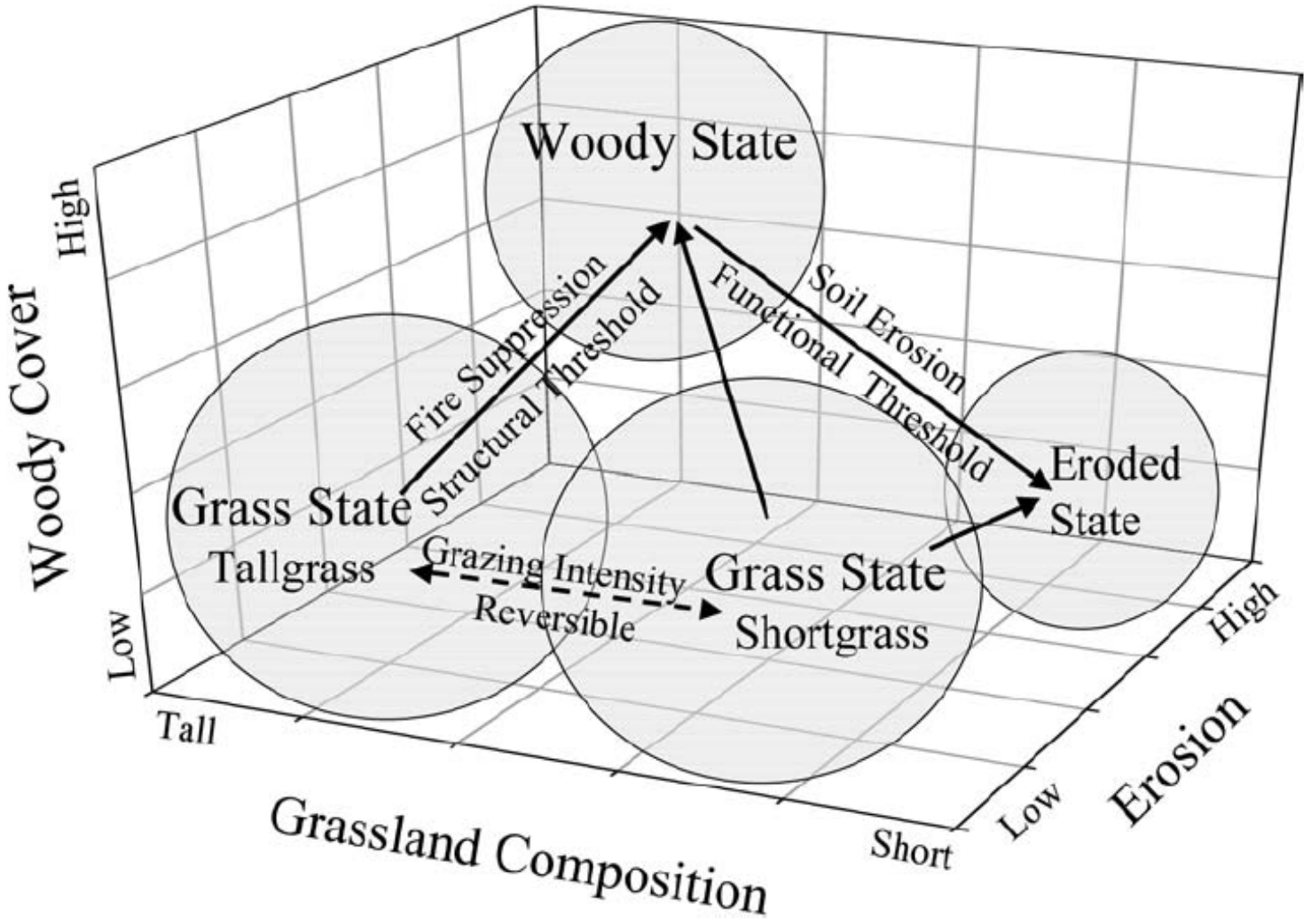
by Robin Kundis Craig

forthcoming 34:1 Harvard Environmental Law Review (March 2010)

Managing in the face of uncertainty

- Forest management (Millar et al. 2007)
  - *Resistance*, *resilience*, and *response* options
- Conservation (Lawler et al. 2010)
  - *Adaptive management*
- Ecological forecasting?

Incorporate climate drivers in state & transition models?



Briske et al. 2005

Line-up

- Wolter *Climate variability*
- Jackson *Paleoecology*
- Miller *Paleoecology*
- Knapp *Experiments*
- Dalgleish *Observations*
- Duniway *Observations*
- Bestelmeyer *Management implications*
- **Discussion**

Managing for the future

- Without reference conditions, how do we know when to apply conservation practices?
  - Shrub removal
  - Weed control
  - Grass seedings
  - Prescribed grazing

- Can we really add climate drivers to ESD's?