

Succession

- Habitat management is often manipulation of succession
- Models of succession
 - Linear 'Climax' models
 - Poly-Climax models
 - Threshold models
 - Individualistic models
- Predictability and habitat management

Terms & Definitions

- Succession
 - Primary =
 - Secondary =
- Disturbance =
- Sere = stage
- Climax =

Climax concept

- Climax concept is useful because –
 - So we can say, for example, that a particular site should develop in a 100 years to a stand of oaks
 - Conditions (temp, precip, etc.) lead to short-grass climax community

Linear models

- Climate determining factor
- Time required
 - with relative stability of conditions
- Linear succession models suggest that _____

Linear 'Climax' models

- Succession is a _____ change of plant community over time
- Several theories proposed for the mechanism of this change

Basic 'linear' succession model

Elasticity and Resilience

Elasticity =
Resilience =

Climax models

- Facilitation model (Relay Floristics)
 - Key characteristics =
- Inhibition model (Initial Floristic Composition)
 - Key characteristics =
- Tolerance model
 - Key characteristics =

Summary

- Replacement is facilitated
- Replacement is inhibited
- Replacement depends upon competitive ability under resource regime

Poly-Climax models

- Dis-climax (Daubenmire)
 - Key characteristics =
 - Examples: grazing, water, wind erosion etc.
- Climax pattern (Whittaker)
 - Communities are adapted to a range of conditions in which they exist
 - Clines of 'climax' communities changing with conditions over space
 - Not neatly separable into discrete communities

Whittaker (1975) Patterns

Actual patterns

Poly-Climax with 'thresholds'

Threshold Models

- Cumulative effects of disturbance can push systems to new equilibrium

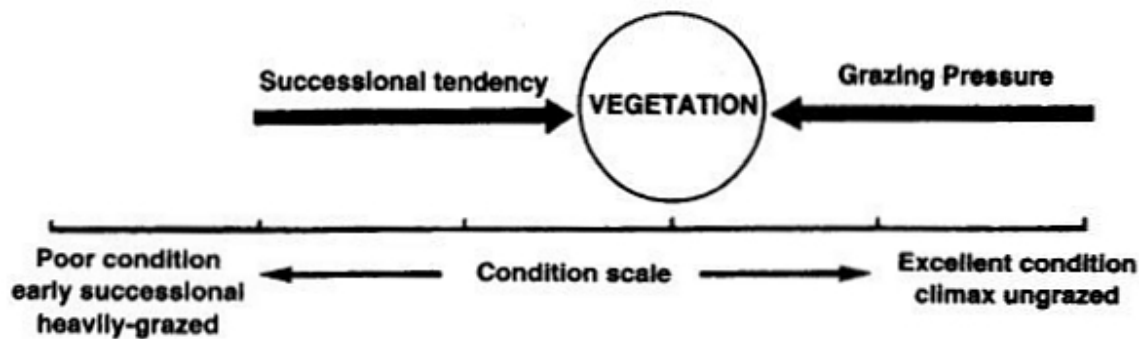
Succession cont.

- Current thinking about plant succession tends towards 'individualistic' models
 - Rather than 1 single hypothesis they are an umbrella for hypotheses that consider succession as a:
 - Gradient in time or resource availability
 - Consequence of differential longevity
 - Consequence of population processes
 - Result of life history traits
 - Stochastic process

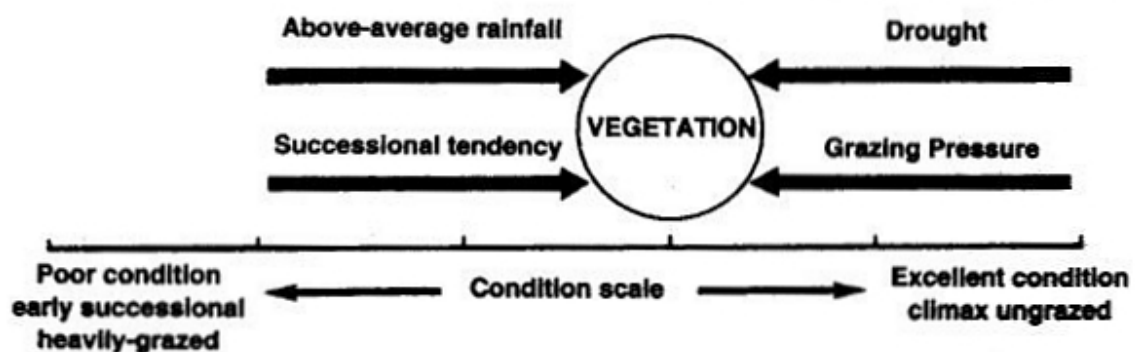
Individualistic Models

- Changing trends in thought
 - No uniform holistic explanation for successional patterns
 - Non- equilibrium vs. equilibrium models
- Communities are the result of interactions of plants and their environment
 - Gradients in time, resource availability
 - Differential longevity of plants
 - Population processes
 - Life-history traits
 - Stochastic processes

General Range Succession Model (Westoby 1989)



(b) INCORPORATION OF RAINFALL VARIABILITY IN THE RANGE SUCCESSION MODEL



Factors that can affect plant community compositions

- Present vegetation
- Surrounding vegetation (propagules)
- Past vegetation (seed bank)
- Resource levels (precip, light, soils etc.)
- Disturbance levels (herbivory, manipulations)
- Stochastic factors (climate, resource variability)