**Announcements:**
Final – Take home. I will hand out on the last day of class (5/5) and it will be due on 5/11 at noon.

**The role of space and scale in diversity**

The world is a “mosaic” of environmental “patches,” or habitat types

Whittaker (1972) distinguished three different levels or scales of diversity

Alpha diversity: “Local scale” diversity within a community (richness, S-W diversity)

Beta diversity: **Change in diversity** between local communities
- Measured as the number or fraction of unique species between the communities as a function of some measure of the distance between the communities
  - Geographic distance
  - Environmental gradient

Gamma diversity: “Regional scale” diversity across all communities in a defined region.

**Landscape Ecology**

The alpha-beta-gamma view of diversity leads naturally to landscape ecology.

Primarily concerned with the spatial arrangement and dynamics of “patches” on the “landscape mosaic.”

Measures of landscape mosaic
- Heterogeneity: number of patch types, relative abundance of types
- Patch size, number, and shape
- Connectivity among patches

Major question: how does the arrangement/juxtaposition of patches affect ecological processes?

Example: Monica Turner et al.’s study of Yellowstone succession after the 1988 fires

**Connectivity** – One of the major problems in landscape ecology is understanding connectivity.

Part of the problem has to do with having a basis for comparison – this has led to the use of “neutral landscape models”
Simplest example: random maps

It has turned out that neutral landscapes have some pretty interesting and non-intuitive properties.

Concerning connectivity, one measure of interest is the probability of having a habitat cluster (or patch) span from one side of the landscape to the other.

*How does this probability change as we increase or decease the cover on the landscape?*

What are the implications for managed vs. random (i.e., unmanaged) fragmentation

**Connectivity depends on scale**

Keitt et al. 1997 – Habitat connectivity of Mexican spotted owls (*Strix occidentalis*)

Dispersal characteristics of the species not well documented.

How is population structure affected by dispersal ability?

Certain patches may be “stepping stones” among subpopulations