

FES 100 - Introduction to Forest Biology: Topic #2

## **Forest Ecosystems and Energy**

(Campbell & Reece: see each topic)

### **I. Objectives**

- A. Define “forest”
- B. Describe energy flow through a forest
- C. Use basic concepts to evaluate human impacts on forests

### **II. What is a Forest?**

- A. Interacting system of biotic and abiotic components in a given area – ecosystem (p. 1098-1103)
  - 1. Biotic component:
    - 2. Abiotic, physical environment in area - “site”.
    - 3. Size of interacting area varies.
      - a) Stand.
      - b) Landscape.
- B. Other levels of organization.
  - 1. Communities
  - 2. Populations of species
  - 3. Organism, organ, tissue, cell, molecular

### **III. Forest ecosystems are unique in time and space.**

- A. Site changes due to climate and community changes.
- B. Species evolve.
- C. Chaotic interactions.
- D. Can’t be replicated.



B. Producers capture energy: autotrophs.

1. Primary producers
2. Gross primary productivity.
  
3. Net primary productivity.

C. Consumers: heterotrophs.

1. Primary.
2. Secondary.
3. Decomposers.

D. Trophic levels.

1. Energy is lost at each level.
2. Energy flow is one-way.
3. Pyramid of productivity.
  - a) Biomass.

E. Niche (p. 1160)

**VII. Ecosystems change over time - Succession. (p. 1186-1191)**

A. New sites and pioneer succession -

B. Disturbance and secondary community -

- C. “Climax” community

**VIII. The Basis for FES 100 and Understanding Forests**

- A. “Sustainable” Forests are living – they have 3 basic factors needed in all living systems:
  - B. A forest ecosystem is “*sustainable*” if the system’s components:
    - C. Introducing factors with which the system has not evolved can lead to substantial systems changes.
    - D. Importance of these concepts
      - 1. Well meaning people develop practices that interfere with forest functioning
      - 2. A better scientific understanding of forests is essential for developing sustainable ecosystems

**Key Terms.**

forest  
site  
stand  
landscape  
community  
population  
electromagnetic spectra  
kinetic energy  
chemical energy  
heat  
photosynthesis  
food webs  
respiration  
organism  
species  
autotrophs  
primary producers  
gross primary productivity  
net primary productivity  
heterotrophs  
decomposer  
primary consumer  
secondary consumer  
trophic levels  
pyramid of productivity  
niche  
succession  
pioneer community  
disturbance  
secondary community  
climax community  
sustainable forestry  
invasive species