

## SEGMENT FOUR LECTURE NINE: HUMAN IMPACTS AND CONSERVATION

Specific conservation strategies:

1. Biodiversity is concentrated in hot spots; tropical forests, coral reefs, and chaparral, are habitats for many endemic species found nowhere else, so preservation efforts are focused on biological hotspots (56.17).

2. Target invasive species for eradication (Fig. 56.8).

3. Principle: Minimum viable population size (MVP) is the smallest number of individuals needed to perpetuate a population indefinitely. Maintaining MVP is necessary to maintain minimum genetic diversity, as in the greater prairie chicken in Illinois (Fig. 56.11). Effective population size is based on breeding potential.

4. Principle: Human development fragments landscapes (Fig. 56.7) and makes more abrupt edges than are found in natural landscapes (Fig. 56.14). The ecological landscape is made of interacting ecosystems, such as forest patches or streams and wetlands of the same drainage system. Zoned reserve systems offer a compromise (Fig. 56.19). Successful nature reserves preserve the ecological landscapes with natural gradations from one type of ecosystem to another.

Natural **edges**, are boundaries between ecosystems. "Edge species include the ruffed grouse and the white-tailed deer. Edges are sites of speciation.

Movement **corridors** allow organisms to travel between fragments of habitat. Artificial movement corridors can be constructed connect habitat fragments (Fig. 56.16).

5. Natural resources have economic value. Recognizing and paying for the economic value of natural resources is sensible conservation. Costa Rica has a program, started in the 1990's, to compensate private landowners for different classes of **ecosystem services**, which are all of the processes through which natural ecosystems help sustain human life on earth, including

- a. Watershed protection for:
  - i. Flood control;
  - ii. Clean water for drinking;
  - iii. Low-sediment water for hydroelectric power;

Landowners are paid to conserve natural resources. Costa Rica has gone from having the highest deforestation rate in the world to the lowest because of a net gain of forest.

Preserving natural forests in Costa Rica near coffee plantations stabilized bee populations, protected 11 species of bees that pollinated coffee crops increasing yield and reducing deformed coffee beans. Total added value: \$62,000. Alternative: cut down the forest for pasturing livestock, with a net yield of only \$24,000.

Broad Conservation Activities

1. Establish nature preserves
2. Restore degraded habitats
  - a. **Restoration Ecologists** apply ecological principles in developing ways to return degraded ecosystems to conditions as similar as possible to their natural predegraded state (Fig. 56.21, 23).
  - b. **Bioremediation** is the use of organisms to detoxify polluted ecosystems as, e.g., the use of bacteria to clean up oil spills (Fig. 56.22).