

Ecosystems as Resources

Sustaining Ecosystems using proper
land and water management
techniques

Miller 10,11,12

NATURAL SERVICES PERFORMED BY ECOSYSTEMS

- ❖ CARBON STORAGE, MAINTENANCE OF CARBON CYCLE
- ❖ WATER TREATMENT – WETLANDS
- ❖ PEST MANAGEMENT
- ❖ SUSTAINS BIOGEOCHEMICAL CYCLES
- ❖ BUILDS SOIL, CONTROLS SOIL DEGRADATION
- ❖ MODIFIES CLIMATE- URBAN HEAT ISLAND

Why should we protect the
earth's biodiversity?

Instrumental Value of Biodiversity

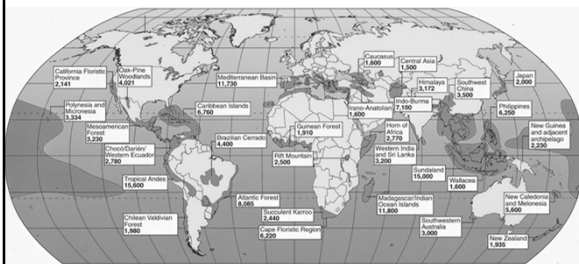
- ⊕ **Agriculture-**
- ⊕ **Medicine-**80% of the people depend on non-western medicine,
- ⊕ **Scientific research**
- ⊕ **Recreational-** hunting!

Modern drugs from traditional medicine

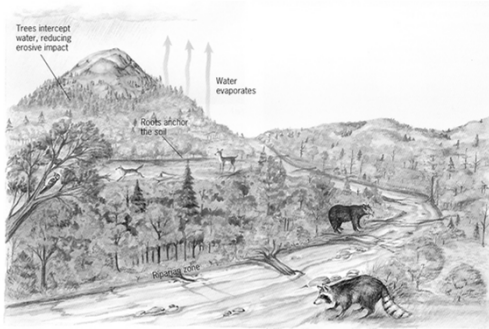
Table 11-1 Modern Drugs from Traditional Medicines

Drug	Medical Use	Source
Aspirin	Reduces pain and inflammation	<i>Filipendula ulmaria</i>
Codeine	Eases pain; suppresses coughing	<i>Papaver somniferum</i>
Ipecac	Induces vomiting	<i>Psychotria specacuauha</i>
Pilocarpine	Reduces pressure in the eye	<i>Pilocarpus jaborandi</i>
Pseudoephedrine	Reduces nasal congestion	<i>Ephedra sinica</i>
Quinine	Combats malaria	<i>Cinchona pubescens</i>
Reserpine	Lowers blood pressure	<i>Rauwolfia serpentina</i>
Scopolamine	Eases motion sickness	<i>Datura stramonium</i>
Theophylline	Opens bronchial passages	<i>Camellia sinensis</i>
Vinblastine	Combats Hodgkin's disease	<i>Catharanthus roseus</i>

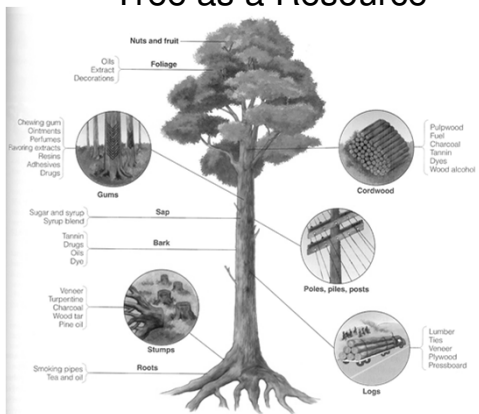
Biodiversity Hot Spots



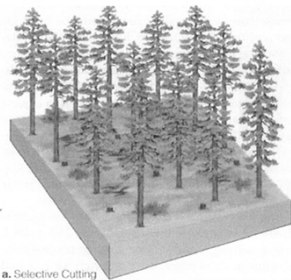
The Biodiversity of a Forest



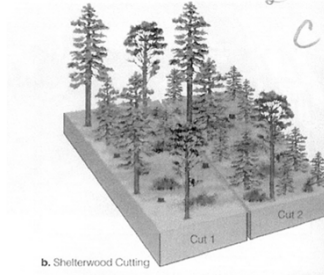
Tree as a Resource



Forms of Tree Harvesting Selective cutting

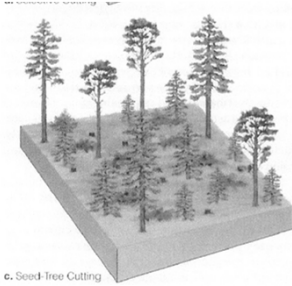


Shelterwood cutting



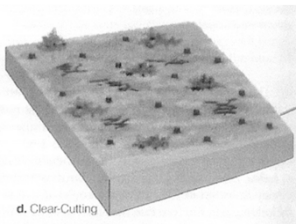
b. Shelterwood Cutting

Seed-tree Cutting



c. Seed-Tree Cutting

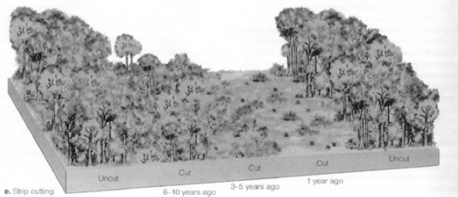
Clear-cutting



d. Clear-Cutting

Strip Cutting

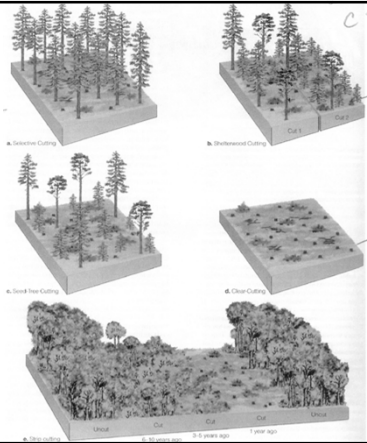
A variation of clear-cutting that can allow sustainable timber yield without widespread destruction

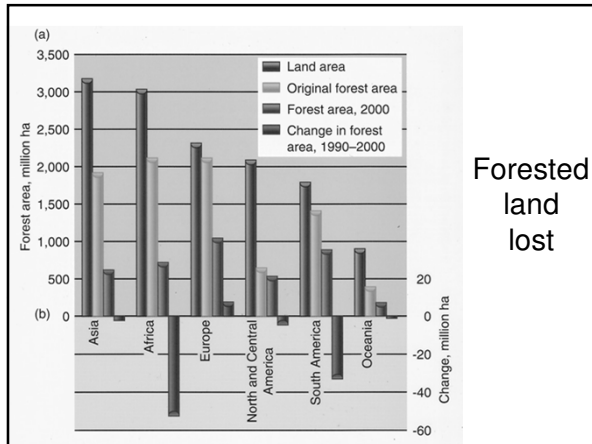


Which type encourages Secondary succession?

Which type protects Biodiversity?

Which type encompasses ecological integrity?





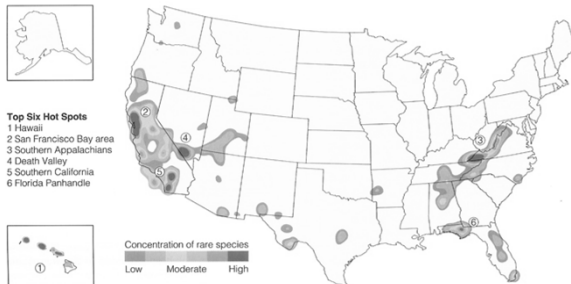
Forested land lost

Rangeland- 1/2 of the earth's ice-free land

● **@42% is used for grazing**

● **Utilizes two different management techniques**

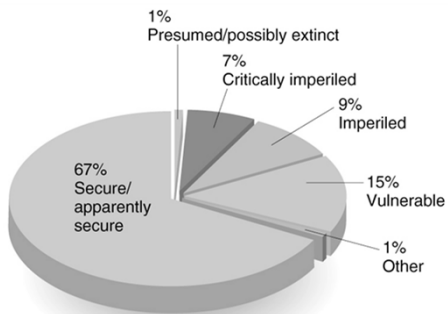
A Biological hotspot is an area in the biosphere where



- Top Six Hot Spots
- 1 Hawaii
 - 2 San Francisco Bay area
 - 3 Southern Appalachians
 - 4 Death Valley
 - 5 Southern California
 - 6 Florida Panhandle

--- In California there are 3,488 native plant species, 60% can be found nowhere else on earth

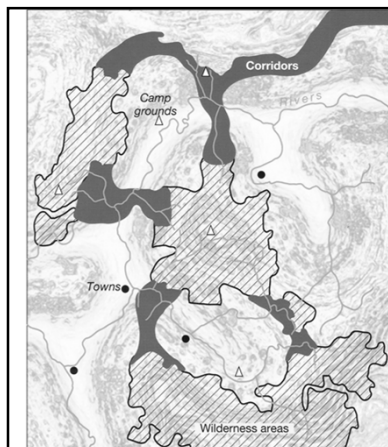
The State of U.S. Species



Conservation vs. Preservation

Areas
protected in
the United
States

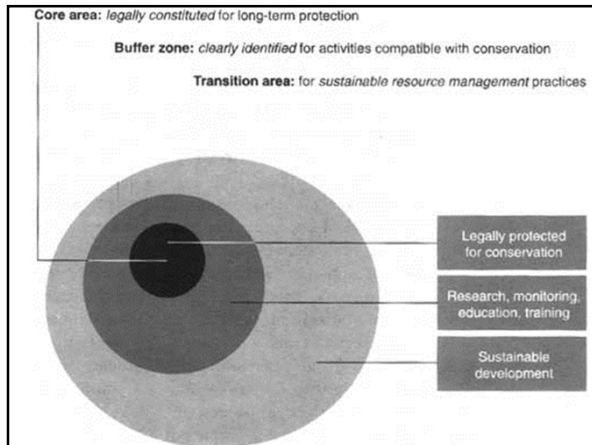




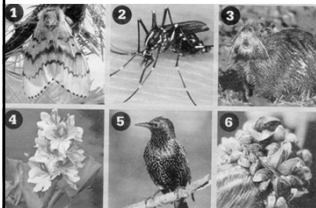
Wildlife
Corridors

Biosphere Reserves

- The idea of the biosphere reserve was initiated by UNESCO in 1974. The objective of the program was to obtain international cooperation for the conservation of the biospheres.
- The concept of "biosphere reserve" implies environmental conservation, scientific research and sustainable development.
- This is realized through a specific land-use system which takes into account the topographic, biological, economic and socio-cultural characteristics of each site.



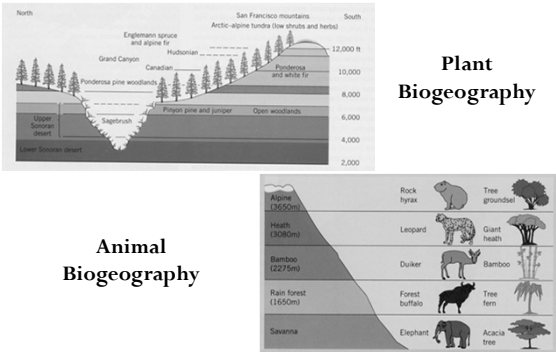
Invasive species



- 1) **Gypsy Moth**- devours trees
- 2) **Asian Tiger Mosquito**- transmits encephalitis
- 3) **Nutria**- eats 3lbs of marsh plants a day
- 4) Clogs ponds, rivers, and swamps in south east
- 5) **European Starling**- introduced 1890, destroys fruit and vegetable crops
- 6) **Zebra mussels**- multiplying rapidly in the Great Lakes, clogging filtration systems

Biogeography

The geographical distribution of living things



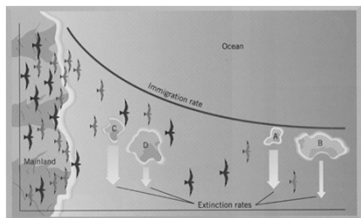
**Animal
Biogeography**

**Plant
Biogeography**

Biogeography

- ↓ Scientists use this knowledge to predict what will grow where based on climatic similarity
- ↓ Physical barriers created by geological processes such as glaciation have separated species and caused migration and speciation.
- ↓ Look at the ratio of endemic to exotic species.
- ↓ Knowledge is use to predict future implications of global changes

Theory of Island Biogeography



Does this happen in urban areas?

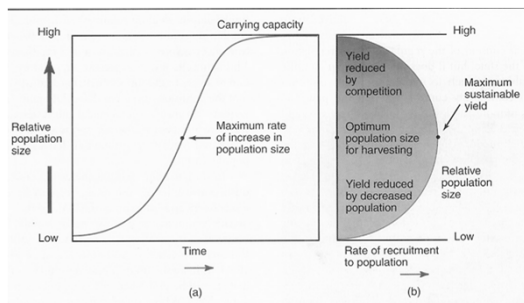
Gap Analysis

- Map existing vegetation and vertebrate species
- Create a computer generated model
- Compare land management programs to see if alterations are necessary
- Used in Orange County

Ocean as a Resource

- Ⓞ Marine fisheries account for 1/5 of the human protein consumed
- Ⓞ Magnuson Act of 1976~set a 200-mile

Maximum Sustainable Yield



Optimal Population for harvesting is about 50% cc
