Chapter 18
Conservation of Biodiversity p. 495
AXES Paragraph P. 34 NB

1/5 Agenda

- WELCOME BACK!
- Warm up, pg. 74
  - Stamp CH 18, 19, 20 MC SG
- Notes
- Go over CH 18, 19, 20 MC SG answers
- Wanted posters
- PERMISSION SLIPS!!!!

1/5 Biodiversity CH 18

Obj. TSW learn about the importance of biodiversity and the need for Conservation. P. 74 NB

1. Why is protecting Biodiversity important?
2. Give some examples of Global declines in Genetic Diversity of Wild organisms, Crops /Livestock and in species.
3. What are some of the causes of Declining Biodiversity?

Chapter 18 Opener
Environmental Science

Why is biodiversity important?

- Provides a number of instrumental and intrinsic values to humans
- Instrumental values
  - Provisions, such as food, medicine, and building materials regulating services such as the ability of plants to remove human-added CO2 from atmosphere, support services such as the pollination of agricultural crops
- Intrinsic values
  - Provide no direct benefit to people but are simply the belief that individuals, species and ecosystems are inherently valuable in themselves and that we have an obligation to preserve them

The 6th Mass Extinction

- Extinction- when there are no longer any of the species in the world.

- We are currently losing approximately 50,000 species per year.
- The focus of this chapter is on conservation.
- This chapter looks at the causes of Biodiversity loss and the laws involved that protect species.

Genetic Diversity

- Scientists want to conserve genetic diversity so that the species can survive environmental change & inbreeding will not occur.
- Wild Organisms: Inbreeding occurs when individuals with similar genotypes, generally relatives, breed with each other
- Ex: Florida Panther: Roamed most of North America; eradication and habitat loss the population shrank, led to interbreeding, scientists released new panthers in to area which reduced interbreeding and increased

population from 20 panthers to about 80-100


Figure 18.1

Genetic Diversity of Livestock

- Livestock: UN says that a majority of livestock come from 7 species of mammals and four species of birds
- Producers concentrate on efforts on the breeds that are most productive and much of the genetic variation is lost
- Ex: In Europe, half of the breeds of livestock that existed in 1900 are now extinct; 43% are currently endangered

Genetic Diversity of Crops

- Century ago: Most of the crops consumed were composed of hundreds or thousands of unique genetic varieties
- From CH 11: Green Revolution in agriculture focused on techniques that increased productivity
- Farmers planed fewer varieties concentrating on those with higher yields
- EX: At the turn of the 20th century= farmers grew approximately 8,000 varieties of apples
  - Now: Reduce to about 100 and considerably fewer are available at the local grocery store
  - Open to crop loss if the abiotic or biotic environment changes
  - To help preserve the diversity, there is a global seed bank in Svalbard Norway.

Categories of Endangerment

- Extinct- no known species exist today
- Endangered – good possibility of going extinct in your lifetime.
- Threatened- species with a high risk of extinction in the future
- Near-threatened- species that are likely to become threatened in the future
- Least concern- species are widespread and abundant

Endangered Species Act

- Endangered Species Act- first passed in 1973, it authorizes the U.S. Fish and Wildlife Service to determine which species can be listed as threatened or endangered and prohibits the harming of these species.
- Trading these species is also illegal.
- The act also authorizes the government to purchase habitat that is critical to the species.

The decline of Birds, Mammals, and Amphibians

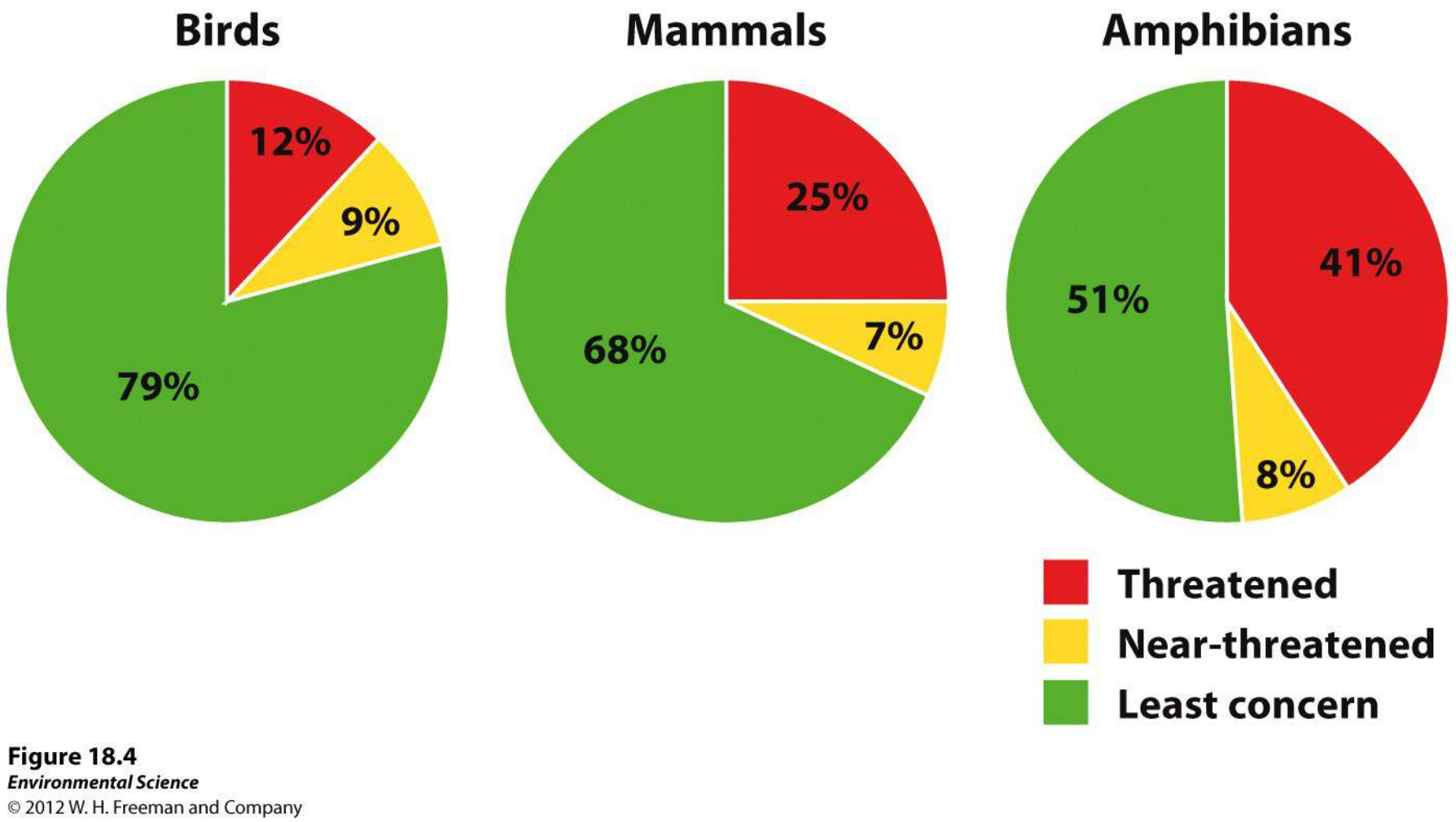


Figure 18.4
Environmental Science

21% Birds, 32% mammals, 49% amphibians are currently classified as threatened or near threatened with extinction in the United States, similar trends exist in the world.

HIPCO – 5 reasons to Biodiversity loss

- H- Habitat Loss
- I- Invasive Species
- P- Pollution
- C- Climate Change
- O- Overharvested

Habitat Loss

- For most species the greatest cause of decline and extinction is habitat loss.
- Most habitat loss is due to human development
- Mt. Rainer National Park WA, Habitat for Spotted Owls
- Clear Cutting an old growth forest for timber Olympic National Forest, WA Spotted Owl can no longer live there.

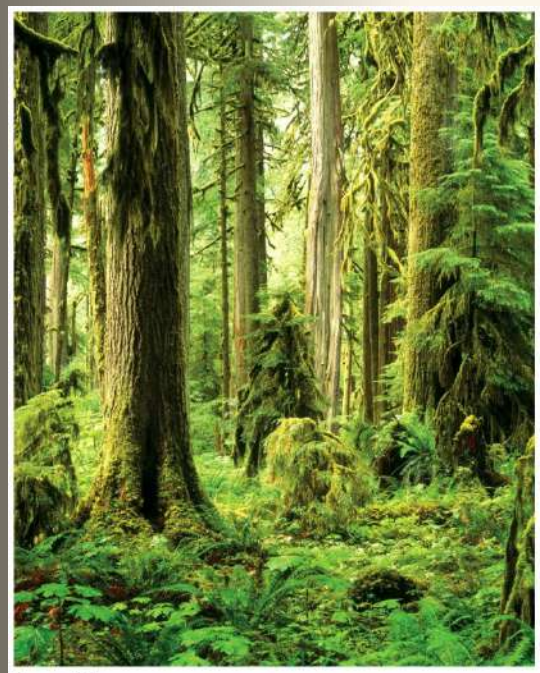


Figure 18.5a
Environmental Science

Figure 18.5b
Environmental Science

Changing Forests

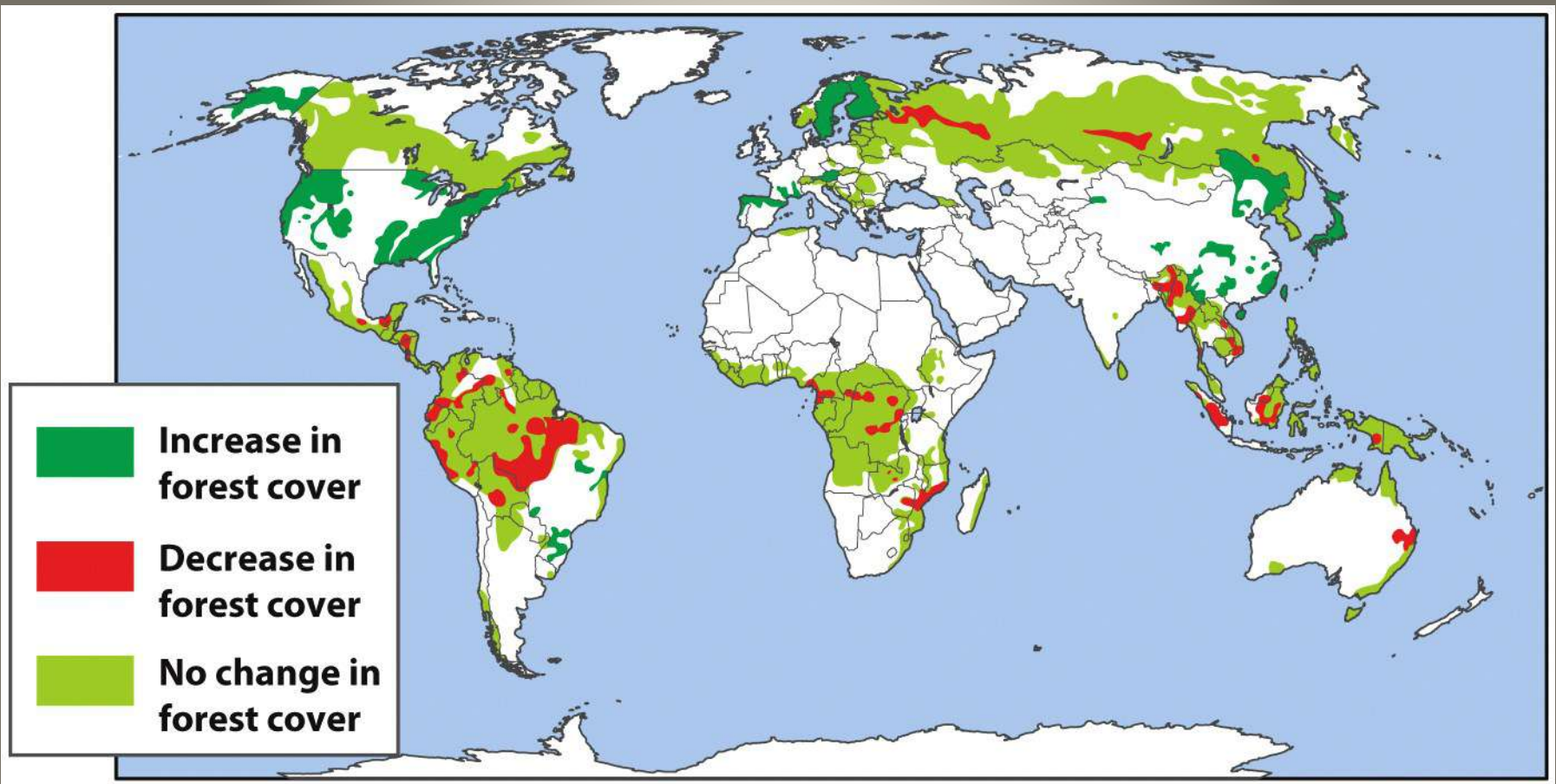


Figure 18.6
Environmental Science

Invasive Species

- Alien species (exotic species)- species that live outside their historical range.
- Invasive species- when alien species spread rapidly across large areas.
- Ex- Kudzu Vine, Zebra Mussel, Silver Carp

Invasive Alien Species

Figure 18.9a
Environmental Science

The Zebra Mussel, below, was accidentally introduced to the Great Lakes in the Northern part of US and has covered all hard surfaces, including water intake and outlet pipes of industries that use the water.

The fast – growing Kudzu vine above, is native to Asia but was introduced to the US to control erosion. As you can see, it takes over.

Figure 18.9b
Environmental Science

Pollution

- Threats to biodiversity can come from toxic contaminants such as pesticides, heavy metals, acids, and oil spills.
- The decline of coral is the result of human impacts that include the increase in ocean temperature, increased pollution and removal of coral by collectors.

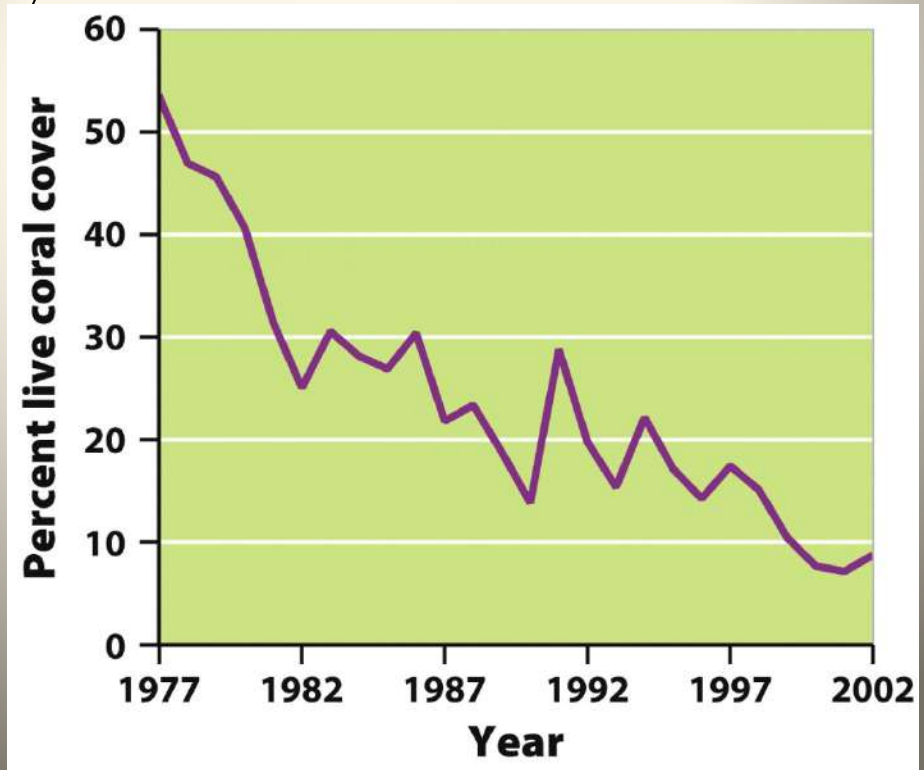


Figure 18.7
Environmental Science

Climate Change

- Primary concern about climate change is how will it affect patterns of temperature & precipitation in different regions of the world
- In some regions→ species may be able to respond to warming temperature and changes in precipitation by migrating to a place where the climate is well suited to the species niche, but not always possible
- EX) Polar bears

Overharvesting

- When individuals of a species are removed at a rate faster than the population can replace them.
- Ex- Dodo, American bison, passenger pigeon.
- State & Federal Regulations restrict hunting and fishing of game animals to particular times of the year and limit the number of animals that can be harvested.

Figure 18.11
Environmental Science

“Wanted Poster”

Like the ones you see of criminals in old time western movies

- Research an invasive species

Examples: Kudzu, Zebra Mussel, Silver Carp, Asian Carp, Cane Toads, Arrundo

- Include the following information in your Poster:
- Why the species is “Wanted”
- Where it has been seen (include a map).
- What other species it has harmed?
- How it made it to the scene of the crime
- A picture of the criminal
- What is being done to try to apprehend the criminal
- How the criminal gets around from crime to crime.
- What problems have they caused?

Analysis

1. Why are scientist concerned about the introduction of invasive species?
2. What do invasive species often become pests?
3. List 3 things you can do to prevent the introduction of invasive species.

2. Sharks and Manta Rays Protected

Sharks not only lucked out in Fiji this year, but 2014 brought around new laws to protect five species of shark and two species of manta ray. CITES, the Convention on International Trade of Endangered Species has been working the last 18 months on regulations that will be implemented to protect sharks and rays. The new regulations will require permits and certificates to accompany and trade of these animals or their parts. The great hammerhead shark, smooth hammerhead shark, scalloped hammerhead shark, oceanic whitetip shark, and manta rays are the species protected by the new regulations. This will help track and regulate use of these animals to ensure their long-time survival.

Chris Zielecki/Flickr

In the News...

1/7 Agenda

- Warm UP
- Go over CH 19 MC Study guide Answers
- Topic 5 Answers
- Do the Math
- Wanted Poster & Trifold

Do the Math P. 505 ES BK

- Calculate the percent increase of terrestrial alien species from the 1930's – 1990's.

Step 1: Read the graph to find the number of species in 1990's & 1930's

1990-s – 1600 species

1930's – 700 species

Step 2: Divide the number of species from 1990's by the number of species from 1930's

90's value – 30's value/ 30's value =

1600 – 700 = 900 species

900 species / 700 species = 1.28

Multiply answer by 100%

1.28 x 100% = 128% increase in number of alien species.

5/2 Conservation of Biodiversity CH 18

Obj. TSW learn about laws to protect species from extinction, to preserve biodiversity. P. 46 NB

1. Describe the two general approaches to conserving Biodiversity.
2. Give an example of how a single species can rebound through the conservation of biodiversity.
3. Give an example of how entire ecosystems can rebound.

Figure 18.14
Environmental Science

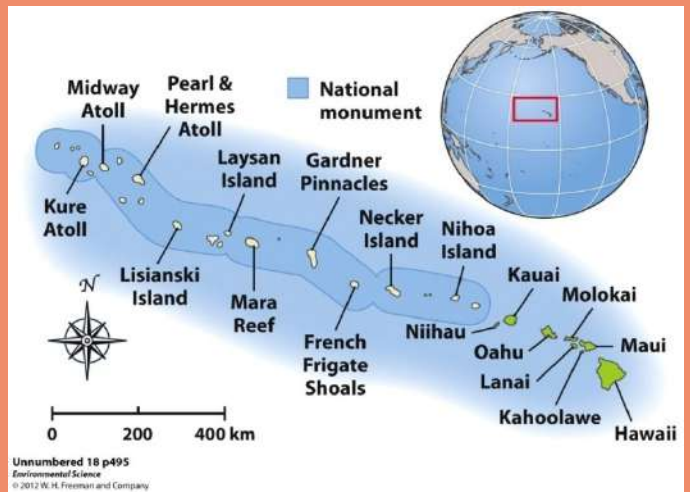
Success Stories for Endangered species

- Bald Eagles – Habitat protection, reduced contaminants in their environment.
- Peregrine Falcons
- Grizzly Bears
- Red Wolves

Figure 18.14
Environmental Science

Read opening story: Modern Conservation Legacies p.495 ESBK

- Create a **Trifold Ecotourism Brochure using Microsoft Publisher** with a partner.
- The purpose is to sell you on a trip to a real national park, Preserve, or marine sanctuary.
- Include all the HIPCO items that would be problems in their park/ preserve
- How can ecotourists help solve these issues?
- Include a map, pictures of native species, and pictures of invasive species.
- Due Thursday



Unnumbered 18 p495
Environmental Science


Chapter 18 Opener
Environmental Science

Lacey Act

- One of the earliest laws in the U.S. to control the trade of wildlife.
- First passed in 1900, the act prohibited the transport of illegally harvested game animals, primarily birds and mammals, across state lines.

CITES

- Convention on International Trade in Endangered Species of Wild Fauna and Flora
- Developed in 1973 to control the international trade of threatened plants and animals.
- Today, CITIES is an international agreement between 175 countries of the world.

Red List p. 51 NB

- The IUCN keeps a list of threatened species, known as the red list.
- Each country has its own way to monitor and regulate the import and export of animals on the list.

Philippine Forest Turtle
The only remaining population of this species is on an island in the Philippines. It is protected by law, however illegal trade has caused a rapid decline of this species in the wild.

Figure 18.12
Environmental Science

Conservation Legislation

- Marine Mammal Protection Act- prohibits the killing of all marine mammals in the U.S. and prohibits the import or export of any marine mammal body parts.

Figure 18.13a
Environmental Science

Figure 18.13b
Environmental Science

Endangered Species Act

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Convention on Biological Diversity

- In 1992, nations came together and made a treaty to protect biodiversity.
- The treaty had three objectives: conserve biodiversity, sustainably use biodiversity, and equitably share the benefits that emerge from the commercial use of genetic resources such as pharmaceutical drugs.

Changes in Protected Land
The conservation of Biodiversity through protecting entire ecosystems

Theory of Island Biogeography

- Larger islands contain more habitats & niches = more species. Less susceptible to extinction.
- Closer to the mainland increase in species numbers.

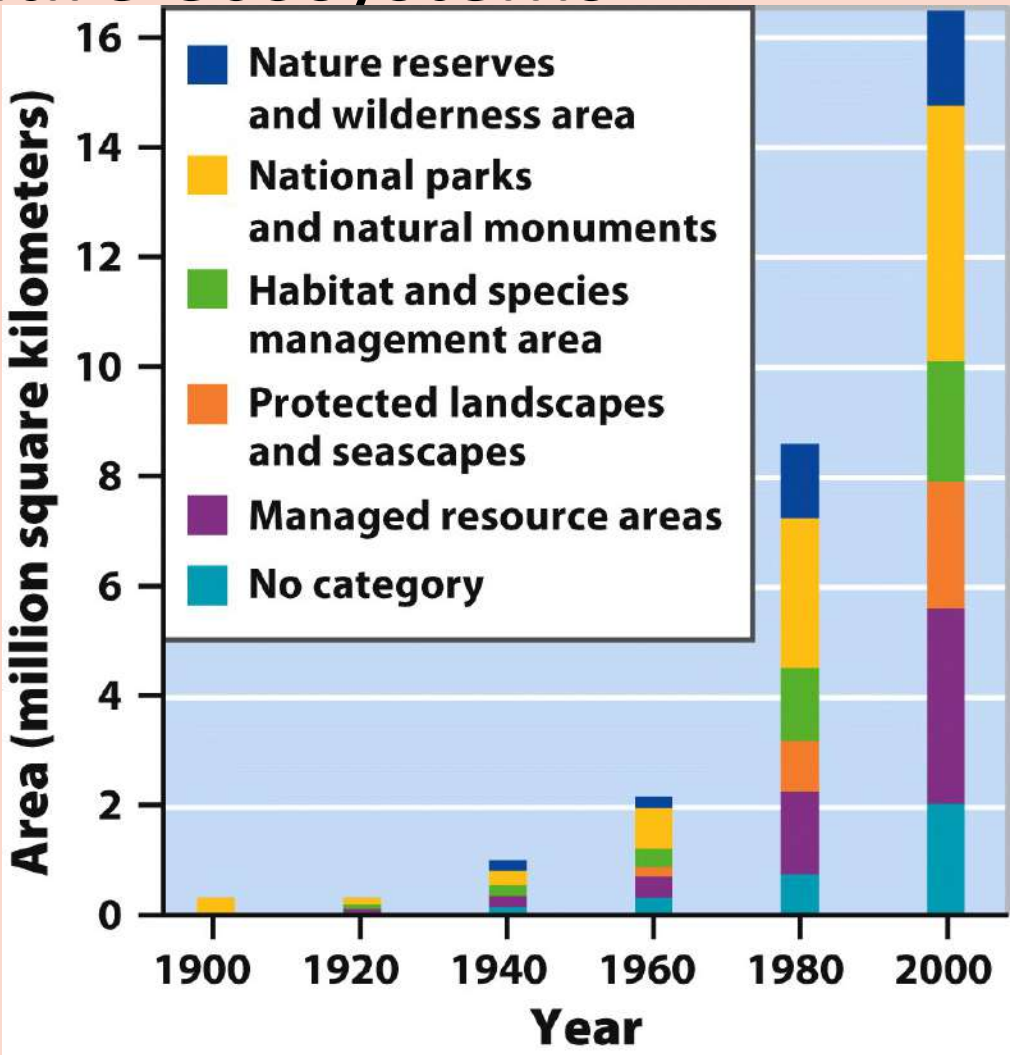

Figure 18.15
Environmental Science

Size, Shape and Connectedness

- When designing and managing protected areas we must consider how close to another area they should be, how large the area is, and the amount of edge habitat the area contains.
- Edge habitat- the area where two different communities come together, typically forming an abrupt transition. Ex. A grassy field meeting a forest.

Central Park in New York City
Island of hospitable habitat

Figure 18.16
Environmental Science

Biosphere Reserves

- Protected areas consisting of zones that vary in the amount of permissible human impact.

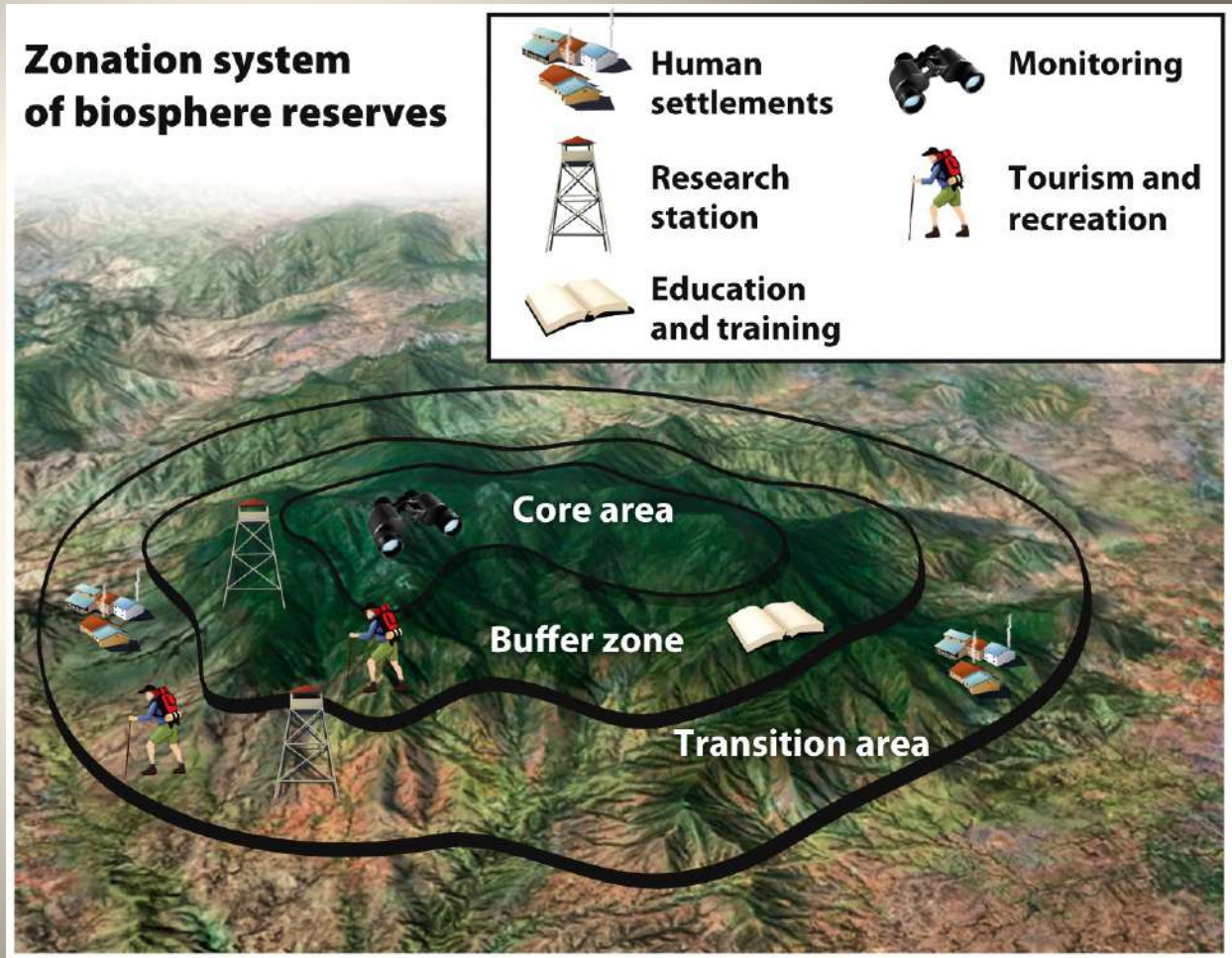

Figure 18.17
Environmental Science

Big Bend National Park Southwest Texas

- Serves as a low – impact core area of the Big Bend biosphere reserve.

Figure 18.18
Environmental Science

Swapping debt for nature in Guatemala

- Maya Biosphere Reserve is protected under an agreement between the governments.
- Protects Biodiversity
- Preserves historic Mayan Temples
- Allows for Sustainable Use of some of the forest by local people.

Figure 18.19
Environmental Science

Biological Diversity Survey – Transecting p.63NB

- How do we measure Biodiversity?
  - Species Richness = # of differ species
  - Species Evenness = Is there a dominant species? Or are they pretty even in number?

Species Name	Number of species
Ex. flower	
Bird	

Working Toward Sustainability

- Swapping Debt for Nature P. 512 ESBK

Increased **Fragmentation of forests** has caused the Forest song birds to come into contact with the Brown Headed Cowbird a Nest Parasite, result is the a decline in species of North American songbirds.

Figure 18.8a
Environmental Science

Figure 18.8b
Environmental Science