

Human Impact on Ecosystems

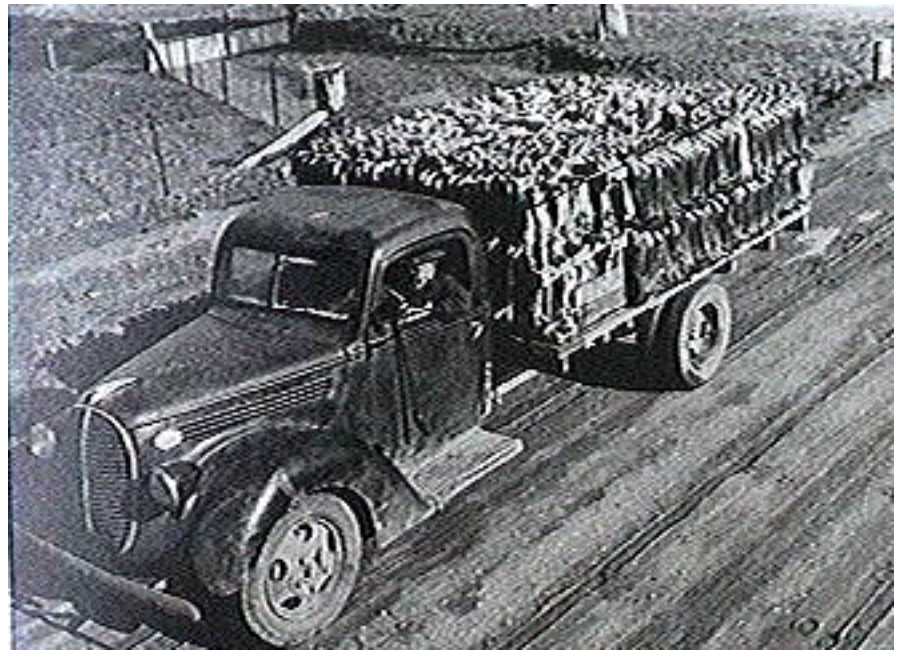
Summary of Levels of Human Impact

Organism Level	
Death and Introduction of Disease	Physiological/ biochemical changes
Reduction in fecundity	Behavioral changes
Genetic (mutagenic) effects	Birth (teratogenic) defects
Cancer (carcinogenic) effects	
Population Level	
Population increase or decrease	Changes in age structure
Invasive Species decimate local populations	Alteration of genetic structure
Loss of genetic diversity	Extinction
Survival of resistant strains (pesticides and antibiotics)	Exotic Introductions
Community-Ecosystem Level	
Disruption of energy flow	Disruption of nutrient cycles
☛ Changes in solar energy or spectrum	☛ Depletion of nutrients
☛ Change in heat input or output	☛ Addition of nutrients Listen to this too: Pfiesteria and Chickens
☛ Changes in Trophic structure	☛ Alteration of nutrient flow
Simplification	
☛ Reduction in diversity	
☛ Reduction in habitat	
☛ Reduction in filled niches	
☛ Lowered stability	
☛ Ecosystem collapse	

See also a quick list on [human impacts on ecosystems](#). See energy [here](#).

Alteration of Biotic Factors

Introducing Competitors



Rabbits invade Australia

- Introduction of foreign species can affect original species composition. Twelve pairs of European rabbits were introduced to Tomes Austin's ranch in Australia in 1859. The rabbits escaped and by the early 1950 there were more than 1 billion rabbits occupying over 1.2 million square miles. Five rabbits eat as much as one sheep. More is [here](#).
- Water hyacinth was introduced to Florida from South America as an ornamental. It rapidly spread to Florida waterways since 10 plants can multiply to 600,00 in eight months. Today, 2 million acres in Florida, Texas, and Louisiana are affected and control costs are over \$11 million per year. They have displaced many native species. There is one upside: Hyacinths feed on nitrites, phosphates and potassium; all of which are major water pollutants. Hyacinths can also act as a biological filter for sewage wastewater. They will also absorb many toxic wastes, including heavy metals (mercury and lead). At Disney World five football-field-sized ponds purify park wastewater. Hyacinth can also be harvested and used as fertilizer or animal feed.
- Other introduced species that have had extensive ecological effects are Gypsy Moths, Africanized Honey Bees, and Fire Ants.

Elimination or Reduction of Predators

- Humans tend to eliminate predatory animals since they are often seen as a danger to livestock, hunted animals, or humans.
- Arizona had a bounty on wolves, coyotes, and mountain lions in the early 1900s. Fifteen years later most of the predators were eliminated. With no predation, deer populations grew from 4,000 to 100,000 in 20 years. Overgrazing resulted in 60,000 dying from starvation. The vegetation has not recovered to this day. Read about reintroduction of wolves [here](#).
- Mosquito fish from the Southern U.S. were introduced to tropical areas to try and control malaria and other diseases. Unfortunately, mosquito fish also eat zooplankton which resulted in an increase in algal growth. Thick mats of algae blocked light which led to the algae dying. Processes of decomposition used up all the oxygen in the ponds, killing all

the fish and most other animals and plants. This created an even larger population of mosquitoes.

- Read about [spider conservation](#) in the United States

Introduction of Disease Organisms

- Pathogenic organisms are part of the **environmental resistance** that serve to keep populations in check.
- In the late 1800s a fungus was introduced from the China when Chinese Chestnut trees were brought to New York Chinese trees are immune to the fungus while the American Chestnut is not. The American Chestnut used to be found up and down the entire Atlantic seaboard west to Illinois. In some areas it made up over 40% of the overstory. It has been nearly wiped out. . The few remaining trees growing today are root sprouts originating from the root systems of long-dead mature trees. Eventually the small trees contract the blight and die, too. However, as the older root sprouts die they are replaced by new shoots. Similar circumstances are responsible for Dutch Elm disease.



Chestnut with blight

- West Nile Virus: A fact sheet is [here](#). A scholarly overview is [here](#).
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Alteration of Abiotic Factors

- Oil spills affect fish, birds, mollusks, amphibians, and mammals.
 - Chlorinated water from sewage disposal plants kill fish.
 - Toxic pesticides kill birds, fish, beneficial insects and spiders.
 - Thermal pollution kills fish, mollusks, etc.
 - Diversion of streams.
 - Concern could be global due to green house effect and global warming.
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Simplifying Ecosystems

- Seen when natural ecosystems are converted to farmlands or subdivisions. Grasslands with many diverse plant and animal species are plowed under and replanted with a single crop (monoculture). With little diversity, monocultures are sensitive to damage from insects and disease. Because they represent an unlimited food source, they have little environmental resistance and there are numerous outbreaks of pest species that require pesticides for control.
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