

Overexploitation:

Simply, this is the excessive use of natural resources, whether a single species, or some other resource such as water.

The effects of this on individual species is obvious:

The dodo was “overexploited”. Numerous other species are on the verge of extinction (rhinos, elephants, whales, etc.) because of this.

But let’s look at the causes in a little more detail, and expand our coverage to other types of resources as well.

Commercial exploitation

Simply, there is a lot of money in wildlife. The range here is almost endless (logging and fisheries to folks selling nuts or mushrooms (!) at a stand).

The danger here is that money is involved - once this happens it’s easy to slip from “exploitation” into overexploitation. For example:

The market for wildlife is huge. Cacti, Birds, Reptiles, various endangered species are all traded for collectors, as house plants, for pets, etc.

People make money. If they can sell twice as much, they make twice as much money. It’s very tempting to overexploit something.

Wild products are often more sought after than domestic products (venison is more expensive than beef [An incidental note: in Germany it is legal to sell venison, as a result hunting is much more controlled than here]).

As something becomes rare, it becomes more expensive. Thus it continues to be exploited. We discussed the egg collecting fad of the great auk (a good example - the price of eggs rose so high that the last populations were extirpated).

Many organisms are found in remote areas - it’s difficult to enforce laws in these areas (who owns the Pacific? That’s another problem).

There are other things we could consider, but this is kind of a list of highlights (or lowlights).

Incidentally, what is wrong with the notion: “Well, it was dead anyway, so why

shouldn't I buy it?" or "If I don't buy it, someone else will."

But, providing this is done legally, and is monitored, commercial exploitation is not necessarily bad. All of us depend on lumber, most of us eat fish, shrimp, crabs, etc. (Mention Blue Crabs).

Subsistence exploitation

This is probably not as serious. Many people, particularly in poorer parts of the world, rely on the natural environment for all their needs.

The hunter-gatherer lifestyle still exists in many parts of the world.

In other areas, people use the environment to a greater or lesser degree. As usual, there is a range here. Some only exploit the environment as a supplement and get most of their needs elsewhere. Others rely on this almost entirely.

Since money is not involved, this tends not to lead to overexploitation as easily - (why gather more roots than you can eat?).

Recreational exploitation

In wealthier countries this is very important. In the United States it is estimated that there are 14 million hunters, 35 million anglers, and 69 million "wildlife watchers" (the best example here would be birders).

How bad are hunting and fishing really?

Hunters and fishermen are often at the forefront of conservation efforts. Huge sums (hunting licences, etc.) are contributed by these groups to help in setting aside reserves, hiring wildlife personnel, and monitoring wild populations.

On the other hand, particularly some fishermen have overexploited lakes and streams, often exterminating populations in some areas.

(Let's not get into the whole issue of "controlled hunts", where otherwise restricted areas are made accessible due to an overabundance of some type of animal (e.g., deer in Northern Virginia or Black Bear in New Jersey)).

Overall, as long as activities are monitored (as they should be), this

is probably not so bad.

But even folks simply enjoying nature can have an impact.

Animals can be chased away (accidentally), or prevented from reaching a food or water source.

A particularly notorious example is in some game parks, where a single lion or cheetah can attract dozens of cars.

(One Sunday afternoon in the Nairobi game park a single female lion attracted close to 50 cars!)

Some larger predators have also figured out that cars may indicate a kill, and so have been attracted to cars in turn. This can cause cheetahs to have to abandon their kills (this is not an insignificant problem in some areas!).

A similar phenomenon can happen here when people spot buffalo, bear, or bald eagles in some of our parks.

Incidental exploitation

In this case, other organisms are caught or killed incidentally. Some specific examples include:

Tuna fisheries, where nets often catch dolphins. These often drown before the nets are retrieved (many cans of tuna advertise “tuna safe” as a result - not sure this is still the case since some years ago laws concerning incidental dolphin catch were strengthened).

Shrimp fisheries now need to use a “turtle exclusion device”. This is a device that lets sea turtles (that often get trapped in shrimp nets) escape before drowning. Some shrimpers still complain about this, but it seems to be working fairly well.

Many traps can be indiscriminate. Drift nets are particularly notorious this way (these are huge nets (miles long) that catch everything in their path). There has been some effort to regulate this. Japan has banned drift nets in their waters (it’s fine for Japanese fishermen to use them elsewhere!).

Indirect exploitation

Kind of a catch all for other types of exploitation. For example, cats could be considered an exploiter. (Most) cats are kept as pets by humans, so humans are

responsible. One estimate indicates that cats may kill as many as half a billion song birds every year. Keep your cat indoors!

Other examples might be fences, roads, etc. that impact animal movements (this was also considered under habitat loss).

Consequences

Some of these are kind of obvious:

Killing (or removing) too many members of a species can cause that species to go extinct (e.g., dodo, etc.), or at least wind up on the threatened species list.

Others are more subtle:

The population structure of a population can be changed. Trophy hunters go for “big” males, whether deer, lion, or whatever. These are also (often) the healthiest individuals in the population. This also biases some populations towards females.

The age structure can be changed. Particularly in fisheries, adults are removed from the population. Many fish have type III survival curves (remember? - lots of juvenile mortality, then mortality drops off as individuals reach adult hood. Fisheries thus change the age distribution of the population. Sometimes the effects of this can cause a population to crash, but more often it's not known exactly what the effects are.

(Another example involves logging where trees are cut when their growth slows down, which is years before they reach their maximum size)

Genetic effects - we already mentioned removing the healthiest individuals from the population (trophy hunting). Small populations reduce the genetic diversity. Some estimates show that both small populations and the removal of the “healthiest” individuals leads to a large loss of alleles.

Ecosystem effects - sometimes the removal of a “keystone” species can drastically alter the habitat.

Sea otter populations have decreased. This has allowed one of their favorite prey (sea urchin) to increase in population. By increasing, the sea urchins are reducing the kelp forests off the Pacific coast.

A slightly more controversial idea suggests that the extinction of large herbivores in Australia (due to the arrival of humans 40,000 years ago), has increased vegetation leading to the rather nasty fires that now occur over large parts of Australia).

It is important to remember that the removal of one species can have profound effects on other species in that community.

Concluding remarks:

Although mentioned above, it should be mentioned again. The pet trade is huge. In many cases this removes animals from a population without giving anything back. While the animals are not killed, they are lost as members of the population.

Breeding efforts by pet-enthusiasts usually fail.

Many species (particularly turtles and some snakes) are endangered primarily due to the pet trade.

This can vary from country to country (in Europe for instance, there is a huge market for pet turtles in some areas).

This can also have unintentional side effects - mention specially bred turtles.

Many live animals are smuggled for the pet trade every year. The Fish and Wildlife service conducts raids with great regularity (even in this area there have been raids on houses where people kept illegal (= endangered) pets).

Next:

Exotic species!