

Bird Conservation

Class Business

- Check the web site for exam details. Also, be warned that I will be out of town from 7-12 May and unable to answer email during that time. If you have exam questions it will be to your advantage to contact me before I leave.

Reading for this lecture

Required. Gill: Chapter 24.

1. Threats to bird populations

A) HABITAT LOSS

- i) Loss of habitat is the primary reason behind species extinctions and declines. Even when other factors play a role in causing a species to decline, habitat loss or alteration is often the underlying reason.
- ii) Example: In the last 200 years over half of all the wetlands in the United States have been destroyed. In California more than 90% have gone. Most of these losses have been due to drainage so that the land can be used for agriculture. Currently about 750 acres (300 ha) of wetlands are destroyed every day. This is equivalent to the area of all UConn campuses (both Storrs and regional campuses) in wetland being destroyed every 5 days.
- iii) The effect of this is widespread declines in wetland species. E.g., most North American duck populations declined dramatically during the middle of the last century. An intensive conservation plan, begun in the mid-1980s has helped reverse the declines for many species, but others continue to decline or have populations that are smaller than they were in the 1970s.
- iv) Another example: About half the world's rainforests have been destroyed since 1940. Remainder only covers about 7% of Earth's land surface, but it contains about 66% of all bird species. Again, destruction continues: approx. 50 million acres per year.

B) OVERKILL

- i) Collectively, unregulated hunting and the effects of introduced predators (covered below) are probably the second most important threat to bird populations.
- ii) Hunting is a problem especially for large species (i.e., those that are worth killing to eat).
- iii) Ecologically equivalent to hunting is the removal of birds from the wild for the pet trade. This has had an enormous effect on parrot populations and is one of the reasons why about a quarter of all parrot species are globally threatened with extinction.
- iv) Harvesting birds from the wild, however, does not necessarily threaten populations. If hunting (or other forms of harvest) are well regulated then populations can persist without declines. Good regulation requires (a) that the population's biology is known well enough to determine how many birds can be taken without affecting population size, and (b) that there is enforcement to make sure limits are met. For example, millions of Mourning Doves are killed by hunters in North America each year, yet the species remains widespread and common.

C) POLLUTION

- i) A wide variety of pollutants can cause problems for birds. Two prominent examples are DDT and oil.
- ii) DDT is a pesticide that was widely used in North America but was banned in the 1970s (it is still used in some other countries) and was found to be responsible for declines of various bird species. The species most affected were those at the top of the food chain (e.g., Bald Eagle, Peregrine Falcon, Osprey, Brown Pelican). The reason for the declines was that DDT, which accumulated in the tissues of these top predators, eventually reaching such high concentrations that it began to affect the bird's eggs. During egg production the chemicals would pass from the female's body into the egg shells, causing the shells to be thinner than normal. These thin shells broke more easily, and a lot of young birds failed to hatch. This in turn resulted in population declines.
- iii) The effects of oil are best known from massive oil spills, like that caused by the Exxon Valdez running aground in Prince William Sound, Alaska in 1989. Although these spills kill hundreds of millions of birds, there is also a huge amount of oiling caused by smaller spills and by routine shipping activities (e.g., flushing tanks with sea water, which probably kill at least as many birds.

D) INTRODUCED AND “INVASIVE” SPECIES

- i) Changes in the distribution and abundance of other species also can cause population declines. Often (typically?) these changes are a direct result of human activities. Introduced species (i.e., those that are moved to a place they are not native to) are especially problematic, but human activities also can increase the abundance of native species that have harmful effects on others, or cause one species to be more vulnerable to the detrimental effects of another.
- ii) Predation. Probably the greatest problem involves increased predation. This can happen when predatory species are introduced into areas where the native species lack defenses to avoid predation (e.g., cats, rats, mongoose, etc. on islands, see below). It also can happen when human activities lead to an increase in predator populations. For example, gull and crow populations have increased due to human trash (landfills, McDonald’s parking lots, etc.) and populations of birds such as jays and grackles may have increased due to bird feeding.
- iii) Competition. In some cases the spread of species into new areas cause competition that harms certain other species. For example, it has been suggested that the colonization of North America by European Starlings (following human introduction) has caused competition for nest sites with cavity nesting birds.
- iv) Parasitism. Brood parasitism by Brown-headed Cowbirds have been implicated in the declines of many songbird species (e.g., warblers). Cowbirds not only cause the young to die, but also use up the resources of parents that care for cowbird chicks, causing a double problem. Cowbirds are known to have increased greatly in number and distribution because of human activities, such as forest clearing and fragmentation (which makes habitat more suitable for cowbirds) and livestock farming (which increases the food available to cowbirds).

2. Extinct species

A) RECENT NORTH AMERICAN EXTINCTIONS

- i) Since European settlement of North America, several species and subspecies of birds have gone extinct. In almost all cases, the disappearances can be attributed to human activities.
- ii) Species that have gone extinct in the last couple of hundred years include:
 - Labrador Duck – reasons for extinction poorly known, but possible that hunting played a role.
 - Eskimo Curlew – a shorebird that is almost certainly extinct, last seen in wild in 1963. Market hunting about a century ago almost certainly played a big role in the decline of this species.
 - Great Auk – flightless seabird, related to puffins, that was wiped out by hunting. Last birds seen in the wild were killed in 1844.
 - Passenger Pigeon – thought to be one of the most common birds in the world prior to its demise. Population estimated to be about 2 billion birds in 1780. By 1914 it was extinct. Causes were a combination of habitat destruction and hunting.
 - Carolina Parakeet – formerly native to the mid-western and southeastern US. Persecuted and hunted to extinction because they ate orchard fruits and because people liked to eat them.
 - Ivory-billed Woodpecker – thought to be extinct, with last confirmed US sighting in 1950s. Recent observations in Cuba and Louisiana hold out hope that there may be a few left. Decline thought to be primarily due to habitat (forest) destruction.
 - Bachman’s Warbler – not reported since 1962. Formerly occurred in natural cane swamps in the southeastern US. Extinction due to widespread habitat destruction.

B) WORLDWIDE, MOST RECENT EXTINCTIONS HAVE OCCURRED ON ISLANDS

- i) 90% of all bird extinctions in historical times have been on islands.
- ii) Island species are vulnerable, because they typically have small populations, because there often is nowhere to go if habitat is destroyed, and because they are especially vulnerable to introduced species (predators, diseases, competitors, etc.).
- iii) Example: a lot of Polynesian islands are inhabited by flightless rails that are found on only the one island. Most of these rails are highly endangered (usually because of introduced predators). Research on bone remains on these islands suggests that every single island in Polynesia formerly had at least 1-2 species of flightless rails. Most of these species are now extinct. This suggests that historically about 10% of all bird species were flightless tropical rails.

- iv) Introduced species affect island birds in a wide variety of ways. In addition to just eating the birds and their eggs (e.g., mongoose, cats, rats, brown tree snake), some species trample nests or cause nesting burrows to collapse (e.g., goats), alter the habitat by eating vegetation etc. (e.g., goats, rabbits, pigs). Introduced diseases are also a problem (e.g., avian malaria seems to play a role in the decline of some Hawaiian land birds).
- v) Examples include:
- On Herokapare, New Zealand, 400,000 birds declined to 3,000 birds (minus 6 species) in 12 years after the introduction of cats.
 - On Lord Howe Island, Australia, 5 species of birds have become extinct since the 1918 introduction of rats.
 - On Green Island in the South Pacific, rats destroyed >50% of albatross nests by attacking incubating birds.
 - On Laysan Island in the Hawaiian chain, rabbits denuded the vegetation so badly that 4 out of 5 endemic species became extinct.
- vi) Introduced predators also have effects in continental areas. For example, studies suggest that domestic cats kill 2,000,000,000 small birds and mammals each year in the United States. Native populations have always dealt with predators but house cats are especially problematic because (a) they occur at extremely high densities compared to native predators, and (b) they receive supplemental feeding (plus health care, etc.), so there is no regulation of the population size when their prey populations start to decline.