EEB 2208: LECTURE TOPIC 23

CONSERVATION AND THE LAW

Reading for this lecture

Primack: Chapters 20, 21

1. Legal approaches to biodiversity protection

A) VARIOUS ALTERNATIVES

i) Land purchase/permanent protection – setting aside land in reserves is generally the best long-term option, but often it is not possible (e.g., because land is not available or is too expensive), so various other approaches have been developed.

ii) **Conservation easements** are agreements whereby the landowner gives up the right to develop a piece of land in return for something of value to them (e.g., direct payments, tax breaks, etc.).

iii) **Conservation leasing** involves paying someone to actively manage their land for conservation purposes.

iv) **Conservation banking** requires landowners to provide protection for protected species or habitats (e.g., by paying organizations that run "conservation banks" in which they buy land on which protected species occur, restoring habitat, etc.) in return for the right to destroy/develop equivalent habitat elsewhere. This habitat **mitigation** ensures that some protection will come out of development activities. The creation of a conservation bank is better than each landowner conducting mitigation activities separately because it allows them to pool resources, and thus do more efficient (and hopefully more effective) conservation – e.g., by protecting larger areas of habitat.

B) EXAMPLE: THE CONSERVATION RESERVE PROGRAM (CRP)

i) The CRP is a voluntary program that encourages landowners to take actions that protect a variety of natural resources on their land by planting permanent vegetation cover rather than crops.

ii) The main goals of the program are to provide long-term protection of soil and water because of the importance of these resources for agriculture and society at large, but the program also has a secondary goal of providing wildlife habitat.

iii) Farmers who choose to enroll their land in the program get paid annual rental fees by the government. In addition, they can receive financial help in creating suitable vegetation cover on the land they have enrolled, up to a maximum of half the cost of the habitat creation. In cases where the conversion of land to the CRP is considered especially important, signing bonuses are also paid out.

iv) In return they must sign a 10-15 year contract and agree to manage the land by planting prescribed vegetation cover types, rather than using it as cropland.

v) The CRP only includes land that is considered environmentally sensitive and would otherwise be farmed. Various factors determine whether land qualifies for the program, for example, the risk of soil erosion.

vi) In 2010, ~34 million acres spread across 424,000 farms will be enrolled in the program at a cost of $1.7 billion. Not surprisingly, CRP lands tend to be concentrated in major farming regions – especially in the Great Plains.

C) TYPES OF LEGISLATION

i) Many different forms of legislation influence biodiversity protection. These are just a few examples.

ii) Pollution control. Many "environmental laws" are not really designed with biodiversity conservation in mind. For example, the Clean Water Act and much air pollution legislation were designed with human health as a key focus. Nonetheless, these laws do result in the conservation of natural resources in ways that benefit biodiversity immensely.

iii) Import/export. All laws that deal with the movement of species across borders affect biodiversity issues, even though many are designed for purposes that have nothing to do with conservation. For example, laws designed to limit the movement of agricultural pests are important in restricting the spread of invasive species. Similarly, import restrictions can reduce the trade in endangered species (more on this in the next lecture).

iv) Indirect protection. Various other laws also have the effect of creating and protecting wildlife habitat. For example the CRP program described above is part of the U.S. Farm Bill, which is designed to maintain a productive agricultural industry.

v) Direct species/habitat protection. Finally, there are laws that are specifically designed to protect species. Probably the most important of these in the United States is the Endangered Species Act.

2. The Endangered Species Act

A) BACKGROUND

i) The ESA was first passed in 1973 (under Nixon and with strong bi-partisan support), and subsequently amended in both 1978 and 1982.

ii) Its main function is to identify and protect species that are threatened with extinction. The endangered species list categorizes species into two groups:

- **Endangered species** are those considered likely to become extinct in all or a major portion of their range in the near future.
- **Threatened species** are those that are likely to become Endangered in the near future.

iii) The law is implemented by the U.S. Fish and Wildlife Service (USFWS) and the NOAA Fisheries Service (also known as the National Marine Fisheries Service or NMFS).

B) WHAT IS LISTED?

i) Currently (April 2010), 1901 species are listed. Of these 1324 occur in the United States.

ii) In addition to US species, there are over 577 foreign species listed under the Act. These species are included to provide them with protection because they might be imported into the US.

iii) The list includes a wide variety of species, from elephants to lichens. But, there are clear biases towards charismatic species. For example, the US species break down as follows: 376 vertebrates, versus only 198 inverts (70 of which are clams!); 719 flowering plants compared to only 31 other plants.

iv) The list of foreign species is almost all (567/577) vertebrates (partly because of what is likely to be imported – although there is also plenty of trade in rare plants, such as orchids.)

v) Check out this site http://ecos.fws.gov/tess_public/TESSBoxscore to see how things break down for yourself (note that these numbers are updated daily so may vary slightly from those given in these notes).

C) WHAT DOES THE ACT DO?

i) The ESA requires that government agencies consult with the USFWS or NMFS on any activity that might affect listed species.

ii) The Act also prevents "take" of listed species on private land, trade in listed species, and damage to their habitats.

iii) Another key component of the Act is that it requires the agencies to develop recovery plans for listed species. These recovery plans need to include explicit recovery goals (e.g., the population size at which the species can be removed from the list), as well as devising a strategy for achieving recovery.

D) RECOVERY GOALS

i) An analysis of recovery goals for listed birds shows that population targets, on average, are approximately in line with what you would want according to studies of the minimum viable population size required to limit the risk of extinction (though at the lower end of the range).

ii) The mean recovery population size is about 5500 individuals. There is, however, considerable variation in the goals – from as low as 400 (California condor) to 20,000 (wood stork), and many species do not meet the MVP guidelines (see lecture on PVA).

iii) This variation in recovery population size cannot be explained by biological traits (such as reproductive rate, survival rate, body size, etc.) as one might expect. But, it can be explained by non-biological variables. For example, the main cause of variation is the size of the population when the plan was written – species with very small populations have lower target population sizes than species with larger populations. This result is a little disconcerting and suggests that human biases influence the recovery goals, rather than just the biological factors that are most likely to affect extinction risk.

iv) Other variables that help explain this variation are the year the plan was written (goals have increased over time), and whether or not the species is listed throughout its geographic range (species listed range-wide have higher population targets).

E) ARGUMENTS AGAINST THE ACT

i) The ESA has been an extremely controversial piece of legislation, pitting environmentalists against business in many, many battles. Listed below are some of the main arguments that have been used in attempts to weaken or repeal the Act.

ii) It costs too much. Costs come in two forms. First, the loss of income that could be made from land that is protected. For example, the listing of the northern spotted owl in the Pacific Northwest has resulted in forestry restrictions on 2.8 million hectares of land, with the loss of billions of dollars in lumber revenue. (Though remember that there are many ecosystem services that that land provides in its forested state, and these probably also amount to billions of dollars.) Second, there is the direct cost of recovering species, which can be in the millions of dollars.

iii) It limits growth.

iv) It interferes with private land-owner rights.

v) It doesn't work. (see (G) below)

F) MAKING COMPROMISES

i) Various compromises have been introduced to overcome some of the problems described above, especially those that impose extremely stringent restrictions on business activities.

ii) One of the most important compromises has been the advent of Habitat Conservation Plans (HCPs). These were introduced in the 1982 amendment to the Act and were designed to preempt some of the difficulties that arise when species are listed.

iii) The basic idea is that plans are created that allow for development in certain areas, but that also ensure that protection occurs elsewhere (frequently these plans are done at a fairly large regional scale – e.g., the scale of entire counties). These plans apply both to listed species and sometimes also to species that could be listed in the future. This second group of species is important because one potential benefit of these plans is to protect these species before they become listed (and prevent the need for listing), so as to avoid all the restrictions that come into play after listing.

iv) The development of HCPs involves input from business and political interests as well as biologists. One important benefit to business is that, in return for their cooperation in ensuring that there are sufficient protected areas, they may receive assurances that limit their liability (both legal and financial) in future actions concerning listed species.

v) By spring 2008, over 890 HCPs had been approved, covering tens of millions of ha of land and protecting 100s of species.

G) WHY HAVE SO FEW SPECIES RECOVERED?

i) One of the most common arguments against the Act is that since very few species have ever been removed from the list, the Act (and the recovery process) simply doesn't work.

ii) For example, by 2009 only 51 endangered populations had ever been de-listed, and only 25 of these were de-listed because the species had recovered (9 had gone extinct, 7 had their taxonomy revised, others were removed because of errors in the listing process or the discovery of new populations).

iii) This criticism, however, reveals a very poor understanding of the circumstances under which the Act works. First, most species are not listed until they are already in very dire straits. Listed animals average a population size of ~1000, listed plants average < 120 individuals, and at least 39 species had < 10 individuals when listed. Add to this the fact that most listed species have suffered widespread habitat loss and it is not surprising that few recover very quickly, and that some go extinct despite the Act's protection.

iv) In addition, endangered species recovery and protection is very expensive and the number of listed species is rapidly increasing, which spreads the limited funds much more thinly.

v) But, it is important to evaluate the success of the Act. Think about what would be a more reasonable test of the Act's effectiveness – we'll talk about this in class.