

Name: _____ Pledge (sign): _____

Envr 201 Test #1 Key

Point Total: 100 pts possible

- 12 pts 1. Briefly (1-2 sentences) define/explain the following terms from the Endangered Species Act:
- (a) the 'God Committee'
The 'God Committee'—the official name is the Endangered Species Committee—is a seven-member cabinet level group that was created by the 1978 amendment to the ESA. It has the power to exempt agencies from the requirements of the ESA if five of the members vote to do so.

 - (b) Habitat Conservation Plan
If an endangered species or its critical habitat resides on private land, before taking any actions that may harm the species (or its habitat) the owner must file a Habitat Conservation Plan (HCP) with the Fish and Wildlife Service. Approval allows the landowner to develop his land in a manner consistent with the HCP, presumably protecting the species from undue harm.

 - (c) Critical Habitat
When a species is listed as endangered or threatened, an area that is essential to species recovery can be designated as a Critical Habitat. Critical habitats are designated through the best scientific information, though economic considerations can also play a role.
- 5 pts 2. What are the consequences of the environmentalists' dilemma described by Bryan Norton?
Although most environmentalists agree about many policies, such as protecting an endangered species' critical habitat, they can differ in the ways in which they defend these policies. This results in the environmentalist's dilemma in choosing between the language of animal rights (too strong for many) and economic benefit (often too permissive). The consequence results in difficulty when advocating for those policies, as well as disagreements among environmentalists.
- 5 pts 3. In your opinion, is Leopold's Land Ethic utilitarian/anthropocentric or biocentric? Justify your answer.
According to Leopold's Land Ethic, actions are judged by their consequences for the health of ecosystems. Either answer above can be argued with some merit:
- Utilitarian: the Land Ethic advocates actions that preserve or increase the value of ecosystems to humans, through the many services they provide. So even though the health of an ecosystem (and its organisms) are valued, this is done for the benefit of humans. And the Land Ethic does not prohibit killing animals or other resource management, as long as the health of the entire ecosystem is not at risk.
 - Biocentric: the Land Ethic assigns moral standing to ecosystems, and the biological communities that are a part of them. The Land Ethic values actions that improve or sustain ecosystem health, without any mention of the benefits that those actions would confer to humans.

5 pts 4. Briefly explain the process of *geographic speciation*.

In geographic speciation, two species populations become separated geographically and subsequently experience a different set of selection pressures. This favors differential evolutionary pathways and, after a time, even if the geographic separation disappears the two populations will not interbreed freely.

6 pts 5. What is the 'mosaic nature' of the environment, as noted by G. Evelyn Hutchinson? What is its significance?

At smaller spatial scales in an ecosystem, there is greater variability in the nature of the environment and the selective pressures it presents to a species. For that reason, smaller species (who cannot wander over large areas) will tend to evolve into a greater number of distinct species in response to this environmental variability. Thus, the significance of the 'mosaic nature' is that it is one cause of greater biodiversity for smaller species.

8 pts 6. The 1890 Census that declared the disappearance of the American Frontier was followed closely by the rise of Pinchot's Progressive Conservation. This was not coincidental; explain why.

Pinchot's movement had two foci: the efficient use of natural resources, and spreading the benefits of using those resources to the American public, not just the rich landowners. With the closing of the frontier came the realization that natural resources were not limitless even in the new world. More efficient use of those limited resources, and sharing them with all the people, proved to be a popular selling point.

8 pts 7. Biologists and others have been alarmed over species extinction. As E.O. Wilson says, 'there can be no doubt that extinction is proceeding far faster than it did prior to 1800. The basis for this statement is not the direct observation of extinction.' What *is* the basis for this statement? Answer in a little detail.

The basis of this statement is the observed loss of habitat. Habitat loss is the leading cause of biodiversity loss, and Wilson's work on island biogeography resulted in a mathematical model that could result in a good estimate of the relationship between habitat area and biodiversity: $n = kA^{0.25}$, where n is the number of species, k is a constant, and A is the area. This estimate tells us, for example, that losing 50% of an ecosystem will result in the loss of approximately 16% of the species.

- 12 pts 8. According to Roger Sedjo, what are the problems with ecosystem management? Be complete. In your answer, use and describe the concept of an 'organic act.'

Federal land is managed by a number of federal agencies, such as the Fish and Wildlife Service or the Forest Service. The Congressional statute that determines which lands an agency manages and the goal of that management is the agency's "organic act."

At the time that he wrote his article, the US Forest Service had been using the principles of ecosystem management as a guide to its decisions about the use of National Forest lands. In ecosystem management, the health of the forest ecosystem is valued. Sedjo, however, felt that managing a land in order to improve or maintain the health of the ecosystem was not consistent with the mandate of the Forest Service through its organic act. Currently the organic act for the Forest Service is the National Forest Management Act (1976) which dictates that multiple uses with sustained yield (and not 'ecosystem health') shall be the guiding principle behind forest management. Sedjo believed that ecosystem health was too vague a concept to be an operational guideline, and that it was inconsistent with both the USFS mandate and with the wishes of the citizenry for whose benefit the USFS manages its lands.

- 12 pts 9. In class we discussed two Supreme Court cases, shown below. For each, briefly summarize the dispute that led to the case, state the court's ruling, and explain its significance in environmental law. Use the back of this sheet as necessary.

(a) *Sierra Club v Morton*

Disney wished to build a large ski resort in what was at the time a National Forest (Sequoia National Forest) whose purpose was to serve as a game resort. An access road through a nearby National Park was also planned, and this too was illegal. Sierra Club sued the Secretary of the Interior (Morton) and claimed legal standing to do so as an organization interested in the area. The Supreme Court ruled that the Sierra Club lacked the legal standing to sue *as an organization*—although individual members could sue if they wished. The significance is that an organization cannot be granted legal standing to sue just by asserting an interest in the matter. Another important aspect of the ruling is that the court asserted that non-economic environmental harm to an area was sufficient to confer standing; up to that point, economic interest was largely the criterion used to confer standing.

[*After the Court's ruling:* the Sierra Club later amended the suit to include individual members whose interests were harmed. However, the case was eventually dropped and the resort was never built.]

(b) *TVA v Hill*

The TVA built a dam (Tellico Dam) that was halted just short of completion under the authority of the Endangered Species Act (ESA): at the time it was believed that completion of the dam—which was started before the ESA was passed—would cause the extinction of a small fish that was 'listed' as endangered. Such an action was illegal under the ESA, but the TVA asserted that the dam was started before the law passed, that halting it would be economically very damaging, and that Congress had signalled its intentions that the dam be completed in spite of the ESA. The Court ruled against TVA, claiming that the language of the ESA was very clear in protecting species from extinction no matter the cost. The significance was to show the broad scope and power of the ESA: the small/lowly snail darter could halt a multi-million dollar project.

[*After the Court's ruling:* an amendment to the ESA created the Endangered Species Committee (the 'God Squad') which had the authority to consider economic costs and benefits in deciding to exempt actions from the Endangered Species Act. The TVA asked for an exemption but the Committee did not grant it. Then the ESA was amended by Congress specifically to exclude the Tellico Dam from its provisions; the dam was later completed. However, the snail darter did not go extinct, since other populations were found. Its listing status has since been downgraded to 'threatened.']

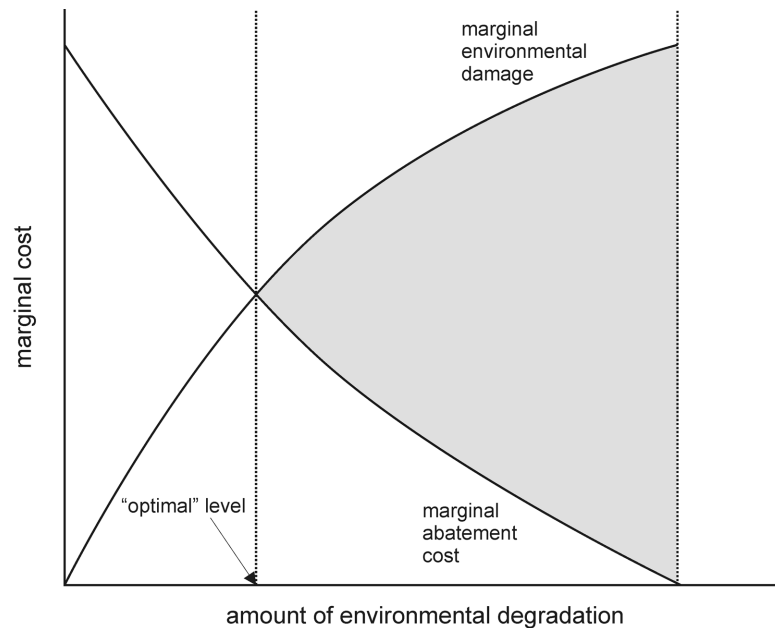
12 pts 10. (a) What are the basic premises of environmental economics? Briefly explain each premise.

Applying neoclassical theory to environmental disputes or resources rests on the following basic assumptions:

- Preferences have no limits, and each individual is the best judge of his/her own preferences. No matter how much an individual has, s/he is not satisfied and wants more.
- Substitutability; as applied to the environment decisions, this means that all important aspects of the environment can be assigned a proper market value. This implicitly assumes that scientific knowledge is up to the task, with acceptable levels of uncertainty.
- strong utilitarianism, which asserts that we should optimize the aggregate satisfaction of the public, (as measured in market value). This is the basis of using cost-benefit analysis as the basis of economic policy (see below).

15 pts (b) When economists apply their tools to environmental problems, mention is often made of the economically most 'efficient' or 'optimal' levels of environmental degradation. What is meant by this statement, and how is it determined? (A diagram might help your explanation.)

The economically efficient or optimal levels of degradation occur when the marginal cost of further environmental improvement are exactly equal to the benefits (to society) of those improvements. This is illustrated by the following figure.



The situation on the far right side represents the case of no effort made to control environmental degradation: eg, the maximum amount of pollution, forest clear-cutting, or mining, with no consideration given to ecosystem or human health. Proceeding to the left, a small amount of degradation abatement will cost a certain amount, as determined by the area under the *marginal abatement cost* (MAC) function curve. The resulting environmental improvement is quantified by the total area under the *marginal environmental damage* (MED) function curve; it is assumed that the state of natural and social science is able to determine the MED with reasonable certainty. The difference between these areas—as shown in the shaded area—is the net benefit to society from the abatement. The economically optimum level of degradation, leading to the maximum public welfare (strong utilitarianism), would be achieved when the MAC and the MED are exactly equal. Further environmental improvement would only occur at a net cost to society.