

Name: _____ Pledge: _____

Env Studies 201 Test #1

Point Total: 100 pts possible

- 5 pts 1. According to Lynn White, what has been the dominant historical Christian attitude towards wilderness? Use 1-2 sentences.
- Humans are apart from nature, and have dominion over it. White: "Despite Darwin, we are *not*, in our hearts, part of the natural process. We are superior to nature, contemptuous of it, willing to use it for our slightest whim."
- 5 pts 2. Sum up the Land Ethic in a single sentence. You may use a direct quote, if you like.
- The best summary is the famous quote from Leopold: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." The Land Ethic is a holistic ethic that considers the sum of the whole (i.e., an ecosystem) as greater than its parts (the organisms and their physical environment).
- 5 pts 3. The ecological economist Robert Constanza, with many coworkers, published a landmark study that puts a price (33 trillion dollars) on the services that nature provides humankind. Janet Abramovitz thinks the work of Constanza *et al.* is a good thing. Why?
- Nature's services, such as pollination, waste assimilation, nutrient recycling, and flood control, are used free of cost by many industries. Abramovitz argues that Constanza's study is the first step in assigning the proper value to these services. "By undervaluing natural services, economies unwittingly provide incentives to misuse and destroy the very systems that produce those services." Assigning a dollar value to nature's services is the first step in incorporating them properly into the cost-benefit balance sheet—i.e., in 'internalizing' nature's services.
- 6 pts 4. It is generally accepted that the current rate of species extinction is the fastest since the dinosaurs became extinct (the so-called K-T wave of extinctions) and that human activities are largely to blame. How are we causing these extinctions? List as many reasons as you can, and circle the single most important reason.
- *land transformation* (the most important reason), including deforestation, grazing, building dams for water reservoirs and hydroelectric power plants, converting wilderness to 'built land' (building homes, roads, etc), mining, and many other activities.
 - introducing *invasive species* into ecosystems (i.e., biological pollution)
 - *overexploitation*: excessive hunting, fishing, recreation (e.g., too many hikers or campers in an area), etc.
 - *chemical pollution*, such as pesticides, fertilizer, greenhouse gases, ozone-depleting substances, smog, industrial discharges, and many others
 - *killing biological 'pests,'* such as top predators (e.g. wolves), insects, or weeds, thereby upsetting ecosystem dynamics

- 5 pts 5. (a) What is the distinction between the *intrinsic* and *instrumental* value of a organism, species or ecosystem?

Instrumental value is due to the utility of an object for human purposes, while intrinsic value is independent of the needs and desires of humans.

- 8 pts (b) To which of these values does John Muir appeal in his article when he argues against damming Hetch Hetchy? Explain your reasoning.

Although many of John Muir's writings emphasized the intrinsic value of nature, he probably recognized that utilitarian arguments had a greater chance of winning the day—a tactic that is still commonly pursued today, almost a century later (something Bryan Norton referred to as 'the environmentalist's dilemma').

Muir emphasized the aesthetic, spiritual and recreational values of the beautiful Hetch Hetchy valley when arguing against its damming. Although these values of nature do not result in material goods (such as lumber, water, or electricity), they are nonetheless aspects of nature that are valued due to their impact on humans. As such the values are instrumental and not intrinsic.

- 5 pts 6. (a) Explain in a general sense how the Endangered Species Act protects biodiversity.

Species can be 'listed' as either endangered or threatened (likely to become endangered in the near future). The species' *critical habitat* may also be listed, along with the species. Once listed, both the species (and its critical habitat, if included) are protected from actions by government agencies as well as private entities and individuals. A recovery plan must be established to increase the species population.

Besides (hopefully) saving individual species from extinction, protection of listed critical habitats from harmful activities protects the entire ecosystem. In this way, the listed species acts as an 'umbrella,' shielding other species from harm. Despite this, most species listed under the ESA do *not* have critical habitats designated, since the habitat may be excluded if potential economic harm outweighs the benefits of inclusion.

- 2 pts (b) YES or NO (circle one): can a subspecies be 'listed' as threatened or endangered under the endangered species act? YES.

- 5 pts (c) What is the main method by which two subspecies become distinct species? Be brief (1-2 sentences).

The main method is *geographic speciation*, whereby two subspecies are geographically isolated from one another. Continued physical and behavioral evolution, particularly if the habitats are dissimilar, may result in organisms that do not freely interbreed even if the isolation ends.

- 5 pts 7. Both Paul Taylor and Aldo Leopold espouse ethics that are usually classified as *biocentric*. What is the most important distinction between Taylor's and Leopold's philosophies?

The main distinction is on Leopold's insistence that an ecosystem—an interdependent community of organisms, and their physical environment—is an object worthy of moral concern. Taylor acknowledges the importance of ecological concepts: he states that the great lesson of ecology is

the interdependence of all living things in an organically unified order whose balance and stability are necessary conditions for the realization of the good of its constituent biotic communities.

Nevertheless, Taylor's concern is for the good of individual organisms: the ecosystem 'members.' He does not think that ecosystem 'balance and stability' are goals worthy of pursuing in and of themselves, as Leopold does. Leopold's more holistic viewpoint is that the health of the entire community—in particular, the interactions between populations of species, and between populations and their physical environment—is what's important. In this view, one might countenance the loss of individual organisms provided that the loss does not harm overall ecosystem viability.

8. Mark Sagoff has some harsh words for the use of cost-benefit analysis (CBA) as the primary means to set environmental policy.

8 pts (a) How can CBA be used to make decisions about environmental issues? An example (e.g., development of Mineral King Valley by Disney) may help.

In cost-benefit analysis the costs and benefits of some proposed action are quantified as dollar figures and then compared. CBA can be applied to actions that degrade the environment: do the monetary benefits of the proposed action exceed the cost to society? If so, the action may proceed. The trick is to be able to accurately quantify the societal cost in monetary terms.

In 1965, the U.S. Forest Service accepted a bid from Walt Disney Corp. to develop Mineral King Valley (then a part of the Sequoia National Forest) as a ski resort. The Sierra Club filed suit to stop development, obtaining an injunction halting development plans. A cost-benefit analysis of the proposed development might be to balance the projected profit of the proposed ski resort to Disney against the willingness-to-pay of Sierra Club members (or perhaps the general public) to visit Mineral King Valley in its undeveloped state. In this manner CBA measures consumer preference, reasoning that if the existence of the wilderness in Mineral King Valley is important enough then people will pay more money to keep it that way. (Note that although the Sierra Club lost a landmark case—*Sierra Club v Morton*, 1971—in the U.S. Supreme Court over their standing to file suit, the valley was added to the Sequoia National Park in 1978, preventing future commercial development.)

CBA can be used to find the 'economically efficient' level of environmental degradation (eg, levels of pollutants in the environment, amount of development, etc). The point at which the marginal societal cost of the degradation equals the marginal benefits is the economically efficient level of degradation. The thinking is that, assuming that all costs and benefits are accurately translated to dollar figures, the economically efficient degradation level leads to the highest aggregate level of happiness in society. CBA can thus be seen as utilitarianism using an economics 'yardstick.'

10 pts (b) Describe Sagoff's main criticism(s) of the use of CBA in environmental decisions.

Sagoff's most pervasive criticism of CBA, and the general economic approach to environmental policy, concerns the conflict between values and preferences. "A contradiction between principles—between contending visions of the good society—cannot be settled by asking how much partisans are willing to pay for their beliefs." He makes a sharp distinction between one's attitudes as a citizen and one's choices as a consumer, and gives instances where the latter can conflict with the former.

In addition, 'some values are more reasonable than others and therefore have a better claim upon the assent of members of the community.' CBA's wealth-optimization function (which is meant to maximize 'public good') is in some sense a popularity contest, where consumers 'vote' with their money. But the popular vote does not always yield the morally correct path. For example, citizens voting (as measured by a willingness-to-pay) to deny minorities equal rights does not make that choice the most ethical one.

Ultimately, Sagoff does not feel that markets should be used to answer questions that are better argued on their ethical merits. 'A value judgement is like an empirical or theoretical judgement in that it claims to be *true* not merely *felt*.' Consumer preferences do not usually reflect moral principles, and they should not be used to justify policies that involve such principles as whether a company has the right to expose people to toxic levels of pollutants without their knowledge or consent.

9. Biologist E.O. Wilson states

There is no question in my mind that the most harmful part of ongoing environmental despoliation is the loss of biodiversity.

5 pts (a) Exactly what *is* biodiversity?

Biological diversity—biodiversity—can be defined simply as the variability in all the organisms in a particular region (or in the entire world). It can be measured or described in different ways: *species diversity* is the number of distinct species; *genetic diversity* refers to the distribution of the types of genes within and across species; and *ecosystem diversity* refers to the variability in species habitats. All of these biodiversity measures are reflected in the diverse forms and functions exhibited by organisms.

8 pts (b) Why does Wilson feel that biodiversity loss is worse than other environmental problems, such as global warming or acid rain? Be complete.

The complete quote from Wilson, in *Biophilia and the Environmental Ethic*, gives the answer:

There is no question in my mind that the most harmful part of environmental despoliation is the loss of biodiversity. The reason is that the variety of organisms, from alleles (differing gene forms) to species, once lost, *cannot be regained* [italics added]. If diversity is sustained in wild ecosystems, the biosphere can be recovered and used by future generations to any degree desired and with benefits literally beyond measure. To the extent it is diminished, humanity will be poorer for all generations to come.

There are two components to his answer. First of all, biodiversity loss is essentially irreversible, since it takes millions of years for diversity to be regained after mass extinction events. Secondly, the biodiversity we are losing is incredibly valuable. Ecosystem health is widely viewed to be related to the complexity of the biological community: stable and viable ecosystems tend to be the ones with higher biodiversity. The services provided to humanity by functioning ecosystems are many, and mostly irreplaceable, including soil formation, nutrient cycling, pollination, genetic material, water regulation, and recreation.

8 pts 10. According to Vandermeer and Perfecto, the 'disarticulated' nature of Third World economies is an important cause of tropical rainforest destruction. Explain.

The 'disarticulated' nature of Third World economies refers to the fact that local producers do not care about the ability of their workers to buy their products. In *Rethinking Rain Forests: Biodiversity and Social Justice*, the authors state

The typical arrangement in the Developed World is an articulated economy, while that in the Third World is disarticulated, in that the two main sectors of the economy are not articulated or connected with one another. The banana company does not really care whether its workers make enough money to buy bananas; that is not its market.

So 3rd-World producers have less incentives to treat their workers well, subjecting them to low wages and frequent layoffs. These workers, many of whom have been displaced from cities to the rainforests, have no choice but to live off the land, usually in ways, like subsistence farming, that are harmful to the rainforest.

10 pts 11. Describe the Hetch Hetchy debate and explain its significance in the context of U.S. environmentalism.

Hetch Hetchy valley was part of the Yosemite National Park, which was established in 1890. In 1903 San Francisco Mayor James Phelan applied to the Interior Dept for the rights to dam the river flowing through the valley, which would create a water reservoir and hydroelectric power for the citizens of his city. Although the permit was denied, Phelan tried again after the great S.F. earthquake and fire of 1906. This began a vigorous public debate between conservationists, led by Forest Service chief Gifford Pinchot, and preservationists, led by Sierra club founder John Muir. After much public debate and some behind-the-scenes lobbying, the Raker Bill was passed in 1913 which allowed the damming of Hetch Hetchy. The defeat was a bitter one for Muir, who died one year later at age 76.

The debate was a significant event in U.S. environmental history. As stated in Roderick Nash's seminal *Wilderness and the American Mind*, 'Muir expressed his belief that over ninety per cent of the American people would oppose San Francisco's plans if they were apprised of their consequences.' President Teddy Roosevelt, although he was sympathetic to Muir's viewpoint, reluctantly sided with longtime friend Pinchot, believing that creation of the reservoir best served the interests of his people. Furthermore, Roosevelt seriously doubted Muir's claim of widespread support against damming the Hetch Hetchy river.

Muir's response was to make the debate public through his writings. A popular author, Muir never achieved 90% support, but the strength of the public reaction against damming was shocking to Roosevelt and somewhat bewildering to Pinchot. The significance of the debate was this: despite the formation of a few National Parks—in Yellowstone, the Adirondacks, and Yosemite—Hetch Hetchy marked the first time that non-commercial interests in wilderness preservation were seriously considered as an alternative to commercial development. As Nash stated, 'the most significant thing about the controversy over the valley was that it occurred at all. One hundred or even fifty years earlier a similar proposal to dam a wilderness river would not have occasioned the slightest ripple of public protest.' The aesthetic and spiritual values of wilderness preservation competed directly with commercial interests and put up a respectable fight, one that the Sierra Club learned from and put to use in later, more successful battles. The Hetch Hetchy debate marks an important transition from the 'frontier' attitude towards wilderness. It is not much of a stretch to say that the ongoing US environmental debate began with Hetch Hetchy.