

Review Questions for Econ. 4535 -Natural Resource Economics
Third Set

II. An Introduction to Renewable Resources: Fishery Economics and the Common Property
Problem: Static and dynamic CP Problems

1. Why isn't the equilibrium stock size for most common property resources zero? Under what conditions would you expect it to be zero? In what sense is your answer an explanation of animal extinction?
2. Explain, as if to an Econ. 3070 student, why a restriction on the size of fishing boats is not an efficient way to regulate access to a common property fishery.
3. Define, for the stock of a renewable resource, the optimal harvest rate over time. Explain intuitively why such a path is intertemporally optimal. You can use math if you want (its not necessary), but if you do, make sure its nothing more complicated than simple calculus.
4. Restrictions on mesh size is one type of fishery regulation that is commonly used and one that is commonly discussed in the literature. However, we have never discussed mesh size. Why was there no need for us to consider mesh size in our simple fishery model? Describe a fishery in which mesh size would be an important variable.
5. The simple fishery model that we considered in class ignored the age structure of the stock (i.e., implicitly assumed that the stock could be completely described in terms of its biomass). Discuss, in terms of portfolio theory, how the results of our simple fishery model would generalize if the different cohorts (age classes) of the stock grow at different rates. I expect your answer to be verbal and intuitive, not mathematical.
6. Given, the production function, $h = g(x)E$, would the common property nature of a fish stock cause the market to fail if there is no future (i.e., if we live in a one period world)? What if the production function exhibited diminishing marginal productivity in effort?
7. In terms of our fishery model, discuss the relationship between the discount rate and the optimal stock size, X^* , provide an intuitive explanation of that relationship. As part of your answer, define the discount rate, define present value, and integrate your discussion of the relationship between the discount rate and the optimal stock size to the concept of present value.
8. Explain why renewable resources should not be managed so as to maximize their sustainable yield. Why do you think maximizing sustainable yield is often suggested as the appropriate goal of fishery and timber management?
9. Is fish farming the long term solution to the over exploitation of our ocean's fisheries?

10. Are imposing size limitations (such as meat counts in the case of scallops) an efficient way to reduce the harvest rates in common property fisheries?
11. It is sometimes suggested that the growth function for whales might look as follows



Explain why the growth function looks this way (rather than the simpler function we have been assuming). Will whales be more or less prone to extinction because they have this sort of growth function rather than the simpler type of growth function that we have been assuming?

11. Will the market misallocate common property resources that are not scarce?
12. Assume that a park is a common property resource. Argue (both verbally and graphically) that the park will be too congested.
13. Many regions of the world (the southern Sahara, Tibet, the Amazon Basin, etc.) are undergoing deforestation. What is it? Is the optimal rate of deforestation zero? What factors would determine the optimal rate of deforestation? Why might you conclude that current rates are excessive?
14. In the paper "Free Riders en Route to Disaster," it is suggested that common property renewable resources are eventually driven to extinction. Is this always the case? Discuss.
15. In his article "Free Riders en Route to Disaster," Julian Edney describes a common property game involving nuts in a bowl. He describes some of the group solutions to the game as quite creative. Quoting him, "One of the groups, for example, decided that to slow down the harvest, they would have to skewer each nut on the end of a pencil, balance it on their noses, and walk over to deposit it in a chalkboard tray before returning for another single nut." Edney seems to feel that this "solution" solved the problem. Discuss, using economic terminology, whether it did.
16. Define the term "common property resource" (your definition should be example free). Now give an example (not fish) of a common property resource. Is it a good example? Why or why not? Explain, as if to an Econ. 3070 student, why the market is incapable of efficiently allocating common property resources. Give an example of a resource that is not a common property resource. Explain in terms of their characteristics why some

natural resources are common property resources and others are not?

17. Is Hardin predicting that over breeding will lead to our eventual ruin? Do you agree? Should population growth be controlled through coercion? If so, what form do you think that coercion should take?
18. Discuss the optimality and feasibility of gear regulations and quotas in fisheries regulation.
19. In his paper "Free Riders en Route to Disaster," Julian Edney states that "Territorial Division of the commons is actually a rather radical solution." Why do I think this statement is silly?
20. Argue that having more information about a common property renewable resource will, by itself, tend to decrease the rate at which it is harvested. Now argue that having more information about a common property renewable resource will, by itself, tend to increase that rate at which it is harvested.
21. Verbally argue and graphically demonstrate that a tax on one of the components of fishing effort (e.g., a boat tax) will result in fish being harvested inefficiently. Your answer should include a definition of efficiency. Why doesn't tax on per unit catch do the same thing?
22. Describe a situation where fish do not grow (either through individual growth or reproduction) and where it would still be optimal to not harvest all of the fish.