

RESOURCE ECONOMICS PRELIMINARY EXAMINATION

March 29, 1995

You have until 12:00 (four hours) to complete this examination. Exams will be collected promptly. Pace yourself in responding to the questions so that you do not spend an undue amount of time on any one question at the expense of other questions.

Part I: Answer all of the following three questions

1. A frequent criticism levied against the U.S. Forest Service is that the Service subsidizes timber cuts. This same criticism can be applied to the U.S. wilderness system, because wilderness areas are subsidized by U.S. taxpayers.
 - a. Provide an economic analysis of the impact of subsidizing harvesting on the volume of timber cut. Compare to the socially optimum level of timber cut. Consider only harvesting and the harvesting subsidization in your analysis.
 - b. Provide an economic analysis of the impact of subsidizing the wilderness system. Compare your answer to the socially optimum level of wilderness. Consider only wilderness and the wilderness subsidy in your analysis.
 - c. Compare your results from (a) and (b). Are the criticisms valid?
2. A resource pool is used by $n+1$ identical individuals. The net returns of resource extraction for each of these individuals depend on summed extraction by all other users as well as on own extraction. The net return function of every user is the same:

$$NR_i = a + bf_i - cf_i^2 - d \sum_{j \neq i} f_j$$

where a , b , c , and d are known, positive parameters and f_i is own resource extraction. It is also known that $b > 2dn$.

- a. What are total net benefits of this resource pool when individuals ignore their interdependence and act independently?
 - b. What can the pool's net benefits be if individuals act cooperatively? What is the total improvement in net benefits over independent behavior (part a)?
 - c. Quantitatively establish two distinct policies the government can use to achieve the results of part b.
3. This year the Environmental Protection Agency ranked Texas as number two in the amount of toxic substances being released into the environment. Suppose that Governor Bush appoints you as his senior economist to study this issue. In essence, he wants you to perform an economic analysis of the current toxic situation in Texas and to provide him with recommendations. How would you go about accomplishing this task?

Part II: Answer one of the following two question

4. The concept of “sustainable development” has become an important buzz word for many international lending institutions. Carefully define the concept of sustainable development, and discuss its strengths and weaknesses. How does this concept relate to natural resource economic theory?
5. Scarcity rents is a topic which has received considerable attention in the theoretical and applied literature. What does “scarcity rent” mean, to what type of issues does it apply, and what role does it play in the allocation of resources?