Resource Economics Preliminary Examination

January 31, 1986

You have until 12:00 (four hours) to complete this examination. Exams will be collected promptly. Pace yourself in responding to questions so that you do not spend an undue amount of time on any one question at the expense of other questions. Write your student ID number at the top of each page of your answers, and do not write your name anywhere on the answers you turn in.

A. Answer all three of the following questions.

1. A region is populated by individuals each having the utility function $U_i = f_i(R_i, N_1, N_2)$ where R_i is the only rival good, and N_1 and N_2 are both nonrival and nonexclusive goods. N_1 is the amount of water recreation type 1, and N_2 is the amount of water recreation type 2. N_1 represents natural environments which permit stream-based fishing and, in certain areas, canoeing when water levels are sufficient. N_2 represents reservior environments with lake-based fishing, year-round boating, and skiing.

   Current levels of these two recreation types are $\bar{N}_1$ and $\bar{N}_2$. N_2 environments can be increased by constructing projects which decrease N_1 environments. Such conversions are irreversible. Of course, reservior projects induce a wide range of other, nonrecreational costs and benefits.

   The regional authority is contemplating a new project which will increase N_2. As part of the CBA, the decrement in N_1 and the increment in N_2 must be valued. Answer the following questions separately.

   (a) Assuming f_i and income are known for all individuals, how would you conduct the valuation? Provide appropriate theoretical detail and illustrations.

   (b) Assuming utility functions are unavailable, how would you conduct the analysis? Assume there are no funding limitations for your research. Justify your answer by identifying alternatives and making a rational selection.

   (c) Income varies greatly within the region. This may be a factor because participation in N_2 recreation generally requires substantially more capital (a boat and other equipment) than does N_1 recreation. How might you deal with this observation in the CBA?

2. Natural resourses are often categorized into those that are renewable and those that are nonrenewable.

   What is meant by this terminology? Elaborate on the strengths and weaknesses of this distinction using examples to assist in your discussion.

   Fisheries and forests are examples of resources which fit into the same category within this terminology. Yet these resources are typically addressed conceptually and in the policy arena as though they are very different. Discuss why this occurs and whether it is appropriate.

3. If you were an intructor teaching undergraduate students in resource economics, you would need to explain the meaning of efficiency in various economic contexts. Assuming your goal is to convey an understanding of the concept of economic efficiency as well as the ways in which the concept is often misused, how would you proceed? [Note: Remember that efficiency is the cornerstone upon which economic policy decisions are customarily based. If you treat the concept too lightly, you will do your students a serious disservice.]

B. Answer any one of the following questions.

4. World production of shrimp is considered to have reached its maximum level. This is particularly true for the Gulf of Mexico. In spite of relatively constant landings, fishing vessels continue to enter the Gulf of Mexico shrimp fishery.

   (a) Explain why vessels continue to enter the Gulf of Mexico shrimp fishery and what the implications of this continued entrance are for fisherman and the general public (society).

   (b) To prevent overfishing and to assure continued abundance of future fish stocks, policy makers often impose regulations to protect the fishery and promote economic well-being of the industry. List some of the more common regulations and discuss their expected impact.

5. The hazardous waste landfill in Spiro, Illinois, has come under increasing attact by the citizens of Spiro and the environmental group Greenspeak. The owners of the dump have been conscientious about the landfill operations. Under pressure from those opposed to operation of the landfill, the Illinois Pollution Control Board has authorized an economic assessment of whether or not to keep the dump open and has selected you to do the study.

   (a) Briefly categorize the costs and benefits of continued operation of the dump, and how they might be measured.

   (b) According to economic theory, at what level should the landfill be operated? Is it possible that the landfill should be closed?