RESOURCES ECONOMICS PRELIMINARY EXAMINATION
January 15, 1990

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 the last three digits of your student ID number at the top of each page of your answers, and do not write your name anywhere on the answers.

Part I: Answer all of the following three questions.

1. The local supply of deer (for hunting) is controlled by ranchers 1 and 2 who own adjacent property. These ranchers spend money on management, M, to produce deer, D. The ratio of the price of D to the price of M is dictated by regional markets and is given by $P_D/P_M = 4$. Because of terrain, vegetative cover, etc., some deer migrate from ranch 2 to ranch 1 during the hunting season. [Fences to retain cattle are ineffective for deer.] An interdisciplinary research team composed of range scientists and you (an economist) believe that annual production functions are given by

$$D_1 = (M_1 + \tfrac{1}{2}M_2)^{1/4} \quad \text{and} \quad D_2 = M_2^{1/4}$$

   a. Determine whether or not independent decision making will result in economic efficiency. What is happening here? Can independent decision making be efficient if transaction costs are nonzero?

   b. If rancher 2 erects a deer-proof fence, we believe the production function will be altered to $D_2 = M_2^{1/2}$ because migration is eliminated. [The effect on ranch 1's production function is obvious: set $\tfrac{1}{2}M_2 = 0$.] Under these conditions what is the rancher's maximum willingness to pay (annually) for the fence? Assuming that the fence is profitable, will the rancher's decision to erect the fence be economically efficient?

2. In the past decade a substantial degree of concern has been focused upon the rate at which the quantity of wetlands in the United States has been reduced. These lands play a vital role in the balance of the ecosystem by performing a variety of functions, many of which are not totally understood or easily identifiable.

   Suppose you are the resource economist charged with the responsibility of evaluating a proposed project which will significantly alter a major wetlands area along the Texas coast. Opponents of the project have argued for valuing the wetlands at their replacement cost, while proponents argue that the market price to purchase the wetlands is a reliable indicator of their value.

What does your expertise in resource economics enable you to say about each of these arguments? How would you approach the problem of assigning a value to the wetlands destroyed? [To reduce the scope of your answer assume that the project will totally destroy these wetlands forever].

3. Water is often managed and allocated by institutions which specify maximum permitted levels of water use for particular uses, such as irrigation. Such insitutions are argued to limit conflict, distribute water to its highest and best use, and provide water users with the security they require to invest in water-using capital and technology. Compare and contrast the economic implications of this Permit system as contrasted to a market system in which water rights can be transferred between users at their discretion.

Part II: Answer any one of the following two questions.

4. Open-access resources are argued to result in over-exploitation of the resource base and elimination of economic rent.

   a. How is it that independent agents acting in their own best interests can bring about an inefficient state of resource use?

   b. Alternatively, common-property resources, as a distinct category, appear to present an institutional solution to over-exploitation of the resource base. Yet, it is still argued that such common property solutions result in an economically inefficient state of the world. Why?

   c. Discuss your answers to parts a and b above in relation to a rescource allocation system which meets all of the neoclassical assumptions for perfect competition, including dynamic efficiency.

5. Communities seeking to expand their employment and personal income levels look primarily to attracting new basic industry to their area. Their focus at present is primarily on manufacturing and government facilities. The number of communities seeking new industry far exceeds the number of facilities available to locate. In order to compete, many communities have begun to offer location incentives such as free land, utility rate concessions, property tax abatement schemes, etc. In response, manufacturing firms and government agencies shop for the "best deal" among all offered by communities.

   Please discuss and evaluate this phenomenon from both the perspective of a community interested in its benefit-cost relationships and society at large. In your evaluation, include both temporal and geographical distribution concerns, risk, intracommunity income effects, and whether the facility is a private manufacturing or government entity.