RESOURCE ECONOMICS PRELIMINARY

EXAMINATION

January 18, 1978

You are required to write on five of the questions below conforming to the options presented. The examination is for a four hour period, 8:00 to 12:00. Pace yourself in responding to questions considering this four hour restriction; i.e., do not spend an undue amount of time on any specific question at the expense of the other questions.

A. Answer four questions for the following set of five:

1. Benefit-Cost Analysis can not have a role in pesticide regulatory decisions because the health hazards associated with pesticides cannot be evaluated in monetary terms. Critically evaluate this statement.

2. The Texas High Plains is faced with a declining supply of groundwater since there is essentially no natural recharge to the aquifer. However, there are methods of "recharging" water back to the aquifer. (e.g., recharge wells, lake modification) Unfortunately little is known about the economic implications. Carefully describe how you would do the research needed to determine if recharging water back to the aquifer was economically justified by the farmer or society. Indicate methods or methods of analysis, data needs, etc.

3. Richard F. Fullenbaum, Ernest W. Carlson and Frederick W. Bell in a comment (published in the AER, June 1971) on an article written by Vernon L. Smith (published in the AER, June 1968) state:

"Smith attempts to develop his theory of production from resources by specifying a cost function. In the case of commercial fishing, Smith states that ..."The most natural general hypothesis about total operating cost for the individual fisherman requires it to be an increasing function of the vessel's catch rate, by x, but a decreasing function of fish population i.e., $\phi=\phi(x,X)$, with $\phi_1 \equiv \partial\phi/\partial x>0$, and $\phi_2 \equiv \partial\phi/\partial X<0$" (p. 413). He then formulates the following cost function for the fishing firm,

$$(1) \quad C = \phi(x,X,K) + \hat{\pi}$$

where C = total cost per unit of time, x = catch rate per vessel per unit of time;, X = fish population; K = both the number of homogeneous firms (vessels) and a measure of the real capital stock in the industry; $\hat{\pi}$ = minimum return necessary to hold the vessel in the industry. As we shall see, the specification of (1) leads to unreasonable results. Actually, the total cost per unit of time for any fishing firm is not a direct function of x, X, and K. Rather total cost per firm per unit of time in long-run equilibrium is merely dependent upon factor prices. That is, total cost for the fishing firm in the long run is not explicitly influenced by ouput or x*."
State whether you agree with their comment and explain your answer.

4. Suppose that you have been asked to assess the economic feasibility of acquiring land to make a canoeable stream accessible to the general public. Indicate the conceptual framework for your analysis and methods that might be used to empirically estimate the benefits associated with the project.

5. One of the continuing debates among practicing benefit-cost analysts involves whether it is appropriate to consider indirect benefits in assessing the economic consequence of public investment decisions. What is this debate all about? As an expert in this area, please clarify this issue for us and provide recommendations as to whether or not, or when, to include indirect (or secondary) effects in such analyses.

B. From the following set of three questions, select one.

1. Evaluate the following statement made by E. W. Carlson made in "Cross Section Production Functions for North Atlantic Grownfish and Tropical Tuna Seine Fisheries - Measruies of Fishing Power and Their Use in the Measurement of Fishing Effort."

"The abstract production furnction refers to outputs and inputs per unit of time. The unit of time is undefined. When using annual vessel data, we have to note the fact that the vessels are not utilized for the same amount of time and standardize for this.

In the biological literature, the concept of fishing day is considered to be by far the most desirable measure of vessel fishing time. There is no denying that there are very difficult conceptual problems in deciding what the proper measure should be. In the simple case, though, an economist would prefer to use days absent from port as a measure of fishing time than days fishing. This is primarily because if a fisherman is an economic maximizer, he will attempt, ceteris paribus , to maximize his gross revenue per day at sea and will plan his fishing strategies accordingly. Under this assumption, the fisherman may or may not when or where his expected catch rates are higher."

2. An ancient Mexican shrub called Guayule is being considered as a source of natural rubber for the United States. A likely location of production is the sparsely populated, economically depressed, southwest Texas area.

   (1) How would you evaluate the economic impact of this enterprise on the local economy if asked to do so in a research contract.

   (2) Under what conditions would production subsidies for this enterprise be justified?

3. Deer compete to a certain extent with livestock for pasture. Also, brush control, which increases the amount of grass available for livestock, reduces deer habitat and forbes deer prefer. Develop a theoretical framework for determining an optimal mix of open pasture and brush, and thus of deer and cattle.