

RESOURCES ECONOMICS PRELIMINARY EXAMINATION

June 8, 1992

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.

Part I: Answer all of the following three questions

1. After some study, it has been determined that the preferences of a group of people (Group A) would cause them to behave as if they have the following collective expenditure function if there were markets for goods  $x_1$  and  $x_2$ :

$$e(p_1, p_2, U) = 2\sqrt{p_1 p_2 U}.$$

The  $U$  term represents collective utility. Although  $x_1$  is purchased in the marketplace at price  $p_1$  (currently,  $p_1 = \$5$ ),  $x_2$  is available to the group in fixed quantity without the opportunity for market exchanges. Up to this time, 16 units of  $x_2$  have been available to the group at zero cost. Now, a second group (B) has successfully pressured the government for a reapportionment of scarce  $x_2$ . As a result, Group A must suffer a decline in  $x_2$  from 16 to 8, and their collective utility will be lowered from  $U' = 200$  to  $U'' = 100$ . What compensation would you argue should be paid to Group A?

2. Residential solid waste disposal is problematic for a city for at least two reasons. First, landfill space is increasingly expensive to procure because no one wishes to be a neighbor to a LULU (locally unwanted land use). Second, public concern for groundwater quality has created a variety of regulations concerning landfill management. As a result, landfills must be lined with nonporous soils and a system of observation wells must be drilled around the site to monitor possible groundwater contamination.

Traditional city policy (Policy I) has been to charge each resident \$10 per month for twice-a-week pickup of any and all bagged garbage placed at the roadside on Mondays and Thursdays. A policy proposal (Policy II) is to (a) collect only garbage placed in authorized containers, (b) charge \$15 per month to rent each authorized containers (no other means of obtaining containers is possible), (c) change to once-a-week pick-up, and (d) encourage recycling by offering free pick-up of separated paper, aluminum, and plastic.

Analyze Policy II relative to Policy I with respect to economic merit. Provide a policy recommendation of your own construction (Policy III) and indicate its merits relative to Policy II.

3. The Everglades is a unique resource area located in south Florida. Throughout the years it has attracted many visitors who go there to appreciate this resource as well as to fish and hunt. However, due to phosphorous runoff from sugar cane fields, the Everglades region is deteriorating. In order to alleviate this problem, the state of Florida is considering a lawsuit that will impose costly management practices on the sugar cane growers. Imagine that you have just been hired by the Environmental Protection Agency to head a research team which will study this problem. Your results will be essential for policy makers concerned with the restoration of the Everglades. Because this is a sensitive issue, the results of your study will be closely scrutinized by citizens and other interested parties. Given the above information, what would you do or assign your research team to do? And, how would you do it?

**Part II: Answer one of the following two questions**

4. Common pool resources are quite common throughout the world. These types of resources are said to lead to market failure and hence are a problem for natural resource management. Define what a common pool resource is and contrast this definition with those of private and public goods. What organizational arrangements have economists proposed for each of these three classes of goods? How are these arrangements defined?
5. Taxes, standards, and transferable development rights (TDR's) are some of the common policy tools used to protect environmental resources. Using the tools of economic analysis please respond to the following:
- Briefly explain the efficiency characteristics of these policy tools.
  - Cite examples of specific environmental problems and show how the policy tools may be applied to solve the problem.
  - Discuss some of the potential implementation problems associated with each policy (be sure to discuss both costs and institutional problems).