RESOURCE ECONOMICS PRELIMINARY EXAMINATION
August 30, 1995

You have until 8:15 to read the exam and ask any clarification questions. You then have until 12:15 (four hours) to complete this examination. Exams will be collected promptly.

Part I: Answer all of the following three questions

1. Together, the residents of Ourtown behave as if they maximize aggregate utility given by

$$U = H^3 G^6$$

where H is annual expenditures on all private household goods and G is the annual flow of public services. Aggregate annual income in Ourtown is $100. In this case G comes solely from publicly owned, nondepreciating capital (e.g., swimming pools, parks, zoos, roads) that have no operating costs. G is currently 2 units. The local government sometimes makes investments to increase G by adding to this public capital. Except for these investments, all income is spent on H which has a price of $1 per unit. Ourtown has no existing debt, and it can borrow any funds it wishes.

To guide decision making on the attractiveness of alternative public investments, Ourtown employs the Kaldor criterion, a 6-year planning horizon, and a 10% discount rate (its cost of borrowing). Ourtown government is considering a one-time investment costing $400 that will immediately raise public service flows from 2 to 4 annually. Perform the appropriate analysis to see if this investment should be undertaken?

2. Resource economics has long supported and developed the methodology of cost-benefit analysis in guiding public construction projects. In a somewhat different application, the U.S. Congress and the legislatures of several states have considered legislation requiring that proposed environmental regulations pass a cost-benefit appraisal before they can be adopted. Carefully explain procedures you would use, data needs, and the strengths and limitations of a cost-benefit analysis of a regulation that would require all automobiles to use propane rather than gasoline to reduce harmful air emissions.

3. The preservation of endangered species is an important topic not only in Texas, but in the rest of the U.S. and the world. One complicating factor is the fact that endangered species are found on both privately owned land and publicly owned land. Endangered species range from small, seemingly inconsequential plants and animals (such as insects and grasses) to high profile species (such as gray wolves and whales). Present an economic discussion of the relevant principles dealing with the preservation of species.

Part II: Answer one of the following two questions

4. An increasingly important dichotomy in the economics literature of pollution has to do with the distinction between point and nonpoint pollutants. Distinguish these two types of pollution from an economic perspective and fully discuss the implications of this distinction for the design of efficient pollution contol policy.

5. Some profit-maximizing, agricultural production practices are associated with the pollution of ground and surface water supplies. Similarly, environmental regulations on the farmer are harmful due to reduced profit. Therefore, agriculturalists argue that environmental regulations reduce the farmer's control over land – essentially taking a portion of the farmer's property rights – therefore necessitating compensation to the farmer for lost profit. Evaluate these statements.