

## Resource & Environmental Economics Field Examination

January 11, 2007

### Instructions:

You have 4 hours to complete the exam. This time commences at the end of the 15-minute reading period during which no writing is allowed.

Please use your assigned "alpha letter" on every page to identify your exam and number each page. Do not use your name or social security number. Write on only one side of the page leaving at least one inch margins. Upon turning in the exam make sure the pages are in order.

You have four questions to answer.

### Answer four of following five questions.

1. Assume the following situation is factual. Institutions and laws regarding water rights have supported overuse of water resources such that several aquatic species have become threatened or endangered. That is, they are at risk of extinction. The users of the water believe they can clearly demonstrate the value of water in their uses, say urban and agricultural. They feel that water has little public value in supporting species. Lay out a model that you believe could lead to estimates of the value of instream water to support these species sufficiently to avoid extinction. You need not take the view that such values will be large or outweigh the costs. Explain how you will address the social issue about whether the value of water in support of aquatic species is larger, the same, or smaller than the value of water in present urban and agricultural uses.
2. Evidence is mounting that the burning of coal from certain deposits leads to mercury emissions that in turn damage fish and those that eat fish. As a consequence of these concerns, government bodies are beginning to study mercury emissions. From an economic perspective lay out the basic issue as an economic problem. Provide a broad set of alternative policy designs that could alter power plant emissions in a desirable way. Describe each of these policy options. Discuss the economic characteristics of the alternative policies. Among other properties, would alternative policies necessarily result in different levels of mercury emissions and are there reasons to favor particular policies among this set? How would you conduct an empirical study to assist in policy selection and what sorts of information would you generate?

3. Suppose you are engaged by a consortium of Texas oil producers wishing to optimize returns due to pumping oil from the reserves they hold. Develop and fully explain a modeling framework to guide their decisions, emphasizing current period pumping but also informing the group about the probable path of optimizing behavior over time. Clearly identify the information the consortium will have to provide to you in order to establish a working model. Describe for them the more important worries you have regarding the weaknesses of your approach, but also observe the advantages.
4. Ongoing debate concerns the control and management of federally owned lands in western U.S. states, where the U.S. government currently owns more than a third of the total amount of land in each state. These lands are very diverse and have various productive potentials for use in forestry, mining, and grazing. Indeed, much of this land is leased by the federal government via long-term contracts to private firms and ranchers for these purposes. There are strong doubts about whether current leasing arrangements transfer a fair portion of economic rents to the public sector. Proposals have been occasionally made to sell large, selected parcels of these lands to enhance economic development and capture sale values as government revenue.

Some of these lands possess special geologic formations and unique "scenic wonders". Much of these lands also offer diversified recreational opportunities (hunting, hiking, camping, skiing, etc.) and serve as important natural habitats and watersheds.

To what extent might it be sensible to increase the amount of private land in this region via open auctions of public lands? Describe the economic issues involved in this question and identify the approach(es) you would take in resolving an answer to this question.

5. The Edwards Aquifer was the subject of legal reform where new legislation limited total pumping water use and allowed users to trade ground water rights. This legislation also stated that each agricultural acre has to retain at least one acre foot after any transfer – meaning that all but one acre foot can be sold or leased. The political intent of this restriction was to support economic activity in rural areas as the higher productivity of irrigation over dryland agriculture is known to add to farmers' purchases of inputs and other goods.

Now, some people are arguing that this limit is not desirable even though it may be beneficial for rural areas. Lay out an analytical framework that can accurately evaluate the economic cost of the one acre-foot retention rule. Describe all components and informational requirements. How would you use this framework in addressing the central issue?