

Natural Resource Economics
Summer 2001

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Field Exam

There are three questions on the exam; you should do all of them.

You have until 2 hours to finish this test. Answer the questions using as much precision and detail as the time allows. Be sure to watch your time.

Answer all of the following three equally-weighted questions.

1. Prove that a properly-chosen tax on emissions can induce firms to emit the optimal amount of pollution. Also show that the optimal tax is equal to the marginal abatement cost for each firm. Use the notation and framework given on pages 113-114 of Hanley, Shogren, and White; excerpts of those pages are attached to this exam. Explain each step thoroughly (including the steps I have hidden from you on pages 113–114).
2. Attached to this exam are the first two pages of a class handout on fisheries economics.
 - (a) In what circumstances is $\delta - F'(x) = 0$? In those circumstances, will the species become extinct?
 - (b) In Equation (5), what is the sign of $\delta - F'(x)$? Are there more fish in this situation, or in the one in which $\delta - F'(x) = 0$? Why, both mathematically and intuitively?
 - (c) What would change on these two pages if the number of firms were $N > 1$ instead of one?
3. In 1974 Nobel-Prize-winner Robert Solow gave a lecture as president of the American Economic Association. I have attached a bit more than 3 paragraphs of that lecture to this exam. Given your knowledge of the Hotelling Rule, and, in particular, of its implications for the change of *total* profit through time, identify a somewhat misleading implication in Solow's remarks. (Solow makes no mathematical errors; here, I am speaking about interpretation.)