ECO6143 Natural-Resource Economics Mid-term exam March 9 2005 University of Ottawa Open book exam Professor: Louis Hotte Time: 3h00

1. (25 points) An empirical study has concluded that as the demand for a certain fish increases, its supply decreases. How would you explain that? Be as complete and clear as possible.

2. (25 points) What are the effects on a mineral industry's output and price path of a fully anticipated:

- (1) Increase in the total stock of reserves.
- (2) Fall in the choke price.
- (3) Technological change that decreases the cost of extraction over time.
- (4) Increase in demand.

NB To answer this question, use a four quadrants diagram and assume that you are now at time 0 and that the change is anticipated to occur at a future specific date, say at date t_0 . Explain clearly your answer.

3. (25 points) A fishery is subject to a free access by n fishers. The government wants to regulate fishing activities by controlling the length of the fishing season. By reducing the fishing period, the effective effort of each fisher goes down. Let x_i be the true effort of fisher i and ℓ be the length of the fishing season, where ℓ is expressed in fraction of one year, i.e. $\ell \in (0, 1)$. Effective effort is given by $e_i = \alpha(\ell)x_i$, where $\alpha' < 0$ and $\alpha(1) = 1$. The unit cost of true effort is c and the total steady state harvest function is h(e), where e is the total effective effort, with h''(e) < 0.

- (1) Characterize the Nash equilibrium true effort level for any given season length ℓ . (Assume that all fishers are identical and find the symmetrical equilibrium.)
- (2) Let $h(e) = ae be^2$. Is it possible to find a fishing season length that would yield an equilibrium at the maximum sustainable yield? Explain.