Environmental Economics and Policy (Econ 231-01)
Homework 3: Due Tuesday Oct. 19
60 points
Label and explain all graphs

1. (15 points) Regression Results and Open Space.

Below find regression results from Soren Anderson's honors thesis, which we did **NOT** read for class. These results are from a regression that estimates the effect of house, neighborhood, and open space characteristics on house values **in suburban St. Paul.**

The dependent variable is house sale price, in dollars.

Independent Variable	Coefficient	T-statistic
Lot size (acres)	992.09	6.02
Square feet in house	52.33	53.33
Number of bedrooms	-5141.55	-8.72
Number of bathrooms	25193.37	26.72
Age of house	-150.19	-8.00
Has Fireplace	1531.77	1.39
Property tax on home	4.20	12.43
Race (percent minority population in neighborhood)	-847.94	-5.45
Income (Median household income in neighborhood)	0.20	2.57
Percentage neighborhood population living in owner-occupied housing	-197.65	-4.80
Median home value in neighborhood	0.31	10.10
Population density per sq. mile in neighborhood	-2.28	-6.58
Distance to central business district (meters)	-0.35	-3.08
Distance to nearest mall (meters)	0.45	3.84
Distance to major highway (meters)	2.67	8.32
Distance to nearest park (meters)	**1.89**	**2.76**
Distance to nearest golf course (meters)	0.96	2.34
Distance to nearest cemetery (meters)	-0.34	-1.78
Distance to nearest river (meters)	0.50	3.05
Distance to nearest lake (meters)	-1.16	-3.13
Constant term (intercept)	-56.48896	-0.01

a. Interpret the coefficient on distance to nearest park (what does the number mean, in numerical terms)? How is this result similar or different than the result that Anderson found in the paper we read for class?
b. Under what condition would comparison of the average price of homes near parks to the average price of homes far from parks yield the same result as the estimate in the table above?
c. What kinds of open space benefits can be quantified using hedonic price analysis? What kinds of benefits cannot? Explain.

2. (15 points) Measuring Benefits. The regional government is contemplating a major new dam and water project that would create substantial costs and benefits. Some of these costs and benefits appear in the first list below. The second list includes methodologies to measure the value of a particular cost or benefit. How would you match up the two lists? For each cost or benefit on the first list, which methodology on the second list is best suited to measure it, and why? **For each item, explain how the chosen method would be applied.**

There is more than one correct way to answer this question.

I. The dam will provide a fish ladder, but will still interfere with the travel of adult salmon upstream to spawn, and of baby salmon downstream. Some of these salmon are endangered species.

II. The dam will provide hydroelectric power, will reduce the burning of fossil fuel, and will thus reduce damaging emissions of carbon monoxide, particulate matter, and other air pollutants that threaten human health.

III. The project will result in a lake for fishing, swimming, and boating.

IV. The dam will reduce the likelihood of flooding in communities downstream.

Possible Methodologies Include:

A. Hedonic price method. Make sure you explain the equation and the data used in estimation.

B. Contingent valuation method. Make sure that in your explanation you discuss the main potential biases encountered when using this method and how you would mitigate their effects.

C. Averting expenditure method. Use a graph in your explanation.

D. Travel cost method. Use a graph in your explanation.

3. (15 points) Cost Estimation

Do Callan and Thomas, Chapter 8, page 184, problem 3.

4. (15 points) Uncertainty and the Choice Between Price and Quantity Instruments

After extensive research, scientists and economists determine that the marginal social benefits of reducing greenhouse gases (GHGs) can be expressed by the equation, $MSB = 150 - 2Q$, where Q is the quantity of abatement. Some uncertainty, however, remains about the marginal social costs of abatement. The best available guess is that $MSC = 0.75Q$. The international community

decides to implement a global tradable permit system. After the system has been implemented, the real *MSC* is estimated to be $MSC = 0.75Q + 10$.

a. Graph the *MSB*, expected *MSC*, and real *MSC* of abatement. Indicate the quantity of abatement that was originally set, and the expected and real *MSC* of attaining that abatement.

b. Was the choice of a permit system (versus a tax on GHGs) a good idea given the nature of the uncertainty, *MSC*, and *MSB* involved? Illustrate your answer using your graph above.

c. Why didn't I ask you to consider the effect of uncertainty in benefits on the choice of permits versus a tax on GHGs? Use a graph in your explanation.