

Exam I
(100 points)

- (12 pts) 1. What kinds of policy impacts are intangible? Also include an example of an intangible impact and indicate why the example is consistent with your definition.
- (16 pts) 2. Name the two opportunity costs of water that are often omitted from the rates utilities charge for the water they provide to clients? What types of water are each of these opportunity costs usually associated with?
- (22 pts) 3. Under average weather conditions, total water use in a summer month is 60 million gallons when consumers expect to be charged \$8/1000 gallons. The price elasticity of demand is -0.4. \$8/1000 gallons is also the utility's marginal cost of supplying water.

If drought implies that the utility can only supply 90% of summer-month quantity demanded at the normal price (assuming drought demand is the same as average-weather demand), what is the "loss due to drought" for a summer month? Illustrate with a graph and compute.

- (25 pts) 4. Carefully draw a 2-period model of optimal water use that accurately corresponds to the information contained in the following statements of aggregate total benefits and total costs for a two period scenario ($t=0, 1$) with a discount rate of $d=10\%$. Calculate equations for each relationship you draw.

$$B_0(w_0) = 40 + 50w_0 - 2w_0^2 \quad B_1(w_1) = 44 + 50w_1 - 2w_1^2$$

$$C_0(w_0) = 10 + 5w_0 + 0.75w_0^2 \quad C_1(w_1) = 10 + 6w_1 + 0.75w_1^2$$

Summed water use over both periods cannot exceed W . [Hydrologic quantification of W is the subject of ongoing, uncompleted study.]

Will water use in period 0 have to be curtailed below the ordinary behavior of period 0 agents? Why/not? Explain using your graphic.

- (25 pts) 5. An urbanized region has four important sectors of water demand for a river serving as the region's sole water source. These sectors are residential, commercial, industrial, and recreational. Would you recommend enforced and transferrable rights to the river's water for achieving optimal water allocation or would you recommend alternative policies? Why? Define and apply the relevant conceptual tools completely. If government decides to enact transferrable rights, how should the rights be initially assigned and why?