CE 5333 – Special Topics in Water Resources Exercise Set 1

Purpose: Uncertainty and the impact of subtle changes in consequences and costs on the decision making. Critical thinking and reading of classic documents from the literature.

Exercise

1. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	198,000 live; 402,000 die	100%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the "cost" to implement either action is identical. Which action would you choose? Why?

2. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	600,000 live; 0 die	33%
	0 live; 600,000 die	66%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the "cost" to implement either action is identical. Which action would you choose? Why?

3. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	600,000 live; 0 die	33.3335%
	0 live; 600,000 die	65.6665%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the "cost" to implement either action is identical. Which action would you choose? Why?

4. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	198,000 live; 402,000 die	100%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the "cost" to implement action A has a cost, equivalent to two thousand premature deaths within one year of the action. Which action would you choose? Why?

5. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	198,000 live; 402,000 die	100%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the "cost" to implement action A has a cost, equivalent to two thousand premature deaths within ten years of the action. Which action would you choose? Why?

6. Did "cost" have an effect on **your** decision? Did the timing of the cost of that matter?

7. Read "The tragedy of the commons" by Garrett Harding (on the class server).

   a) Write an abstract of the essay (no more than one page).

   b) Consider the National Park System. The parks are finite, yet the number of visitors per year is generally increasing. What system of admission would you institute for controlling access to the overcrowded parks? Would you use a reservation system? What basis would you use in a reservation system for selecting who is admitted?

   c) Hardin states that the morality of an act is a function of the state of the system at the time the act is performed. List three contemporary examples of acts with little current effect such as that of plainsmen in 1800 killing a bison to eat only the tongue?

   d) The use of septic tanks for weekend homes around Lake Tahoe was common in the 1960s. As the shores around the lake became lined with these homes, the lake became a common sewer. Eventually it was necessary to pass a law in California and Nevada to ban the use of septic tanks and build municipal and regional disposal systems with connecting sewer lines to each home. Discuss the use of Lake Tahoe as a "commons" and suggest alternatives to a legal solution to the problem (of a common sewer).