

Name: _____

CVEN 664 – Water Resources Planning and Management
Fall Semester 2009
Dr. Kelly Brumbelow, Texas A&M University

Midterm Exam #1

Open-book, Open-notes (2 pages, 5 questions); Time allowed: 60 minutes
Attach additional sheets as necessary with your answers.

1. In your job as a water resources manager at an irrigation district, you meet one day with a representative from the Acme Biotech Company. The representative states that she is selling a brand new type of sugarcane for which experimental plots show that “compared to what your farmers are planting now, the crop coefficients are typically reduced by 10-15%, but yield reduction coefficients actually go up by 5-10%.” If farmers in your irrigation district were to replace their current variety with the new one, *what would be the expected effects on water demand and profitability for the average farmer and for the district as a whole? Include both short and long-term effects.* (25 points)

The following 4 questions address the Catawba-Wateree case study. If you wish, you may answer with a single essay that answers *all* of the questions in an integrated fashion. Use systems theory concepts as appropriate in your answers. Your goal is to demonstrate deep insight into the case study gained through the use of systems theory techniques discussed in class. (75 points)

2. Viewing this case study with a very narrow scope, the South Carolina Board of Health and Environmental Control (SCBHEC) in July 2009 denied a Section 401 Water Quality Permit to Duke Energy pursuant to Federal Energy Regulatory Commission (FERC) relicensing of Duke Energy's hydroelectric dams and plants on the Catawba-Wateree River. Describe the MODELS employed in this case study by three OBSERVERS: (i) SCBHEC, (ii) Duke Energy, and (iii) professional staff of the South Carolina Department of Health and Environmental Control (DHEC). Are there clear instances of violations of the "principle of SYSTEM-NOTATION indifference" among these models?

3. In 2007, the North Carolina Environmental Management Commission (NCEMC) approved a permit for the North Carolina cities of Concord and Kannapolis (current combined population approx. 100,000) to withdraw up to 10 MGD from the Catawba River. The NCEMC acts in the same role in North Carolina as the South Carolina DHEC does in its state. Describe the MODEL employed by NCEMC, and explicitly state any PROJECTIONS used by NCEMC in building its MODEL.

4. The organization American Rivers somewhat famously named the Catawba-Wateree River as the #1 "most endangered river" in the U.S. in 2008. Discuss what is meant by the NOTATION "most endangered river." Would other OBSERVERS of the system agree with this NOTATION, use different NOTATION, and/or use the same NOTATION to refer to different realities in the SYSTEM?

5. The FERC relicensing process is a lengthy one requiring extensive documentation and activity by the applicant beyond straightforward interaction with FERC alone. Discuss how this particular application incorporates the "general law of complementarity." Has the inclusion of this "law" served the purpose that we discussed in class?