Choose one of the topics listed below and write an essay to be turned in at next week's Wednesday class (9/13). The essay should be 1-2 pages in length (single-spaced type). You must use at least three references other than handout #1 or the text book for the class. The essay will be graded as follows:

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td>Organization (Logical flow of ideas):</td>
<td>15%</td>
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<td>Grammar, spelling</td>
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<td>Originality</td>
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<td>Seriousness of thought</td>
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<td>Quality and citation of reference(s)</td>
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Essay Topics:

a. Water diversion: About six years ago, a Canadian company proposed to bottle water from Lake Superior and ship it to Asia as drinking water. This proposal met considerable resistance in both Canada and the U.S., and the Canadian government disallowed the company to carry out the shipments. Other companies have been denied permits to bottle ground water from aquifers that recharge into the Great Lakes. The option of piping water from the Great Lakes to the arid southwest has been discussed in the past. More recently, a town in Wisconsin that lies just outside the Great Lakes Basin (i.e., watershed) applied for permission to use L. Michigan water for its drinking water; Governor Granholm (Michigan) opposes this application. Discuss who owns the water in Lake Superior according to existing international treaties. What policies have been enacted or are in consideration now for regulating water withdrawals from the Great Lakes? What guidelines do you think should be established for use of water from the Great Lakes?

b. One tool that is used in environmental protection is "marketing of environmental commodities". E.g., allowances for emission of sulfur and nitrogen oxides are traded on a regional basis in this country; similar trading of water pollution rights are being implemented on an experimental basis in numerous locations in the U.S. In the global conferences on climate change (e.g., Kyoto, Rio de Janeiro), the U.S. has repeatedly argued that it should be allowed to trade its CO2 emissions for reductions in emissions achieved in developing countries. Marketing of water also has been proposed as a means of combating water shortages, and globally there is a large movement underway to privatize water treatment and to allow the private companies to sell the treated water. The basic idea behind all of these actions is that market prices will reflect the "value" of the commodity, and market forces will act to optimize (economically) the distribution of the commodity and thereby avoid waste. Discuss the pros and cons of privatization of treatment of drinking water and wastewater. What percentage of drinking water in the U.S. is treated by private firms? How do the issues associated with privatization differ in developing and developed countries?
c. The Clean Water Act (1972) stated that "it is a national goal that the discharge of pollutants into navigable waters be eliminated". Many people have criticized this policy of "Zero Discharge" as being unattainable and unreasonably costly, but it has been incorporated into the Binational Program's policy for nine specific pollutants to Lake Superior. Discuss the merits and problems of "zero discharge" in general. Do you think that it is a good policy or goal? What are the pollutants for which zero discharge into Lake Superior is mandated, and how will this goal be attained?

d. Lake Superior is an example of an environmental "commons". What is meant by a "commons"? What are the problems in maintaining a "commons"? What regulatory approaches can be taken towards maintaining a "commons"? Which approach do you think is most appropriate for maintaining the quality of Lake Superior waters?

e. The 21st century has been predicted to be the “century of water”, the century in which water will be the major source of conflicts and stress in the world. What are the facts on which this prediction is based? What policies could be enacted to minimize future conflicts? Given that people in developing countries already pay, on average, 12 times more for water than people in developed countries, is accurate pricing a realistic approach?

f. Again and again in opinion polls the American public voices its support for environmental protection. However, when we examine lifestyles of Americans, there seems to be a contradiction. Per capita, we consume more energy, paper, water, and numerous other resources than do people of any other country in the world. There is much discussion about how to change lifestyles of the public, but one viewpoint is that this is just another manifestation of the abrogation of personal responsibility in this country. The camp owner in the UP who builds a septic system too close to a lake or stream with the rationalization that the camp is used only a few months per year, the official at MTU who opts not to install water-efficient toilets in new buildings because of pressure to contain construction (rather than operating) costs, or each one of us who owns an SUV rather than a small car has made a decision affecting the environment. Each person has balanced their wants and needs against those of the environment and decided that the environment is less important. How could this problem be addressed? What could be done to help each of us to know the environmental consequences of our actions? Would that knowledge be enough to change our behavior? What else could be done to change the way individuals construct their lifestyles?

g. In response to the suicide plane attacks of 9/11 there have been many curtailments of fundamental rights of U.S. citizens as well as of foreign nationals whom the U.S. has apprehended. Humorously, whenever the current administration enacts a policy that they think might offend the sensibilities of many citizens, they cloak that policy in a name that implies the opposite of what the policy change embodies. Thus, in the “Patriot Act”, the rights of U.S. citizens to privacy, to freedom of speech (Bill of Rights), to assembly (Bill of Rights), to information (Right to Know law), as well as other rights have been eroded. A powerful tool in fighting pollution has been the Right to Know law that has enabled citizens to learn who is polluting their air, water, ground water. The Bush administration has tried to restrict the public access to information about drinking water quality in the name of public safety. First describe
the facts of this situation, and then discuss how you think that the need for public safety could be reasonably balanced with the public’s right to access information about their drinking water.

h. Energy is a major environmental issue that affects climate change, air quality, surface water quality, and water supply. Although hydroelectric power is almost neutral with respect to climate change (a recent study found that the 3 Gorges dam in China has had significant effects on regional climate), there is little movement to expand its use in the U.S. In contrast, hydroelectric power remains a hotly debated issue in Canada, China and many developing countries. Many people are arguing that we need to increase our use of nuclear power to meet our energy needs without emitting more CO₂. Canada has proposed new nuclear facilities sited on the Great Lakes. Large windfarms are being proposed for marine and Great Lakes coastal waters, but these have been opposed by property owners worried about aesthetics and environmentalists worried about bird mortality. Depicted below is an outdated projection of the relative magnitudes of world energy sources. Choose any of the renewable energy sources (wind, hydroelectric, solar, geothermal, wave, tidal, biomass, ocean current, marine thermal, etc.) or energy conservation, and discuss the implications for WATER-RELATED ISSUES of a large increase in the use of this energy source.

World Energy Consumption by Fuel Type, 1970-2020

![World Energy Consumption by Fuel Type, 1970-2020](image)


i. The 21st century has been predicted to be the “century of water”, the century in which water will be the major source of conflicts and stress in the world. In many areas of the world, the
demand for water already exceeds the supply, in many areas of the world water is already a
major limit on economic growth. However, unlike many other materials, use of water does not
destroy the resource. It could be argued that it is only limitations on our ability to reuse water
that actually limits the water supply. In this essay, you are to address the potential for and
limitations to water reuse. What is meant by gray water and dual distribution systems? To what
extent could water purification and reuse mitigate the shortage of water? What hurdles must be
overcome for water reuse to be more widely used and for it to be a viable option for meeting
water demand in arid regions?

j. Sustainability has become the buzzword of this decade. Despite its frequent use, rigorous
definition of the term is still elusive. Many discussions of “Sustainable” water policy are
particularly fraught with poorly defined concepts. A coming starting assumption is that there
must be a balance between supply and demand for water, but definition of either the supply or
demand is not trivial, and space and time scales become critical when the “balance” between
supply and demand is defined. The discussion becomes even fuzzier when “cultural” and
“economic” attributes of sustainability are included. In this essay, you are to consider a single
location (probably one with which you are familiar) and discuss all of the factors of which you
can think that affect water supply and demand. These factors should include components of the
physical world, cultural practices (e.g., use of automobiles), engineering practices (e.g., using
water to convey sewage, use of impervious paving materials), legal and social practices (e.g.,
zoning laws, property values).

k. The failure of the federal government of the U.S. to act on the issue of climate change is
leading to a rapid expansion of efforts by states, cities, NGO’s, and individuals to minimize
green house gases. One of the interesting concepts that has arisen is that countries, states, cities
or individuals can offset their own greenhouse gas emissions with reductions elsewhere or CO2
uptake elsewhere. For instance, purchase of a Terra Pass (http://www.terrapass.com) allows one
to offset the CO2 emissions from one’s automobile by supporting renewable energy projects
elsewhere. The seductive aspect of this approach is that one does not need to alter one’s
lifestyle, one can simply pay for the ecological damage caused by one’s lifestyle (e.g., one could
have a green lawn in Arizona as long as one paid for the ecological harm). What are the pros
and cons of this approach? Does the net benefit of the approach vary systematically with the
scale on which it is applied (i.e., is this approach alright for individuals but not for nations)?
Would you recommend this approach be widely used? What if any limits or restrictions to this
approach should we consider?

l. Separation of Powers or checks and balances among the branches of government has long
been held to be an important and distinguishing trait of democratic governments. Nevertheless,
there is a general tendency in this country to subvert or get around many of these checks and
balances. The dominant party in the congress tends to support actions of the executive branch
when the chief executive is of the same party, and the executive branch seeks to fill the judicial
branch with nominees who are likely to support its policies as well. On January 15, 2003, the
Bush administration directed federal regulators at the Environmental Protection Agency (EPA)
and the U.S. Army Corps of Engineers (ACE) to withhold protection from “isolated wetlands
and waterways” amounting to tens of millions of acres of wetlands, streams, and other waters,
unless they first obtained permission from their national headquarters in Washington, DC. After
considerable outcry from within the EPA, from 218 members of Congress, as well as from individuals and organizations across the country, on Dec. 16, 2003, the administration publicly announced that it was dropping the plan to remove isolated waters from Clean Water Act (CWA) protection. On June 19, 2006 the U.S. Supreme Court, with a plurality possible only because of two recent appointments by President G.W.Bush, issued a ruling vacating policies that have been in practice since the 1972 passage of the Clean Water Act in which “isolated” waters are protected. In this essay, you are to summarize the background, the ruling (both plurality and dissent) and significance of the Supreme Court ruling in the Rapanos vs. United States case.