**The Habitable Planet, *Unit 8: Water Resources***

**Reading Guide**

*Section 1: Introduction*

1. What is this unit about?
2. How might climate change affect the water cycle?
3. What positive trends have there been in water supply and water quality?

*Section 2: The Global Water Cycle*

1. Describe “latent heat”.
2. Human activity doesn’t change the amount of water in the water cycle, but what effect does human activity have on the water cycle?
3. What are the three basic steps of the water cycle?
4. What water sources are freshwater?
5. What are the top three water reserves?
6. How does solar radiation drive the water cycle?
7. What has been done in areas with large seasonal fluctuations in water availability?
8. How are material cycles tied in with the water cycle?

*Section 3: Distribution of Freshwater Resources*

1. Describe groundwater.
2. What is the water table? What causes it to change?
3. Describe the vadose zone.
4. What is an artesian aquifier?
5. How do confined and unconfined aquifers differ? Which provides a better water supply?
6. How long does water remain in an aquifer? How does this affect distribution of contaminants?
7. Explain why rivers are important, despite containing and relatively small amount of freshwater.

*Section 4: Groundwater Hydrology: How Water Flows*

1. Describe porosity and permeability.
2. What materials produce good aquifers? Why?
3. Where does groundwater discharge usually occur? Recharge?
4. What is hydraulic head? How does it relate to groundwater flow?
5. How are streams fed?

*Section 5: World Demand for Water*

1. Why do some areas of the world have more freshwater than others?
2. What is “water stress”? What causes it?
3. Why does agriculture consume more water than electric power production?
4. Describe the inequality of water availability around the world.
5. What is a watershed?
6. Why are water issues studied at the watershed level?
7. What drives world water use?
8. What goal has the U.N. set for drinking water and sanitation around the world?

*Section 6: Depletion of Freshwater Resources*

1. What is the effect of water extraction on aquifers?
2. Explain why energy costs have made groundwater extraction prohibitive in some places.
3. What aquifer covers a large portion of the central U.S.?
4. Why have rivers like the Colorado and Rio Grande seen a reduction in flow level?
5. How does this affect the mouths of the rivers?
6. How does groundwater pumping affect rivers?
7. What are the benefits of river floods?
8. How did the levees and canals around New Orleans affect the damage from Hurricane Katrina?

*Section 7: Water Salinization*

1. How do groundwater extraction and irrigation cause salinization?
2. What is seawater intrusion?

*Section 8: Water Pollution*

1. What pollutants are regulated in the U.S. under national primary drinking water standards?
2. Where do the pollutants come from?
3. Why are sediments considered a pollutant?
4. What are non-aqueous phased liquids? Give some examples.
5. How does sorption affect contaminant dispersion?
6. Distinguish between point source and nonpoint source pollution. Give an example of each.
7. What approaches can be taken to address nonpoint source pollution?
8. How do wetlands improve water quality?
9. What are estuaries?
10. Describe nutrient pollution.
11. How does increased nitrogen circulation affect the world’s water?

*Section 9: Water-Related Diseases*

1. Identify and describe the four major categories of water-related illnesses and give examples of each.

*Section 10: Major Laws and Treaties*

1. Summarize the Clean Water Act.
2. What are TMDLs?
3. Summarize the Safe Drinking Water Act.
4. Summarize the United Nations Convention on the Law of the Sea.
5. What is the typical Exclusive Economic Zone?
6. Has the U.S. ratified the LOS Convention? Why or why not?