

Introduction to Environmental Science (ENR2100)
The Ohio State University, Columbus, Ohio, USA
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Textbook: Environmental Science for a Changing World, Freshwater Resources
Lectures: Freshwater Resources

FRESHWATER RESOURCES



The talus slopes of Crowfoot Mountain sweep into Alberta, Canada's Bow Lake in Banff National Park. The valley where Bow Lake sits was carved by glaciers more than 10,000 years ago. Retrieved from http://environment.nationalgeographic.com/environment/photos/freshwater/#/crowfoot-mountain-slope_122_600x450.jpg



THE OHIO STATE UNIVERSITY

Freshwater Resources

Freshwater is absolutely necessary for life on Earth and perhaps life on other planets. Its a natural resource that is often taken for granted in many developed countries, like the USA and China. Energy production, climate change, agricultural practices, urbanization and a growing population are forcing us to make difficult choices about the conservation and preservation of freshwater resources around the world.

Watch/read the following and type your answers in a Word document (or any other word processing software that you are comfortable using). After you are done, log onto <https://carmen.osu.edu> and upload your Word document (or PDF file) with your answers to the Carmen dropbox. The dropbox will close exactly at the deadline and if you miss the deadline then you will not be able to complete this assignment and you will earn a 0%. Do not wait until the last minute to upload your answers to dropbox because if something goes wrong with your Internet connection and you miss the deadline, then you are out of luck. We do not accept assignments by Email and we do not accept late assignments. One word of caution. As with most classes offered at OSU, we use TurnItIn software <http://turnitin.com> to check for plagiarism against previously published articles and books and against student papers from universities all over the world. So it is in your best interest to make sure that you assignment is your own. We really do want to hear from you and your thoughts and ideas on the various topics below. You will no doubt offer exciting insight and novel solutions to these issues and it is important for your success in our class that you use your own ideas and talents to complete this assignment. When you answer these questions we are looking for you to provide substantial insight and knowledge of the subject matter. As such, your answers will likely require between 250-500 words for each of the 4 questions listed below. For comparison, this paragraph that you are currently reading contains approximately 300 words.

1. (6-points) Watch Dr. Lower's lectures entitled "Freshwater Resources" on Carmen or go.osu.edu/enr2100. Also watch the supplementary videos and follow the links that are contained within his lecture. (Note that there are six parts to the "Freshwater Resources" lectures.)
 - a. What is physical water scarcity? What is economic water scarcity? What role(s) does each play in water resources that are available to humans who live in specific regions of the Earth, as described in Dr. Lower's lectures? Which one affects the majority of people living in the United States? Which one affects the majority of people living in Africa?
 - b. Follow the link in Dr. Lower's "Freshwater Resources" to the National Geographic Water Footprint Calculator (<http://environment.nationalgeographic.com/environment/freshwater/change-the-course/water-footprint-calculator/>). What is your Water Footprint? Is this higher than, approximately equal to, or less than the average American's Water Footprint? Are there ways that you

can conserve water, either daily or periodically? Write a general description of your water usage and potential or possible conservation efforts, if any.

2. (6-points) Why is it advantageous for some farmers to obtain water from a groundwater source, rather than other sources? What are some of the disadvantages? What effects could groundwater harvesting have upon other water sources? Based on your answers, do you think that surface water or groundwater resources are better to use, and why? A good source for information on surface water and ground water is the United States Geological Survey (www.usgs.gov). Sources and additional links for information are listed at the bottom of these pages, if you need additional information.
3. (6-points) Agriculture in the United States relies heavily on the Ogallala (High Plains) Aquifer in the central United States. It underlies portions of eight states in the High Plains area: South Dakota, Nebraska, Wyoming, Colorado, Kansas, Oklahoma, New Mexico, and Texas. Find one article from one of the following secondary sources: Popular Science (www.popsci.com), Scientific American (www.scientificamerican.com), or Discover Magazine (www.discovermagazine.com). The article should be about the Ogallala (High Plains) Aquifer, groundwater depletion, and its impact upon surface water and/or agricultural uses. Provide citation information such as the author's name, the source name, title of the article, and the date that the article was posted to the internet. Read the article. Describe what is happening to the aquifer and why, how much water has been depleted and why it is being depleted, and the impacts upon human water consumption and agriculture in the United States.
4. (7-points) Politics play a heavy role in the distribution of water resources. An important current event is the drought that is happening in the Western United States. The past few years have resulted in little rain and reduced mountain snow melt to replenish water supplies for California and other states. In the Spring of 2015, water restrictions were placed upon municipalities and residents to limit the use of water. The politics surrounding these restrictions are significant. This topic has been the subject of many news articles. Read information from at least two of the following municipal or governmental sources: California EPA (http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.shtml), the Association of California Water Agencies (<http://www.acwa.com/content/drought-map>), or the Western Municipal Water District (<http://www.wmwd.com/index.aspx?nid=208>). Find and read two more articles from USA Today (www.usatoday.com), the Los Angeles Times (www.latimes.com), or NPR (www.npr.org). What are some of the arguments for the water restrictions? What is the major objection that many people, both inside the state of California, and residents of other states, have to these restrictions? Who has been left out of the restrictions, and how are they to be enforced? What will happen in regards to water allocation and resources if these restrictions were not put into place? Does all of this change the hydrological cycle? If so, how?