#6. Water for Life

Summary: In this module you will learn about types of waterbodies and why they are important.

Goals: By the end of this module you will be able to describe the role of water in different ecosystems, and also basic water (in)equity issues in the world, the U.S. and your community.

Tribes Taking Action. Check it out: Leech Lake Nation (Ojibwe) protect and manage wetlands to respect their tradition of harvesting wild rice. https://americanindian.si.edu/environment/ojibwe/Future.cshtml

Required readings:

Role of Water --

Millennium Ecosystem Assessment (2005). Ecosystems and human well-being: Wetlands and water. https://www.millenniumassessment.org/documents/document.358.aspx.pdf

https://cfpub.epa.gov/watertrain/pdf/modules/WetlandsFunctions.pdf Note to Instructors: This is the print version of a training module which can be completed on-line. If connectivity is not a problem, students should be encouraged to complete the module on-line. There is a quiz which begins on page 19 of this scripted version that students could take as a self-assessment, or it could be used as a quiz in class (answer key is on page 23).

Charles Fishman (author of *The Big Thirst*). 48 min video lecture on the Future of Water https://www.youtube.com/watch?v=6HCc9NVIjIo

Water Equity --

Chapters 1 – 3 in *Community Culture and the Environment: A Guide to Understanding a Sense of Place*. Available through this page https://www.epa.gov/nep/community-culture-and-environment (pdf file download is: https://www.epa.gov/sites/production/files/2015-09/documents/community_culture.pdf)

https://www.ted.com/talks/kelsey_leonard_why_lakes_and_rivers_should_have_the_same_rights_as_humans TED talk by Kelsey Leonard (Indigenous Water Scholar)

Rosenberg, Tina. 2010. "The Burden of Thirst." For those with a subscription to National Geographic, the article with photos is here: http://ngm.nationalgeographic.com/2010/04/water-slaves/rosenberg-text Text of the article (no photos) can also be found here: https://www.bpi.edu/ourpages/auto/2016/2/4/58686069/The%20Burden%20of%20Thirst.pdf

Water & Classic Civilizations: https://www.youtube.com/watch?v=rP54LFFSZ1Q

Supplemental Content:

Importance of Water for Life (videos) https://www.youtube.com/watch?v=ZScEgE55XTM from Bozeman Science, https://www.youtube.com/watch?v=fxlMABxU7zU from Khan Academy

https://www.epa.gov/wetlands This is a page of links to more detailed info. Some instructors may wish to spend class time on the pages addressing Tribal Wetland Program services, particularly at colleges where the sponsoring Tribe(s) have such programs. Other instructors may wish to spend class time on the pages devoted to Wetland Science.

Kingsolver, Barbara. 2010. "Water is Life." Available to those with National Geographic subscription at: http://ngm.nationalgeographic.com/2010/04/water-is-life/kingsolver-text Plain text of the article is available here: http://www.standardsinstitutes.org/sites/default/files/material/2._water_is_life_text.pdf

Key Vocabulary: ecosystem, wetland, wetland services, flooding, Ramsar Convention, hydric soil, facultative plant, obligate plant, water scarcity, water abundance, biodiversity, detritus, community cultural assessment, stakeholder

Assessment Tools:

Discussion Questions (can be used in classroom or for on-line discussion board):

- What is the role of water in the following ecosystems: Mojave desert, mixed hardwood forest in Michigan, and tallgrass prairie?
- Does your community charge you to use water? If so, how is that priced (e.g. flat fee, metered withdrawal, metered discharge, other)? What are the incentives and barriers to water conservation in your community?
- Are any of the water supply and use issues discussed in Tina Rosenberg's article of importance in your community? Which ones & why?
- Name a wetland in your community and identify some of the services (aka functions and values) that it provides.
- What would you do to engage stakeholders and the public in developing a place-based Wetland Program in your community?
- Charles Fishman argues that "free" is the wrong price for water. Do you agree with him? Why or why not?

Essay: Select an issue raised by Kelsey Leonard in her TED Talk and write a short essay expanding upon how that issue is important in your culture and/or community. Be specific.

Draft Plan: May is American Wetlands Month. Prepare a draft plan to celebrate wetlands in your community that: does not require extra funding, would comply with Coronavirus safety measures, and includes a minimum of 2 events per week.

Personal Home Use Water Calculator: https://water.usgs.gov/edu/activity-percapita.html What is your per capita water use? What could you do to reduce your water use by 25%? Would it be easy or hard to sustain those reductions long-term? Why?

Module 6 Lab Activity Note: Instructors need to provide coordinates for a wetland site that they want the students to use in this exercise. The Field Exercise can be skipped if time is limited.

Desktop Exercise

Section 404 of the Clean Water Act establishes protections of the nation's wetlands and waterways from dredging or filling. (See: https://www.epa.gov/sites/production/files/2015-03/documents/404_reg_authority_fact_sheet.pdf). One challenge for regulators and property owners is to determine the location and extent of wetlands to understand which areas are protected under CWA §404. Throughout the U.S., the standard method for wetland determinations and boundary delineation is overseen by the U.S. Army Corps of Engineers (USACE) [https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/16/nrcs143_020653.pdf and https://www.nan.usace.army.mil/Missions/Regulatory/Wetlands-Identification/]. Wetland determination and delineation is grounded in the site's hydrology, soils, and vegetation. In this lab exercise you will conduct a desktop preliminary wetland determination for a site in your community using the same methods employed by Professional Wetland Scientists to meet USACE guidance.

Using the coordinates for the study site provided by your instructor, look up the site on the National Wetland Inventory (NWI) to see if it has previously been classified as a wetland. [https://fws.gov/wetlands/ national wetlands inventory OR https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/]. Take a screenshot of your findings, and if the site has previously been classified by NWI, take note of the site's wetland cover/ classification.

Now look up the site coordinates on the nationalmap.gov (introduced in Module 4) and turn on the National Hydrography Dataset. Does this potential wetland site fall within an identified waterway or natural depression that would support wetland hydrology? Make notes and take a screenshot of your findings.

The NRCS web soil survey can be used to search for the presence of hydric soils at your study site. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm Identify the mapped soil types at this site and make notes on whether they are classified as hydric soils. Does this site have wetland soils? Take a screenshot of the soil map for the site.

Photos can sometimes provide useful information about site vegetation. Identify the site on at least 3 different aerial / satellite photos and take screen shots. Interpret these photos to obtain as much information as you are able about site vegetation. Does this site have wetland vegetation?

And finally, prepare a report that summaries what you know about the hydrology, soils, and vegetation of the study site based upon your desktop evaluation. In the conclusions state whether you think this site is a wetland based upon the weight of evidence.

Field Exercise

Obtain the USACE's wetland plant list for your area (http://wetland-plants.usace.army.mil/nwpl_static/v34/home/home.html). Go to the wetland site evaluated above in the desktop exercise. At the site identify a minimum of 20 different plant species (10 most common/abundant and 10 that are less so). Prepare an IMRAD style lab report and include discussion of whether the observed plants are Obligate, Facultative, Upland, or Wetland. Based upon the USACE guidance, does the vegetation you observed support a wetland determination of this site?