

## **GPHY 335: WATER AND SUSTAINABILITY**

Fall 2022

~ Geography Program, W.A. Franke College of Forestry and Conservation ~  
University of Montana

### ***Land Acknowledgement:***

*The University of Montana resides on the aboriginal territories of many Indigenous peoples including the Selis (Salish), Ksanka (Kootenai), and Qlispe (Kalispel). Many other Indigenous peoples including the Amskapi Pikuni (Blackfeet), Nimiipuu (Nez Perce), Shoshone, Bannock, and Schitsu'umsh (Coeur D'Alene) also relied upon their traditional knowledge and relationships with this land and this space for survival in the past and today. We bring respect for these diverse Indigenous peoples' sacred connections to their homelands, along with their continued historical, political, and sovereign rights. We honor the path they have always shown us in caring for this place for the generations to come.*

### **INSTRUCTOR & COURSE INFORMATION**

Class Meetings: Health Sciences 207  
Tuesday, Thursday 12:30- 1:50pm

**Instructor:** Sarah J. Halvorson, Ph.D.

**Office:** Stone Hall 211

**Phone:** (406) 243-2793

**E-mail:** [sarah.halvorson@umontana.edu](mailto:sarah.halvorson@umontana.edu)

**Office Hours:** Tues/Thurs 2:00-4:00pm, by appointment (in person or Zoom)

**Reader/Grader:** Logan Brauer

**E-mail:** [logan.brauer@umconnect.umt.edu](mailto:logan.brauer@umconnect.umt.edu)

**Office Hours:** by appointment (zoom only)

### **COURSE DESCRIPTION**

What are the ways in which our lives are shaped by water and hydrological systems? What are the ways in which water and hydrological systems are shaped by our lives? And ultimately, how sustainable and resilient are these water-society interactions and relationships? These questions provide the guideposts and springboards for *Water and Sustainability*. As we take up these questions, we will grapple with an incredibly complex array of values and concepts as well as policies and conundrums that all combine to influence water-related concerns in the American West and beyond. Building upon a geographical perspective, we will explore what it means to pursue sustainability in our approaches to meeting local-to-global water needs and to the management of the water sector. We will evaluate water-related issues, problems, and solutions

as they have evolved over time, using the American West as our region of focus. Our study will take us into the scales of water control and influence (e.g., household, local, state, regional, tribal, national, and international) and help us to establish spatial linkages between actions in places and impacts in others. Along the way we will continually seek to probe questions of sustainability within the context of our hydro-social systems.

I have a long-standing association with the American West and the startling array of issues and challenges of this arid region. The spectacular past and present alterations in western hydrology reflect an immensely complex story of human settlement, large-scale water diversions, the evolution of water policy and law, and expanding frameworks of water management. I enjoy engaging in research and teaching on western water and related natural resource issues, always emphasizing the real-world implications of findings and recommendations for sustainability and community well-being. My hope is that you will be similarly challenged to think creatively about the issues, to look critically at diverse sources of information, and to develop an informed perspective to guide current and future learning and involvement in water and sustainability.

## ***OBJECTIVES & LEARNING OUTCOMES***

A major objective of this course is to develop a framework for understanding and analyzing questions of sustainability and resilience in relation to water-related goods and services, patterns of water-related problems, and policy challenges in the arid western landscape. Through this effort, you will develop skills in identifying a range of governance structures and behavioral choices/alternatives that might result in more fair, equitable, and sustainable uses of scarce resources such as water. I expect that you will come away from this course seeing water policy and management as more complex and multi-layered than you thought previously, but also—I hope—a topic you are eager to explore further. In addition, a major objective of the course is providing experience in scientific research, writing and communication through the composition of a range of high-quality written works and through in-class discussion and presentation.

### ***Thematic Learning Outcomes***

By the end of this course you will learn to...

- Describe the social-hydrological cycle in terms of its sustainable and unsustainable components and linkages.
- Describe the manner in which different physical factors (i.e., climate, topography, landforms) and human factors (i.e., population distribution, demographic shifts, structural economic changes, jurisdictional boundaries, regulatory frameworks) shape the distribution of water resources in time and space.
- List and describe the various water-related goods and services desired by society, and the manner in which they are provided by water managers.
- Discuss how the cultural, social, and economic characteristics of different places affects the demand for water-related goods and services.

- Discuss the manner in which different communities and entities in the American West have modified the workings of the hydrologic cycle in order to produce water-related goods and services.
- Discuss how different levels of governance and authority for water, describe their management activities, and explain key features of Montana's system for allocating and enforcing water rights.
- Discuss how "water agreements" are made between states, tribes, federal agencies, and the U.S. and its neighbors.
- Describe characteristics of international water management as they relate to questions of global water and sustainability
- Identify a range of governance structures and behavioral choices/alternatives that might result in more fair, equitable, and sustainable uses of scarce water resources and more resilient hydro-social systems.

### ***Advanced Writing Course Learning Outcomes***

This is an approved advanced upper-division writing course, and upon its completion students should be more active, confident, and effective contributors to the body of knowledge and should understand geographical dimensions of inquiry. The course provides opportunities for engaging in frequent and regularly scheduled writing of reflections of/on assigned readings, and in the development of a research paper on a theme or topic germane to the course.

- Identify and pursue sophisticated questions for academic inquiry.
- Find, evaluate, analyze, and synthesize information effectively from diverse sources.
- Manage multiple perspectives as appropriate.
- Recognize the purposes and needs of discipline-specific audiences and adopt the academic voice necessary for the chosen audience.
- Use multiple drafts, revision, and editing in conducting inquiry and preparing written work.
- Follow the conventions of citation, documentation, and formal presentation appropriate to that discipline.
- Develop competence in information technology and digital literacy.

### ***REQUIRED READINGS AND RESOURCES***

Cech, Thomas V. 2019. *Principles of Water Resources: History, Development, Management and Policy, fourth edition*. Hoboken, New Jersey: John Wiley & Sons. This is also available as an e-book from the publisher's website.

Postel, Sandra. 2020. *Replenish: The Virtuous Cycle of Water and Prosperity*. Washington, D.C.: Island Press.

Recommended:

Turabian, Kate L. 2018. *A Manual for Writers of Research Papers, Theses, and Dissertations*, 9<sup>th</sup> Edition. Chicago: The University of Chicago Press.

In addition to the above texts, readings and supplemental resources will be placed throughout the semester on the course's **Moodle** site. Readings on Moodle [M] and supplemental texts are included in the Course Schedule below and others will be announced over the course of the semester.

## ***COURSE REQUIREMENTS & ASSESSMENT***

### ***Attendance, Reading and Participation:***

Simply put, please read the assigned material and come to class prepared.

Students are expected to engage in each scheduled class session since the lectures, presentations, films, and guest speakers will often cover material that is not found in the assigned readings. If you are unable to attend a class session, then you are responsible for contacting your fellow classmates to get the notes on the material covered during that session.

One of the objectives of the class sessions is to stimulate a meaningful exchange of ideas and thoughtful discussion; therefore, active involvement of students is expected. Class sessions should be regarded as opportunities for you to share your ideas and views on key issues raised by course material. I expect you to do the reading and to take responsibility by showing up every class period prepared to learn and engage. Taking notes in class is strongly urged to supplement the readings and to assist in the preparation of assignments.

### ***Examinations and Reading Quizzes:***

There will be **two exams** this semester. The exams will cover the assigned readings, lecture material, films, class discussions and guest lectures. The exams will require written essay responses to short and long essay questions.

We will also have a set of **Reading Quizzes** that will be in class and will help to keep you on track and engaged with the readings. For the most part these will be unannounced and are aimed at helping all of us stay on track with assigned readings.

### ***Reflective Essays:***

You will have the opportunity to practice your essay writing skills in conjunction with your reading of selected items and space for personal reflection. We will discuss each assignment, and I will post specific guidelines on Moodle. Because these are intended as reflection essays, they should articulate your own informed opinions, views, and ideas—not simply a summary of the assigned readings. For these **two reflective essays**, you should develop and defend a central thesis or view that concerns or follows from the material you have digested. Cite material as appropriate using the Turabian author-date style.

### ***Research Paper and Presentation:***

#### **Research Paper:**

According to the United Nations, the World Health Organization (WHO) and UNICEF, approximately two billion people or 26% of the global population lacked access to safe drinking water in 2020. Across the American West, communities are increasingly struggling to meet basic drinking water needs as well as to respond to a whole host of water-related concerns that threaten community water security. ***Here in Montana, we can see first-hand that the landscape – or rather the hydroscape – reflects major water challenges that are profoundly shaped by history, geography, and policy and require new and innovative thinking to support sustainability and community resilience.***

Sustainability in the water sector has been described as “a multidimensional objective that involves careful planning of system inputs, outputs, and outcomes” (Wescoat et al, 2022). Our contribution to this discussion will be to focus our attention on one of the most vital yet vulnerable aspects of water to community well-being: safe and accessible drinking water. Our thrust this semester will be to conduct an assessment of drinking water across the State of Montana and examine how community water security relates to sustainability planning and action.

This is an approved writing course at UM, which implies that it is a writing-intensive course and the bulk of your grade is based on written work. As such, you are required to devote time and energy to the preparation of a research paper and will be provided with considerable feedback on a draft of the paper prior to your submitting a final version for a grade. In keeping with these expectations, we will devote some attention to the general topic of writing, you will be directed to the UM Writing and Public Speaking Center for assistance in the mechanics and organization, and we will have an orientation to the library’s resources for research.

As explained in more detail in the Research Paper Guidelines, your paper should be 8-10 pages in length, carefully composed, printed in double-spaced 12-point font, and fully referenced using Turabian author-date style. At the beginning of the semester you will be requested to identify a research topic that is focused on a water and sustainability topic of relevance to the American West. In order to help you carry out this project, you will be asked to submit your topic and research question, a prospectus, a reference list, and an outline of your paper in advance of the

deadline for the first draft of the paper (see the course schedule for due dates). The paper will be evaluated and returned for revision. The revised paper, together with the first draft, is to be submitted by the end of the semester. Research for the paper should cite at least five peer-reviewed scholarly articles, one contemporary news article, and one personal interview; your paper must include at least one map appropriate to the topic chosen. More details on this assignment will be provided in class.

### **Evaluation of Writing:**

All of your writings will be read and critically reviewed with respect to spelling, grammar, composition, voice, and strength and depth of research (where appropriate). Critiques will include comments and corrections so that you can work to improve your reading, analysis, research, and writing skills as you progress through the course. You are expected to incorporate any corrections and/or suggestions for revision into future work with the aim of improving your writing skills. You should refer to the Turabian manual in reviewing the corrections and/or suggestions for revision, and are encouraged to visit with the instructor to discuss your reviewed works.

### **In-Class Research Presentation:**

Using appropriate visual aids (PowerPoint, maps) plan to provide a concise and well-organized 10-minute presentation of your research results. Specifically, the presentation will highlight the research objective, the sources of relevant information and data, the results that were discovered, and the conclusions drawn from the work (please review separately posted Presentation Guidelines and Schedule). Grades will be assigned based on thoroughness and rigor of the research conducted as well as the professionalism of the presentation—and points will be deducted for going over the allocated time, which means preparation in advance is essential. Everyone is expected to attend all presentation sessions, as this is both respectful to your fellow classmates and an important opportunity to deepen and apply your understanding of water policy. For that reason, you will receive a separate grade for your attendance at the presentation sessions.

## **GRADING**

The course grading breakdown to be employed is as follows:

<b>Assignments:</b>	<b>Point Value</b>
Exams (2 @ 50 points)	100 points
Reflective Essays (2 @ 80 points)	160 points
Reading Quizzes (8 @ 10 points)	80 points
<b>Term Paper Research Project:</b>	
Prospectus and initial references	50 points
Annotated outline	50 points
First Draft	80 points
Final Draft	100 points

Presentation	50 points
Presentation Participation	30 points
<b>Total Points</b>	<b>700 points</b>

I will be grading using the plus/minus system as based upon the following percentages of the total points possible for the course as weighted by the criteria specified in course requirements. The best individual strategy to ensure that you receive a grade you can live with is to work to meet and/or exceed course requirements. Remember, A's are rewards for Superior Performance, B's for Above Average Performance, and C's for Average Performance. *This class carries traditional letter grading only and is not offered under the CR/NC option.*

A = greater than 93.0%	A - = 90.0-92.9%	
B+ = 87.0-89.9%	B = 83.0-86.9%	B- = 80.0-82.9%
C+ = 77.0-79.9%	C = 73.0-76.9%	C- = 70.0-72.9%
D+ = 67.0-69.9%	D = 63.0-66.9%	D- = 60.0-62.9%
F = less than 59.9%		

## **ADDITIONAL POLICIES**

### **Late Work & Attendance:**

Work is due at the start of class on day specified. Late work will lose one-half a letter grade (i.e., A to A-) for each weekday late. Please do not make excuses for late work – I will need advance notification of any factors that will affect your ability to turn in work on time and/or to meet other course requirements. Brief or occasional absences for reasons of illness, injury, family emergency, religious observance or participation in a University sponsored activity (for example, field trips, ASUM service, music or drama performances, and intercollegiate athletics) may be excused. Absences for reasons of military service, wildfire duty, or mandatory public service will be excused. I will not extend deadlines for individuals unless timely notice of the absence is given beforehand. Be prepared to provide **documentation** for events leading to absences if you wish extensions or to make up missed work. Similarly, makeup exams can only be administered if you have a legitimate and documented excuse for an absence or situation that constrains your ability to be present on exam day.

The UM “Class Attendance/Absence Policy” can be found in the [UM Catalog \(2015-2016\) Academic Policies and Procedures](http://www.umt.edu/catalog/academics/academic-policy-procedure2.php) (<http://www.umt.edu/catalog/academics/academic-policy-procedure2.php>).

### **Respect, Inclusiveness and Diversity:**

We believe and act upon the premise that all students are entitled to and deserve respect, courtesy, and tolerance, regardless of their race, background, religious affiliation, gender, disability or any other perceived difference. Likewise, faculty, staff, and students deserve the

same treatment from other students. Therefore, our intention is to make every effort possible to promote and create a safe space for diverse thoughts, ideas, and people.

***Academic Honesty:***

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code, available for review online at <http://www.umt.edu/student-affairs/community-standards/default.php>. Note in particular that the Student Conduct Code defines plagiarism as “representing another person's words, ideas, data, or materials as one's own.” Assigned readings in Turabian also provide guidance on proper citation of sources.

***Equal Access:***

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Office of Disability Equity (ODE). If you have a disability that adversely affects your academic performance, and you have not already registered with ODE, please contact them directly in Lommason Center 154 or 406-243-2243. I will work with you and ODE to provide an appropriate modification.

***Basic Needs:***

Any student who faces challenges securing their food and housing and believes this may affect their performance in the course is urged to contact the Office of Student Success for support. Furthermore, please notify me if you are comfortable in doing so. This communication will enable me to explore any additional resources that might be available.