

## Geography 344. The American West. Spring 2008

Instructor: Joe Mason

207 Science Hall

mason@geography.wisc.edu

Office Hours: 1:30-2:30 PM Tuesday; 11:00 AM-12:00 Noon, Wednesday; or by appointment.

**Introduction to the course.** This course is an overview of the geography of the western United States, with a strong emphasis on drawing out the connections between the physical and biological nature of the American West, and the environmental and land use issues that are especially prominent in that region. One of the distinctive characteristics of the American West is that obvious, and hotly contested, examples of human impacts on the landscape often occur against a background where natural vegetation still predominates, though altered to various degrees by human activity. New suburban or exurban housing developments are often surrounded by sagebrush, ponderosa pine, or saguaro cactus rather than by agricultural fields as they might be in other parts of the world. New mines or gas fields stand out like sore thumbs in the wide-open "sagebrush oceans" of the Rocky Mountains or Great Basin.

Paradoxically, it may be very hard to clearly distinguish the human role in other important processes of environmental change in the West, including changes in wildfire frequency, arroyo-cutting, or shrub and tree invasion of grasslands. Finally, many human activities that have historically been important in the West, including livestock grazing and irrigation, actually involve *modification*, not replacement, of natural physical and biological systems

With that background, a clear understanding of the West's climate, landforms, biogeography, and history of long-term environmental change is essential to developing informed opinions on contentious issues related to water resources, wildfire, mining, grazing, logging, invasive species, wilderness, and exurban development. More broadly, despite the widely expressed interest in moving toward sustainable land use in the West, this will be very difficult to achieve without recognition of the constraints imposed by this region's physical and biological nature.

**Geographic Focus.** We will use a somewhat arbitrary but long-standing definition of the American West: It is the part of the United States lying west of the 100<sup>th</sup> meridian. In addition, the primary focus will be on the Interior West, with less attention given to coastal California, Oregon, and Washington, and leaving out Alaska and Hawaii completely. This is mostly a matter of time available, and if you would like to see more attention paid to certain parts of the west, please let me know. Several regions within the West will be used repeatedly as *examples or settings for case studies*, to illustrate broader concepts from lecture. At this point, I envision using the following areas, though others may be added or substituted:

- The Colorado Front Range, Platte River system, and central High Plains
- The greater Yellowstone region, Snake River Plain, and Blue Mountains of Oregon
- The southern Arizona borderlands
- Sierra Nevada and the Central Valley
- The northeastern Great Basin and Wasatch Front

**Course website.** I will post material related to the course on a password protected Learn@UW site, including copies of the syllabus, assignments, updated reading lists, outlines of exam topics, and most slides shown in lecture. An online gradebook will be available for you to check your current scores.

**Textbooks and other assigned readings.** The required texts are *The Sagebrush Ocean*, by Stephen Trimble, and *Ogallala Blue*, by William Ashworth. Neither is a traditional textbook; however, *The Sagebrush Ocean* conveys better than any textbook the nature of the physical landscape and biogeography of the Interior West. *Ogallala Blue* is a highly readable introduction to issues of water rights and water conservation, and to the more prosaic parts of the western

landscape, dominated by irrigated crops, cattle, and dying small towns. Other required *or* optional readings will be on electronic reserve through the UW-Madison Libraries. These are mainly short selections from books, journal articles, or other sources. Finally, I will require or suggest a number of readings from the magazine *High Country News*, which is available online at no cost ([www.hcn.org](http://www.hcn.org)).

**Grading.** The course grade will be based on a quiz (10%), two exams (25% each), and three assignments (40% total). The *quiz* and *exams* will include a combination of short essays, short-answer and multiple-choice questions, related to lecture material and required readings (the quiz is shorter and covers less lecture material). Before each exam, I will hand out an outline of the topics to be covered. The *assignments* will involve application of concepts covered in class to case studies of specific places in the West. For example, you may be asked to identify a current local environmental or land use issue in some particular part of the West, and then place that issue in the context of local climate, landforms, hydrological systems, and impacts of past human land use. The product to be handed in might include some brief text (not lengthy papers), illustrations and maps, and links to other sources of information. To complete these assignments you will need to use the textbooks and other assigned readings, online data sources, Google Earth images, and other resources.

**Lecture and exam schedule.** The *quiz and exam dates listed are fixed*, but the schedule of lecture topics is tentative. In fact, *please note* that time allotted to some of these topics will almost certainly expand while time reserved for others will shrink, as we move through the semester, and some new topics may be added. A separate *reading list* for the first few weeks of the semester will be handed out on the first day, and is also available from the course Learn@UW site. Additional lists covering later topics will be handed out in lecture and posted on the course website.

**1/22. Introduction to the course.** What is the “real West”? What sets the West apart from the rest of the U.S.? Overview of course organization

**1/22, 1/24, 1/29. Landforms and Landscapes.** Physiographic provinces: *A brief* overview. Great Plains, Rocky Mountains, Colorado Plateau, Basin and Range, Snake River Plain and Columbia Basin, Sierra Nevada and Central Valley, Cascadia. Important landforms of many western landscapes: Alluvial fans, closed basins and playas, stream terraces, mesas and tablelands.

**1/31, 2/5. Climates, Present and Past.** Atmospheric circulation and moisture sources. Summer-wet and winter-wet climates. Lapse rates. Orographic precipitation and rain shadows. Examples of climate change over the past 25,000 years. Great droughts.

**2/7, 2/12, 2/14. Biogeography.** Biomes and life zones. The deserts: Chihuahuan, Sonoran, Mojave, and Great Basin. “Sky islands” and migration of plant and animal species. Climate, CO<sub>2</sub>, and vegetation. Examples of prehistoric vegetation change. Wetlands and riparian corridors.

**2/19. Fire.** Fuel and ignition. Fire and climate. Fire-adapted vegetation. What was the role of humans in prehistoric fire regimes?

**2/21, 2/26. Water, Part 1.** Natural hydrological systems of the West. Water balance and runoff. Major river systems of the West and the nature of their drainage basins. Small ephemeral streams: washes and arroyos. Closed- and open-basin lakes. Groundwater and its connections with surface water. Losing and gaining streams.

## **2/28 Exam 1**

**3/4, Water, Part 2.** Irrigation systems. Forms of irrigation and their history in the West. Connections between irrigation systems, natural hydrological systems, and geomorphology. Expansion of irrigation and change in agriculture on the Great Plains.

**3/6, 3/11. Water, Part 3.** Water rights and water law. Prior appropriation and riparian rights. Link between mining and water law. Importance of water issues in establishment of the National Forests. Extrabasinal transfers and interstate compacts. Role of the federal government in water projects. Development of urban water systems. Water conservation.

## **Spring Break, 3/15 to 3/23.**

**3/13, 3/25 Grazing.** Wild and domestic herbivores. Rangelands of the West. Effects of grazing on vegetation, soils, and runoff. Grazing systems and transhumance. History of livestock grazing in the West, regulation of grazing on the public lands, and calls for removal of livestock from federal lands. Confined livestock feeding and connections to agriculture, water use, water quality, energy use, and greenhouse gases.

## **3/27 Quiz**

**4/1, 4/3. The Changing Mile and Invasive Species.** Tree and shrub invasion and other recent vegetation change, and the roles of climate, grazing, fire, and increased atmospheric CO<sub>2</sub>. Invasive species and the role of grazing, fire control, and “rangeland improvement.”

**4/8. The Arroyo Problem.** Arroyo-cutting, prehistoric and historic, and its causes.

**4/10, 4/15. Western Forests.** Climate and major forest types of the West. Early exploitation of the forests, and establishment of the National Forest system. Fire control and its impacts on vegetation. Managing forests for wood production, and unintended consequences. Conflicting visions of forest management in the late 20<sup>th</sup> and early 21<sup>st</sup> centuries.

**4/17. Mining and Fossil Fuel Extraction.** Hard rock mining: Location and environmental issues and relationships to geological setting. Hard-rock mining law. Coal, oil, natural gas, and oil shale extraction, and associated environmental issues.

**4/22. Urban, Suburban, and Exurban Development in the Western Landscape.** Growth into the foothills, and implications for utilities and fire protection. Ranches to ranchettes. People and wildlife in the urban fringe.

**4/24, 4/29. National Parks and Wilderness.** Fire and environmental change in wildlands: What can (or should) be actively managed? Case studies. Desert wilderness and immigration in the southern Arizona borderlands.

**5/1, 5/6. The Future of the West.** Climate change, fire, and water resources in the 21<sup>st</sup> century. Future of ranching and logging. Groundwater depletion. Change in agriculture. Sustainable land use in the West.

## **5/8 Exam 2 [no exam during finals week]**