

GEOL 502 Field Trip--Scablands and Continental Glaciation

See GEOL 502 course website for course syllabus, expectations, field trip schedules, camping equipment, etc. (www.geology.cwu.edu GEOCLASSES Graduate Course catalog)

Field Guide: Copies provided at first class meeting.

Itinerary

Day 1: Meet at Lind Hall, 8:00 AM; leave CWU campus at 8:30 AM

Day 2: Return to CWU campus by 6:00 PM on Day 2

Day 1 Stops, Ellensburg to Steamboat Rock:

1. Ginkgo State Forest--first Missoula flood evidence
2. Ginkgo State Park Visitors' Center (if open), Columbia River Basalts and fossils
3. Overview of the Columbia River canyon from the I-90 Wild Horse viewpoint
4. One or two stops in Frenchmans Coulee
5. Quincy Basin—sediments and mounds
6. Lunch at Soap Lake in Grand Coulee
7. Lenore Lake, Grand Coulee Monocline
8. "Kolk" potholes near Deep Lake in Sun Lakes State Park.
9. Dry Falls overlook and museum
10. One or two stops in Upper Grand Coulee below Steamboat Rock
11. Steamboat Rock Campground (Camp here overnight)
Laser light show on Grand Coulee Dam!

Day 2 Stops, Steamboat Rock to Ellensburg via Wenatchee

1. Hike to top of Steamboat Rock
2. Steamboat Rock rhythmites and moraine
3. Lunch at Grand Coulee Dam (possibly visitors' center if there is time)
4. Crown Point overlook
5. Glaciated scabland on Waterville Plateau
6. Eskers near Sims Corner
7. Yeager Rock erratic
8. Withrow Moraine
9. Moses Coulee bar and moraine
10. Great Columbia River Terrace, Wenatchee
11. West Bar giant current ripples (Columbia gorge)
12. Ellensburg

GEOL 502 Course Assignment

General report on Geology of the Pacific Northwest

Your assignment for the GEOL 502 course includes an essay entitled: “An outline of the geology of the Pacific Northwest”. See details in the course syllabus for the format and exact structure of this assignment. You will need to include the topics of this field trip in your final essay about the geology of the Pacific Northwest, supported by evidence from the handout, your own observations and field notes, and additional references that you find on the topic.

Specific report on Missoula Floods and Continental Ice Sheet

Address the following questions if you select this field trip topic for one of your two in-depth essays.

1. The number, magnitude and age of the Missoula floods are still strongly debated by researchers, even 80+ years after Bretz initially proposed his “outlandish hypothesis” that massive floods carved up the landscape of eastern and central Washington. Develop your own conclusion about the number, relative magnitude, and relative or absolute age of the floods at the sites that we visit on this field trip, as well as the spatial and temporal relationship of the floods to the Cordilleran ice sheet in north-central Washington.
2. Discuss how the preexisting geological formations and features in the region influenced the erosional and depositional effects of the Missoula floods. Support your interpretation with a synthesis and comparison of the information that we gather at different sites along the Missoula flood route.

The Controversial Theory of the Missoula Floods and Channeled Scabland

-- Josh Wyrick, Oregon State University

While teaching at the University of Chicago, J. Harlen Bretz led summer field classes in Washington and Oregon. In 1922, he spent a summer in eastern Washington, studying what would be known as the Channeled Scabland. As he studied this area, he noticed many unusual features of immense proportion, such as huge erratic granite boulders, streamlined loess hills, large gravel bars, etc. In 1923, he wrote a paper describing these geomorphic features and claimed them to be results of very large flows of water, larger than anything on record. He was careful not mention the adjective ‘cataclysmic’ in his first papers, because he knew most geologists would be quick to disbelieve this theory. James Hutton had, in the late 1700’s, set forth his theory of uniformitarianism, which stated simply that ‘the present is the key to the past.’ This theory meant that everything happened slowly and if wasn’t happening today, it didn’t happen yesterday. Since the whole of the geology world gave in to this belief, no one accepted Bretz’ theory. However, this upstart theorist was not abated nor silenced. He continued his study of the Scablands, despite the growing number of enemies he was making of his peers. He wrote several papers a year between 1923 and 1932, each time presenting some new evidence of what he dubbed the Spokane Flood. In 1930, he found the one thing that had eluded him so far – the source for such a huge amount of water: Glacial Lake Missoula. Many geologists conducted their own research in order to disprove Bretz’ theory. Ironically, most of their research actually helped prove the Spokane Flood theory (although it wasn’t shown until much later). Eventually though, geologists started seeing Bretz’ point of view. J.T. Pardee presented his research in 1942, agreeing with Bretz’ concept that it was Lake Missoula that provided the waters for the floods.

After the acceptance of Bretz’ theory, work could then proceed in analyzing the details of such an immense flood. Bretz had suggested the idea of multiple floods, but initially only thought 6 or 7. Waitt (1980) found evidence of at least 40 separate floods. Recent research of O’Connor, Waitt, and Baker has shown evidence of multiple late Pleistocene floods, some of them reaching a maximum discharge of $10-15 \times 10^6 \text{ m}^3/\text{s}$ ($10-15 \text{ mi}^3/\text{hr}$). The number, magnitude and age of the Missoula floods are still strongly debated by researchers, even 80+ years after Bretz initially proposed his “outlandish hypothesis” that

massive floods carved up the landscape of eastern and central Washington.