

EES Field Course to Idaho-Wyoming, May, 2022

By Dickson Cunningham

During late May, fifteen enthusiastic students led by Professor Curmudgeonly Cunningham and Professor Drywit Drzewiecki enjoyed a 13-day earth and environmental science field course to Idaho, and Wyoming, with a bit of Utah and Montana thrown in. Because of Covid, EES extended field courses had been put on hold for three years and so it was great to be able to restart one of the highlights of our undergraduate program. This was the third time we have run the Idaho-Wyoming field course and as always, it was an exciting educational adventure in one of America's most geologically spectacular regions.

We arrived in Salt Lake City and began our clockwise route stopping first at Antelope Island in the Great Salt Lake where we were immediately confronted with the visible effects of the western drought - low water levels and extensive mud and salt flats where the lake used to be. But, we did stroll down to the lake edge and examined the interesting algal mounds (while swatting brine flies). A few bison and pronghorn antelope also made cameo appearances. We then drove to a high lookout where we were treated to a wide panorama of the impressive snow-capped Wasatch Range with its tectonically active mountain front. We were awed by the scale of the Great Salt Lake Basin and noted the ever-growing urban-suburban sprawl, which also contributes to the regional problem of sustainable water usage.

Then it was off to southern Idaho and the beautiful Albion region with its City of Rocks National Reserve. We enjoyed an afternoon hike through the heavily jointed and knobbly granite landscape before driving up to Twin Falls and feasting on burgers and pie slices at Idaho Joes. In the morning, we visited the Snake River Canyon to see the thick flood basalts in cross-section, including pillow lavas. We also went to Shoshone Falls for a different view of the canyon stratigraphy and the deeper rhyolites that represent the older caldera history of the Snake River Plain and Yellowstone hotspot track.



Nick Perreault describing the granite landscapes of Idaho's City of Rocks



Giddy in the Gorge! (Shoshone Falls, Idaho)

Then we drove north across the Snake River Plain to Craters of the Moon National Monument, which is always one of the geological highlights of the trip because of its raw, lunar-like volcanic landscape. We climbed a cinder cone, examined spatter cones and enjoyed a rugged hike onto the vast lava plains where we scrambled over the huge 2076 ± 45 year-old Blue Dragon flood basalt and explored inflation and deflation features, including lava caves. Delighted shouts of “aha, an aa” and “ahoy, a pahoehoe” filled the air as we explored the remarkable surface features characteristic of young and fresh flood basalt volcanism.



Our soon-to-be-expert volcanologists!



The vast ~2075-year-old Blue Dragon flood basalt at Craters of the Moon National Monument



15 EES students and two old goats, Craters of the Moon National Monument

Later we drove up to Mackay and into the Lost River Range valley where we had dinner reserved at the L7 Bar and Grill. The prime rib and barbecued meat sandwiches were delicious and we were also treated to wonderful live

country music, which we shared with friendly Idaho ranchers and their extended families. It was an authentic rural atmosphere in a remote Idaho valley, and I think it then dawned on all of us that we really had left Connecticut behind! After such a full day, we retired to the Wagon Wheel Inn which is a lovely base to explore the region. We spent the next day hiking up Lower Cedar Creek to see the Devonian-Mississippian carbonate stratigraphy with its diverse invertebrate marine fossils. Dr Drzewiecki demonstrated his eagle-eye ability to find and identify all sorts of corals and brachiopods, and some students found beautiful take-home samples for their collections. We also saw fold and fault evidence for the Sevier Orogeny in the canyon cliffs. But, the highlight of the hike was a very impressive natural spring (exit portal for an underground stream) gushing out of the mountainside at the end of the trail. To top off the hike, we were treated to a blizzard on the return descent – the first of many wintery experiences on the trip!



The amazing underground stream outlet of Lower Cedar Creek Canyon, Lost River Range, Idaho

After lunch, we drove up the valley to the 1983 M = 7.3 Borah Peak earthquake zone. This site is always impressive because of the fresh surface ruptures in front of Idaho's highest peak looming above the downfaulted valley. We arrived in a snowy hailstorm and had to wait out a major squall, but the weather eventually improved and we enjoyed exploring the fault zone and learning about one of America's largest historic intraplate earthquake events. Then it was back to Mackay where we dined at the finest of local gas station pizzerias, before returning to our motel for a competitive evening of horseshoes and cornhole.



At the Borah Peak earthquake site, Idaho



It was here that the 1983 Borah Peak earthquake caused massive surface rupturing – genuine rock and roll!



Beautiful Borah Peak, Idaho's highest summit at 12,662'.

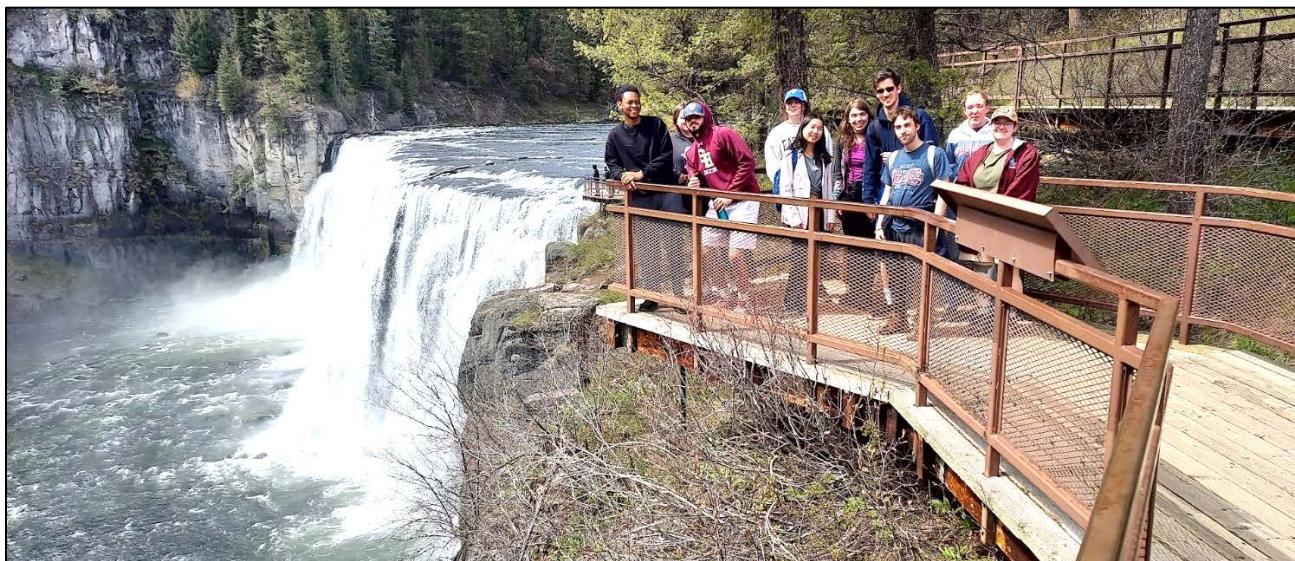
The following day we left early for the long drive to Yellowstone. We had several stops en route to see the rhyolite domes in the Central Snake River Plain and to climb one of the Menan Buttes tuff cones – a spectacular example of a “hydrovolcano”. It was an enjoyable scramble up, although I had to take it slowly on the loose gravelly trail having recently undergone rotator cuff surgery and not wanting to fall and re-damage my partially healed shoulder. Eventually, this old geezer and a few younger stragglers (who were distracted by sagebrush ant colonies) got to the top and were treated to one of the most expansive views of the Snake River Plain with the St Anthony dune field and snowy Lemhi Range to the north and northwest. We enjoyed seeing the clear outcrop evidence for the crater’s explosive origin, including glassy lapilli, basaltic blocks and other crater ejecta.



Olivia Gentile – our expert on the diverse volcanic eruption history of the Snake River Plain

We then continued on to the Island Park Caldera and stunning Mesa Falls. There were no wooden barrels available to ride over the falls, so we had to settle on taking selfies and appreciating the basaltic cliffs. Then we drove north into Montana to see the impressive Madison Landslide. Xavier told us all about the fateful 1959 Hebgen Lake earthquake and the co-seismic landslide which created Earthquake Lake and generated a remarkable debris field that extends high up the opposite side of the valley. Soon-after, I decided to ignore the weary looks and growling stomachs and squeeze in a quick stop to see the huge Hebgen Lake fault scarp, which we realized is 2.5 times the height of our student Hans (so we agreed the scarp is Hans+Hans+Ha units tall). Finally, we arrived in West Yellowstone where we checked into our plush KOA cabins and then returned to town for a nice restaurant meal. Very late that night, Nick apparently got lost looking for the communal bathrooms and wandered for hours looking for the right cabin, whilst fearing he would become a hungry bear snack!

The next morning, we started our 2.5 days in Yellowstone with visits to all the geothermal highlights including Norris Geyser Basin, the Old Faithful area, and Mammoth Hot Springs. We also squeezed in Roaring Mountain, the Grand Prismatic Spring area, Hayden Valley and the stunning waterfalls in the Grand Canyon of the Yellowstone. This year, spring arrived late and we were surprised to find 3 feet of snow in the higher regions



Mesa Falls Posers



Xavier Jackson Ward telling us about the devastation wrought by the 1959 Madison landslide event



Norris Geyser Basin, Yellowstone (where the Earth needs Tums!)



Yellowstone Lake – still frozen in the last week of May!

and Yellowstone Lake still covered in ice. The wildlife sightings were better than ever, we saw several grizzly bears – one close up, a black bear, and hundreds if not thousands of bison including many playful young calves. A moose also paid a social roadside visit and the Lamar Valley was as herbivore-filled and beautiful as ever. We were fortunate to visit Yellowstone at a time when fewer tourists are present and wildlife viewing is at its best. The weather also was adventurous as we had blizzards, rain, hail and strong sun, but thankfully not the calamitous floods that hit the park a few weeks later and made national news.



There's a bear there!



The next generation of Yellowstone bison with ever watchful mothers



Genevieve Rondeau telling us all about geodetic evidence for the restless magma chamber beneath our feet.



Emma Bean at Artists Point with the Lower Falls of the Yellowstone River in the distance



Marshmallow toasting at our luxurious KOA in West Yellowstone

Next, we headed south to Jackson where we had several days to explore Grand Teton National Park. We were fortunate with clear weather so that we could see the full majesty of the range with its stunning frontal relief. The following day, we had a lovely float trip down the Snake River cruising past a mother moose and her calf and enjoying the beautiful views of the Teton range whilst floating past the famous river terraces.



Will Petrucci, Aiden Gamache, Nick Peteros and Olivia Gentile in front of Jackson Lake and the Grant Tetons



Bighorn sheep on the eastern slopes of the Teton Valley



Our group at a viewpoint along the Grand Teton inner loop road

We also went to the Gros Ventre landslide and learned about the destructive slide and subsequent lake burst that devastated the town of Kelly in 1927. The following day was our first rainy washout, so we spent the morning in Jackson visiting the National Elk Refuge visitor center and the National Museum of Wildlife Art. Both were new stops on the trip and were educational and enjoyable rainy-day activities. A planned hike to Cascade Canyon across Jenny lake had to be cancelled because of the poor weather and trail closure due to deep snow at low elevations, so instead we took a nice 5-mile loop trail around Leigh and String Lakes a bit further north. The weather lifted a bit and this hike turned out to be quite interesting because of all the avalanche chutes along the steep mountain front and recent snow avalanche damage from this past winter/spring. Many trees looked like they had been snapped off just yesterday. In addition, in one of the avalanche sites, shrubby willows had colonized the landslide scar and a female moose found it to be the perfect mountainside buffet restaurant (with a nice view). By then, we had also worked up a keen appetite, and spent the evening in Jackson where we enjoyed the lively restaurants, shops and pleasant atmosphere.



Jacob McCourt taught us all about the Snake River and the downstream potential for renewable hydropower.



Miss Mabel the Moose munching merrily

Heavy rain continued the next morning, but we forged on and drove to Pinedale where we enjoyed a stop in the Museum of the Mountain Man before driving up Skyline Drive into the Wind River Range. We were able to reach a higher elevation than on previous trips and found some good outcrops of the Archean basement complex which for all students was by far the oldest piece of North American crust that they had ever set foot on. We then descended to a wonderful lookout over glacially scooped out Fremont Lake that is bound by huge lateral and end moraines – a textbook example of a major alpine glacier valley that marks the furthest and lowest extent of the Pinedale Glaciation event. Next we drove to the top of the Pinedale Anticline which is famous for its vast natural gas field and extensive drill platforms. As soon as we got to our stop, the weather set in with high winds, snow, and large ballistic sleet pellets. Emily was still determined to give her presentation and so we pulled the vans up side-by-side and she heroically told us everything we ever wanted to know about the gas field and modern extraction methods. Few professors could have tolerated the conditions and given such a fluent presentation!



Emily Watling ignoring the wind and snow to tell us all about the Pinedale gas field



Our introductory lesson on fossil fish collecting at the Kemmerer American Quarry, during a Memorial Day blizzard!

We rolled into Kemmerer that evening after driving past beautiful variegated sedimentary outcrops along the Green River Valley and passing through tiny cowboy towns with historic old wooden saloons. Dinner was uninspiring fast food, but we were excited to be in fish fossil land and back at the very pleasant Fossil Butte Motel. The next morning, we drove up to the American Quarry where we were hit by blizzards again and some slippery dirt roads that made us wonder if we would be able to get back to Kemmerer on the return trip. But we did manage to drive out of the quarry, perhaps because we were laden with so many fish fossils! Emily even found part of a sting ray and immediately sold it to a local collector for \$200! After lunch in Kemmerer, we examined roadside coal outcrops and discussed the energy economy of Wyoming. We then drove to Fossil Butte National Monument where we were amazed by the remarkable fossil collections on display. Many students remarked that they wanted to immediately return to the quarry and hopefully find a \$35,000 bird or bat fossil! Final souvenirs were then purchased at the monument shop before heading back to our motel where we held an extensive review session followed by the final exam. Afterwards, we crossed the street to dine (and slurp some giant Mexican beverages) at the excellent El Jaliscience restaurant. It was a great final night celebration. Although unfortunately, one of our students took ill with Covid and had to lay low on the final day and missed our group dinner. Fortunately, she had a very mild Covid case, and she was also able to fly back with us the next day to Connecticut. Our return flights to Bradley were uneventful and we were glad to return home safely to family and friends. We now have so many happy memories to reflect on and share with others, and I think we all felt very grateful that in this era of Covid, we were still able to pull off such a marvelous educational journey in one of America's most scientifically interesting and scenic regions!

(Note, we owe special thanks to the EES Founders Fund, Provost Salka, Kim Roy and Beth Leslie for supporting our trip and helping with financial matters and trip logistics).

A few more happy memories!

