



# YELLOWSTONE FOREVER

## A WALK THROUGH TIME: GARDNER CANYON GEOLOGY

### Itinerary & Details

FIELD SEMINAR - SUMMER 2023

**INSTRUCTORS:** Karen Williams, Ph.D.

**INSTRUCTOR BIOGRAPHY:** Karen Williams is a geomorphologist with a Ph.D. in Earth Sciences from Montana State University. She has taught geomorphology at Montana State and led field trips and geology hikes for MSU, Montana Wilderness Association, and Yellowstone Forever. She has worked in glaciated landscapes ranging from the Yukon to Yellowstone. She also has over twenty years of experience in stream restoration and serves on the board of directors of the Clearwater Resource Council, the watershed conservation group of the Clearwater River in western Montana.

**ACTIVITY LEVEL:** This course is an activity **level 5** and students enrolled in this course are expected to be active participants. Be prepared for brisk aerobic, destination-oriented hiking up to 12 miles a day. You should be physically conditioned to do these hikes comfortably. Elevation changes up to 2000 feet on dirt trails or off-trail. Loose rock, uneven footing, steep hillside traverses, and stream crossings are possible. Good coordination is required.\*

*\*All field activities will be conducted as a group. If you cannot meet the activity level expectations during your program, you may be restricted from participation in daily outings. We will not alter program itineraries or activities to accommodate participants who cannot meet the expectations of the stated activity level.*

**LOCATION:** Course begins at the Yellowstone Forever classrooms located in Gardiner, MT.

**PROGRAM DATES & TIMES:** The program begins at 8:00 a.m. on Saturday, June 10, 2023, and ends the same day at 5:00 p.m.

**LODGING CHECK-IN & CHECK-OUT:** No lodging is provided for this course, however, there may be limited lodging available through Yellowstone Forever at the Yellowstone Field Overlook Campus. For more information, please contact the Institute at [institute@yellowstone.org](mailto:institute@yellowstone.org). You can also find more information on Gardiner based lodging here: [Gardiner, MT - Lodging](#). (Yellowstone River Motel will grant you 10% off their rooms if you mention that you are taking a Yellowstone Forever Field Seminar.)

**MEALS:** You will need to bring your own food; lunch should be able to travel in the field with you.

For general information about the facilities, preparing for classes, what to expect, cancellation policies, and more, please see the [Gardiner Field Seminars - Summer General Information](#) document.

## FROM THE INSTRUCTOR

Welcome to Yellowstone National Park! The north entrance of Yellowstone is a complex geologic area. Glaciers from the Gallatin range, the Yellowstone ice cap, and the Beartooth plateau interacted in this area during the last Ice Age creating glacial landforms and periodic glacial outburst floods. In addition to the glacial story, this area has been subject to folding and faulting, landslides and earthflows, and most recently the 2022 floods. In this field seminar, we will travel off trail along the edge of the Gardner River Canyon starting near Mammoth and past Slide Lake observing landforms and geologic units exposed in the canyon and hiking over landforms created by landslides and earthflows. We will make a large loop returning to Mammoth via trail.

I always enjoy off trail travel and hope you will too!

- Karen Williams

## PROGRAM ITINERARY

The itinerary is designed to take advantage of the best opportunities in the park, but may be adjusted to adapt to weather conditions, wildlife activity, holidays, and road construction. *The details and timing of the agenda are subject to change.*

We will meet at the Yellowstone Forever headquarters in Gardiner for a safety briefing and introduction. We will then be transported by YF van to the hike starting point near Mammoth and finish the hike at Mammoth where the YF van will take us back to Gardiner.

## PROGRAM EQUIPMENT

For a full list of recommended equipment for all courses see the [Gardiner Field Seminars - Summer General Information](#) document.

Items specific to this course are:

- ☐ **Binoculars**
- ☐ **Camera**
- ☐ **Bear Spray**
- ☐ **Journal**, for notes (optional)

## RECOMMENDED READING

- Good, J. D, and Pierce, K. L., 1996, Interpreting the Landscape: Recent and Ongoing Geology of Grand Teton and Yellowstone National Parks. Grand Teton Natural History Association. 58 pp.

## WHOM TO CONTACT

**For any questions, concerns, or additional information please contact the following:**

- Program itinerary, health forms, payment, and activity questions please contact Yellowstone Forever at [institute@yellowstone.org](mailto:institute@yellowstone.org) or 406-848-2400
- Road updates, park conditions, and general park information please contact Yellowstone National Park Service at <https://www.nps.gov/yell/contacts.htm>
- If running late for a program, please contact 406-848-2400