



# YELLOWSTONE FOREVER

## CATASTROPHE COUNTRY: HOW EXTREME EVENTS SHAPE NORTHERN YELLOWSTONE

### Itinerary & Details

FIELD SEMINAR – SUMMER 2024

**INSTRUCTORS:** Grant Meyer, Ph.D & Matt Bingham, M.Ed.

**INSTRUCTOR BIOGRAPHIES:** Grant Meyer grew up exploring the Greater Yellowstone Ecosystem, and has long been fascinated by its unique landforms and the processes that have created them over the millennia. He has conducted research in the park since 1983 on a variety of topics, including uplift and volcanic hazards in the Yellowstone caldera, erosion and debris flows following wildfires and their relation to climate change, and landslides and extreme floods that have altered the landscape and strongly influenced Yellowstone's dynamic ecosystems. He has shared his passion for understanding these processes with students and the public on numerous field classes throughout the western USA and Yellowstone, early on as a graduate student at Montana State University, and culminating as Professor Emeritus of Earth and Planetary Sciences at University of New Mexico.

Matt Bingham is an Instructor at Milton Academy in Massachusetts, where for the last 26 years he has designed and taught courses in environmental science, geology, and biology, and led many field science projects, as well as training students in outdoor skills. As an undergraduate at Middlebury College, Matt completed seminal research on past extreme flooding in Yellowstone, and has since explored the park guiding adventure travel trips. He is a widely experienced outdoor educator who has led field excursions, worked with research projects, and gained first-hand scientific understanding in the Swiss Alps, New Zealand, Belize, the Bahamas, Mexico, Iceland, and Greenland, as well as in many of America's great national parks. His teaching emphasizes doing real hands-on science in the outdoors, where his students work with local researchers on field projects near the Milton campus. Matt has also served as the school's sustainability coordinator, new teacher mentor, and the Director of the H. Adams Carter Outdoor Program.

**ACTIVITY LEVEL:** This course is activity **level 2** and students enrolled in this course are expected to be active participants. Be prepared to hike up to 3 miles per day, comfortably, with elevation gains up to 600 feet. Some off-trail hiking possible.

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

**LOCATION:** Lamar Buffalo Ranch – Yellowstone National Park, WY

**PROGRAM DATES & TIMES:** The program begins at 7:00 p.m. on Tuesday, August 20, 2024, and goes through Thursday, August 22, 2024, at 5:00 p.m.

**LODGING CHECK-IN & CHECK-OUT:** Lodging check-in begins at 4:00 p.m. on Tuesday, August 20, 2024 and lodging check-out is at 9:00 a.m. on Friday, August 23, 2024.

**MEALS:** This course is not catered. Participants will need to bring their own food; lunch should be able to travel in the field.

**For general information about the facilities, preparation for classes, what to expect, cancellation policies, and more, please see the [Lamar Buffalo Ranch - Summer General Information](#) document.**

## PROGRAM ITINERARY

Yellowstone is well known for its giant caldera and supervolcano eruptions, but other catastrophic processes have played an important and recurring role in creating the dramatic scenery and vibrant ecosystems of the park. This is especially apparent in the mountainous landscapes of northeastern Yellowstone, where massive landslides, extreme floods, earthquakes, severe wildfires, and debris flows punctuate the seemingly serene environment, along with volcanic paroxysms on longer timescales. During this seminar, you will examine the evidence for these events in the recent geologic past, as well as those in recent decades, and consider how such natural disturbance is a key factor in maintaining ecological diversity. Fascinating landforms, geologic deposits, and vegetation patterns relating to these episodic phenomena are spectacularly displayed within easy travel distance from your base at Lamar Buffalo Ranch, allowing hands-on study. This course will also provide important context for understanding how ongoing climate change is likely to alter the Yellowstone landscape you have come to know.

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.*

### Day 1

#### **Welcome**

The program starts with an evening orientation. You will get to know one another and be introduced to the program. Throughout the evening, the itinerary and seminar key concepts will be discussed, as well as what to expect to pack for the field each day.

### Day 2

(begin 8:00 a.m., end at approximately 5 p.m.):

Setting the stage: Field overview of northeastern Yellowstone geology, glaciation, and postglacial history

Barronette Meadow: The persistent effects of glaciation; Erosion processes and the effects of repeated major events

Warm Creek area: What created these spectacular cliffs? And what may be world's largest landslide...

Have human activities caused flood impacts in Yellowstone?

Round Prairie: History of extreme floods and their effects on valley-floor environments

Wildfires, storms, and debris flows: Geological evidence for extreme events

### Day 3

(begin 8:00 a.m., end at approximately 5 p.m.):

Effects of volcanism and earthquakes in the Lamar Valley area

Trout Lake debris avalanche, other massive landslides in the Soda Butte Creek valley, and reactivation by slumping

Soda Butte Creek and Lamar River confluence area: Stream systems, floods, and climate change over millennial timescales

Lamar Canyon: Impacts of the 2022 flood in a steep narrow gorge

What produced the massive boulder deposits near the Yellowstone-Lamar River confluence?

### Day 4

#### **Check-Out**

Check out of cabins by 9:00 a.m.

## PROGRAM EQUIPMENT

For a full list of what is included in this course, in addition to recommended equipment check out the [Lamar Buffalo Ranch - Summer General Information](#) document.

- Field notebook and pencil for observations;
- Geological magnifying hand lens, 10x is best (optional but recommended)
- Waders and/or angler's rubber-sole wading boots or old running shoes for optional wading. Felt-soled wading boots are not allowed in Yellowstone to avoid transportation of invasive species. River sandals are OK only if you are well accustomed to wading rock streams in them, as these provide limited traction and little protection from rocks and debris
- Hiking poles, ski pole, or wading staff for wading
- Extra dry socks

## RECOMMENDED READING

There are books and reference materials at the ranch for the class to enjoy during the stay. In addition to those materials, the following recommended readings are not required but may enhance the visit.

- Digital copies of readings will be provided by email prior to the course. The following book is a very useful general reference:
  - Good, John M., and Kenneth Lee Pierce. *Interpreting the Landscape: Recent and Ongoing Geology of Grand Teton and Yellowstone National Parks*. Grand Teton Natural History, 1996.

## WHOM TO CONTACT

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

- Program itinerary, health forms, payment, and general program 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.