

# **2005 Idaho Earth Science Teachers Field Workshop**

## **Lost River Field Station Borah Peak, Idaho**

**July 10-15, 2005**

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## Schedule of Events

### Sunday, July 10

Noon – 4 pm	Arrival at Lost River Field Station; registration and camp setup
4 pm – 5 pm	Workshop opens. Introductions and distribution of workshop packets
6 pm	IESTA-hosted barbecue dinner for participants, family members, and staff
7:30 – 8:15 pm	Lecture: “Geology and Earthquake Hazards of the Big Lost River Area” (Bill Phillips)

### Monday, July 11

8 am – 9 am	Field Station: Workshop overview; credit requirements; safety
9 am – 5 pm	Fieldwork: All day geology field trip (Breckenridge, Cash, Othberg, Phillips, Weaver)
5 pm – 7:30 pm	Dinner and free time
7:30 pm – 8:30 pm	Lecture/Activity: “Out of the Rock” (Judy Walling)

### Tuesday, July 12

8 am – 9 am	Field Station: Non-structural hazards for schools (Stephen Weiser)
9 am – 10 am	Field Station: Overview of resources for teachers on the Yellowstone supervolcano, Mt St Helens, and tsunamis (Chris Jonientz-Trisler)
10:30 am – 5 pm	Fieldwork: Technique Modules (Breckenridge, Cash, Othberg, Phillips, Weaver)
5 pm – 7:30 pm	Dinner and free time
7:30 pm – 8:30 pm	Activity: “Analysis of field data” (Phillips, Breckenridge, Othberg, Cash, Weaver)

### Wednesday, July 13

8 am – 10:30 am	Field Station: Define research projects (Staff)
10:30 am – 5 pm	Fieldwork: Research projects
5 pm – 6 pm	Free time
6 pm – 7:30 pm	IESTA-hosted barbecue dinner and rock raffle for participants, family members, and staff
7:30 pm – 8:30 pm	Activity: “Mine Safety Rescue” (Mike Weaver)

### Thursday, July 14

8:00 am – 5 pm	Fieldwork: Research projects
5 pm – 7:30 pm	Dinner and free time
7:30 pm - ??	Work on research presentations. Staff available for consultation

### Friday, July 15

8 am – noon	Field Station: Research presentations
Noon – 1 pm	Workshop closed. Depart campsites.

### Friday, July 22

Workshop report due [2 credit enrollees only]

## Safety Information

### Hazards

Field work can be dangerous. Below are the most important hazards you may face when performing field work at the workshop.

1. Automobile accident
2. Slipping on steep/loose/uneven ground
3. Lightning strike
4. Low temperatures and/or wet conditions leading to hypothermia
5. High temperatures leading to heat exhaustion and/or heat stroke
6. Rockfall
7. Drowning
8. Getting lost

### Making Field Work Safe

The risk of serious injury from all of the above hazards can be greatly reduced by planning ahead.

1. We will be driving in convoys of 5 or more vehicles. Convoys can be confusing to drivers not associated with the workshop. If you are driving, stay in the convoy line. Do not pass vehicles. Keep your vehicle lights on so it is clear to other drivers that you are part of the convoy. Do not drive low clearance passenger cars on roads intended for 4-wheel drive vehicles.
2. Wear good quality, comfortable hiking boots. Do not attempt to climb steep scarps, especially those composed of gravel or other loose materials.
3. Keep an eye on weather conditions. If you can hear thunder, apply the **30-30 rule** and return to your vehicle or the field station if unsafe. The field station is safest but avoid contact with wiring, telephones, or plumbing. Vehicles with metal roofs and sides are the second safest location during electrical storms.
  - While outside, use the "**30-30 Rule**" to know when to seek a safer location. When you see lightning, count the time until you hear thunder. If this time is **30 seconds** or less, go immediately to a safer place. Wait **30 minutes** or more after hearing the last thunder before leaving the safer location. Note: the "30-30 Rule" will not work well for "first-strike" lightning from locally developing thunderstorms. Watch for brewing convection and seek shelter before the first lightning is produced.
  - If caught in a thunderstorm with lightning, squat low to the ground and minimize ground contact. Make yourself the smallest target possible.
4. Always take a raincoat, sweater, warm hat, and some extra food in your field pack.
5. Always take a sun hat and extra water in your field pack. Sunburn is dangerous. Use sun block and wear sunglasses. Wear long sleeve shirts and long trousers to reduce exposure.
6. Avoid working at the base of cliffs.
7. Do not enter deep water or rapidly flowing water.
8. Inform workshop organizers of your plans and do not alter them. Stay aware of your position by frequently consulting your map. If lost, make yourself comfortable and stay in one place so that searchers can find you more rapidly. Carry a whistle in your field pack to signal rescuers.

**Parents: The Big Lost River near the field station may be hazardous to unsupervised children!**

## Field Trip Route

### Monday, July 11, 9 am – 5 pm. Field Trip

**Start** Lost River Field Station. GPS operation. Turn left (east) on Bartlett Point Road. At junction, turn left (north) on Old Chilly Butte Road. At junction, turn right (east) on Trail Creek Road. At junction, turn left (east) on Highway 95. Turn right (northeast) on Doublesprings Pass Road. Road is indicated by signs for historical markers discussing the 1983 earthquake.

**Stop 1:** 1983 Fault Scarp, Doublesprings Pass Road (Phillips). Ground rupture and the 1983 earthquake. Recognizing fault scarps. Geomorphic surfaces. Evidence for prehistoric earthquakes. Trenching studies.

Continue northeast on Doublesprings Pass Road.

**Stop 2:** Mississippian McGowan Formation near Freighter Springs on Doublesprings Road (Phillips). Brunton Compass operation. Introduction to regional stratigraphy. Identifying and describing siliciclastic rocks. Original horizontality, superposition, and cross-cutting relationships. Environment of deposition.

Continue northeast over Doublespring Pass.

**Stop 3:** Glacial Features, Doublespring Pass (Breckenridge). Moraines and outwash terraces. Evidence for climatic change. Environment of deposition. Dating [relative and radiometric] of geomorphic surfaces.

Continue northeast driving by glacial outwash terraces.

**Stop 4:** Upper Mississippian Carbonate Bank Unit at the Doublesprings Creek Fossil Site (Cash). Identifying and describing carbonate lithologies and fossils. Environment of deposition.

Retrace route southwest to Highway 95. Turn left (south) and proceed to the Cedar Creek drainage. Identify the correct road by a sign indicating climbing access to Borah Peak. Turn left (east) on the road. Proceed to parking area near Birch Springs (on right side of road). Walk north about 1 km along 1983 fault scarps.

**Stop 5:** Patterns of faulting (Phillips). Antithetic faults, grabens and horsts, displacement profiles.

Return to field vehicles then walk ~200 m south to landslide on faint trail keeping well above Birch Springs.

**Stop 6:** Co-seismic Liquifaction, Birch Springs (Othberg). Mass wasting and seismicity. Influence of groundwater. Assessing slope stability. Factor of safety concept.

Return to field vehicles and retrace route to Highway 95. Proceed south to Trail Creek Road. Turn right and continue on gravel road leading to Chilly Cemetary. Turn right (north) and drive Chilly Cemetary. Park vehicles and walk up jeep trail ~200 m uphill to adit.

**Stop 7: Mineralization and Mines (Phillips, Weaver).** Adit on Chilly Butte above pioneer cemetery. Regional mineralization. Mineralogy practice. Mine safety and abandoned mine lands.

Retrace route to Trail Creek Road and return to Lost River Field Station.

## **Technique Modules**

### **Tuesday, July 12, 10:30 am – 5 pm. Technique Modules**

Break into four groups.

**Groups A and B:** Perform Module 1 from 10:30 am to 1:30 pm

**Groups C and D:** Perform Module 2 and 3 from 10:30 am to 1:30 pm

**Groups A and B:** Perform Module 2 and 3 from 1:30 pm to 5:00 pm

**Groups C and D:** Perform Module 1 from 1:30 pm to 5:00 pm

**Module 1:** Mapping geomorphic surfaces, Doublesprings Pass (Breckenridge, Cash, Weaver). Use of air photo mapping to define and record geomorphic surfaces. Equipment: air photo, topographic map, colored pencils, map board.

**Module 2:** Use of GPS in surficial geological mapping (Phillips). Map fault scarps between Birch Springs and Rock Creek with GPS and measure displacements with tapes. Equipment: Garmin GPS-12, 5 m tapes, air photo and topographic map.

**Module 3:** Use of hand leveling in surficial geological mapping (Othberg). Measurement of slope profiles across Birch Creek landslide (Othberg). Equipment: Bruntons, home-built inclinometers and 30-m tapes.

### **Tuesday, July 12, 7:30 pm – 8:30 pm. Analysis of Technique Module Data (Breckenridge, Othberg, Phillips, Cash, Weaver)**

- A. Download GPS coordinates into TOPO!
- B. Download GPS coordinates into text (.txt) file format and inport into Excel
- C. Plot displacement profiles using Excel
- D. Plot hand-leveled topographic profiles using Excel

# Academic Requirements

## Learning Objectives

The workshop's learning objectives are:

- to review earth science techniques and concepts
- to gain exposure to new earth science theories and technologies
- to explore natural hazard recognition and mitigation, particularly those caused by earthquakes

Note that we do not plan to tell you how to teach your classes. We are aware that you are the experts in that field. Our primary objective is to help you update and deepen your knowledge of the earth sciences and natural hazards.

## Teaching Methods

Our teaching methods emphasize “learning by doing,” although traditional lectures and a field trip are also used. The introductory evening lecture provides an overview of the geologic history of the Big Lost River area. The next day, you will see many of the rocks and structures discussed on the field trip. On Tuesday, we instruct you in some simple but highly effective field methods. These “technique modules” emphasize the collection and analysis of field data. During the remainder of the workshop, you will devise and carry out a small research project on some aspect of the regional geology. You may focus your research on your teaching needs, on hazard recognition and mitigation, or on a project driven solely by your own curiosity. Additional evening lectures and activities will be used to provide more information on hazard-related subjects and on teaching-related resources. The workshop culminates in presentation of research results on Friday morning.

## University Credit

University credits are assigned by the course instructor, Bill Phillips, on a Pass/Fail basis.

The requirements for receiving **ONE** academic credit for the workshop from the University of Idaho are:

1. Attend field trip
2. Attend and complete the technique module assignments
3. Attend all evening lectures/activities
4. Present research project results in the Friday morning seminar. Research results are presented orally in teams of 2 or 3 workshop attendees. Teams larger than 3 students are not permitted.

The requirements for receiving **TWO** academic credits for the workshop are:

1. Satisfactory performance of the requirements for one credit
2. Submission of a written research paper.

The research paper must be submitted to the course instructor, Bill Phillips, by Friday, July 22. Submission by email is preferred. In the case of postal mail, the paper must be postmarked by July 22. The report may also be submitted at the close of the workshop on Friday, July 15.

## **Research Paper**

The precise topic and content of the paper is negotiated with the instructor (Phillips) during the workshop. Participants have the following general options for the paper:

1. Develop a teaching module for use in their classrooms from the material presented in the workshop
2. Present a written account of their workshop research project. It is fine to use data collected in the field by research teams. However, interpretation and analysis of the data must be the work of the individual responsible for the paper.

Large numbers of citations from the scientific literature are not expected in the papers. Instead, we hope to see evidence of critical thinking and development of insight into earth science topics, especially natural hazards.

The papers must be typed and submitted either as a printed document or electronically by email (Word or Wordperfect format, please).

The length of the papers should not exceed 10 typed double-spaced pages (12 point font) nor be shorter than 5 typed double-spaced pages. Illustrations and references do not count when determining page lengths.



## **Staff Biographies**

### **Roy Breckenridge**

Roy Breckenridge is an Idaho Geological Survey Director and the Idaho State Geologist. He came to IGS from the Wyoming Geological Survey in 1978. Roy's PhD and M.S. are in geology from the University of Wyoming. His areas of expertise are geomorphology, Quaternary geology, and field mapping. Roy enjoys all disciplines of geology and has worked in many diverse geologic terranes. He is currently working on the glacial geology of northern Idaho and the Long Valley area. Roy has enjoyed a long-time association with the Idaho earth science teachers workshop and IESTA.

### **Jim Cash**

Jim Cash is a teacher with the Moscow School District. He has taught earth science at Moscow High School since 1982. Jim has presented research on earth science teaching at both state and national conferences. He was actively involved in creating curriculums and course assessments for the teaching of earth science in Idaho. At present, Jim is working with Idaho State University and the Idaho Geological Survey to develop the geology portion of the Idaho Digital Atlas. Jim is also the secretary/treasurer of the Idaho Earth Science Teachers Association.

### **Chris Jonientz-Trisler**

Chris is a Natural Hazards Specialist at the Region 10 office of the Department of Homeland Security/Federal Emergency Management Agency (DHS/FEMA) in Seattle. Prior to joining DHS/FEMA, she was a volcano seismology Research Scientist and Seismology Lab Coordinator at the University of Washington Geophysics Program. She has a B.S. in Geological Sciences from the U.W. and is a State of Washington Licensed Geologist. Chris has worked in a variety of mitigation, outreach, science, and education roles. These include earthquakes in Alaska, California, Idaho, Oregon and Washington, hurricanes in Florida and Alabama, and at Mount St. Helens' most recent eruption. She is also active in Pacific Northwest and international tsunami issues.

### **Kurt Othberg**

Kurt Othberg is an Idaho Geological Survey Director and Research Geologist at the University of Idaho. He came to IGS from the Washington Division of Geology and Earth Resources in 1980. Kurt has a B.S. in geology from the University of Washington, a B.A. in science education and an M.S. in geology from Western Washington University, and a PhD in geology from the University of Idaho. His research interests include geomorphology, Quaternary stratigraphy, paleomagnetism, surficial geologic mapping, and applications of geologic maps to societal needs. He also has developed earth science education programs for the Survey and the University, including summer field workshops for teachers that have been conducted each year since 1986. Kurt is a past president of the Idaho Earth Science Teachers Association.

### **Bill Phillips**

Bill is an assistant research geologist with the Idaho Geological Survey. He has a B.S. in geology and anthropology from Tufts University, an M.S. in geology from Washington State, and a PhD in geosciences from the University of Arizona. Prior to joining the IGS in 2004, Bill worked at the University of Edinburgh for five years where he taught geomorphology, field methods, and introductory physical geography. He also taught geology, field methods and hydrology courses for two years at

Colorado College. For a decade, Bill was on the staff of the Washington Division of Geology and Earth Resources in Olympia where he worked on geological mapping projects in the Cascades. Bill's current research focuses on dating geomorphic surfaces with cosmogenic nuclides.

### **Stephen Weiser**

Stephen has been employed by the Idaho Bureau of Homeland Security in Boise since 1991. His job focuses on the reduction of losses from floods, wildland/urban fires, landslides, and earthquakes. He also assists state and local governments to take advantage of funding opportunities. Education is a big part of his job. He educates community leaders—who tend to treat hazards only as response issues—about planning for hazard mitigation and recovery. Stephen's goals are to streamline the delivery of hazard reduction activities and make the best use of state and federal dollars. He has an M.A. in English from the University of Oregon, and a B.A. in German, also from Oregon.

### **Mike Weaver**

Mike began work as Idaho's Mine Safety Specialist in 1991. At first living in Star, Idaho (west of Boise), Mike moved to Moscow in 1996 to operate the program through the College of Mines. In 2001, the Mine Safety and Health Program was relocated to the Idaho Geological Survey. This program provides training and consultation on safety and rescue issues to the mining industry. Mike also provides mine rescue response throughout the USA and internationally through Central Mine Rescue in Osburn, Idaho.

### **Judy Walling**

Judy taught 6th grade math and science at the Meridian School District for 15 years. For the past 10 years, she has taught 6th grade science and pre-algebra at Eagle Middle School. Judy has a B.S. in elementary education with a minor in science from Emmanuel College in Boston. Her master's in earth science education is from Boise State. Since 1996, Judy has facilitated and instructed Out of the Rock (OOTR) workshops, mini-workshops, and field trips. At present, she is the Idaho OOTR program coordinator. OOTR is a mineral resource education program sponsored by the Idaho Mining Association and the National Energy Foundation.

### **Gayle Worthington**

Gayle began work at the Idaho Geological Survey in the summer of 2000 after teaching one year of special education at Deary High School. She has since taken several classes in geology to broaden her geology background managing the Publications and Sales Office. Gayle has a B.S. in secondary education in social studies and special education from the University of Idaho.

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