

# Earth Book Montana: Discovering the Geological World

George Brimhall- Geology

Alta Miller- Montana History

For the Wise River Community and Surroundings- Where? Wise River Community Hall

Web Site: [www.earthresourcesmt.org](http://www.earthresourcesmt.org)

## Theme: Rivers, Trout, Salmon Flies, Springs, and Landscape: Underlying Geological Processes

Note: For **K-12 teachers** with active Montana teaching credentials, **28 total units of professional development credit renewal units** are available for all four-day's participation free of charge or lower unit values proportional to the hours attended: one hour in our program equals one professional development unit.

### Saturday July 6th: 9-12 am Narrative Topics

- (1) Tectonic controls on trout species in the American Northwest. By George Brimhall
- (2) Is global warming real and is it caused by humans?
- (3) The Big Dying mass extinction and could it have relevance today?
- (4) Is there evidence of climate change in insect hatches like the Salmon Fly? By Craig Fellin
- (5) Proposed new oil and gas drilling on the Big Hole river basin; Where these lease areas occur; How they relate to known geological maps; fracking technology and social concerns.

12-1 pm Lunch

1-5 pm **Field Trip:** First-hand inspection of some Oil and Gas lease areas for drilling and fracking.

### Saturday July 13th: 9-12 am Narrative Topics: Scientific reasoning: see geology, math, chemistry, and physics come alive first hand in the field.

- (1) Reading geological maps: (1) Wise River Quadrangle, (2) Dillon 1:250k sheet, (3) Geologic Road Map of Montana: MBMG Map 65, scale 1:1,000,000.
- (2) Geological mapping using 21<sup>st</sup> century tools like GPS; overlaying gravity and magnetic maps
- (3) Geological controls on springs and water resources on Mt. Fleecer and Jerry Creek watershed
- (4) Using Calculus to understand water flow and chemistry- a practical, visual application of math

12-1 pm Lunch

1-5 pm **Field Trip:** Jerry Creek to Indian Creek route to observe thrust fault on Granulated Mt., Color banding in rocks along Jerry Creek, orbicular features, geological control on springs, Parker Creek phosphate adit.

### Saturday July 20th: 9-12 am Narrative Topics

- (1) Effects of global warming: How real is climate change and are humans responsible?
- (2) Glacial melting and sea level rise

12:00 Lunch

1 to 5 pm **Field Trip:** Deep Creek basin glacial features and deposits

### Saturday July 27th: 9-12 am Narrative Topics

- (1) Water quality in an around mine sites of different ore metals and wall rock alteration types
- (2) Calvert tungsten mine and limestone buffering
- (3) Base metal sulfide mines with altered wall rocks, mine site remediation

12-1 pm Lunch, Evaluations and presentation of teacher professional development certificates

1-5 pm **Volunteered Science Project presentations**