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Establishing Peatland Geologic Dating and Formation in Ravalli County

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What is Peat?

Peat is composed of mostly decomposed plants.

How is Peat formed?

Peat requires a water saturated environment, accompanied by a lack of oxygen, over a long period of time. The warmer the environment, to a limit, allowing microbes to break down the plants, the quicker the peat will form. (IPS)

What is a Peatland?

A peatland is an area that has a layer of peat at the surface. (IPS)

Abstract

The Bitterroot Valley, located south of Missoula, Montana along US Hwy 93, has a diverse geological history including significant glacial carved canyons and evidence of Glacial Lake Missoula. Just a couple miles south of Hamilton (46-9-36 N, 114-11-29 W) is a peatland field about three hundred acres in size. In the Bitterroot we are interested in dating the oldest lower portion of this deposit out of curiosity to better understanding the geology of the valley. Core samples were obtained in early February 2018. This particular area has a history of peat mining, and we know the top two to three feet of material was removed in the 1970s. Using a hand soil auger, we removed and saved three samples at: 1.8 ft., 2.5 ft., and 3.5 ft. depth. The total thickness of the peat deposit may have been originally five feet or more where the sample was taken. From the surface we drilled through continuous peat to the lowest depth, where we recovered one-inch diameter smooth stones, mixed with smaller pebbles and sand, indicating the bottom of the peat layer. The samples were dried and the sample from the 2.5 ft. depth was sent to Beta Analytic, Inc. in Miami, FL, for radiocarbon dating. Our goal was to determine whether the peat deposit is old enough to be considered ice age or whether it dates to the post ice age Holocene. Either way this information will improve our knowledge of the geological history of the Bitterroot Valley.

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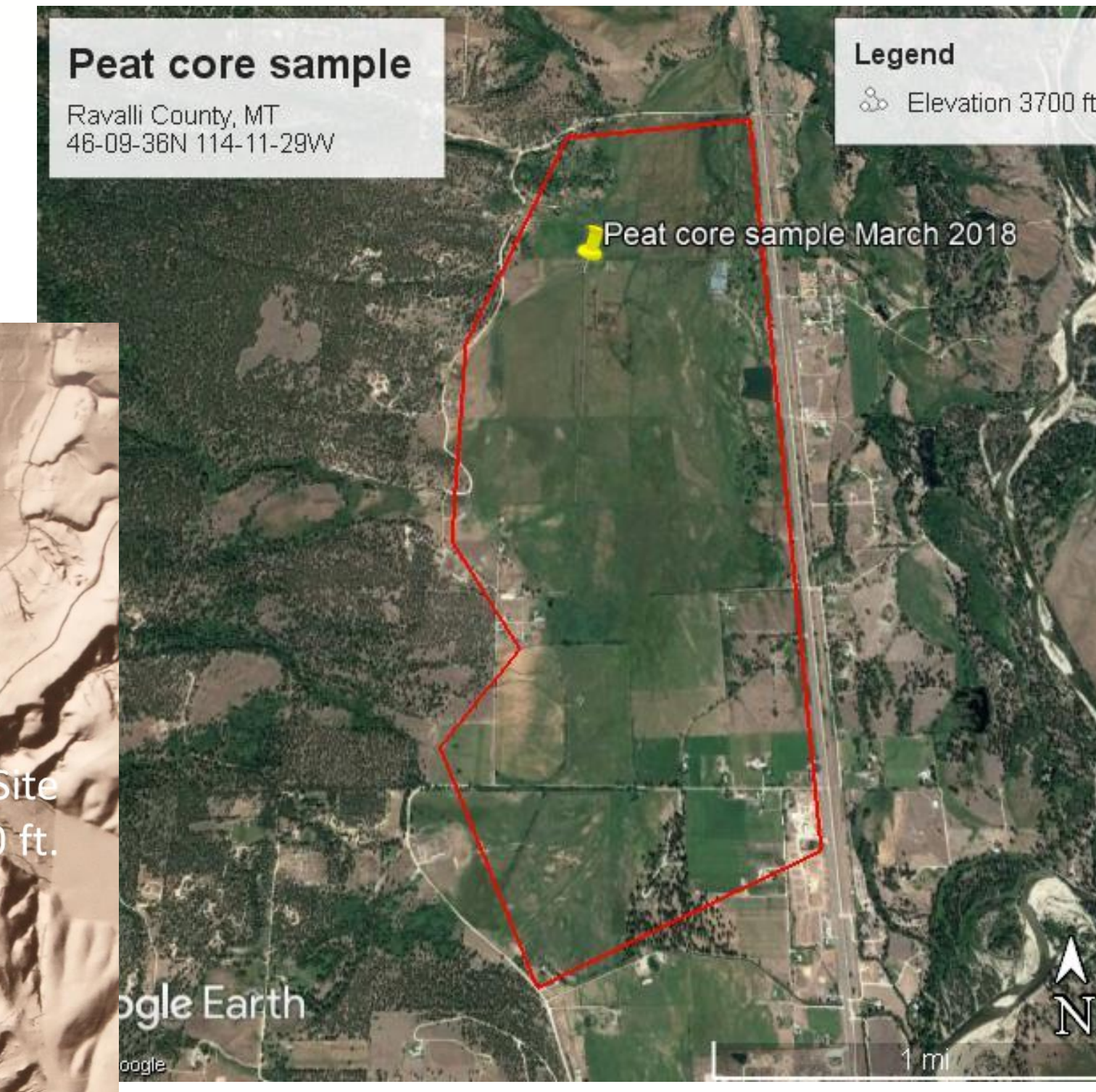
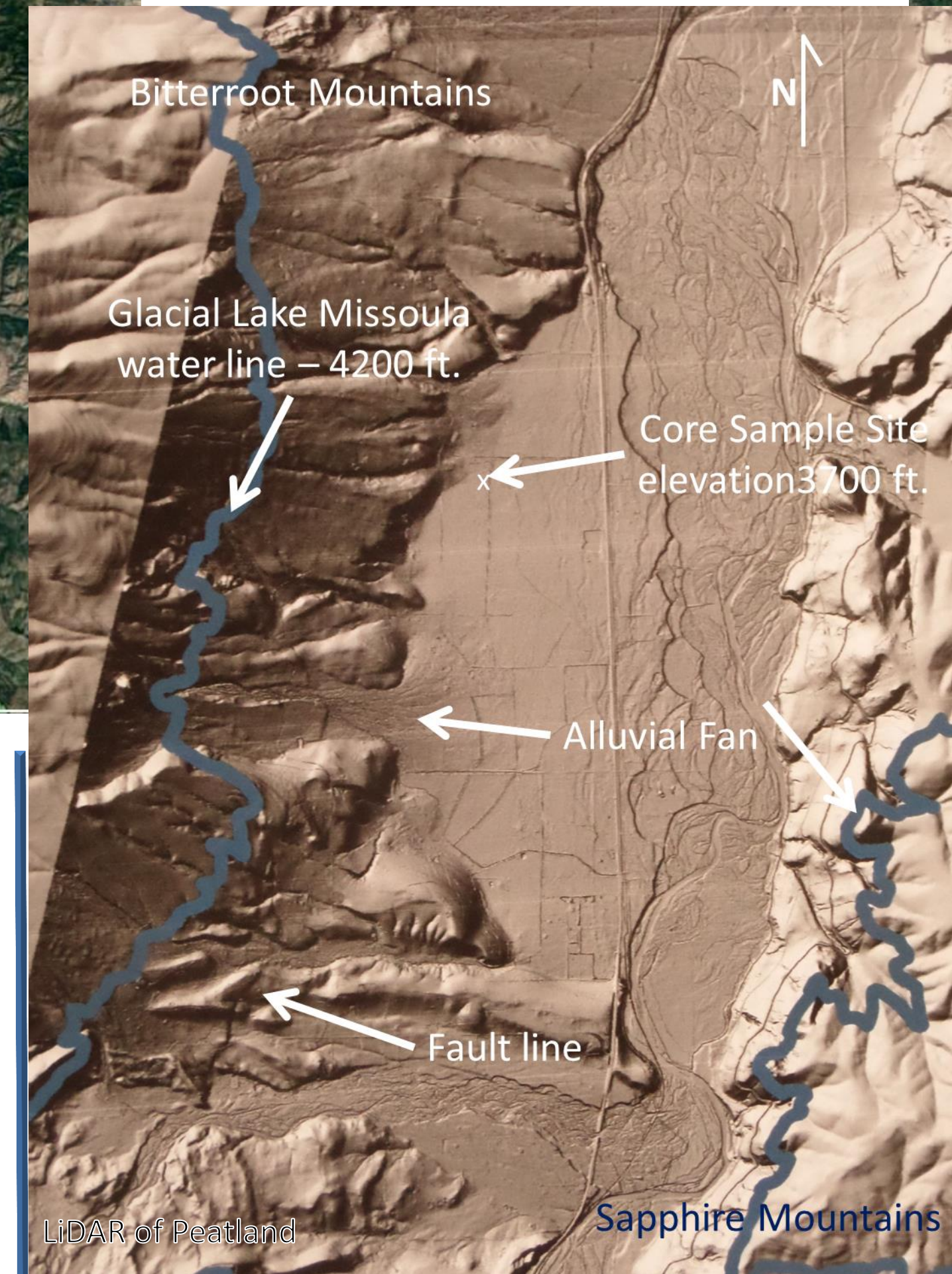
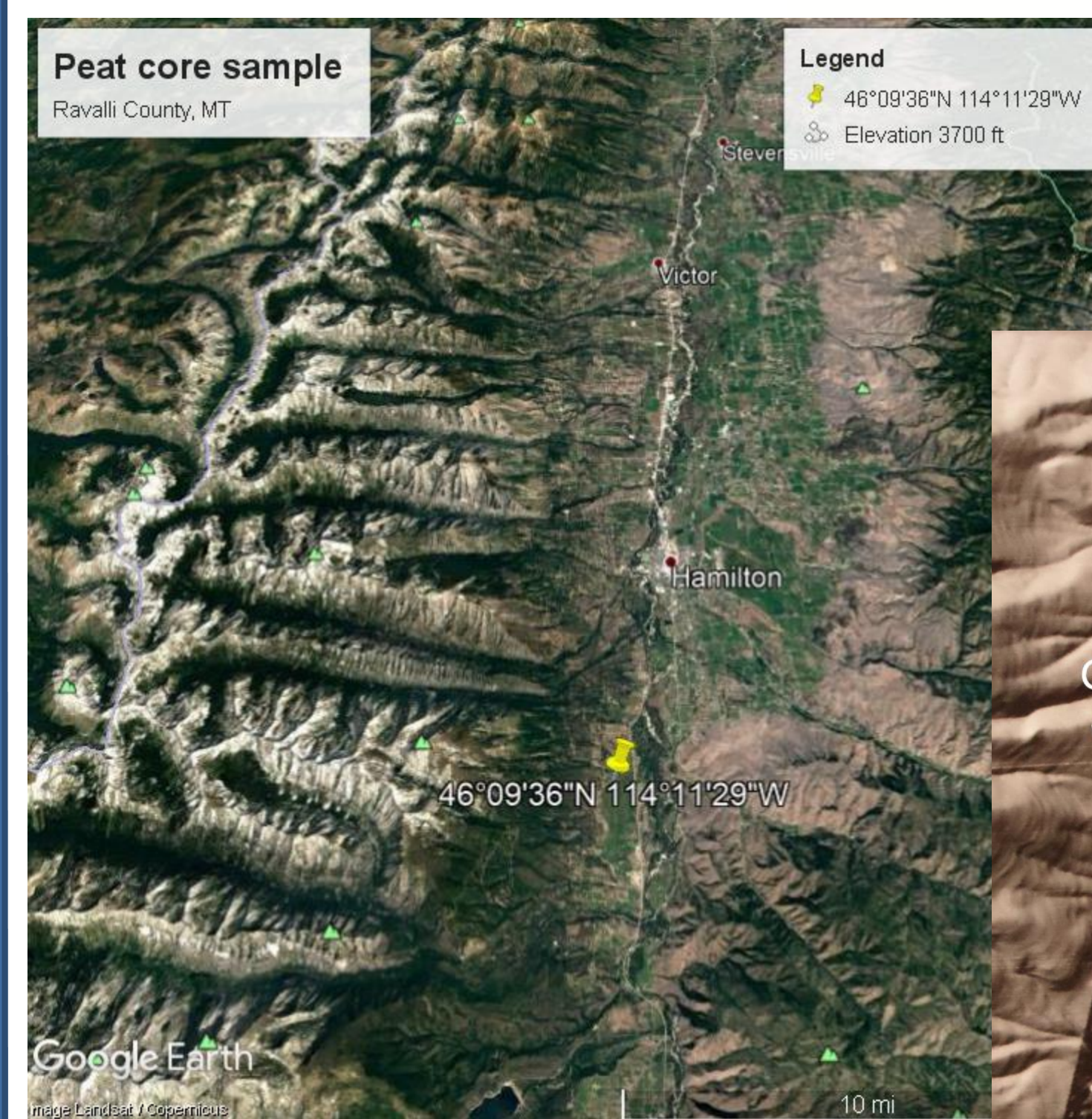
Patti Furniss Education

Memorial Foundation

Establishing Peatland Geologic Dating and Formation in Ravalli County

A New Hypothesis

Saundra Amsden, George Furniss (mentor)

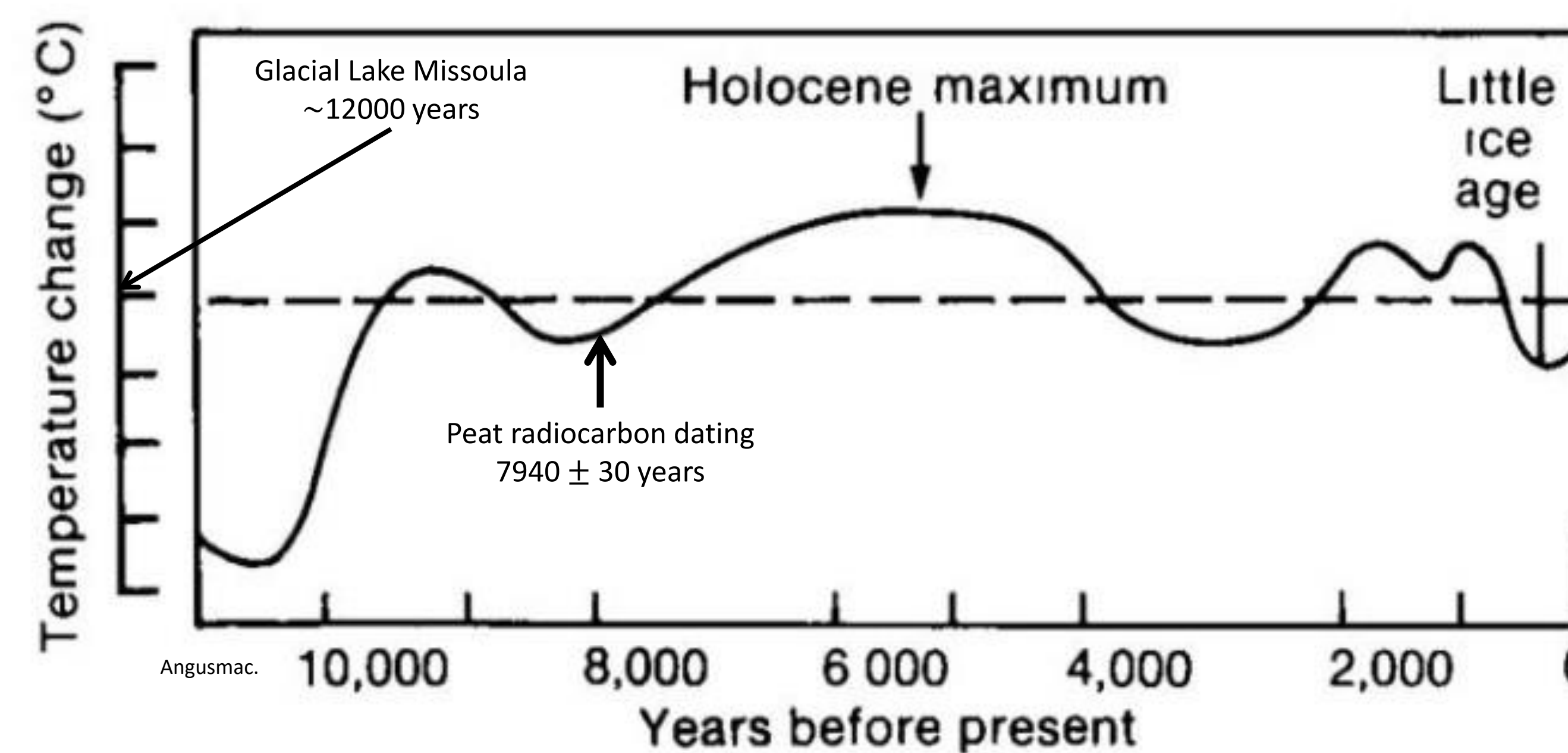


Glacial Lake Missoula

The lake is estimated to have emptied at about 12,000 years ago. Given the date of 7940 years ago for the peat sample, it is hard to correlate the lake to the formation of peat. Additionally, the lake level was approximately 500 ft. or more above the peatland.

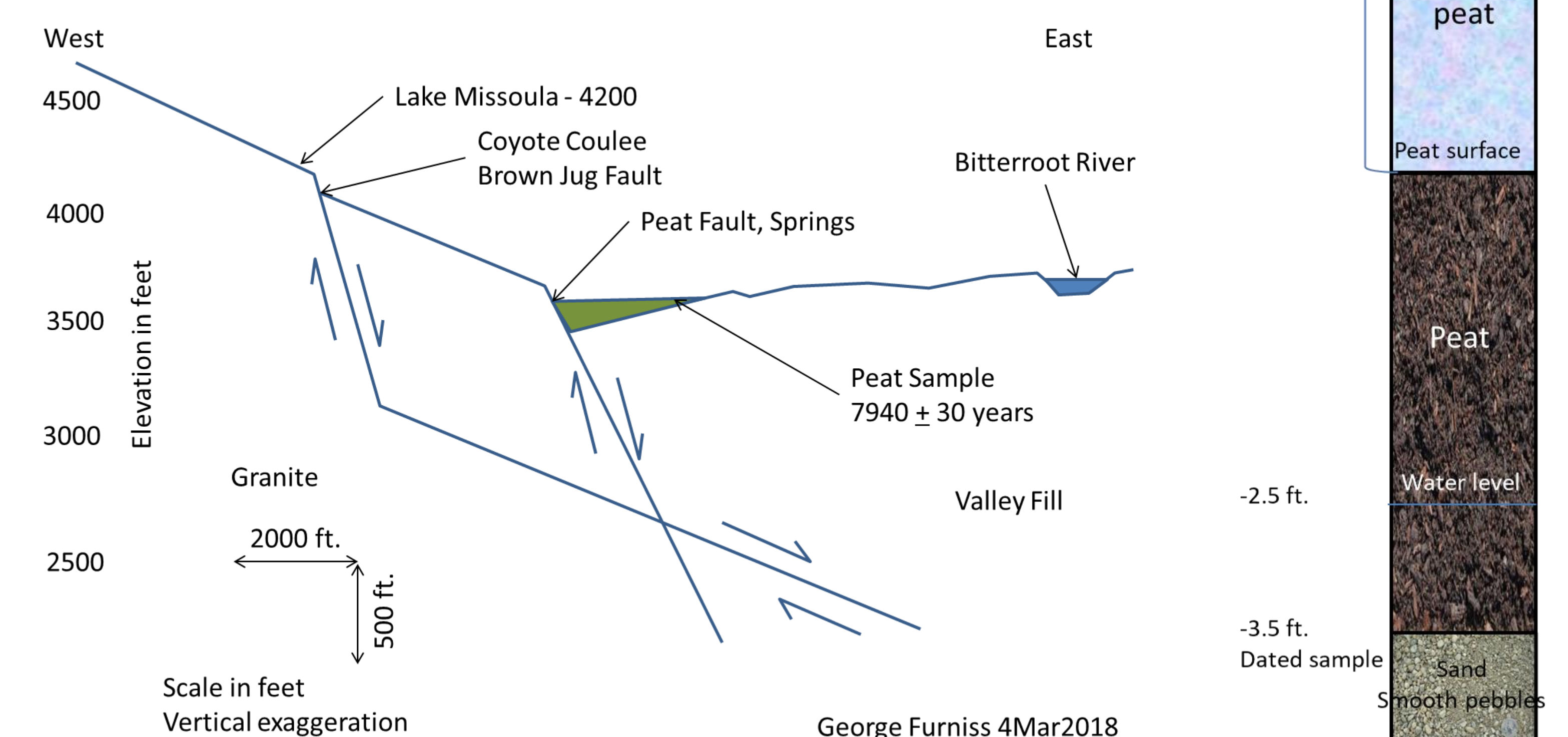
Bitterroot River

There is no good evidence in the LiDAR image of river flow through the peatland area of study, leaving an oxbow pond. This leads us to believe the river did not provide the necessary environment to create the peat. Additionally, flowing water would likely contain oxygen, preventing the formation of peat.



Fault Tilt

With the recent discovery of a post ice age fault along a parallel line with the western edge of the peatland (Byron), we believe this allowed a down-drop tilting of the area on the west side, creating an extensive shallow lake or pond that was kept active for long enough to form a peatland. Visual examination along the fault line shows several natural springs that would have kept the area wet, even during the drier seasons.



Conclusions

Of the three ideas about how the peatland formed, the Fault Tilt appears to be the most plausible. The area of the down-drop could be as large as 1200 acres, as shown by the red path around the possible inclusive area.

What's next?

Core sampling and dating along on east/west lines to determine:

- Depth to help determine if the area has a downward tilt on the west side
- Geologic dating along the lines and at various depths

Core sampling and dating along a north/south line to determine area

- The area of the down-drop tilt could be as extensive as 1200 ac² or 1.84 mi²

This will require drilling equipment, and multiple radiocarbon dating of samples from numerous sites and depths in the proposed area.

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