



Powder River and the Terry Badlands



As Clark descended the Yellowstone River he dutifully noted the many natural features he saw. A modern traveler here still can see and appreciate what he described:

Friday July 30th, 1806 At the mouth of the Powder River, Clark noted:

... the water ... is 100 yds wide, the bed to this river nearly $\frac{1}{4}$ of a mile this river is Shallow and the water very muddy and of the Colour of the banks a darkish brown. I observe great quantities of red Stone thrown out of this river that [and] from the appearance of the hills at a distance on its lower Side induced me to call this red Stone river.

The Powder River flows into the Yellowstone River about seven miles southwest of Terry, Montana.

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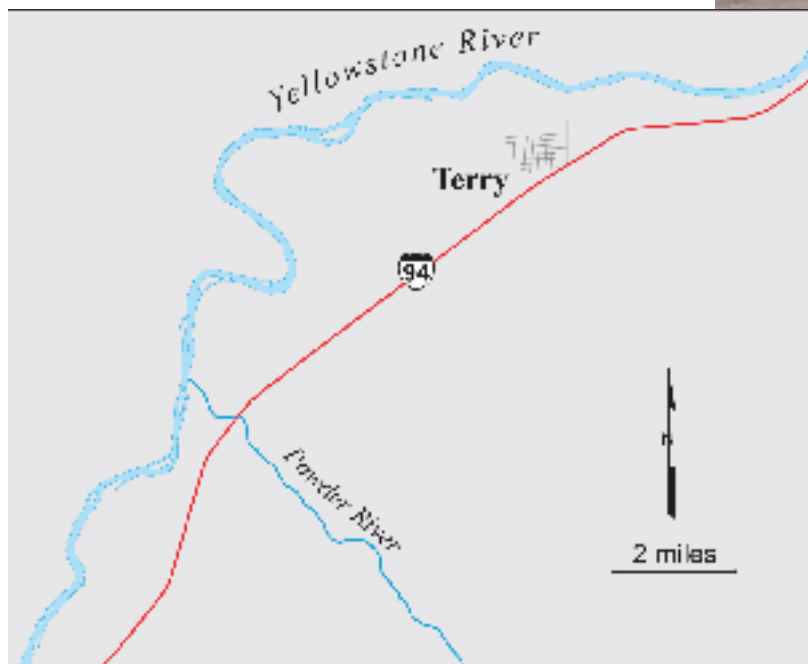


Photo by Ginette Abdo, MBMG

Confluence of the Yellowstone and Powder River — which derives its name from the fine, gray sediment along its banks, said to look like gun powder.



The red rocks in and near this stream induced Clark to call it red Stone river.



Photo by Clay Schwartz, MBMG

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The red-colored stones are chunks of clinker from the Fort Union Formation that washed or fell into the river, which tumbled and smoothed them. Clinker forms when lightning, grass fires, or spontaneous combustion ignites coal beds, and the adjacent rock — if siltstone or shale — is baked and fused, forming orange, red and yellow “burned rock.”



These banks a darkish brown are near the mouth of the Powder River and are composed of layers of silty clay deposited by the river. Erosion of these sediments produces the mud in the river and its muddy look.



The next day, July 31, Clark continued downstream about 7 miles past Powder River to present-day Terry, Montana

This high Country is washed into Curious formed mounds & hills and is cut much with reveens.

. . . here the river approaches the high mountainous country on the N W. Side. those hills appear to be composed of various Coloured earth and Coal without much rock. I observe Several Conical pounds which appear to have been burnt. this high Country is washed into Curious formed mounds & hills and is cut much with reveens.

The high Country is entirely bar of timber. great quantities of Coal or carbonated wood is to be seen in every Bluff and in the high hills at a .distance on each Side.



Photo courtesy of Wayne Mumford (www.waynemumford.com)



The rugged hills on the N.W. Side of the Yellowstone are the Terry badlands carved out of the Fort Union Formation. The darker, patterned, flat area south of the river is flood plain alluvium, formed by modern erosion and flood deposits.

... I observe several conical pounds [mounds] which appear to have been burnt.

These mounds are capped with erosion-resistant clinker — shale and siltstone that were baked when the underlying coal beds burned.

... great quantities of Coal or carbonated wood is to be seen in every Bluff and in the high hills at a distance on each Side.



The dark layers are coal formed 65-55 million years ago from the decay of vegetation in swampy area

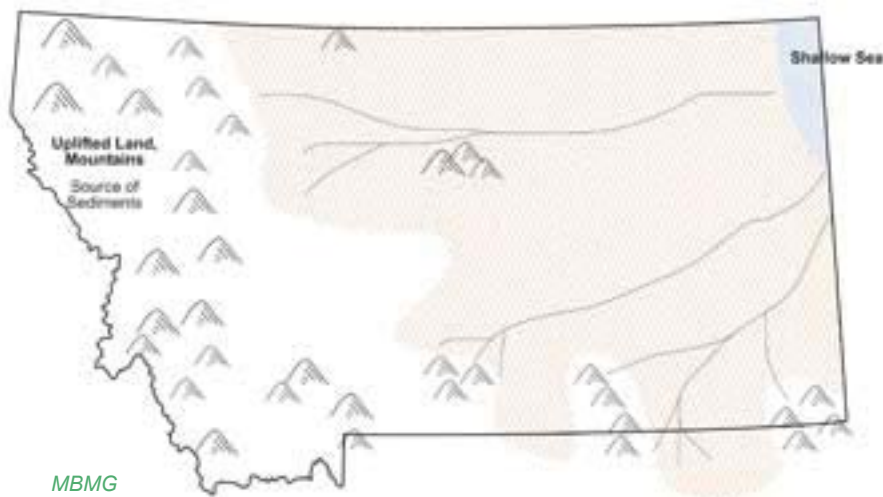
Photo by Ginette Abdo, MBMG



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Lewis and Clark sometimes called the coal of eastern Montana and western North Dakota “carbonated wood” because it contained the remains of the woody plant material. This low-grade coal is lignite.

Sediment . . . erosion . . . badlands...



The curious landscape Clark described resulted from erosion of the Fort Union Formation.

Altitudes near Terry range from 2200 to 2500 feet above sea level; the climate is semiarid. About 65-55 million years ago, however, vegetation grew abundantly here in a moist, subtropical climate near sea level.

Rivers flowing eastward from the mountains toward the inland sea deposited sand, silt and mud.

Woodlands, grasslands, and swamps were interspersed in the area. As plants in the swamps died their remains accumulated and slowly turned to peat.

When the rivers meandered or flooded, layers of sand, silt and clay buried the partially decomposed vegetation (peat) in the swamps.

Through geologic time the clay, silt and sand became mudstone, siltstone and sandstone, respectively. The peat became coal.



Image courtesy of The Field Museum, photographer John Weinstein ©1991



Photo by Ginette Abdo, MBMG

Sandstone and clinker of the Fort Union Formation tend to resist erosion; they often cap hills and buttes in the area. The finer-grained siltstone and mudstone of this formation erode more easily.

Rivers and seasonal streams cut through the flat-lying rocks, forming the canyons, ravines, gullies and hoodoos typical of a badland landscape.