



Meriwether Lewis

Courtesy of Independence National Historical Park



Location Map

# Lewis and Clark in Montana

## Great Falls of the Missouri

*Five magnificent falls in just eight miles*

*Bob Bergantine and Ginette Abdo*



William Clark

Courtesy of Independence National Historical Park

Meriwether Lewis left Clark at the Marias River on June 11, 1805 and set out to find the falls of the Missouri. On June 13, while walking a mile north of that river:

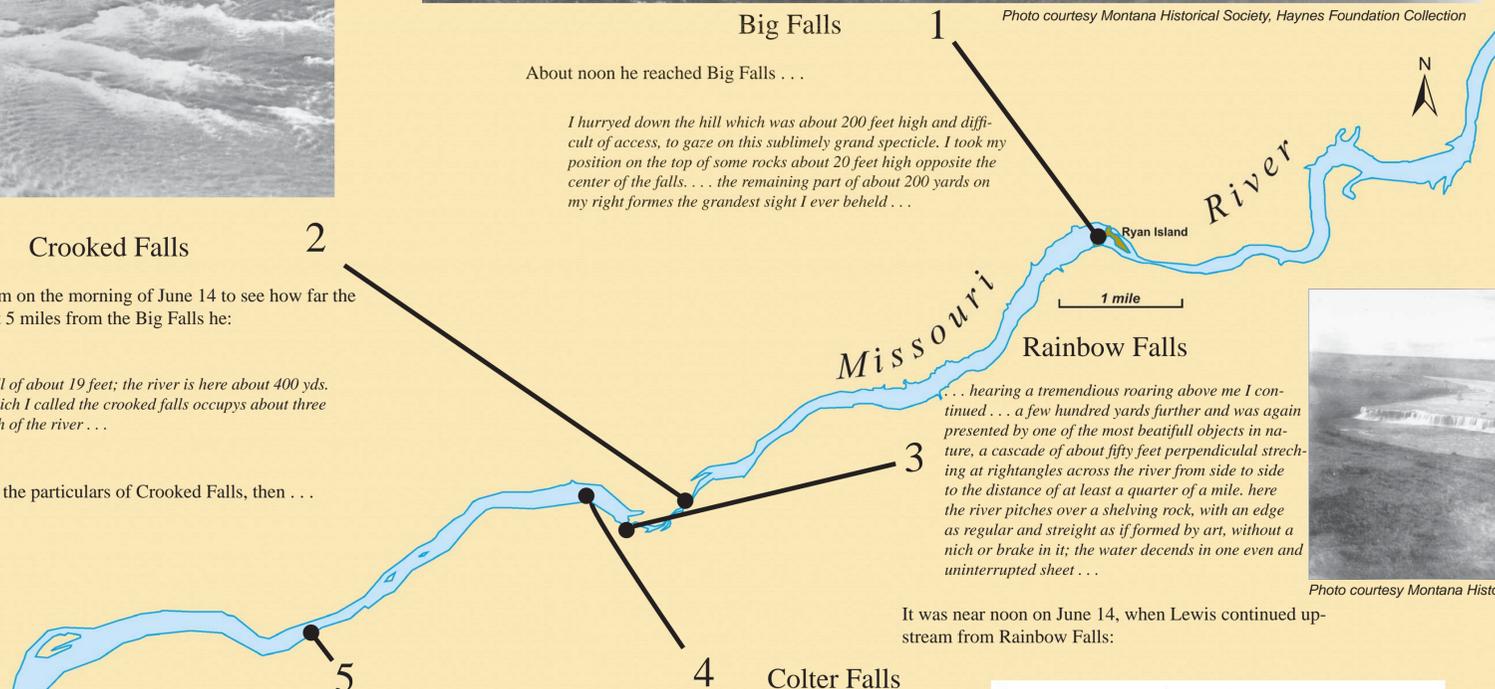
*... my ears were saluted with the agreeable sound of a fall of water and advancing a little further I saw the spray arise above the plain like a column of smoke which would frequently disappear again in an instant ... I did not however loose my direction to this point which soon began to make a roaring too tremendous to be mistaken for any cause short of the great falls of the Missouri.*



Photo courtesy Montana Historical Society



Photo courtesy Montana Historical Society, Haynes Foundation Collection



### Big Falls

About noon he reached Big Falls . . .

*I hurried down the hill which was about 200 feet high and difficult of access, to gaze on this sublimely grand spectacle. I took my position on the top of some rocks about 20 feet high opposite the center of the falls. . . . the remaining part of about 200 yards on my right forms the grandest sight I ever beheld . . .*

### Crooked Falls

Lewis headed upstream on the morning of June 14 to see how far the falls continued. About 5 miles from the Big Falls he:

*... arrived at a fall of about 19 feet; the river is here about 400 yds. wide. this pitch which I called the crooked falls occupies about three fourths of the width of the river . . .*

Lewis carefully noted the particulars of Crooked Falls, then . . .

### Rainbow Falls

*... hearing a tremendous roaring above me I continued . . . a few hundred yards further and was again presented by one of the most beautiful objects in nature, a cascade of about fifty feet perpendicular stretching at rightangles across the river from side to side to the distance of at least a quarter of a mile. here the river pitches over a shelving rock, with an edge as regular and streight as if formed by art, without a nich or brake in it; the water decends in one even and uninterrupted sheet . . .*



Photo courtesy Montana Historical Society

It was near noon on June 14, when Lewis continued upstream from Rainbow Falls:

### Colter Falls

*... I discovered another fall above at the distance of half a mile . . . I found this to be a cascade of about 14 feet possessing a perpendicular pitch of about 6 feet. . . . in any other neighbourhood but this, such a cascade would probably be extoled for it's beaty and magnificence, but here I passed it by with but little attention . . .*

After passing Colter Falls, Lewis:



Photo courtesy Cascade County Historical Society

### Black Eagle Falls

*... arrived at another cataract of 26 feet. this is not immediately perpendicular, a rock about 1/3 of it's decent seems to protrude to a small distance and receives the water in it's passage downwards and gives a curve to the water tho' it falls mostly with a regular and smoth sheet. the river is near six hundred yards wide at this place . . . below this fall at a little distance a beatifull Island well timbered is situated about the middle of the river. in this Island on a Cottonwood tree an Eagle has placed her nest; a more inaccessible spot I believe she could not have found . . .*



Photo courtesy Cascade County Historical Society

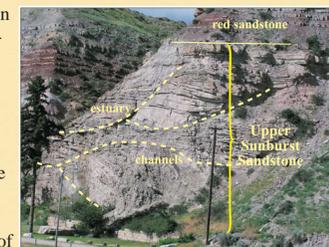
### Creating the Falls

Start with the rocks . . .

Rivers flowing from the west deposited alternating layers of sand, silt, and mud on the coastal plain and shore of a sea that occupied this area during the Early Cretaceous Period. These sediments became the sandstone, siltstone, and mudstone of the middle part of the Kootenai Formation.

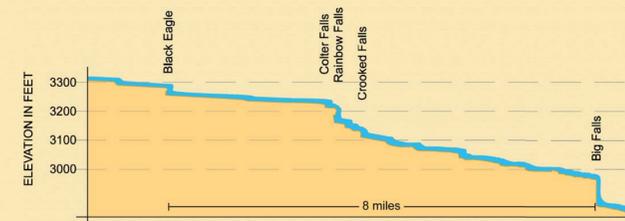
### The Sunburst Sandstone at Big Falls

The Sunburst Sandstone (deposited 120 million years ago) is a resistant sandstone at the base of the middle Kootenai Formation. Deposits typical of tidal channels and estuaries have been identified in these rocks and can be seen north of Ryan Island Park. The height of Big Falls (about 90 feet) is partly due to the thickness of the Sunburst Sandstone there.



Middle Kootenai Formation near Ryan Island Park and Big Falls. Photo courtesy of Robert K. Schwartz.

### Beds overlying the Sunburst—The upper falls



The middle Kootenai Formation rocks that overlie the Sunburst Sandstone are alternating layers of thin sandstone and less resistant siltstone and mudstone. The sediments were deposited in streambeds and interstream areas inland from the shore on a coastal plain or delta plain; they show no evidence of marine conditions. Crooked, Rainbow, Colter, and Black Eagle falls cascade over these rocks.

### Bring on the Glaciers

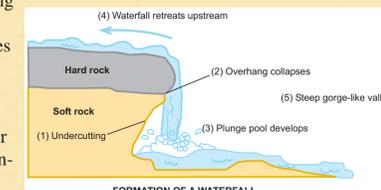
About 15,000 years ago glacial ice advanced just south of Great Falls, burying the Missouri's valley. When the ice retreated, the Missouri River cut a new channel between Sand Coulee Creek and Box Elder Creek (see map at right). Torrents of water began draining through this new channel.



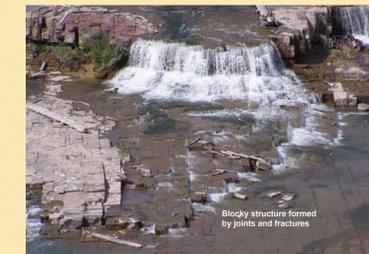
### Post-Glacial Erosion

The Missouri cut its new channel through resistant sandstones interbedded with less resistant siltstone and mudstone. Waterfalls formed as the river flowed over the jointed and fractured rock. Eventually falling water undercuts the more resistant sandstone layers and, as the undercut enlarges, the sandstone collapses along joint surfaces. This process continues and the waterfall moves upstream.

Lewis and Clark might be amazed at how little water sometimes flows over the falls today—five dams control flow along this section of the Missouri.



Layers of maroon-colored mudstone and siltstone in the Kootenai Formation form the Black Eagle Falls. Flowing water cuts into the less resistant beds, undermining the more resistant ones. Photo by Ginette Abdo, MMBG.



The much-reduced flow of water over Black Eagle Falls provides a good view of the layering in the Kootenai Formation and also the blocky structure produced by jointing and fracturing. Water flowing along the joints and fractures contributes to the development of the falls. Photo by Ginette Abdo, MMBG.