

# Ice Age Floods National Geologic Trail



Drumheller Channels (photograph © Tom Foster)

# A TRAIL TO TELL A STORY *of cataclysmic proportions*

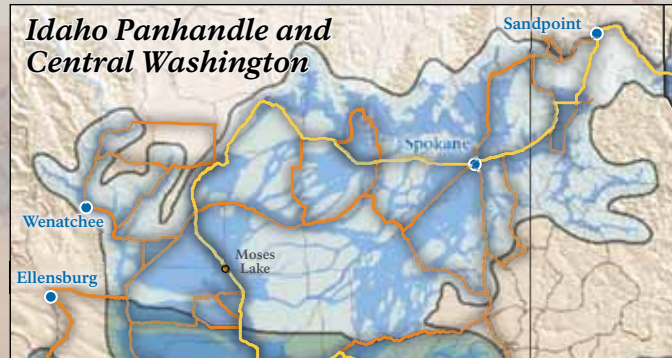
Over the last 2.5 million years, glacial ice sheets periodically blanketed much of the Northern Hemisphere, advancing and retreating in response to climate changes. The Cordilleran Ice Sheet covered much of northwestern North America.

During the last advance, 20,000–18,000 years ago, a lobe of that ice sheet moved south into Idaho. It created an ice dam that blocked the Clark Fork River, causing it to back up far into present-day Montana. This formed the enormous glacial Lake Missoula, up to 3,000 square miles with about 530 cubic miles of water, as big as Great Lakes Ontario and Erie combined.

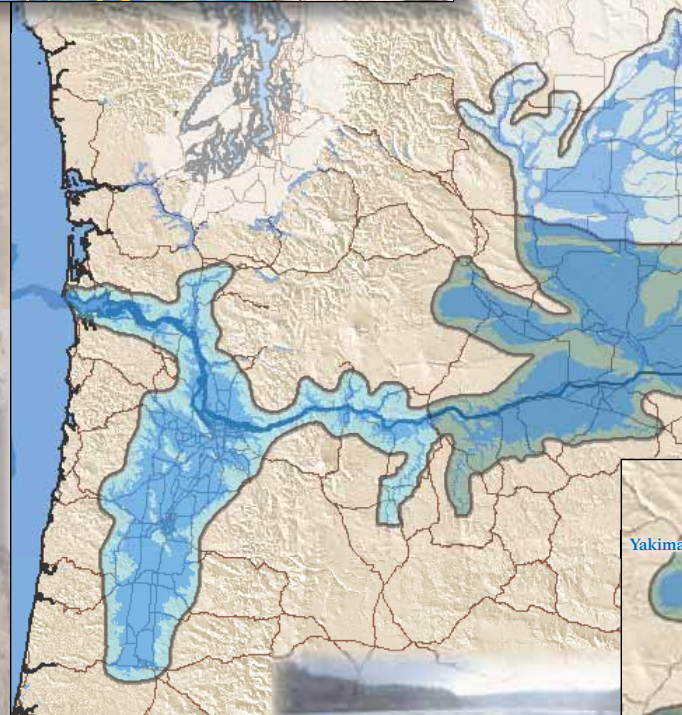
## Catastrophic Events

The ice dam continued to build nearly half a mile high. Then the extreme pressure of glacial Lake Missoula caused it to catastrophically fail, emptying the lake as fast as 20 cubic miles (82 km<sup>3</sup>) per hour, carrying the broken ice dam and debris with it. In a few years the southward-moving ice would once again block the Clark Fork River, and within decades the catastrophe would repeat.

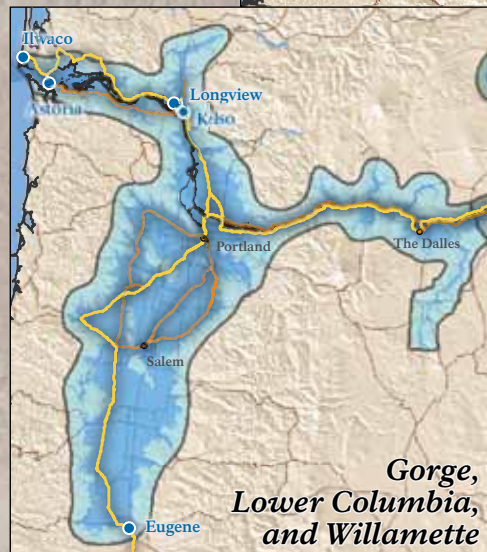
These colossal floods roared across the land at speeds of up to 60 miles per hour, carving the canyons and coulees of the Channeled Scablands of eastern Washington, sculpting and scouring the landscape, picking up 50 cubic miles (205 km<sup>3</sup>) of soil and rock. Much of this material ended up in the Pacific Ocean, but some coated backflooded valleys along the way, providing the rich soils for agricultural regions such as the Yakima, Walla Walla, and Willamette Valleys.



Dry Falls State Park, Washington








Yakima



Willamette Falls, Oregon

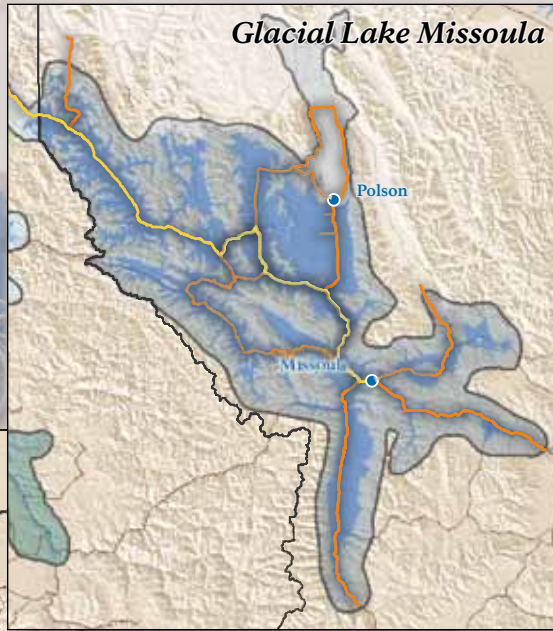
### Ice Age Floods Pathway Tour Routes

-  Flood Zone
-  Study Zones
-  Connecting Pathways
-  Loop & Spur Pathways
-  Gateway Communities

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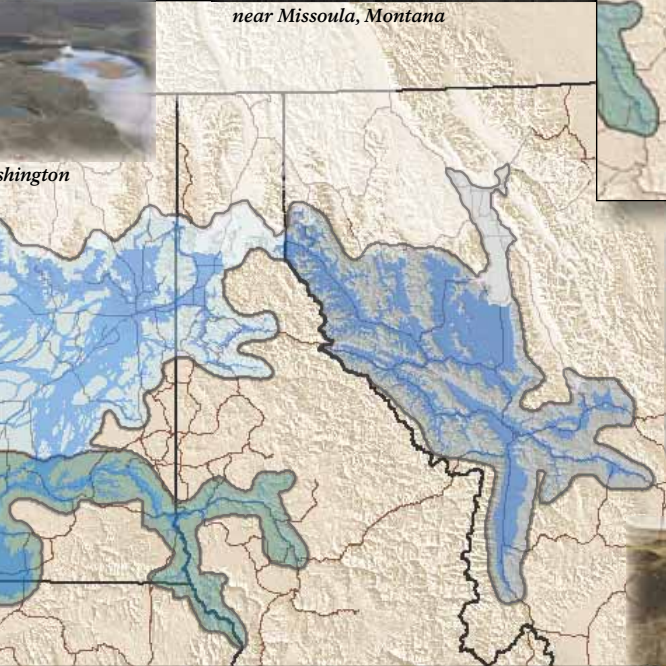
near Missoula, Montana



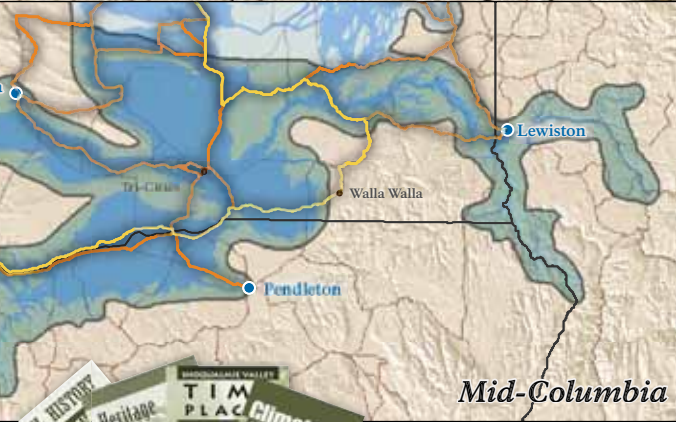
Lake Pend Oreille, Idaho

“Of the nearly 100 floods produced, we find evidence for only 40 being large enough to reach the Portland area, occurring over a period of 15,000–18,000 years ago. We also have evidence throughout the Pacific Northwest of earlier cataclysmic floods occurring as well.”

—Scott Burns, Professor of Geology, Portland State University



Camas Prairie, Montana  
photo © Tom Foster



Mid-Columbia



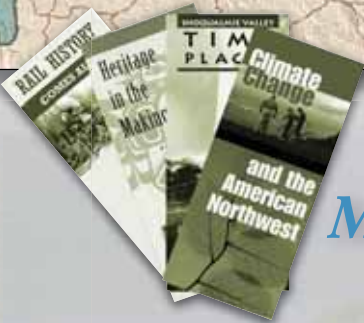
Palouse Falls State Park, Washington  
photo © Tom Foster

J. Harlen Bretz



*This is our opportunity to launch a cooperative effort to educate the public about the Floods, to enrich*

*existing cultural tourism programs in Montana, Idaho, Washington, and Oregon, and to foster a better understanding and appreciation of the extraordinary landscape carved by the greatest documented floods on earth.*



# Ice Age Floods National Geologic Trail Benefits

## Economic Development

National Park visitors spent **\$11.79 billion** in local gateway communities (from 2007 NPS Economic Analysis).

National Parks yielded a total impact, including direct and secondary effects, of **209,000 jobs**, **\$4.5 billion in labor income**, and **\$7 billion** valued added.

The Ice Age Floods National Geologic Trail includes **13 gateway cities** across four western states—Idaho, Montana, Oregon, and Washington.

The route of the Trail will traverse at least **51 towns and cities in four states**, many of them rural and economically distressed.

The **population** within the region traversed by the Trail is **nearly 5 million**.

For many distressed rural towns within the Ice Age Floods Geologic Region, **visitor spending** drives the majority of economic development activity.

The Trail offers a compelling choice for the **55 million US geo-tourists** who represent more than half of the household income of all US Travelers (2002 Study by *National Geographic Traveler Magazine* & US Travel Association).



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## Science Education

**Unusual landscape features** from the Ice Age Floods phenomenon provide an exciting framework for engaging the public in **environmental science education** on existing public lands.

The Trail provides a great **learning experience** highlighting the dramatic **effects of past climate change events**.

Integration of this unique geologic story into science curricula offers exciting **experiential learning** for **students of all ages**.

The Trail will allow **1.3 million kids** under the age of 18 who live in the Floods area to reconnect and **explore their personal connection with the natural world** (2000 US Census).

## Recreation

Ice Age Floods features are of such **massive scale** that fully seeing and understanding them is best accomplished by auto/bus tours, walking or hiking to scenic vistas, biking, kayaking, rock-climbing, and even flying.

Dozens of existing natural and cultural history **museums** along the Trail will benefit from **new exhibits** interpreting the Ice Age Floods and will give visitors the necessary overview to better understand the **local features**.

