



Spokane Falls  
Daniel Lewis

## Cheney-Spokane Chapter SPOKANE, WASHINGTON

The Cheney-Spokane Chapter is part of the Ice Age Floods Institute, a non-profit organization dedicated to the study of the geologic events that sculpted the Pacific NW region and to promoting public education of the unique geologic wonders of the surrounding area. The Institute and its local chapters work closely with the National Park Service to interpret the history and significance of the Ice Age Floods National Geologic Trail to the general public.

The City of Spokane, Washington, is the gateway to the world-famous Channeled Scabland, an area sculpted by immense Ice Age floods derived from repeated catastrophic ice dam failures in northern Idaho. Those dam failures released hundreds of cubic miles of water from Glacial Lake Missoula and sent huge volumes of water through the Spokane Valley and across eastern Washington. The Cheney-Palouse Scabland Tract extends from Cheney to the Snake River near Washtucna, Washington.

The Cheney-Spokane Chapter sponsors public presentations, field trips, guidebooks, and displays. Contact us at <https://IAFI.org/Cheney-Spokane>



Key resources for understanding the impacts of the Ice Age Floods:  
**On the Trail of the Ice Age Floods**  
by Bruce Bjornstad and Eugene Kiver  
Keokee Co. Publishing, Inc.



Craig Goodwin

### FOLLOWING THE PATHWAY

*During the last glacial cycle of the Ice Age, some 80,000 to 14,000 years ago, massive floods repeatedly carved many of the distinguishing features of the Northwest's unique landscape.*

*This is your local guide to dramatic evidence of these historic floods, from spectacular canyons and cliffs to waterfalls and vast, flood-eroded scablands, that can be witnessed with a short road trip.*

*It is our hope that you will use this guide to explore the fascinating geological flood features in our region and want to learn more about the dramatic story of Ice Age Floods.*

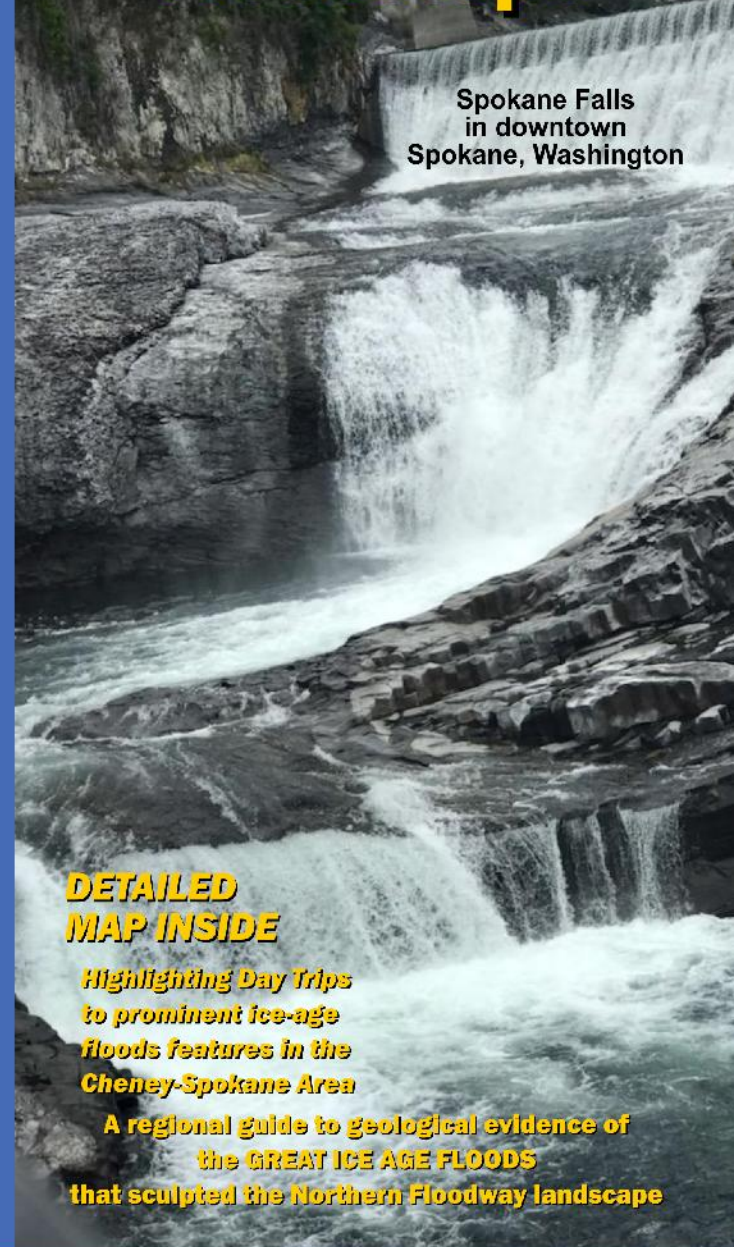
### OF THE GREAT FLOODS



Learn MORE at [IAFI.org](http://IAFI.org) or [facebook.com/IceAgeFloods/](https://facebook.com/IceAgeFloods/)

## A GUIDE TO ICE AGE FLOODS IN THE NORTHERN FLOODWAY

# Our Cataclysmic Floodscape



Spokane Falls  
in downtown  
Spokane, Washington

### DETAILED MAP INSIDE

Highlighting Day Trips to prominent ice-age floods features in the Cheney-Spokane Area

A regional guide to geological evidence of the GREAT ICE AGE FLOODS that sculpted the Northern Floodway landscape



# Interesting Flood Facts!

Glacial ice dams over 2000 feet thick and several miles wide blocked the Clark Fork River and impounded over 500 cubic miles of water in Glacial Lake Missoula, as much as Great Lakes Erie and Ontario combined.

When the glacial ice dams collapsed, the released floodwaters surged away at a rate greater than 10 times that of all the rivers in the world combined.

Floodwaters hundreds of feet deep roared down the Rathdrum Prairie into the Spokane Valley and often into Glacial Lake Columbia, a giant lake formed when the Okanogan glacier dammed the Columbia River near the present Grand Coulee Dam.

Floodwaters overflowed the Spokane Valley onto the West Plains and headed south through the Cheney area, cutting a wide swath of distinctive eroded topography called "Cheney-Palouse Scabland Tract".

Floodwaters stripped away much of the thick silty Palouse soil covering the area, and locally dug deeply into the underlying basalt layers, creating basalt buttes, plateaus, and closed wetland basins.

Floodwaters tens to hundreds of feet deep raced southward for about 70 miles before spilling over the Palouse Falls area and into the Snake River.

## The Story of the Great Ice Age Floods

During the peak of the last Ice Age, a vast Cordilleran continental ice sheet covered southwestern Canada and the northern parts of Washington, Idaho and Montana. An eastern Purcell lobe of the ice sheet descended into the Idaho panhandle, blocking the Clark Fork River with an ice dam thousands of feet thick.

Water rising behind the dam flooded the valleys of Montana creating Glacial Lake Missoula – a great inland lake stretching over 200 miles to the east with a volume of water greater than Lake Erie and Lake Ontario combined.

The rising lake waters periodically caused the ice dam to fail, resulting in sudden, cataclysmic floods that rushed across northern Idaho and the Channeled Scablands of eastern and central Washington, through the Columbia River Gorge, and into Oregon's Willamette Valley, before emptying into the Pacific Ocean at the ancient mouth of the Columbia River. Glacial Lake Missoula would have drained in just a few days as a volume of floodwaters greater than all the rivers of the world combined roared across the landscape at up to 60+ mph.

Now imagine this happening not once but dozens, perhaps even hundreds of times as the advancing continental glacier built a new ice dam!

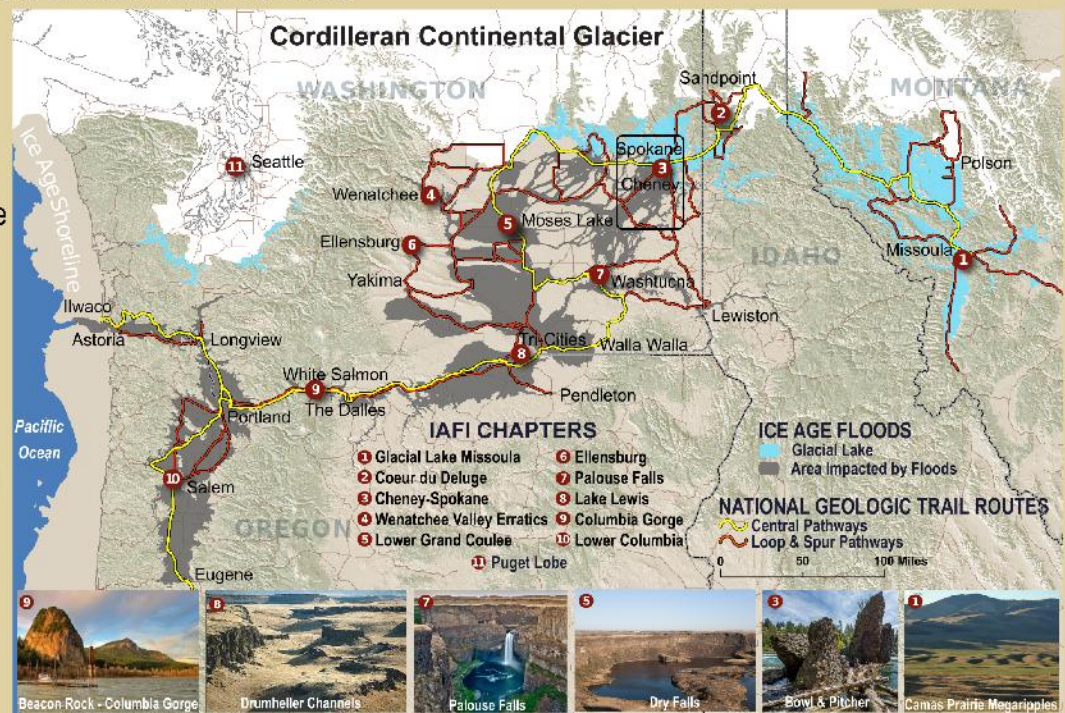


## Ice Age Floods National Geologic Trail

Since the 1990's the Ice Age Floods Institute (IAFI) has worked to create and to build support for the Ice Age Floods National Geologic Trail.

The Ice Age Floods National Geologic Trail is essentially a network of marked touring routes extending across parts of Montana, Idaho, Washington, and Oregon, with several special interpretive centers located across the region. Many interested parties are being brought together in a collaborative and effective interpretive program at a remarkably low cost, despite the extraordinary size of the region.

The Trail is being developed under the National Park Service on existing public lands, with no changes in jurisdiction and no threats to private property rights. The role of the National Park Service is to coordinate and manage the planning of the project and the telling of the story, without taking custodianship of public and private lands.



# Explore Ice Age Floods Features in the Cheney-Spokane Area

Discover why our region is like nowhere else. Jump into the Ice Age Floods story with a **DRIVE/HIKE/LEARN** day tour

## 1 Bowl & Pitcher Riverside State Park, Spokane



**SHORT DRIVE/ SHORT HIKE**  
1 hr R/T hike to Spokane River footbridge

The **Bowl and Pitcher** is a rock formation along the Spokane River several miles west of downtown Spokane. The "Bowl" is a circular depression in the Spokane River and the "Pitcher" is a detached block of highly fractured basalt with a distinctive shape.

No other area within the Spokane River valley has a more diverse geology in a single spot than this. Cliffs of basalt on the west side of the river give way to a geologic fault, now hidden by a scree slope and large slide blocks of basalt in and along the river shores.

The upper columnar and pillow basalt exposed in the high cliff that was dropped to river level by the Latah Fault can best be viewed in late summer when the water is low. The Spokane River incised through the northern basalt plateau over millions of years.

During the last Ice Age, glacial Lake Columbia occupied all of the Spokane River drainage basin up to 2400 foot elevation when great outburst megafloods from glacial Lake Missoula filled the area with sand derived from the bed of Lake Pend Oreille.

The Spokane River began to incise and incrementally remove this sand fill as glacial Lake Columbia surface levels dropped in response to headward erosion at the junction of the Grand Coulee and the Columbia River, until it emptied completely with the melting of the Okanogan Ice Lobe. The granite boulder terraces on the east and the basalt benches on the west side of the Spokane River give mute testimony to this river's ever dropping levels during the end of the last Ice Age.

The Bowl and Pitcher can also be reached from the west side by following a paved road northward from the parking lot on a prominent basalt bench and back south along a dirt trail to the foot bridge.

Find an interactive map and additional details online about these and other Ice Age features at <https://iafi.org/floodscapes/>



## 2 Fish Lake Columbia Plateau Trail State Park

**SHORT DRIVE/HIKE**  
5 mi. from Cheney  
27 mi. from Spokane



**Fish Lake** lies along the Columbia Plateau Trail State Park which follows the Missoula Floods path for 120 miles from Spokane in the north to the Snake River to the south. A wealth of flood and geologic feature examples of the spectacular and unusual topography produced by the Ice Age megafloods are located and well exposed along the amazing rails-to-trails pathway that is the former path of the Spokane-Portland-Seattle Railroad.

Missoula floodwaters overwhelmed the Rathdrum-Spokane valleys and found numerous outlets across eastern Washington at a number of locations. One path led into Hangman Valley and southward up the Marshall and Minnie Creek Valleys, joining forces with other flood channels near Cheney. Floodwater ripped through a narrow gap in the shoulder of the resistant rock steptoe that makes up Prosser Hill across the lake and just east of Cheney. A recessional cataract or perhaps a pair of powerful whirlpools drilled into the bedrock to form two plunge pools or deep basins separated by a shallow bedrock ridge. Following the Ice Age, water in Minnie and Marshall Creeks again returned to their pre-glacial paths eventually draining northward into Hangman Creek.

Fish Lake can be accessed from the Cheney or Fish Lake trailheads by hikers, bikers, and other non-motorized users.

### Local Geologic and Geomorphic Terms

**Scablands** - flat land deeply scarred by fluvial channels, with poor soil and little vegetation.

**Recessional Cataract** - a waterfall that migrates upstream by headward erosion as material is torn from its face by the plunging water.

**Plunge Pool**: rock basin created at the base of a waterfall.

**Steptoe**: an isolated hill or mountain surrounded by lava

**Loess**: glacier-ground and wind-deposited silty sediment.

**Scree**: broken rock fragments accumulated through periodic rockfall from adjacent cliff faces.

## 3 Cheney Scabland Vista E. Washington Univ. Water Tower



**SHORT DRIVE/HIKE - in Cheney**  
30 minutes with hike to viewpoint

**Water Tower Scabland Vista** is easily accessible from parking lot P12 on the Eastern Washington University campus. On a clear day a commanding view overlooking part of the Cheney Palouse Scabland Tract and other landmarks is visible.

The water tower is located on the eastern edge of a large loess island semi protected from floodwaters by the steptoe ridge to the north. Floodwater sliced through the edge of the loess island isolating and streamlining water tower hill. The hill was overrun by floodwaters up to the eagle insignia painted on the large water tower! Several tens of feet of loess here overlie the basalt lava exposed in the rugged scabland below.

To the north local steptoes (hill or mountain tops of older rocks surrounded but not overlain by lava) formed a resistant topographic barrier to floodwaters racing south from the Spokane Valley. Water flowing between two steptoes was funneled into the Four Lakes-Cheney flood channel that directed water through the Cheney area. Here it joined with an even larger flood channel.

To the south of the water tower the combined flow raced through Turnbull Wildlife Refuge located in the forested scabland area below. Beyond on the horizon is Steptoe Butte 34 miles to the southeast.

## 4 Turnbull Natl. Wildlife Refuge Wetlands and Scablands



**SHORT DRIVE - 13 mi.**  
**Cheney to Refuge.**  
Allow 2-5 hours for hiking



**Turnbull National Wildlife Refuge** protects over 16,000 acres of Channeled Scabland landscape that displays butte and basin topography. A significant part of the Missoula floodwater in the Cheney-Palouse Scabland Tract was concentrated in a broad 10-mile-wide area between a ridge of steptoes north of Cheney and the loess or Palouse Hills near the town of Spangle to the east. Turbulent floodwaters over 250 feet deep scoured hundreds of basins in the basalt bedrock that now contain the most extensive wetland in the Channeled Scabland.

A thin post-flood loess (wind-deposited silt-size sediment) enables a variety of plants and animals including elk and moose to prosper in the Refuge and surrounding areas.

A 5.4 mile auto/bike/hike road provides access to a number of trails, marshes and ponds. Other trails up to 6-miles-long are also available. A one-mile paved loop trail by Pine Lakes is wheelchair accessible.

Enigmatic silt mounds called Mima mounds as much as 30 feet in diameter are present near Kepple Lake and other Refuge areas. These may be wind caused but general agreement on origin is lacking.

## 5 Williams Lake Dry Falls and Plunge Pool



**MODERATE DRIVE/SHORT HIKE**  
**ROUNDTRIP 27 mi. from Cheney**  
Allow 2 hours with short hike to dry falls rim

The deep canyon containing **Williams Lake** to the south and Badger Lake to the north is in a flood channel cut into the 30-mile-wide Cheney-Palouse Scabland Tract. Local deepening by floodwater created a series of cataracts that receded upstream leaving vertical canyon walls in their wake. When one of the last cataracts migrated to the head of Williams Lake, it divided into a lower and an upper falls. The upper falls is dramatically displayed from the natural area city park along the rim of the dry falls. The marshy area below is part of the plunge pool basin that developed at the foot of the falls. Williams Lake Dry Falls and Plunge Pool Park is one of only a few areas with these features easily accessible from a public road.

West of the lake is a loess-covered basalt ridge separating the Amber and Williams Lakes Channels. Floodwaters during repetitive floods removed both basalt and loess and narrowed the mid-channel divide. Cross channels on the divide indicate that floodwaters here were at least 400 feet deep! Water velocities likely exceeded 50 mph. A volcanic ash in a sediment core taken from the plunge pool indicates that the last Missoula Flood occurred 14,000 to 15,000 years ago, prior to the 13,500 year before present eruption of Glacier Peak in the North Cascades.

