Lower Columbia Chapter
NW Oregon and SW Washington

The Lower Columbia Chapter of the Ice Age Floods Institute is dedicated to the study of natural prehistoric events that shaped this region, and education of the public to the geological wonders that surround us. The Lower Columbia Chapter spans from the west end of the Columbia River Gorge down the Willamette Valley to Eugene, up through Clark Co., Washington and out to sea at the mouth of Columbia River.

When the Ice Age Floods, coming from Glacial Lakes Missoula and Columbia, entered the Portland Basin from the Columbia River Gorge, they were so vast they could not drain quickly enough through Kalamo Gap, so they backflooded the Tuunian, Yamhill, Clackamas and Willamette Valleys to the 400 foot elevation. These floodwaters created flood channels, traveled up to 11 miles long, and 330 feet high, and left behind huge erratic boulders carried encased in icebergs from the Canadian border area. But they also brought rich Palouse loam soils from eastern Washington to the region where stored in the Willamette Valley. These fertile loams later became a focal point of the Oregon Trail migration.

The Lower Columbia Chapter has forged an excellent relationship with the City of Troutdale, which has sponsored the chapter as an Ice Age destination, and the Troutdale Historical Society whose Heritage Center we use for monthly meetings. We sponsor guest speakers at meetings and host an annual field trip within our chapter's region.

FOLLOWING THE PATHWAY
During the last glacial cycle of the ice-age some 80,000 to 14,000 years ago, continental glaciers and repeated massive floods carved many of the unique distinguishing features of the Northwest's interior landscape.

This is your local guide to dramatic evidence of those cataclysmic forces, 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 these fascinating geological features in our region and will want to learn more about the dramatic ice-age story of glaciers and floods.

OF THE GREAT FLOODS

The Story of the Great Ice Age Floods

During the peak of the last Ice Age, a vast Cordilleran continental ice sheet covered southernmost Canada and the north parts of Washington, Idaho and Montana. An eastern Parshall lake of the ice sheet disconected into the Idaho parshall, 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 80+ mph.

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

The ice dam that blocked the Clark Fork River and formed Glacial Lake Missoula was over 3,000 feet thick.

Glacial Lake Missoula was as big in volume as Lakes Erie and Ontario combined.

When the ice dam broke the floodwaters ran at a rate greater than 10 times the flow rate of all today’s rivers in the world combined.

The floodwaters filled the Columbia River Gorge, spilling over the top and eroding side channels in several places, creating the cliffs and the highest density of waterfalls in the country.

Huge boulders embedded in icebergs floated hundreds of miles in the floodwaters before running aground. These erratic, are scattered across our landscape and still visible today.

A downstream constriction in the floods path at Kalamo caused the floodwaters to back up, creating and filling temporary Lake Allison in the Willamette Valley, to an elevation of 400’, and placing Portland under 370’ of water.

Lacamas Lake and Lake Osoego were gouged out by the in-rushing floodwaters.

The floodwaters carried rich Palouse loess (rock flour) topsoil from central Washington that settled out and decomposed up to 300 feet thick in temporary Lake Allison and now comprise the fertile soils of the Willamette Valley.

Interesting Facts!

The ice dam that blocked the Clark Fork River and formed Glacial Lake Missoula was over 3,000 feet thick.

Glacial Lake Missoula was as big in volume as Lakes Erie and Ontario combined.

When the ice dam broke the floodwaters ran at a rate greater than 10 times the flow rate of all today’s rivers in the world combined.

The floodwaters filled the Columbia River Gorge, spilling over the top and eroding side channels in several places, creating the cliffs and the highest density of waterfalls in the country.

Huge boulders embedded in icebergs floated hundreds of miles in the floodwaters before running aground. These erratic, are scattered across our landscape and still visible today.

A downstream constriction in the floods path at Kalamo caused the floodwaters to back up, creating and filling temporary Lake Allison in the Willamette Valley, to an elevation of 400’, and placing Portland under 370’ of water.

Lacamas Lake and Lake Osoego were gouged out by the in-rushing floodwaters.

The floodwaters carried rich Palouse loess (rock flour) topsoil from central Washington that settled out and decomposed up to 300 feet thick in temporary Lake Allison and now comprise the fertile soils of the Willamette Valley.

Ice Age Floods National Geologic Trail

Since the 1980’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.

Cordilleran Continental Glacier

Lower Columbia Chapter
NW Oregon and SW Washington

The Lower Columbia Chapter of the Ice Age Floods Institute is dedicated to the study of natural prehistoric events that shaped this region, and education of the public to the geological wonders that surround us. The Lower Columbia Chapter spans from the west end of the Columbia River Gorge down the Willamette Valley to Eugene, up through Clark Co., Washington and out to sea at the mouth of Columbia River.

When the Ice Age Floods, coming from Glacial Lakes Missoula and Columbia, entered the Portland Basin from the Columbia River Gorge, they were so vast they could not drain quickly enough through Kalamo Gap, so they backflooded the Tuunian, Yamhill, Clackamas and Willamette Valleys to the 400 foot elevation. These floodwaters created flood channels, traveled up to 11 miles long, and 330 feet high, and left behind huge erratic boulders carried encased in icebergs from the Canadian border area. But they also brought rich Palouse loam soils from eastern Washington to the region where stored in the Willamette Valley. These fertile loams later became a focal point of the Oregon Trail migration.

The Lower Columbia Chapter has forged an excellent relationship with the City of Troutdale, which has sponsored the chapter as an Ice Age destination, and the Troutdale Historical Society whose Heritage Center we use for monthly meetings. We sponsor guest speakers at meetings and host an annual field trip within our chapter’s region.

FOLLOWING THE PATHWAY
During the last glacial cycle of the ice-age some 80,000 to 14,000 years ago, continental glaciers and repeated massive floods carved many of the unique distinguishing features of the Northwest's interior landscape.

This is your local guide to dramatic evidence of those cataclysmic forces, 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 these fascinating geological features in our region and will want to learn more about the dramatic ice-age story of glaciers and floods.

OF THE GREAT FLOODS

The Story of the Great Ice Age Floods

During the peak of the last Ice Age, a vast Cordilleran continental ice sheet covered southernmost Canada and the north parts of Washington, Idaho and Montana. An eastern Parshall lake of the ice sheet disconected into the Idaho parshall, 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 80+ mph.

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

The ice dam that blocked the Clark Fork River and formed Glacial Lake Missoula was over 3,000 feet thick.

Glacial Lake Missoula was as big in volume as Lakes Erie and Ontario combined.

When the ice dam broke the floodwaters ran at a rate greater than 10 times the flow rate of all today’s rivers in the world combined.

The floodwaters filled the Columbia River Gorge, spilling over the top and eroding side channels in several places, creating the cliffs and the highest density of waterfalls in the country.

Huge boulders embedded in icebergs floated hundreds of miles in the floodwaters before running aground. These erratic, are scattered across our landscape and still visible today.

A downstream constriction in the floods path at Kalamo caused the floodwaters to backup, creating and filling temporary Lake Allison in the Willamette Valley, to an elevation of 400’, and placing Portland under 370’ of water.

Lacamas Lake and Lake Osoego were gouged out by the in-rushing floodwaters.

The floodwaters carried rich Palouse loess (rock flour) topsoil from central Washington that settled out and decomposed up to 300 feet thick in temporary Lake Allison and now comprise the fertile soils of the Willamette Valley.

Interesting Facts!

The ice dam that blocked the Clark Fork River and formed Glacial Lake Missoula was over 3,000 feet thick.

Glacial Lake Missoula was as big in volume as Lakes Erie and Ontario combined.

When the ice dam broke the floodwaters ran at a rate greater than 10 times the flow rate of all today’s rivers in the world combined.

The floodwaters filled the Columbia River Gorge, spilling over the top and eroding side channels in several places, creating the cliffs and the highest density of waterfalls in the country.

Huge boulders embedded in icebergs floated hundreds of miles in the floodwaters before running aground. These erratic, are scattered across our landscape and still visible today.

A downstream constriction in the floods path at Kalamo caused the floodwaters to backup, creating and filling temporary Lake Allison in the Willamette Valley, to an elevation of 400’, and placing Portland under 370’ of water.

Lacamas Lake and Lake Osoego were gouged out by the in-rushing floodwaters.

The floodwaters carried rich Palouse loess (rock flour) topsoil from central Washington that settled out and decomposed up to 300 feet thick in temporary Lake Allison and now comprise the fertile soils of the Willamette Valley.
**1. Tualatin, Oregon**
Flood Channels, Iceberg Erratics, Kolp Ponds, Ice Age Fossils

**2. Fields Bridge Park**
West Linn
Williamette Meteorite

**3. Willamette Falls**
Oregon City and West Linn

**4. Bellevue Erratic**
Erratic Rock State Natural Site

**5. Museum of Natural and Cultural History**
University of Oregon
Eugene

**SHORT DRIVE**

Tualatin, Oregon sits at the crossroads of the Ice Age Floods in the lower Columbia region since both the incoming and outlying waters came through Tualatin. The city has extensive Ice Age features and displays including but not limited to mastodon bones at the library, a life-size mastodon sculpture outside Cabela's, Tualatin Commons designed with artful Ice Age Floods features and displays of erratics, the ArtWalk a self-guided tour of public art and natural history, Tualatin River Greenway Trail. The Tualatin Heritage Center displays two huge erratic rocks and Ice Age fossils. The park is designed with play features based on the Ice Age Floods.

**SHORT DRIVE/SHORT HIKE**

Six miles west of McMinnville just off of Hwy. 18 sits a 90-ton rock that was floated as much as 500 miles in an iceberg by way of the Columbia River during the Ice Age Floods and is the largest iceberg erratic found in the Willamette Valley. Corning originally from the Northern Rocky Mountains, when the iceberg in which it was encased melted, the rock was left behind at the 300-foot elevation level. A short uphill hike leads visitors to the Erratic Rock State Natural Site where they can look out across the vast landscape and imagine the huge amount of water that filled the Willamette Valley during the Ice Age Floods. The discovery that erratic rocks were found at or below the 400-foot elevation in the Willamette Valley indicated that the water inundated this region from Portland down to Eugene up to 400 feet above present day sea level.

**SHORT DRIVE/SHORT HIKE**

Fields Bridge Park is a 2.1/2-hour mile nature walk along the Tualatin River with three kiosks and eight interpretive panels dedicated to telling the story of the Ice Age Floods. It is located just two miles from the discovery site of the Willamette Meteorite, which is thought to have been transported to the area in an iceberg during the Ice Age Floods.

**SHORT DRIVE/SHORT HIKE**

The Willamette Meteorite is the largest found in the United States and sixth largest in the world. Displayed at the 1902 Lewis & Clark Exposition, the nickel-iron meteorite was then donated to the American Museum of Natural History in New York and now resides in the Hayden Planetarium in New York. Fields Bridge Park is located at 621 Willamette Falls Dr., West Linn, OR, and is ADA accessible with interpretive signage and self-guided tours available.

**SHORT DRIVE/SHORT HIKE**

Willamette Falls is the second largest, by volume, waterfall in the United States. Created as a receding waterfall during the outflow of the Ice Age Floods this falls on the Willamette River drops 50 feet. Designated a National Heritage Area in April of 2015, the falls is an important historic, cultural and industrial site. The trading and fishing spot for Native Americans, the end of the Oregon Trail for the pioneers, and in 1899 the first long distance transmission of electrical power. High on the bluffs above Willamette Falls are scablands eroded by the Ice Age Floods. Camas Quill Nature Preserve on the West Linn side and Canemah Bluff Nature Park on the Oregon City side. These scablands offer nature walks where you can enjoy the unique ecology of the area.