The Lake Lewis Chapter of the Ice Age Floods Institute is named for an enormous, temporary lake that formed in the Pasco Basin when Ice Age floodwaters collected behind a constriction at Wallula Gap, just southeast of the Tri-Cities area. Lake Lewis lasted only three weeks or less before all the flood waters drained through Wallula Gap. However, during its maximum flood stage, Lake Lewis rose up to 800 feet deep over the Tri-Cities area, depositing an immense amount of sediment and forming a lake that was a major contributor to the development of the Yakima and Walla Walla Valleys. The sediments deposited by Lake Lewis formed fertile soil, which continues to contribute to the tremendous agriculture and wine-producing success of the region.

The Lake Lewis Chapter is dedicated to the study of pre-glacial events that sculpted this region and educating the local public about the geological wonders that surround us. We work closely with a large contingent of professional geologists, scientists, and engineers who contribute to technical presentations, field guides, and public displays. We sponsor guest speakers at bi-monthly meetings and offer field trips throughout the year.

To learn more about the amazing story of the floods, or to attend a bi-monthly presentation, visit us at https://www.facebook.com/LakeLewisChapter/ and https://IAFI.org.

The ice dams that blocked the Clark Fork River were over 2,000 feet tall and backed up Glacial Lake Missoula, which was as big as in volume as Lakes Erie and Ontario combined.

The floodwaters flowed at greater than 10 times the combined rate of all current world rivers. As these massive floodwaters tore across eastern Washington they carried away hundreds of feet of fertile "Palouse" soil.

Stacks of flood-deposited "rhythmites" in many locations (like White Bluffs, Cummins Bridge, Badger Coulee and Gardena Terrace) record 40 and possibly up to 100 separate floods.

Palouse sand and silt eroded by floodwaters were deposited in backwaters of Lake Lewis where they now contribute to excellent terroir that produces premium wine grapes.

Icebergs embossed with huge boulders floated hundreds of miles on the floodwaters before running aground and breaking up, scattering those boulders as erratics that are still visible today across our landscape.

Temporary Lake Lewis reached an elevation of 1,250 feet, placing the area of Tri-Cities under 900 feet of water.

The floodwaters filled Wallula Gap, spilling over the surrounding ridge tops and creating cliffs ABOVE the present day 800-foot-high cliffs.
1. **Drumheller Channels**  
**National Natural Landmark**  
**Butte-and-Basin Scabland**

**LONG DRIVE/HIKE**  
120 miles R/T from Pasco  
Allow 5-6 hours with hiking  
(bring food & water)

Drumheller Channels, designated by the National Park Service in 1986 as a National Natural Landmark, are a dramatic example of butte-and-basin topography (powerfully flood-eroded scabland). This 12-mile-wide gash across the eastern Frenchman Hills is characterized by hundreds of isolated, steep-sided hills (buttes) surrounded by a braided network of channels, some of them today occupied by lakes and ponds. Powerful floodwaters scoured this basin sucking up all loose materials, including gigantic basin columns as well as grinding out huge circular potholes. The potholes were literally drilled out of the basin by violent swirling flood vortices. The Channeled Scabland is such an other-worldly landscape, that the National Aeronautics and Space Administration (NASA) has studied it extensively since the 1970s in preparation for Mars exploration. Today the Drumheller Channels present an intricate labyrinth of channelled and streamlined basalt mesas and buttes, revealing some of the best examples of columnar basalt cliff faces anywhere in the world.

2. **White Bluffs**  
**Hanford Reach Ntl. Mnmt.**  
**Flood Rhythmites and Overlook**

**LONG DRIVE/HIKE**  
90 miles R/T from Pasco  
Allow 6 hours with hiking  
(bring food & water)

White Bluffs is the name given to 30 miles of visually stunning cliffs (geologist refer to as an erosional escarpment) running along the last free-flowing stretch of the Columbia River upriver of Richland. The bluffs are ancient river/lake deposits, predating the Ice Age floods, but there is an exception near Locke Island where the cliffs were breached and refilled with much younger flood deposits. This rhythmite-filled paleochannel is nearly as tall as the bluffs themselves and contains 17 distinct slackwater rhythmites, representing 17 separate cataclysmic flood events. Above the rhythmites are some of the best examples of active sand dunes in the region. This geological showcase abounds in shrub-steppe flora and fauna and is one of the most important wildlife and ecological refuges in eastern Washington - under protection since 2000 as the Hanford Reach National Monument.

White Bluffs Overlook offers panoramic views of the flood ravaged Gable Mountain, Gable Mountain flood bar and the Hanford Site.

3. **Erratics/Bergmounds**

**Rattlesnake Mountain**  
**Ice-Rafted Exotic Rocks**

**LONG DRIVE/HIKE**  
70 miles R/T from Pasco  
Allow 6 hours with hiking  
(bring food & water)

Ice-rafted erratics (rocks not native to an area) are common in slackwater areas along the 700 mile route of the Ice Age Floods. A high concentration of erratics and bergmounds (piles of erratic debris) exists at Rattlesnake Slope Wildlife Area midway along the floods’ path. These granite, quartzite, argillite, gneiss, diorite, schist and gabbro boulders stand in stark contrast to dark Columbia River basalt bedrock of the region. These exotic rocks were all plucked from areas to the north by the Cordilleran Ice Sheet, then transported in icebergs by floodwaters from the breakup of ice-dammed glacial lakes.

The floodwaters temporarily backed up behind the constriction at Wallula Gap, forming short-lived Lake Lewis up to 1250 ft elevation. The erratics and bergmounds were dropped here as icebergs grounded and melted. Most ice-rafted debris is concentrated between 600 and 1000 ft, with far fewer erratics and bergmounds above that because there were many less-than-maximum floods, and because larger deep-rooted icebergs grounded further away from Lake Lewis’s shorelines.

4. **Lake Lewis Isles**  
**Badger Mt. Preserve**  
**Skyline Trail (from Dallas Rd. Trailhead)**

**SHORT DRIVE/MODERATE HIKE**  
14 miles R/T from Pasco  
Allow 2-3 hours with hiking

Lake Lewis Isles is the name given to several basalt hills, south and west of the T-Cities, whose peaks rose above the maximum flood level (1,250 feet above mean sea level) of short-lived Lake Lewis, making them temporary islands in a flooded landscape. Icebergs and other floating debris (including mammoth carcasses) drifted into quieter waters and ran aground along the shorelines of these islands, leaving behind boulders of exotic rock types (erratics) from hundreds of miles away. A drive on i-152 west of Richland and a moderate hike along the Skyline Trail of Badger Mountain Centennial Preserve (leaving from the Dallas Road Trailhead) offer spectacular views of the Lake Lewis Isles, lined up like rattle's on the tip of Rattlesnake Mountain's tail. With a sharp eye, hikers can pick out ice-rafted erratics along the trail below an elevation of about 1,100 feet. The large expanse of vineyards attests to the region’s success in producing world-class wine, influenced in large measure by effects of the Ice Age Floods.

5. **Wallula Gap**  
**National Natural Landmark**  
**and Two Sisters Pillars**

**MODERATE DRIVE/SHORT HIKE**  
32 miles R/T from Pasco  
Allow 2.5 hours with a short hike to Two Sisters viewpoints

Wallula Gap is one of the Pacific Northwest’s signature Ice Age floods features. This spectacular canyon, designated by the National Park Service in 1980 as a National Natural Landmark, was originally cut by the Columbia River then dramatically sculpted by the great Ice Age floods. Floodwaters raced southward across the broad Columbia Plateau at speeds up to 65 miles per hour and squeezed through this narrow, mile-wide passageway. Huge volumes of water backed up behind the construction, rising up to 1,250 feet above sea level and forming an enormous, temporary Lake Lewis. Peak Ice Age water flow through the gap has been estimated at ten times the combined flow of all the rivers in the world.

Two Sisters (also referred to as the Twin Sisters) is a local landmark on the east side of Wallula Gap. It is comprised of two closely spaced basalt pillars (two sisters) that are the subject of local Native American folklore. These two erosional remnants owe their present form to the tremendous power of the Ice Age floods.

Additional details on these features and associated road tours and trails are online at https://isaif.org/