

# ICE AGE FLOODS NATIONAL GEOLOGIC TRAIL, WASHINGTON SECTION - EARTH SCIENCE WEEK 2016

## "OUR SHARED GEOHERITAGE"



"Geoheritage is the collection of natural wonders, landforms, and resources that have formed over eons and come to this generation to manage, use, and conserve effectively. Geoheritage locations are valued for many reasons including: scientific, economic, ecological, education, cultural, aesthetic, artistic, and recreational purposes." – *American Geosciences Institute*

The recently designated Ice Age Floods National Geologic Trail, which traverses parts of Montana, Idaho, Washington, and Oregon, is a prime example of our shared geoheritage. Sites along the Ice Age Floods trail highlight multiple geoheritage values and offer an excellent opportunity to connect the public to the natural environment.

## ICE AGE FLOODS NATIONAL GEOLOGIC TRAIL

In 2009, Congress established the Ice Age Floods National Geologic Trail, the first ever national geologic trail. Still in the development stage, the National Park Service is coordinating the planning and development of the trail with public and private landowners, local and tribal governments, the Ice Age Floods Institute, and other interested parties. The trail will consist of an existing network of highways, roads, and footpaths which will offer interpretive opportunities to bring the story of the ice-age floods to visitors.

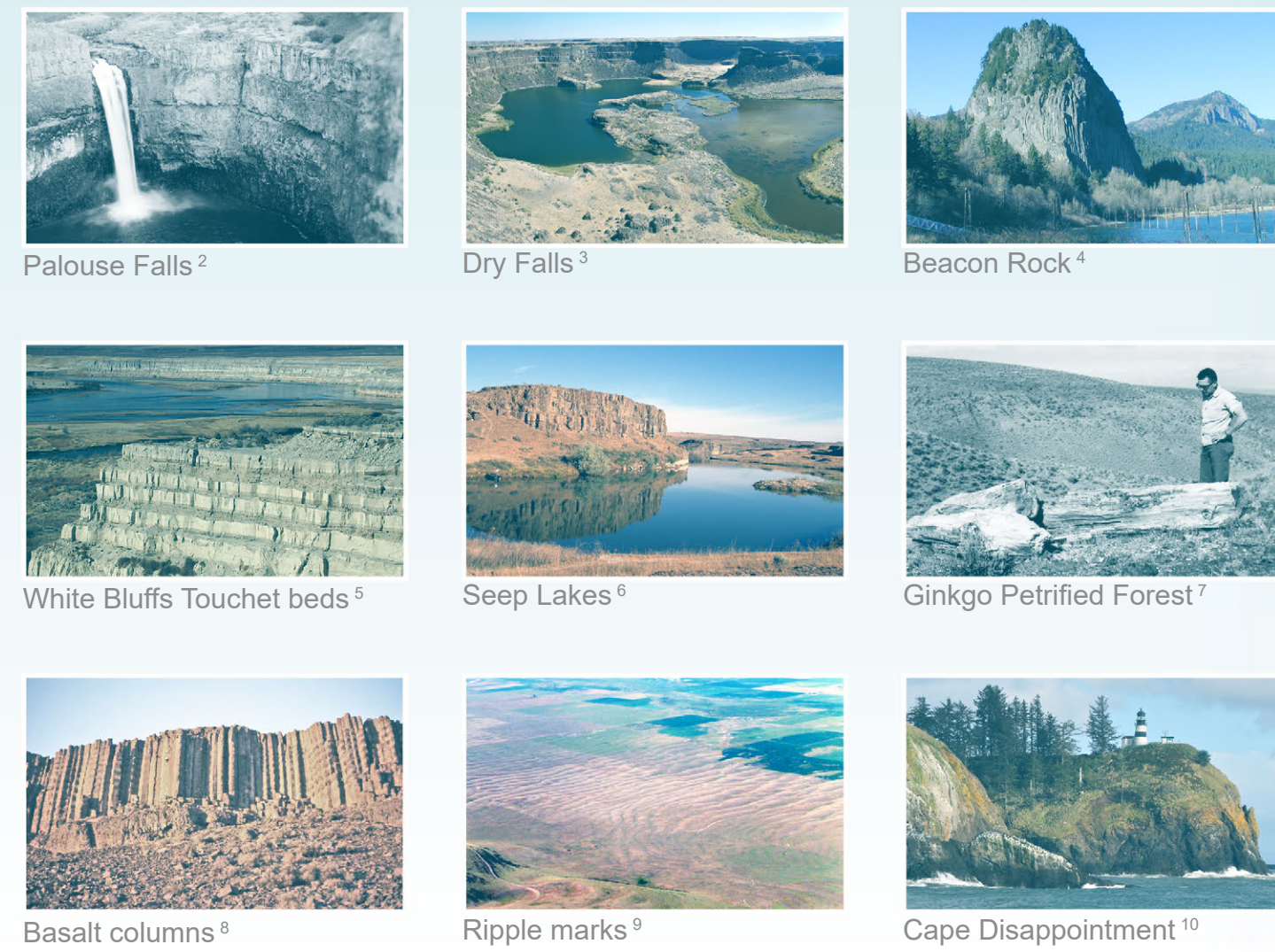
### GEOLOGIC FEATURES

The catastrophic force of the flood waters (see "THE FLOODS" at right) left behind or exposed many different geologic features which can be seen along the trail. Some of these features include:

- **Bedrock features:** colonnades, arches, entablatures
- **Erosional landforms:** scablands, coulees, cataraacts
- **Depositional landforms:** gravel bars, rhythmites, ripple marks
- **Glacial features:** erratics, moraines, kames, eskers, drumlins
- **Wind deposits:** dunes, loess hills
- **Fossils:** petrified wood, mammoth bones

Geologic features can be seen at sites all along the Ice Age Floods National Geologic Trail, including:

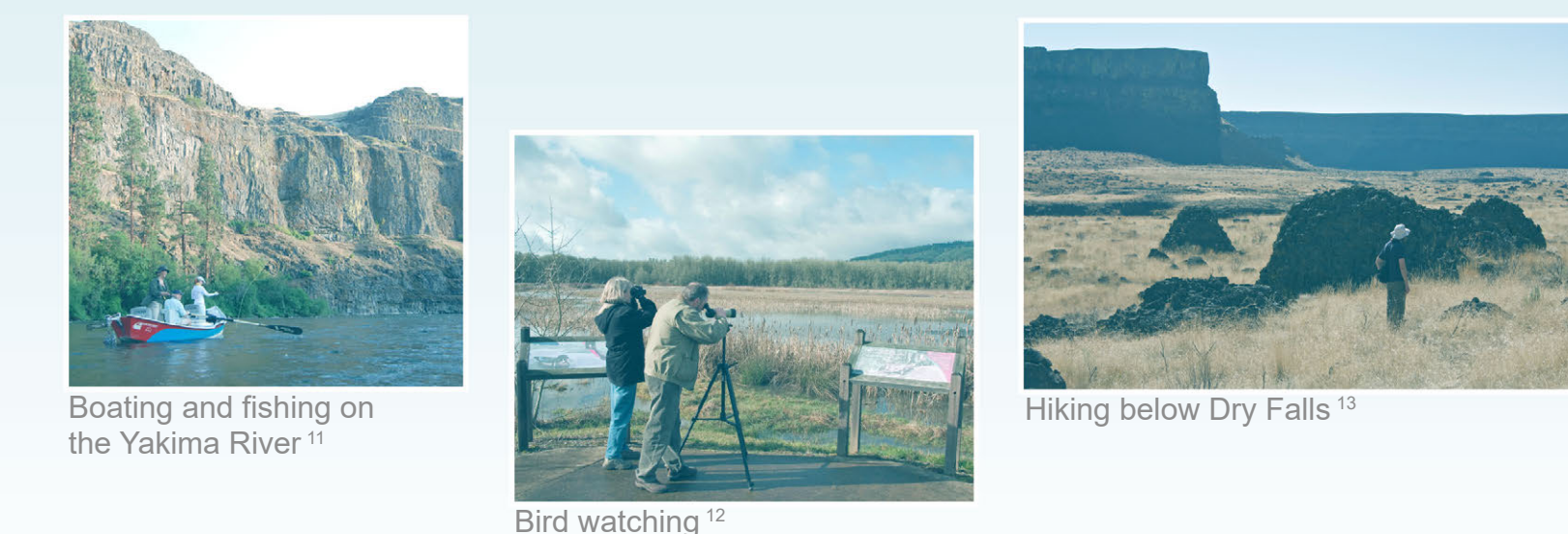
- Palouse Falls State Park
- Steamboat Rock State Park
- Sun Lakes–Dry Falls State Park
- Beacon Rock State Park
- Ginkgo Petrified Forest State Park



### RECREATION

The ice-age floods left behind prime landscapes for recreation. State Parks, wildlife refuges, and other protected land ensures continued availability for public use and wildlife habitat. Visitors can take in the stunning views while hiking, camping, hunting, fishing, rock climbing, boating, bird watching, or wildlife viewing.

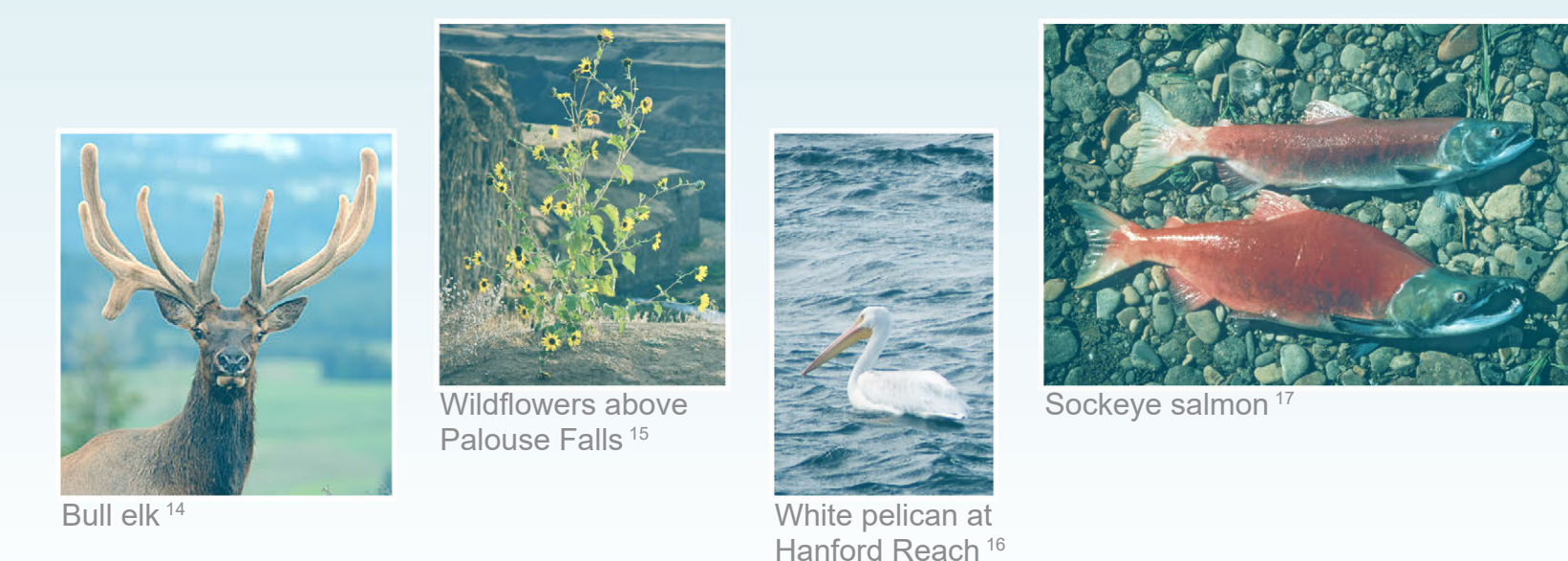
- Places to go:
- Potholes State Park
  - Beacon Rock State Park
  - Lincoln Rock State Park
  - Sun Lakes–Dry Falls State Park
  - Palouse Falls State Park



### ECOLOGY

The shrub steppe ecology found in eastern Washington supports many types of species only found in this type of environment. Flood-scoured basalt formations provide unique habitat for wildlife. The Hanford Reach region on the Columbia River provides habitat for a number of different species including migratory birds, native mammals, and spawning salmon.

- Places to go:
- Turnbull National Wildlife Refuge
  - Bridgeport State Park
  - Yakima Sportsman State Park

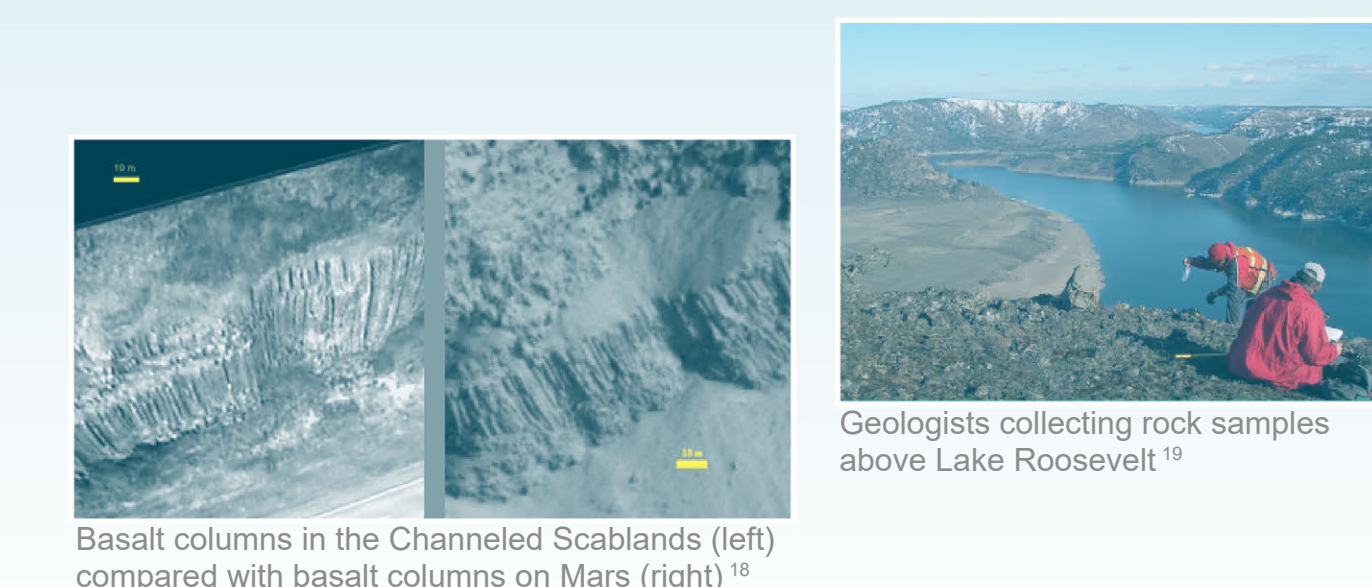


### SCIENCE & RESEARCH

Historical research of the floods has contributed to our understanding of catastrophic processes. Ongoing research has helped us understand the sources of ice-age flood waters, the effects vast amounts of water had on surface topography, and the intervals at which these floods occurred.

Current research on these landscapes is now being conducted by NASA. The channeled scablands closely resemble the surface of Mars, and offer a much closer locality for hands-on study. By studying the catastrophic effects of the water on the basalt landscape of Earth, scientists can correlate these to similar features on Mars.

- Places to go:
- The REACH-Hanford Reach Interpretive Center
  - Ginkgo Petrified Forest State Park



### CULTURE

The unique landscape left by the floods has been used by Native Americans for centuries. Historic campsites, petroglyphs, stone and bone tools, and other relics found along the paths of the floods, help us to better understand these ancestral peoples whose descendants still populate the region.

The terrain left by the floods also influences how present-day Washingtonians use this region. Cultural exhibits at many of the selected sites have more information on the lives and livelihoods of those who call this territory their home.

- Places to go:
- Columbia Hills Historical State Park
  - Lewis & Clark Interpretive Center
  - Fort Spokane Visitor Center



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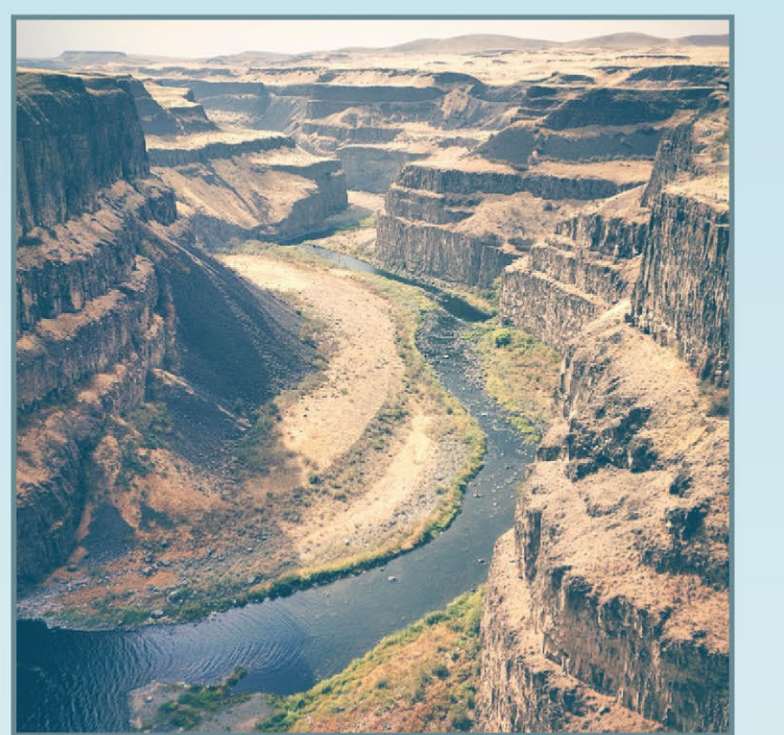
### THE FLOODS

During the last ice age, between 12 and 17,000 years ago, glaciers covered much of northern Washington, Idaho, and Montana. The ice was miles thick in places. Portions of the glaciers repeatedly blocked large river drainages, forming ice dams. Lakes formed behind the ice dams, growing to small inland seas rivaling the size of the Great Lakes.

The largest of these glacial lakes was Glacial Lake Missoula in what is now Montana. The lake was approximately 2,500 feet deep in places and extended over 3,000 square miles. It held as much water as about half of Lake Michigan. When the ice dam burst, all of the water suddenly drained in a matter of days, surging over Idaho, eastern Washington, and Oregon. The vast amount of water moving over a very short period of time carved the deeply scoured terrain that forms much of the dramatic landscape we see today.

In the aftermath of the initial flood, the process of river blockage, ice-dam lake formation, and catastrophic release occurred repeatedly. Evidence suggests that there could have been as many as 100 separate floods at intervals of about every 50 years.

The features it created are colossal. The water plucked giant columns out of the basalt, created smoothed mesas and giant potholes, and formed ripple marks between 15 and 30 feet tall. Collectively, this landscape is called the Channeled Scablands. The floods left behind many other distinctive features, such as, buttes, coulees, and flood bars.

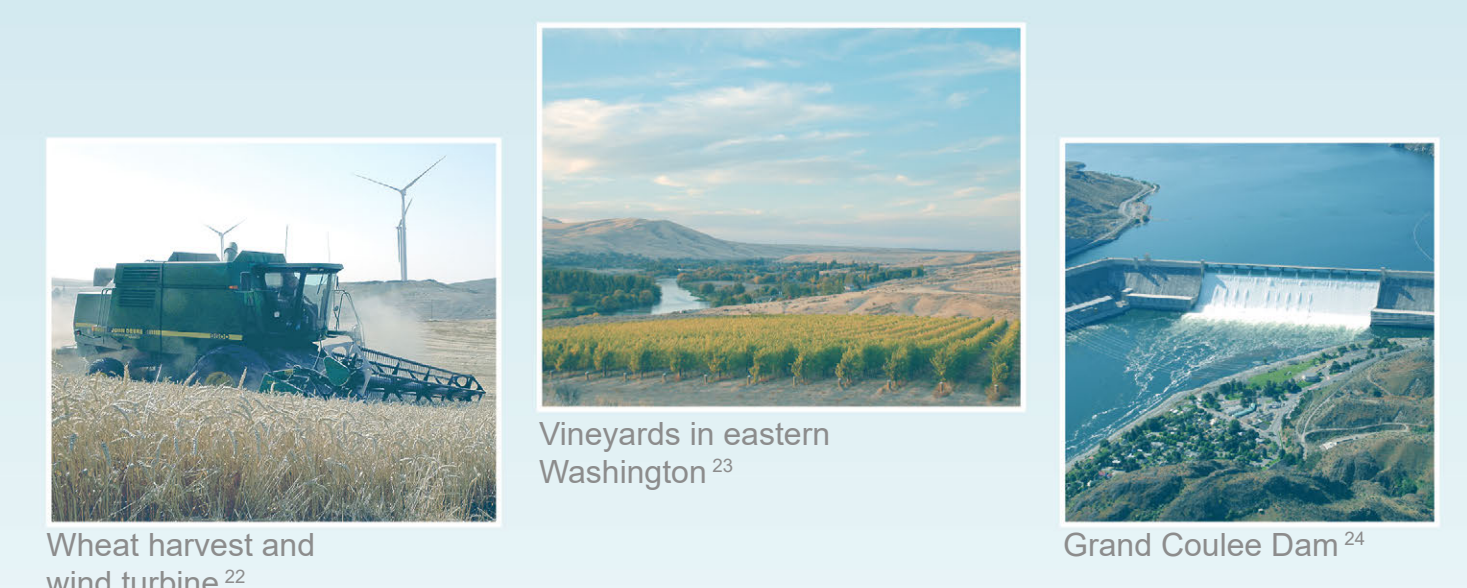


Palouse River Canyon<sup>1</sup>

### ECONOMY

The economy of the channeled scablands and the Pacific Northwest is supported by features created by the floods. The voluminous Columbia River discharges an average of 264,900 cubic feet per second. Industry in the dryland regions of eastern Washington depends on this lifeline for transportation, energy, agriculture, earth materials, and irrigation.

- Places to go:
- Grand Coulee Dam
  - Maryhill State Park



Wheat harvest and wind turbine<sup>22</sup>

Vineyards in eastern Washington<sup>23</sup>

Grand Coulee Dam<sup>24</sup>

