



## Lake Erie Watershed (Great Lakes Basin) Character Statement

Lake Erie is the fourth largest of the Great Lakes in terms of water surface area (9,910 square miles) but the smallest by volume, containing only about 3% of the Great Lakes water. Lake Superior has over 50%, Lake Michigan has 21%, Lake Huron has 16%, and Lake Ontario has 9%. Water from the other Great Lakes reaches Lake Erie through the Detroit River and continues on to Lake Ontario through the Niagara River and Welland Canal.

The total watershed is 30,140 square miles with only 511 square miles in Pennsylvania.

### Geology

All of the Great Lakes experienced glaciation several times throughout the past. The force and power of these events led to the physical characteristics of the lakes including Lake Erie's depth and size. Such events also defined the area's geology and topography thus determining the groundwater resources.

In PA, the Lake Erie watershed lies within two physiographic provinces. The area adjacent to the lake is located in the Eastern Lake Section of the Central Lowland Province and is situated over shale, sedimentary and sandstone bedrock. The upland area of the watershed is located in the Glaciated Pittsburgh Plateaus Section of the Appalachian Plateau Province. These provinces within the watershed are separated by an erosional scarp (a steep slope or cliff found at the margin of a flat or gently sloping area usually against the dip of the rocks) that is three to four miles from the lake and oriented in a southwest to northeast direction. Aquifers in both provinces benefit tremendously from the deposition of glacial drift – unconsolidated material from past glaciers. If this drift is well sorted and coarse in texture, large volumes of groundwater can be transmitted. If it is fine grained, it has a much lower permeability and ability to transmit water. The western third of the watershed and the three to four mile wide lake plain is flat, while the remainder of the watershed consists of rolling hills. The watershed is divided by many valleys formed by erosion, and contains streams that empty into the lake.

The bedrock under the watershed is around 2,400 feet thick and was formed when sediments were deposited on the floors of ancient seas. Shale from the Upper Devonian Age lies beneath most of the soils, and sandstone covers the higher hills. Rock from the Pennsylvania System is exposed throughout the watershed with the exception of Presque Isle State Park, where there are sands from the Pleistocene Age. The area was covered by at least three different glaciers; the last occurring 10,000 to 15,000 years ago. Debris left behind as the glaciers receded consists of a mixture of soils, granite, limestone, quartzite, sandstone, and acid shale particles.

### History

Lake Erie is named for a tribe of American Indians who called themselves *Herie*, which means "long tail" in some translations and "wild cat" in others. They were a settled group, living in longhouse and growing corn, beans and squash. The Eries lived among both the Huron and the five tribes of the powerful Iroquois Confederacy who had been at war with the Huron for generations. By 1649, the Iroquois had forced the surviving members of the Huron to flee. The



Huron were given sanctuary by the Eries, which angered the Iroquois. The Iroquois retaliated and destroyed the Eries, absorbing the survivors mainly into the Seneca tribe.

Lake Erie was officially recorded as being discovered in 1669 by Louis Joliet. The first settlement in Pennsylvania along the shores of Lake Erie did not occur until the late 1700's, after General Anthony Wayne's campaign for peace with the Indians and his victory against the Iroquois at the Battle of Fallen Timbers. Prior to that time, activity in the Great Lakes region revolved around exploration and the lucrative fur trade between the French and the Indians. Furs were transported from throughout the Great Lakes to Lake Erie, then over the short 13 mile portage from Erie to LeBoeuf Creek to French Creek, and eventually down the Allegheny and Ohio Rivers. Because of the short portage and the strategic location, many battles were fought for control of the area. From the time of discovery in the 1600's into the 1700's, the French had control of the area. The French then ceded their claims to Great Britain during the French and Indian War (1754 - 1763). The British built forts to protect their claims; however, they were forced out by Native American tribes during Pontiac's War in 1763. The Native Americans were dissatisfied with British policies after the war. Although they were unable to remove the British, policies improved through negotiations after these battles. The "tab" of what is now Pennsylvania was once known as the Erie Triangle. Although several states and native peoples competed for claims of this land, the federal government finally sold the land to Pennsylvania as it was the only claimant without access to a port at the time. After the Battle of Fallen Timbers (1794 - 1795), the City of Erie was surveyed, paving the way for settlement.

The along came the War of 1812. To take control of Lake Erie from the British, President James Madison ordered the construction of a naval fleet in Erie, Pennsylvania. At the time, Fort Malden was situated at the end of the British supply line making it vulnerable to disruption of supplies. This set up the Battle of Lake Erie in which the Brigs Lawrence and Niagara played an integral part. The American victory under Oliver H Perry secured control over Lake Erie.

As the population grew, land was cleared for farming, the lumber industry thrived, and commercial fishing began with a seemingly endless supply of fish. The Erie Extension Canal was completed in 1844, connecting Erie to Pittsburgh and ensuring the economical transportation of goods. The economy shifted from agriculture and timber to steel, oil, and manufacturing. Development remained unchecked into the 20th century, but it came with a cost. Eroded soils, sewage, decline in fish populations, and typhoid epidemics reflected a lake in trouble. Lake Erie was said to be "choking on the residue of industrial prosperity," and by the 1960's, it was unofficially proclaimed "dead."

## **Problems and Solutions**

The fate of Lake Erie added impetus to research for solutions to the region's problems. In 1972, the International Joint Commission encouraged the signing of the Great Lakes Water Quality Agreement between the United States and Canada. This agreement, along with a ban of phosphates in laundry products, eased Lake Erie's problems. In addition, amendments to the Clean Water Act provided for regulation of industrial and municipal discharge under the National Pollutant Discharge Elimination System (NPDES). On-going research and education, clean up efforts, federal and state laws, permit programs, grant programs, government agencies,



and private organizations have returned Erie to its historical designation of the most biologically productive of the Great Lakes.