

# Lake

A lake is an area filled with water, localized in a basin, surrounded by land, apart from any river or other outlet that serves to feed or drain the lake. Lakes lie on land and are not part of the ocean, and therefore are distinct from lagoons, and are also larger and deeper than ponds, though there are no official or scientific definitions. Lakes can be contrasted with rivers or streams, which are usually flowing. Most lakes are fed and drained by rivers and streams.

Natural lakes are generally found in mountainous areas, rift zones, and areas with ongoing glaciations. Other lakes are found in Endorheic basins or along the courses of mature rivers. In some parts of the world there are many lakes because of drainage patterns left over from the last Ice Age. All lakes are temporary over geologic time scales, as they will slowly fill in with sediments or spill out of the basin containing them.

Many lakes are artificial and are constructed for industrial or agricultural use, for hydroelectric power generation or domestic water supply, or for aesthetic, recreational purposes, or other activities.

## Etymology, meaning, and usage of "lake"[edit]

The word *lake* comes from Middle English *lake* ("lake, pond, waterway"), from Old English *lacu* ("pond, pool, stream").

There is considerable uncertainty about defining the difference between lakes and ponds, and no current internationally accepted definition of either term across scientific disciplines or political boundaries exists. For example, limnologists (Limnology: the study of biological, chemical and physical features of lakes and other bodies of fresh water) have defined lakes as water bodies which are simply a larger version of a pond, which can have wave action on the shoreline or where wind-induced turbulence plays a major role in mixing the water column. None of these definitions completely excludes ponds and all are difficult to measure. For this reason, simple size-based definitions are increasingly used to separate ponds and lakes. Definitions for *lake* range in minimum sizes for a body of water from 2 hectares (5 acres) to 8 hectares (20 acres) (see also the definition of "pond"). Charles Elton, one of the founders of ecology, regarded lakes as water bodies of 40 hectares (99 acres) or more. The term *lake* is also used to describe a feature such as Lake Eyre, which is a dry basin most of the time but may become filled under seasonal conditions of heavy rainfall. In common

usage, many lakes bear names ending with the word *pond*, and a lesser number of names ending with *lake* are in quasi-technical fact, ponds. One textbook illustrates this point with the following: "In Newfoundland, for example, almost every lake is called a pond, whereas in Wisconsin, almost every pond is called a lake."

One hydrology book proposes to define the term "lake" as a body of water with the following five characteristics:

- it partially or totally fills one or several basins connected by straits<sup>[3]</sup>
- has essentially the same water level in all parts (except for relatively short-lived variations caused by wind, varying ice cover, large inflows, etc.)<sup>[3]</sup>
- it does not have regular intrusion of seawater<sup>[3]</sup>
- a considerable portion of the sediment suspended in the water is captured by the basins (for this to happen they need to have a sufficiently small inflow-to-volume

## • Distribution

The majorities of lakes on Earth are freshwater, and most lie in the Northern Hemisphere at higher latitudes. Canada, with a deranged drainage system, has an estimated 31,752 lakes larger than 3 square kilometres (1.2 sq mi)<sup>[11]</sup> and an unknown total number of lakes, but is estimated to be at least 2 million.<sup>[12]</sup> Finland has 187,888 lakes 500 square meters (5,400 sq ft) or larger, of which 56,000 are large (10,000 square metres or larger).<sup>[13]</sup>

Most lakes have at least one natural outflow in the form of a river or stream, which maintain a lake's average level by allowing the drainage of excess water.<sup>[14]</sup> Some lakes do not have a natural outflow and lose water solely by evaporation or underground seepage or both. They are termed Endorheic lakes.

Many lakes are artificial and are constructed for hydro-electric power generation, aesthetic purposes, recreational purposes, industrial use, agricultural use or domestic water supply.

Globally, lakes are greatly outnumbered by ponds: of an estimated 304 million standing water bodies worldwide, 91% are 1 hectare (2.5 acres) or less in area (see definition of ponds).<sup>[15]</sup>

Small lakes are also much more numerous than large lakes: in terms of area, one-third of the world's standing water is represented by lakes and ponds of 10 hectares (25 acres) or less.<sup>[citation</sup>

<sup>needed]</sup> However, large lakes account for much of the area of standing water with 122 large lakes of 1,000 square kilometres (390 sq mi, 100,000 ha, 247,000 acres) or more representing about 29% of the total global area of standing inland water.<sup>[citation needed]</sup>

# Types

In 1957, Hutchinson<sup>[16]</sup> published a **monograph** that is regarded as a landmark discussion and classification of all major lake types, their origin, morphometric characteristics, and distribution.<sup>[17][18][19]</sup> As summarized and discussed by these researchers, Hutchinson presented in it a comprehensive analysis of the origin of lakes and proposed what is a widely accepted classification of lakes according to their origin. This classification recognizes **11 major lake types** that are divided into 76 subtypes. The 11 major lake types are **tectonic lakes, volcanic lakes, landslide lakes, glacial lakes, solution lakes, fluvial lakes, Aeolian lakes, shoreline lakes, organic lakes, anthropogenic lakes, and meteorite (extraterrestrial impact) lakes.**<sup>[18][17][19]</sup>

## Tectonic lakes

Tectonic lakes are lakes formed by the deformation and resulting lateral and vertical movements of the Earth's crust. **These movements include faulting, folding,** and warping. Some of the well-known and largest lakes on Earth are rift lakes occupying rift valleys, e.g. **Central African Rift lakes** and **Lake Baikal**. Other well-known tectonic lakes **are Caspian Sea,** and the **Sea of Aral.**

Often, the tectonic action of crustal extension has created an alternating series of parallel grabens and horsts that form elongate basins alternating with mountain ranges. Not only does this promote the creation of lakes by the disruption of preexisting drainage networks, it also **creates within arid regions** **Endorheic basins** that containing salt lakes (also called saline lakes). They form where there is no natural outlet, a high evaporation rate and the drainage surface of the water table has a higher-than-normal salt content. **Examples of these salt lakes include Great Salt Lake and the Dead Sea.**

## Volcanic lakes

**Volcanic lakes are lakes that occupy either local depressions, e.g. craters and larger basins, e.g. calderas, created by** volcanism. **Crater lakes are formed in volcanic craters and calderas, which fill up with precipitation more rapidly than they empty via either evaporation, groundwater discharge, or combination of both.** Sometimes the latter are called caldera lakes, although often no distinction is made. **An example is Crater Lake in Oregon,** in the caldera of Mount Mazama. The caldera was created in a massive volcanic eruption that led to the subsidence of Mount Mazama around 4860 BCE.

## Glacial lakes

Glacial lakes are lakes created by the direct action of glaciers and continental ice sheets. A wide variety of glacial processes create enclosed basins. As a result, there are a wide variety of different types of glacial lakes and it is often difficult to define clear-cut distinctions between different types of glacial lakes and lakes influenced by other activities. The general types of glacial lakes that have recognized are lakes in direct contact with ice; glacially carved rock basins and depressions; morainic and outwash lakes; and glacial drift basins. Glacial lakes are the most numerous lakes in the world. Most lakes in northern Europe and North America have been either influenced or created by the latest, but not last, glaciation, to have covered the region. Tarn lakes.

## Fluvial lakes

Fluvial (or riverine)<sup>[22]</sup> lakes are lakes produced by running water. These lakes include plunge pool lakes, fluvial dams and meander lakes.

## Oxbow lakes

The most common type of fluvial lake is a crescent-shaped lake called an *oxbow lake* due to the distinctive curved shape. They can form in river valleys as a result of meandering. The slow-moving river forms a sinuous shape as the outer side of bends are eroded away more rapidly than the inner side. Eventually a horseshoe bend is formed and the river cuts through the narrow neck. This new passage then forms the main passage for the river and the ends of the bend become silted up, thus forming a bow-shaped lake.<sup>[16][17][18][19]</sup>

## Fluvial dams

These form where sediment from a tributary blocks the main river.<sup>[23]</sup>

## Lateral lakes

These form where sediment from the main river blocks a tributary, usually in the form of a levee.<sup>[22]</sup>

## **Solution lakes**

A solution lake is a lake occupying a basin formed by surface dissolution of bedrock. In areas underlain by soluble bedrock, its solution by precipitation and percolating water commonly produce cavities. These cavities frequently collapse to form sinkholes that form part of the local karst topography. Where groundwater lies near the ground surface, a sinkhole will be filled with water as a solution lake.<sup>[16][18]</sup> If such a lake consists of a large area of standing water that occupies an extensive closed depression in limestone, it is also called a karst lake. Smaller solution lakes that consist of a body of standing water in a closed depression within a karst region are known as *karst ponds*.<sup>[24]</sup> Limestone caves often contain pools of standing water, which are known as *underground lakes*. Classic examples of solution lakes are abundant in the karst regions at the Dalmatian coast of Croatia and within large parts of Florida.<sup>[16]</sup>

## **Landslide lake**

Landslide lakes are lakes created by the blockage of a valley by mudflows, rockslides, or screes. Such lakes are common in mountainous regions. Although landslide lakes may be large and quite deep, they are typically short-lived. An example of a landslide lake is Quake Lake, which formed as a result of the 1959 Hebgen Lake earthquake.

## **Aeolian lakes**

Aeolian lakes are lakes produced by wind action. They are found mainly in arid environments although some Aeolian lakes are relict landforms indicative of arid paleoclimates. Aeolian lakes consist of lake basins dammed by wind-blown sand; interdunal lakes that lie between well-oriented sand dunes; and deflation basins formed by wind action under previously arid paleo environments. Moses Lake, Washington, is an example of a lake basin dammed by wind-blown sand.

## **Shoreline lakes**

Shoreline lakes are generally lakes created by blockage of estuaries or by the uneven accretion of beach ridges by long shore and other currents. They include maritime coastal lakes, ordinarily in drowned estuaries; lakes enclosed by two tombolos or spits connecting an island to the mainland; lakes cut off from larger lakes by a bar; or lakes divided by the meeting of two spits.

## Organic lakes ????

Organic lakes are lakes created by the actions of plants and animals. On the whole they are relatively rare in occurrence and quite small in size. In addition, they typically ephemeral features relative to the other types of lakes. The basins in which organic lakes occur are associated with beaver dams, coral lakes, or dams formed by vegetation.<sup>[18][19]</sup>

## Anthropogenic lakes

Anthropogenic lakes are artificially created lakes formed by human activity. They can be the result of intentional damming of rivers and streams or subsequent filling of abandoned excavations by either ground water, precipitation, or a combination of both.<sup>[18][19]</sup>

## Meteorite (extraterrestrial impact/ crater) lakes

Meteorite lakes, which are also known as crater lakes, are lakes created by catastrophic extraterrestrial impacts by either meteorites or asteroids.<sup>[16][18][19]</sup> Examples of meteorite lakes are **Lonar crater lake, India** and **Pingualuit crater lake, Quebec, Canada,**<sup>[29]</sup> As in case of Lake El'gygytgyn and Pingualuit crater lake, meteorite (extraterrestrial impact/ crater) lakes can contain unique and scientifically valuable sedimentary deposits associated with long records of paleoclimatic changes.<sup>[28][29]</sup>

## Other types

In addition to mode of origin, lakes have been named and classified in various other ways according to their thermal stratification, salinity, relative seasonal permanence, degree of outflow, and other factors. Also, different cultures and regional of the world have their popular nomenclature

## Types of lake according to seasonal variation of lake level and volume

Lakes are informally classified and named according to the seasonal variation in their lake level and volume. Some of the names include:

- Ephemeral lake is a short-lived lake or pond.<sup>[33]</sup> If it fills with water and dries up (disappears) seasonally it is known as an *intermittent lake*<sup>[34]</sup> They often fill poljes<sup>[35]</sup>
- Dry lake is a popular name for an ephemeral lake that contains water only intermediately at irregular and infrequent intervals.<sup>[24][36]</sup>

- Perennial lake is a lake that has water in its basin throughout the year and is not subject to extreme fluctuations in level.<sup>[24][33]</sup>
- Playa lake is a typically shallow, intermittent lake that covers or occupies a playa either in wet seasons or in especially wet years but subsequently drying up in an arid or semiarid region.<sup>[24][36]</sup>
- Vlei is a name used in South Africa for a shallow lake which varies considerably in level with the seasons.<sup>[37]</sup>

## Notable lakes on Earth

The **largest lake by surface area** is Caspian Sea, which is despite its name considered as a lake from the point of view of geography.<sup>[56][*better source needed*]</sup> Its surface area is 143,000 sq. mi./371,000 km<sup>2</sup>.

- The second largest lake by surface area, and the **largest freshwater lake by surface area**, is Lake Michigan-Huron, which is hydrologically a single lake. Its surface area is 45,300 sq. mi./117,400 km<sup>2</sup>. For those who consider Lake Michigan-Huron to be separate lakes, and Caspian Sea to be a sea, Lake Superior would be the largest lake at 82,100 km<sup>2</sup> (31,700 square miles)
- Lake Baikal is the **deepest** lake in the world, located in Siberia, with a bottom at 1,637 metres (5,371 ft). Its **mean depth** is also the greatest in the world (749 metres (2,457 ft)).  
It is also the world's **largest freshwater lake by volume** (23,600 cubic kilometres (5,700 cu mi), but much smaller than the Caspian Sea at 78,200 cubic kilometres (18,800 cu mi)), and the second longest (about 630 kilometres (390 mi) from tip to tip).
- The world's **oldest lake** is Lake Baikal, followed by Lake Tanganyika in Tanzania. Lake Maracaibo is considered by some to be the second-oldest lake on Earth, but since it lies at sea level and nowadays is a contiguous body of water with the sea, others consider that it has turned into a small bay.
- The **longest** lake is Lake Tanganyika, with a length of about 660 kilometres (410 mi) (measured along the lake's center line). It is also the third largest by volume, the second oldest, and the second deepest (1,470 metres (4,820 ft)) in the world, after Lake Baikal.
- The world's **highest** lake, if size is not a criterion, may be the crater lake of Ojos del Salado, at 6,390 metres (20,965 ft).<sup>[57]</sup>

- The highest large (greater than 250 square kilometres (97 sq mi)) lake in the world is the 290 square kilometres (110 sq mi) Pumoyong Tso (Pumuoyong Tso), in the Tibet Autonomous Region of China, at 28-34N 90-24E, 5,018 metres (16,463 ft) above sea level.<sup>[58]</sup>
- The world's **highest** commercially navigable lake is Lake Titicaca in Peru and Bolivia at 3,812 m (12,507 ft). It is also the largest lake in South America.
- The world's **lowest** lake is the Dead Sea, bordered by Jordan to the east and Israel and Palestine to the west, at 418 metres (1,371 ft) below sea level. It is also one of the lakes with highest salt concentration.
- Lake Michigan–Huron has the **longest lake coastline** in the world: about 5,250 kilometres (3,260 mi), excluding the coastline of its many inner islands. Even if it is considered two lakes, Lake Huron alone would still have the longest coastline in the world at 2,980 kilometres (1,850 mi).
- The largest island in a lake is Manitoulin Island in Lake Michigan-Huron, with a surface area of 2,766 square kilometres (1,068 sq mi). Lake Manitou, on Manitoulin Island, is the largest lake on an island in a lake.
- The largest lake on an island is Nettilling Lake on Baffin Island, with an area of 5,542 square kilometres (2,140 sq mi) and a maximum length of 123 kilometres (76 mi).<sup>[59]</sup>
- The largest lake in the world that drains naturally in two directions is Wollaston Lake.
- Lake Toba on the island of Sumatra is in what is probably the largest resurgent caldera on Earth.
- The largest lake completely within the boundaries of a single city is Lake Wanapitei in the city of Sudbury, Ontario, Canada. Before the current city boundaries came into effect in 2001, this status was held by Lake Ramsey, also in Sudbury.
- Lake Enriquillo in Dominican Republic is the only saltwater lake in the world inhabited by crocodiles.
- Lake Bernard, Ontario, Canada, claims to be the largest lake in the world with no islands.
- The largest lake in one country is Lake Michigan, in the United States. However, it is sometimes considered part of Lake Michigan-Huron, making the record go to Great Bear Lake, Northwest Territories, in Canada, the largest lake within one jurisdiction.
- The **largest lake on an island in a lake on an island** is Crater Lake on Vulcano Island in Lake Taal on the island of Luzon, The Philippines.

**Largest by continent[edit]**



The largest lakes (surface area) by continent are:

- **Australia** – Lake Eyre (salt lake)
- **Africa** – Lake Victoria, also the third-largest freshwater lake on Earth. It is one of the Great Lakes of Africa.
- **Antarctica** – Lake Vostok (subglacial)
- **Asia** – Lake Baikal (if the Caspian Sea is considered a lake, it is the largest in Eurasia, but is divided between the two geographic continents)
- **Oceania** – Lake Eyre when filled; the largest permanent (and freshwater) lake in Oceania is Lake Taupo.
- **Europe** – Lake Ladoga, followed by Lake Onega, both in northwestern Russia.
- **North America** – Lake Michigan-Huron, which is hydrologically a single lake. However, lakes Huron and Michigan are usually considered separate lakes, in which case Lake Superior would be the largest.<sup>[45]</sup>
- **South America** – Lake Titicaca, which is also the highest navigable body of water on Earth at 3,812 metres (12,507 ft) above sea level. The much larger Lake Maracaibo is much older, but perceived by some to no longer be genuinely a lake for multiple reasons.