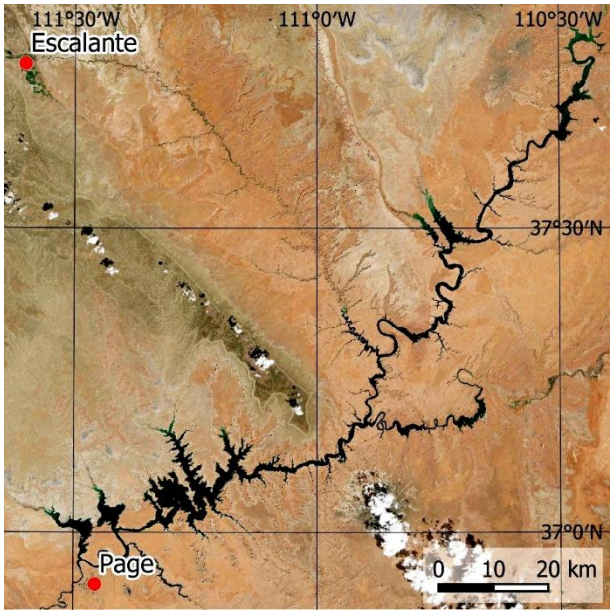
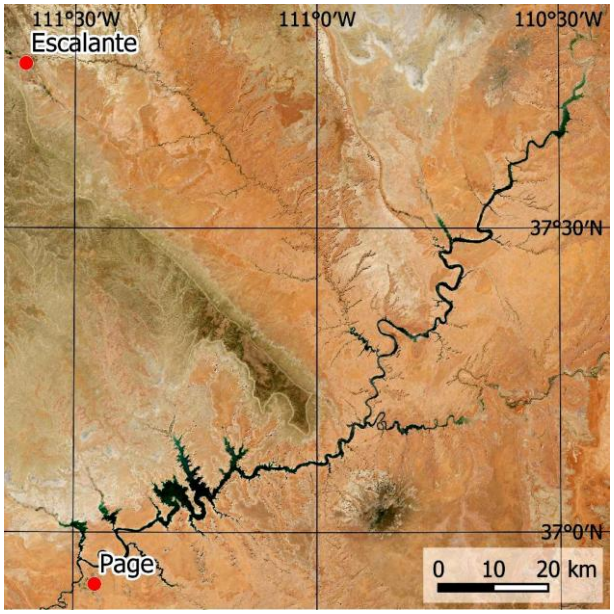


Sentinel-2, 2016-08-31. The image shows the length of Lake Powell and how it fills the adjacent canyons.



Sentinel-2, 2026-08-19. Comparing with the image taken in 2016, the reduction of the water area is clearly visible.

Lake Powell is a reservoir on the Colorado River crossing the border between the U.S. states of Arizona and Utah. It was created in 1963 with the completion of the **Glen Canyon Dam**. The reservoir capacity is more than about **30 km³ of water**. It is important for producing hydroelectric power, recreation, and for communities and farms in the Colorado River Basin.

During the last decades, Lake Powell has faced an increasingly serious water shortage as the southwestern United States has experienced a long period of drought, with higher temperatures increasing evaporation and reducing the amount of water from snow and rainfall. Water is also removed from the Colorado River for cities, agriculture, and industry.

As a result, the amount of water entering Lake Powell has often been smaller than the amount released downstream. In June 2026, about 0.38 km³ flowed into the lake, about 12% of the long-term average, while 0.63 km³ was released through Glen Canyon Dam. At the end of the month the reservoir contained only **6.9 km³**, or about **24% of its capacity**. By August 2026, Lake Powell was about **22% full**, about two thirds of the average for that time of year. Its water level was around 1,072 m above sea level, close to the record low from April 2023 and about 55 m below its highest level.

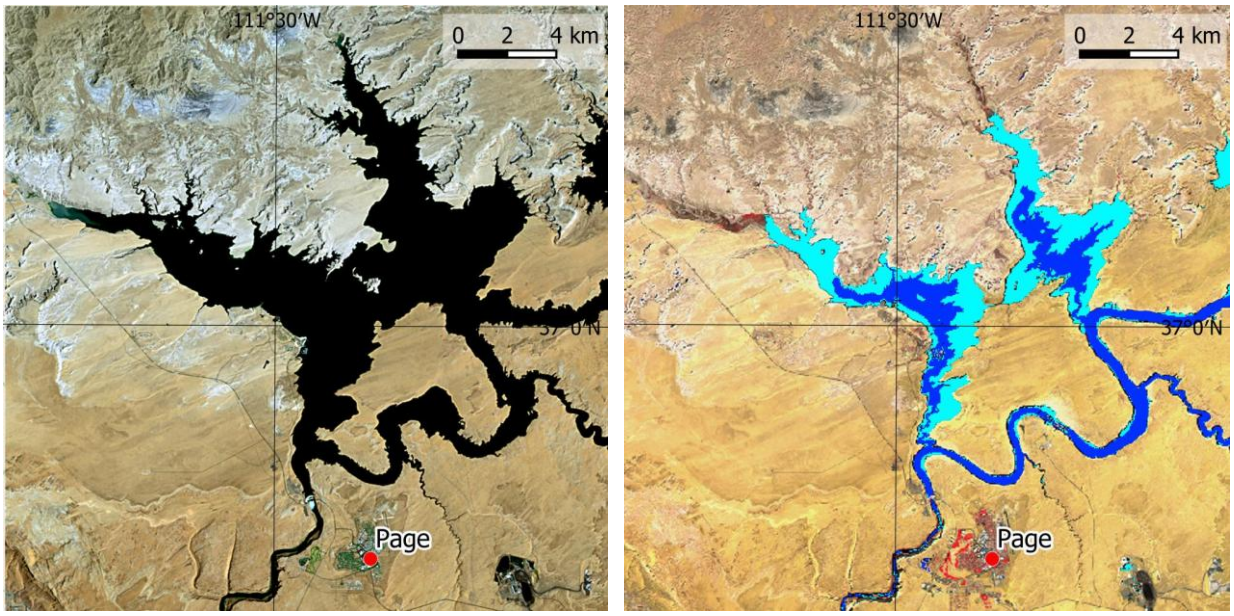
Low water levels create several problems as they mean less storage and make it harder to provide supplies downstream. Falling water levels can reduce hydroelectric power generation at Glen Canyon Dam. Recreation is affected too, as boat ramps and access points can become difficult to use. Reduced water levels can expose large areas of previously submerged land, changing habitats and water quality.

Satellite remote sensing is a powerful tool to assess changes. Satellites like ESA's Copernicus satellites repeatedly cover Earth's surface from space. By comparing images from different years, scientists measure how the boundary of the lake moves with changing water levels. Landsat data have documented changes at Lake Powell from 1984 to the present. In addition to area measurements, satellite data of the water area is combined with elevation data to estimate changes in water volume.

Exercises

- ***Satellite Map:***
  - Look at the satellite image maps and describe the changes between 2016 and 2026. Where are the changes in the water surface most prominent?
  - Which reasons can you imagine for the differences in the change? Think about the role of the steepness of the terrain. Compare for given water level changes the change in water surface in narrow canyons and in flat terrain, respectively.
  - How can these changes influence the wildlife in this region?
  - How do they affect the people living there as well as downstream?
  - Look at the images and try identify important landcover classes (rock, sand, water, vegetation, built-up areas). Is there much vegetation visible? Try to draw conclusions about the climate of the region.

Additional Material



Lake Powell near the Glen Canyon Dam (left: Landsat image from 1984-07-04; right: false color infrared image, overlaid with change in the water surface between 2016-08-31, light blue, and 2026-08-19, blue)

Links and sources

- https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-2/Dwindling_water_levels_of_Lake_Powell_seen_from_space - A 2022 report based on Copernicus data
- https://www.earthdata.nasa.gov/news/worldview-image-archive/low-water-levels-lake-powell-lake-mead-august-2026 - NASA study about water level changes based on satellite data