



Water Resources



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1. Water – The Definition

- Water is a marvelous substance which can be beautiful, powerful and destructive.





2.1. Oceans

- Is the largest area and volume of water.
- Contain more than 97% of the earth's water.
- Contain an average of 35g salt per liter.
- Can be used after being desalinated.





2.2. Ice and Snow

- Contain almost 90% of freshwater.
- Is as much as 2km thick.
- Situate mostly in Antarctica (85%), Greenland (10%), and other snow mountain (5%).





2.3. Groundwater

- Groundwater is water in the rock and soil layer beneath Earth's surface.
- Absorb excess runoff rain and snow on ground.
- Return to lakes, streams, rivers and/or marshes.
- Is readily available for use and drinking.





2.4. Lakes

- Lakes are created from variety of geological events:
 - Tectonic-basin lake
 - Volcanic lake
 - Glacial lake
 - Groundwater-discharge lake
- Lakes generate water from:
 - Collection of water in low areas
 - Natural or man-made dam(s)
 - Rivers and streams
 - Groundwater





2.4. Lakes (cont.)

- Freshwater lakes

- Contribute $91,000\text{km}^3$ (about 0.007% of total Earth's water)
- Provide water for agricultural irrigation, industrial processes, municipal uses and residential water supplies.
- Major freshwater lakes: Caspian Sea (Central Asia), Baikal Lake (Russia), Tanganyika Lake (Eastern Africa), Lake Superior (U.S), and Malawi Lake (Eastern Africa)





2.4. Lakes (cont.)

- Saline lakes

- Possess $85,000\text{km}^3$ (about 0.006% of total Earth's water)
- Saline lakes' water cannot be used due to high salinity.
- Major saline lakes: Caspian Sea (Central Asia), The Great Salt Lake (U.S.), The Dead Sea (between Jordan & Israel), and Aral Sea (between Kazakhstan and Uzbekistan).



The Great Salt Lake

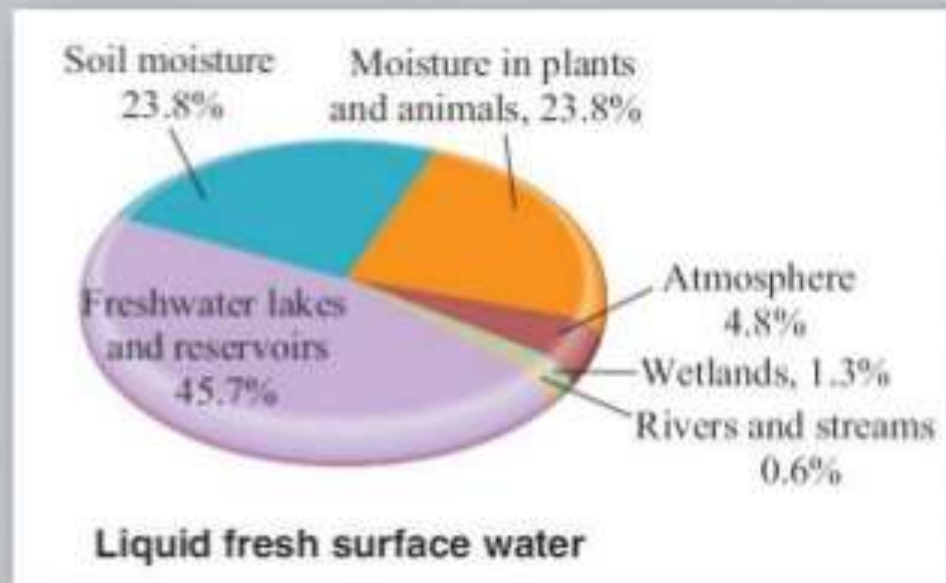


The Dead Sea



2.5. Rivers and Streams

- Rivers and streams are bodies of flowing surface water driven by gravity.
- Rivers and Streams contain only $2,120\text{km}^3$ (about 0.6% of liquid fresh water surface and around 0.0002% of the Earth's water.)





2.6. Wetlands and Soil Moisture

- Wetland are areas of land where water covers the surface for at least part of the year.
- They are not as important as lakes and rivers for water storage.
- However, they play vital roles in:
 - Erosion protection
 - Flood reduction
 - Groundwater replenishment
 - Trapping nutrient and sediment
 - Water purification
 - Providing fish and wildlife habitat





5.7. Atmosphere

- Atmosphere contains about 0.001% of total Earth's water.
- It is around 4% of air volume in the atmosphere.
- Movement of water through atmosphere provide mechanism for distributing freshwater to terrestrial reservoir (in form of rain, snow, hail...).





3. Types of Water Uses

- Off-Stream Uses

- Agriculture
- Thermoelectric
- Industrial
- Mining
- Domestic
- Commercial



- In-Stream Uses

- Hydropower
- Navigation
- Recreation
- Ecosystem Support



Thank you!

