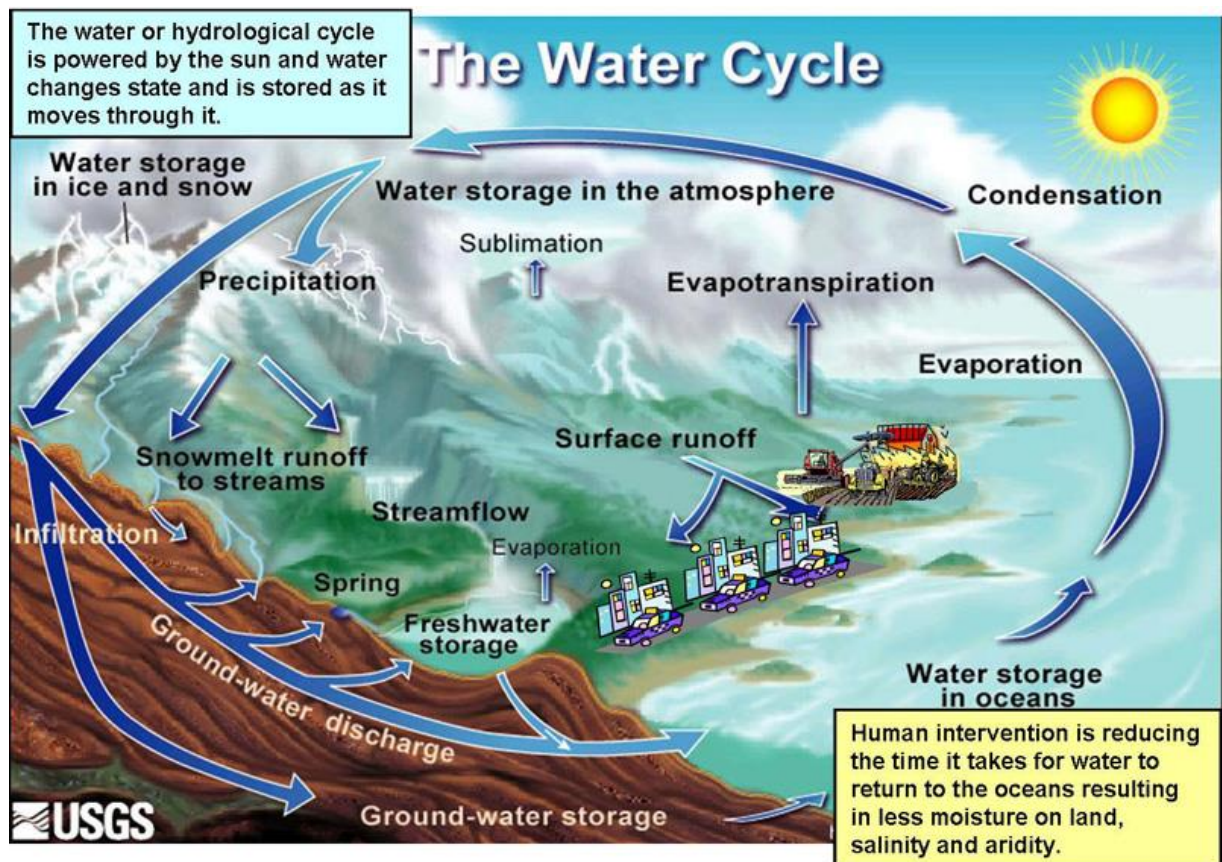


Hydrology. Hydrometry. Hydraulic structures.

Water cycle. Water balance equation



Earth's water is always in movement, and the natural water cycle, also known as the **hydrologic cycle**, describes the continuous movement of water on, above, and below the surface of the Earth. Water is always changing states between liquid, vapor, and ice.

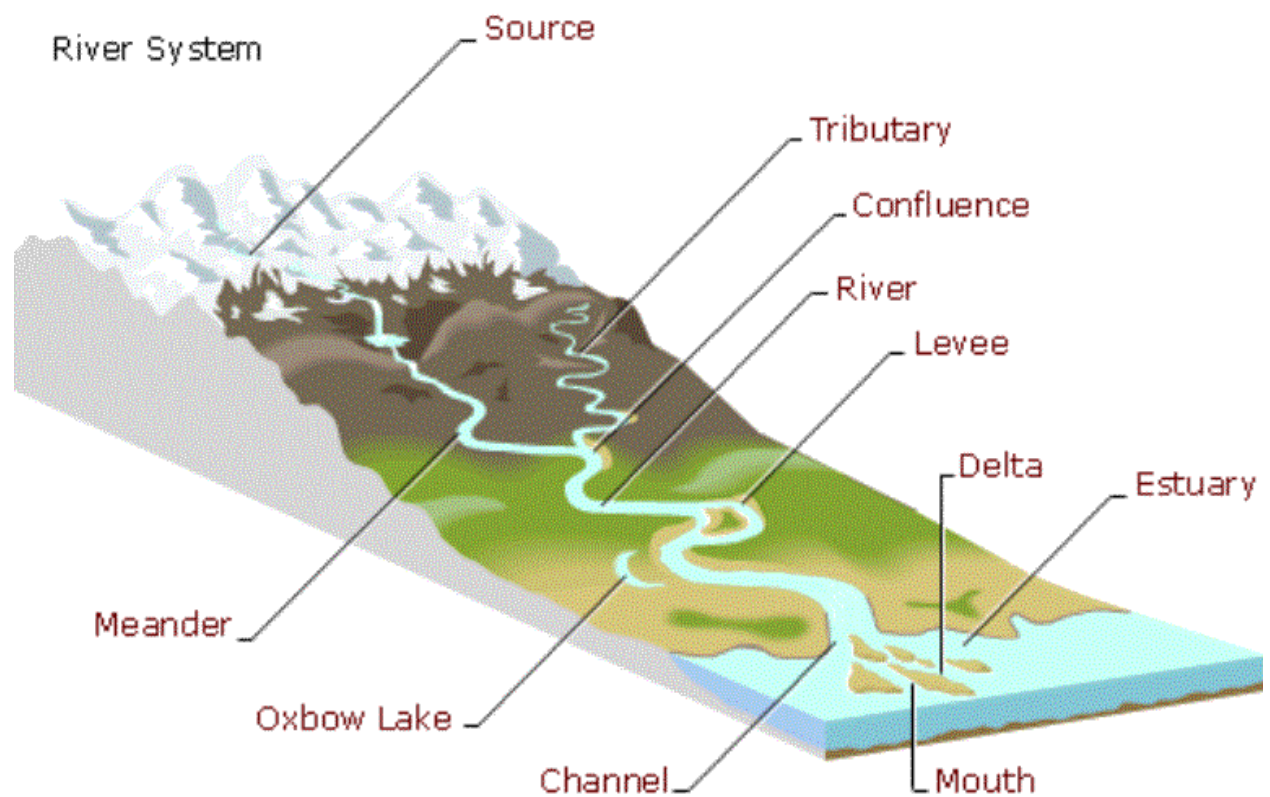
The water cycle has no starting point. But, we'll begin in the oceans, since that is where most of Earth's water exists. The sun, which drives the water cycle, heats water in the oceans. Some of it **evaporates** as vapor into the air. Rising air currents take the vapor up into the atmosphere, along with water from **evapotranspiration**, which is water transpired from plants and evaporated from the **soil**. The vapor rises into the air where cooler temperatures cause it to condense into clouds.

Hydrology

Hydrology is the scientific study of the movement, distribution, and quality of water on Earth, including the hydrologic cycle, water resources and environmental watershed sustainability. A practitioner of hydrology is a **hydrologist**.

Hydrology subdivides into **surface water hydrology**, **groundwater hydrology** (hydrogeology), and **marine hydrology**. Domains of hydrology include **hydrometeorology**, **surface hydrology**, **hydrogeology**, **drainage-basin management** and **water quality**, where water plays the central role.

Hydrometry is the monitoring of the components of the hydrological cycle including rainfall, groundwater characteristics, as well as water quality and flow characteristics of surface water.



Drainage basin – річковий басейн

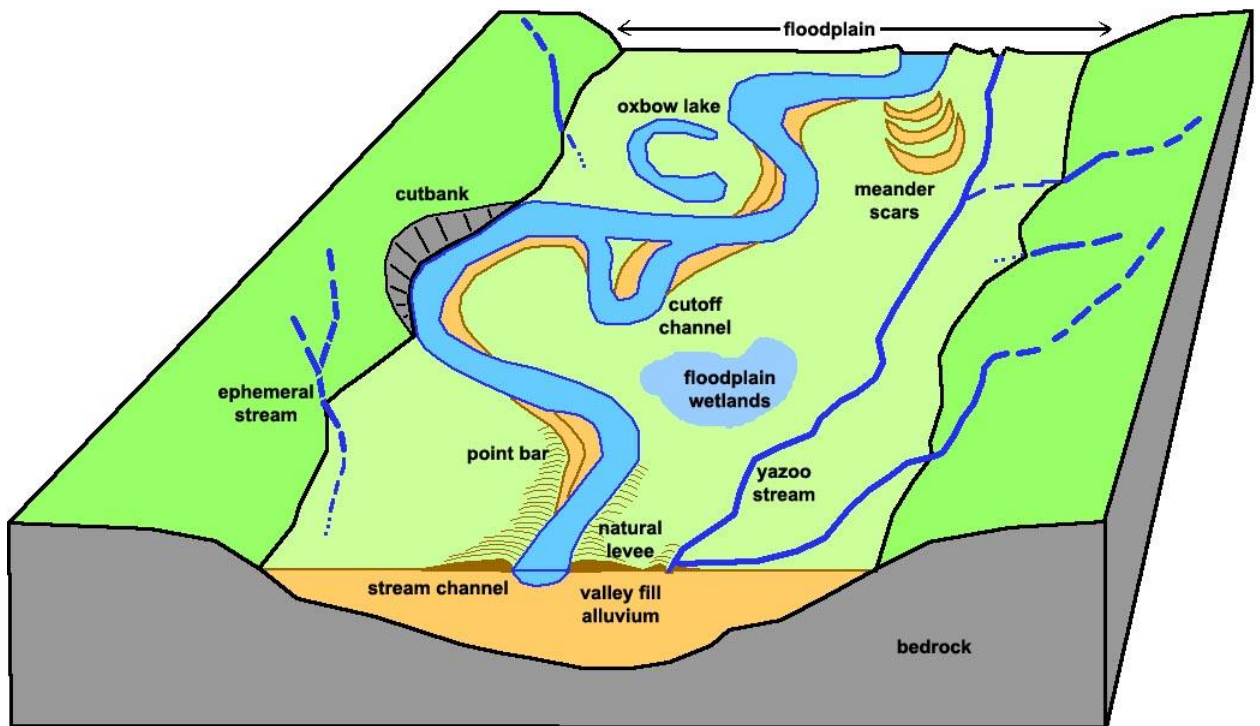
Watershed – водозбір

Oxbow lake - стариця

Levee- дамба

Estuary – гирло воронкоподібне

Mouth – впадіння в океан, озеро



Ephemeral stream - a stream that flows only briefly during and following a period of rainfall in the immediate locality – струмки що пересихають

Cutbank – крутий берег

Cutoff channel – скорочення закруту (меандру)

Point bar - Побочень

Meander scars - старореччє

Floodplain – заплава

Yazoo stream - tributary stream that runs parallel to, and within the floodplain of a larger river

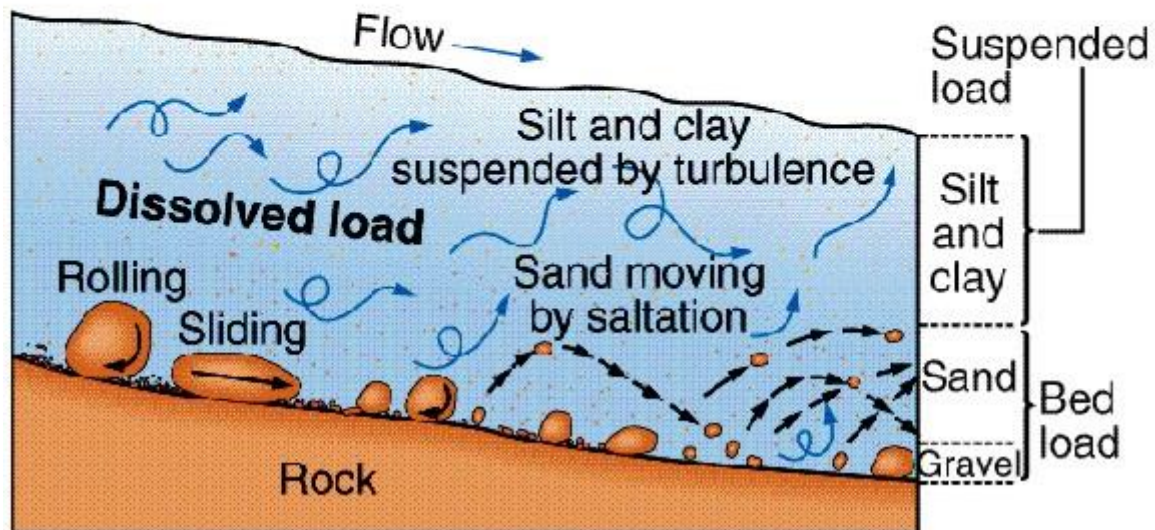
bedrock – скельна основа

wetland - водно-болотні угіддя

Sediments

Plummer/McGeary/Carlson *Physical Geology*, 9e. Copyright © 1996, McGraw-Hill Companies, Inc. All Rights Reserved.

Contents of a Stream Bed



The **sediment load** may be subdivided into three components, the **bed load**, **suspended material** and a narrow intermediate phase of **saltation** in which particles separate from the bed load and bounce along in the flow.

sediment load – наноси

bed load – донні наноси

suspended material – зважені речовини

saltation – стрибок

Silt - мул

Hydrometry

gauging station or hydrometric station - гідропост

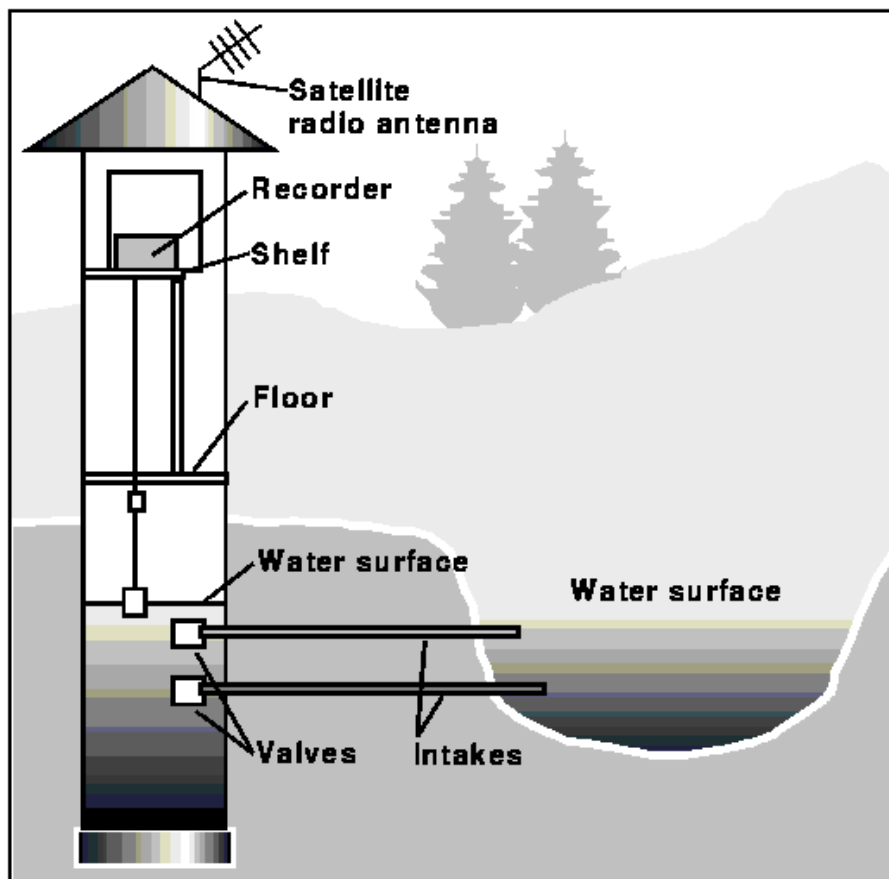
Stage – рівневий пост

The **water level** at a **gauging station**, the most important measurement in hydrometry, is generally known as the **stage**. It is measured with respect to a datum, either a **local bench mark**, which in turn should be levelled into the **geodetic survey datum** of the country (Ordnance Survey datum in the UK).

local bench mark – місцева відмітка берега

geodetic survey datum - геодезична база даних





Stage-Discharge Relationship- зв'язок відмітки з витратою

The establishment of a reliable relationship between the monitored variable stage and the corresponding discharge is essential at all river gauging stations when continuous-flow data are required from the continuous stage record.

rating curve – крива витрат $Q=f(H)$

Extension of Rating Curves – подовження кривої

arithmetic mean – середнє арифметичне

coefficient of variation – коефіцієнт варіації

coefficient of skewness – коефіцієнт асиметрії

FLOW DURATION CURVES – крива забезпеченості

The data most commonly used are **daily mean flows**: the average flow for each day. To derive a flow duration curve the daily mean flow data are required for a long period of time.

A table is derived that has the **frequency**, **cumulative frequency** (frequency divided by the total number of observations) and **percentage cumulative frequency**.

The actual flow duration curve is created by plotting the percentage cumulative frequency on the x-axis against the mid-point of the class interval on the y-axis. The presentation of a flow duration curve may be improved by either plotting on a special type of graph paper or transforming the data. The type of graph paper often used has the x-axis transformed in the form of a known distribution such as the Gumbel or Log Pearson.

- The flow value that is exceeded 95 per cent of the time (Q_{95}). A useful statistic for low flow analysis.
- The flow value that is exceeded 50 per cent of the time (Q_{50}). This is the median flow value.
- The flow value that is exceeded 10 per cent of the time (Q_{10}). A useful statistic for analysis of high flows and flooding.

daily mean flows – середньодобові витрати

frequency – частота

cumulative frequency – повторюваність