Drainage Basin - Streams – *Drainage Pattern*

Course : Physical Geography

First Year Integrated M.Sc Geography

Dr. R. Jegankumar M.Sc.,M.Tech., Ph.D.,
Professor and Head
Department of Geography
Bharathidasan University, Tiruchirappalli

Streams are bodies of water that have a current; they are in constant motion. Geologists recognize many categories of streams depending on their size, depth, speed, and location.

Creeks, brooks, tributaries, bayous, and rivers might all be lumped together as streams. In streams, water always flows downhill, but the form that downhill movement takes varies with rock type, topography, and many other factors.

Stream erosion and deposition are extremely important creators and destroyers of landforms

Source: https://courses.lumenlearning.com/geophysical/chapter/streams-and-rivers/

A stream originates at its source. A **source** is likely to be in the high mountains

where snows collect in winter and melt in summer, or a source might be a spring/Lake/Rainfall.

A stream may have more than one sources and when two streams come together it's called a **confluence**.

The smaller of the two streams is a **tributary** of the larger stream.

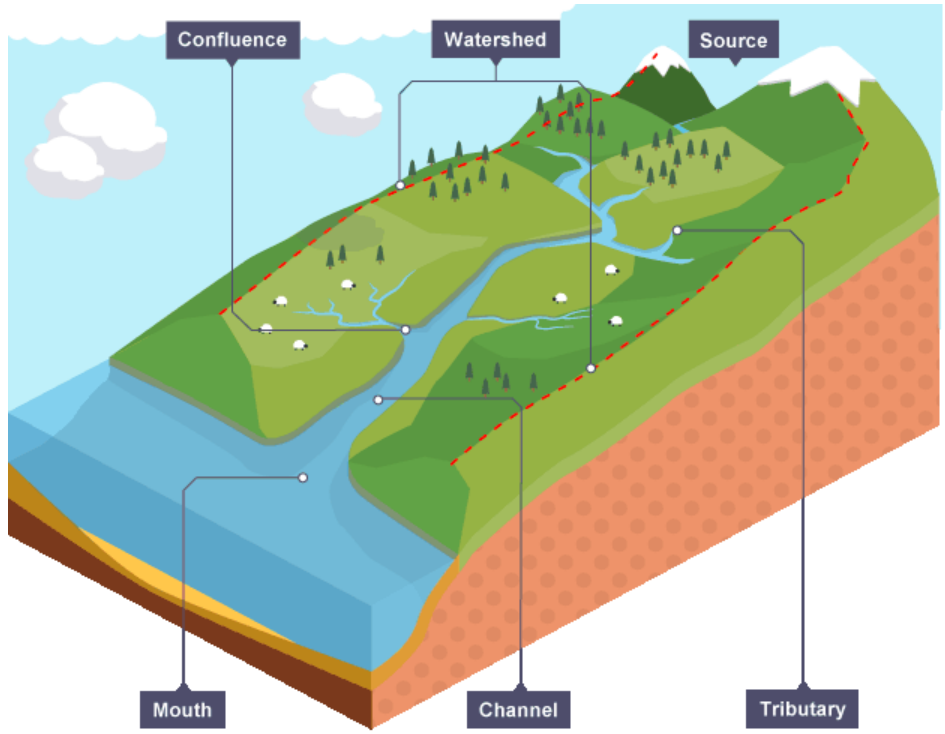
The point at which a stream comes into a large body of water, like an ocean or a lake is called the mouth. Where the stream meets the ocean or lake is an **estuary**

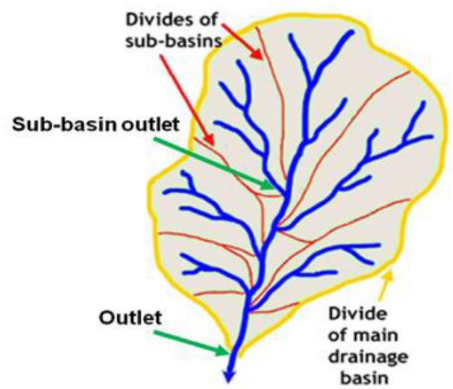
Rivers are the largest types of stream, moving large amounts of water from higher to lower elevations

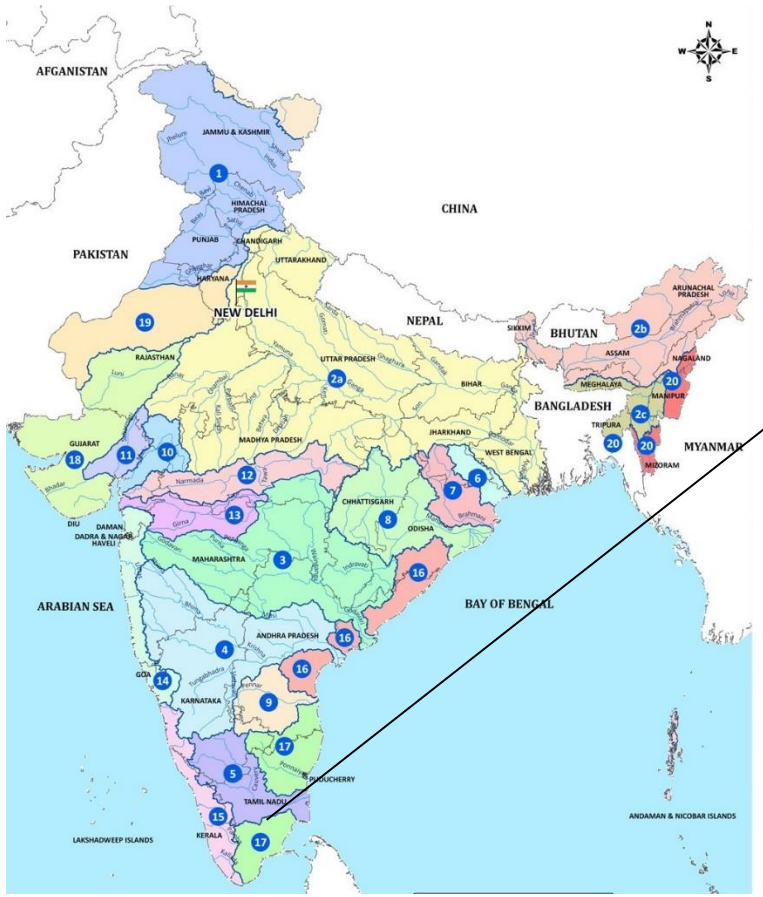
A drainage basin is the area of land that it drained by a river and its tributaries. When a droplet of water falls onto the land (as precipitation), gravity will make sure that the water is 'pulled' downhill to return to the sea.

Characteristics of the drainage basin

- **Drainage basin** - the area of land drained by a river.
- **Catchment area** - the area within the drainage basin.
- **Watershed** - the edge of highland surrounding a drainage basin which marks the boundary between two drainage basins.
- **Source** - the beginning or start of a river.
- **Confluence** - the point at which two rivers or streams join.
- **Tributary** - a stream or smaller river which joins a larger stream or river.
- **Mouth** - the point where the river comes to the end, usually when entering a sea.



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JHARKHAND
WEST BENGAL
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MADHYA PRADESH
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ANDHRA PRADESH
GOA
KARNATAKA
PUDUCHERRY
TAMIL NADU
KERALA
LAKSHADWEEP ISLANDS
ANDAMAN & NICOBAR ISLANDS
ARABIAN SEA
BAY OF BENGAL


KARNATAKA
KERALA
Bay of Bengal


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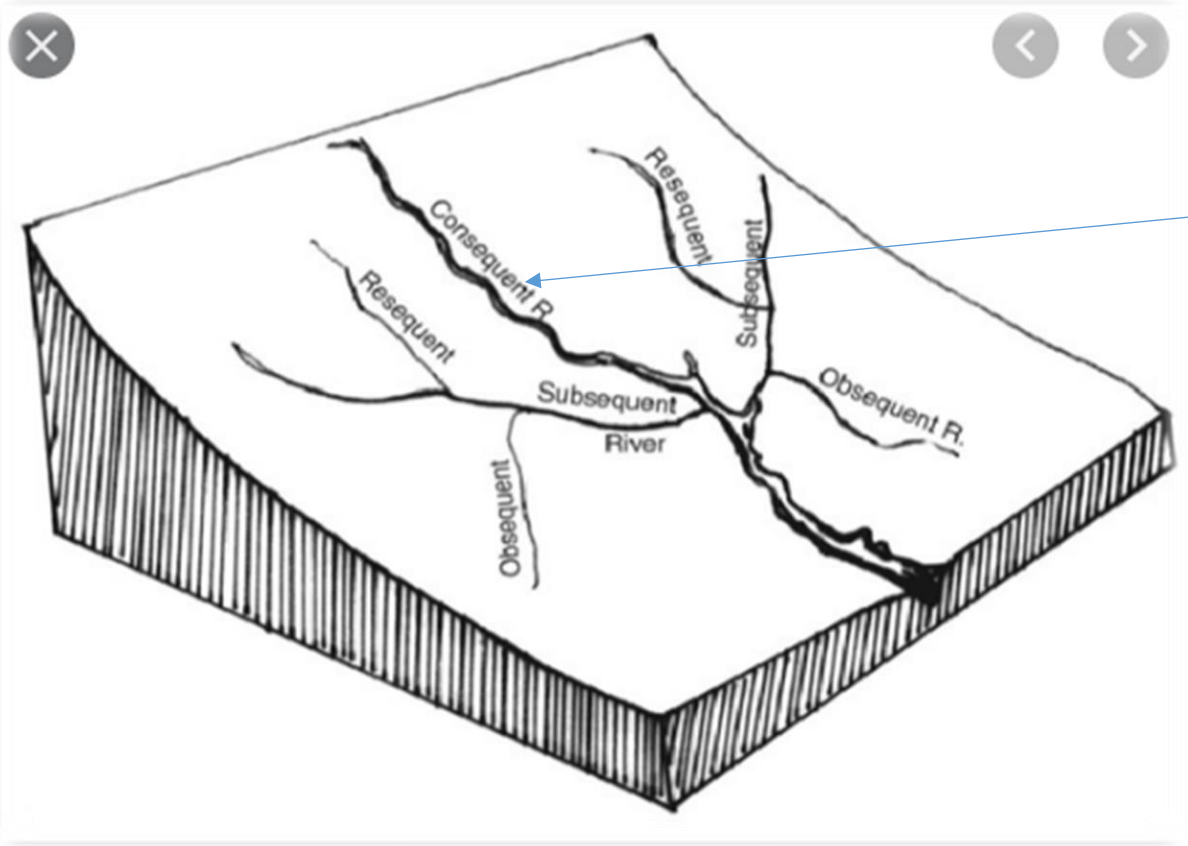
TYPES OF STREAMS

Streams are classified into various types.

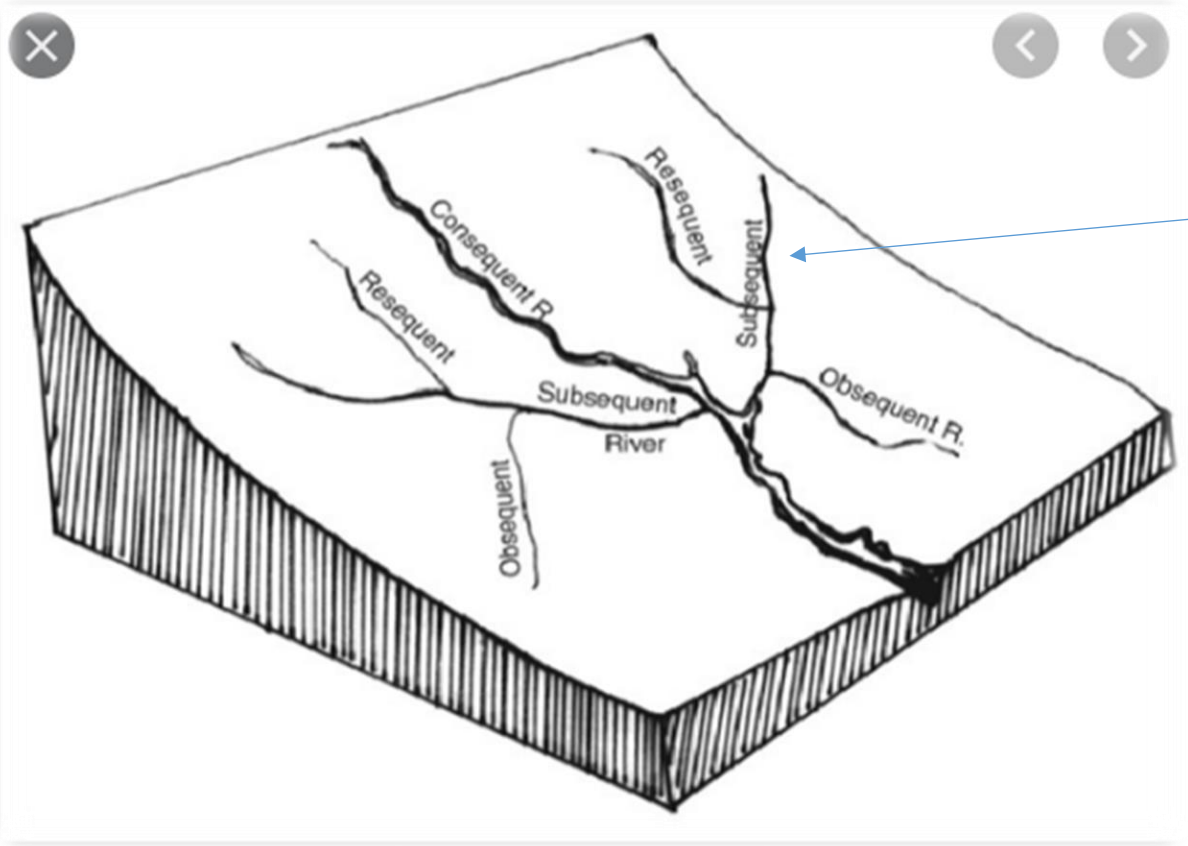
They are:
Perennial or ephemeral streams
Intermittent streams
Consequent streams
Subsequent streams
Obsequent streams
Superimposed drainage
Antecedent drainage

Consequent streams



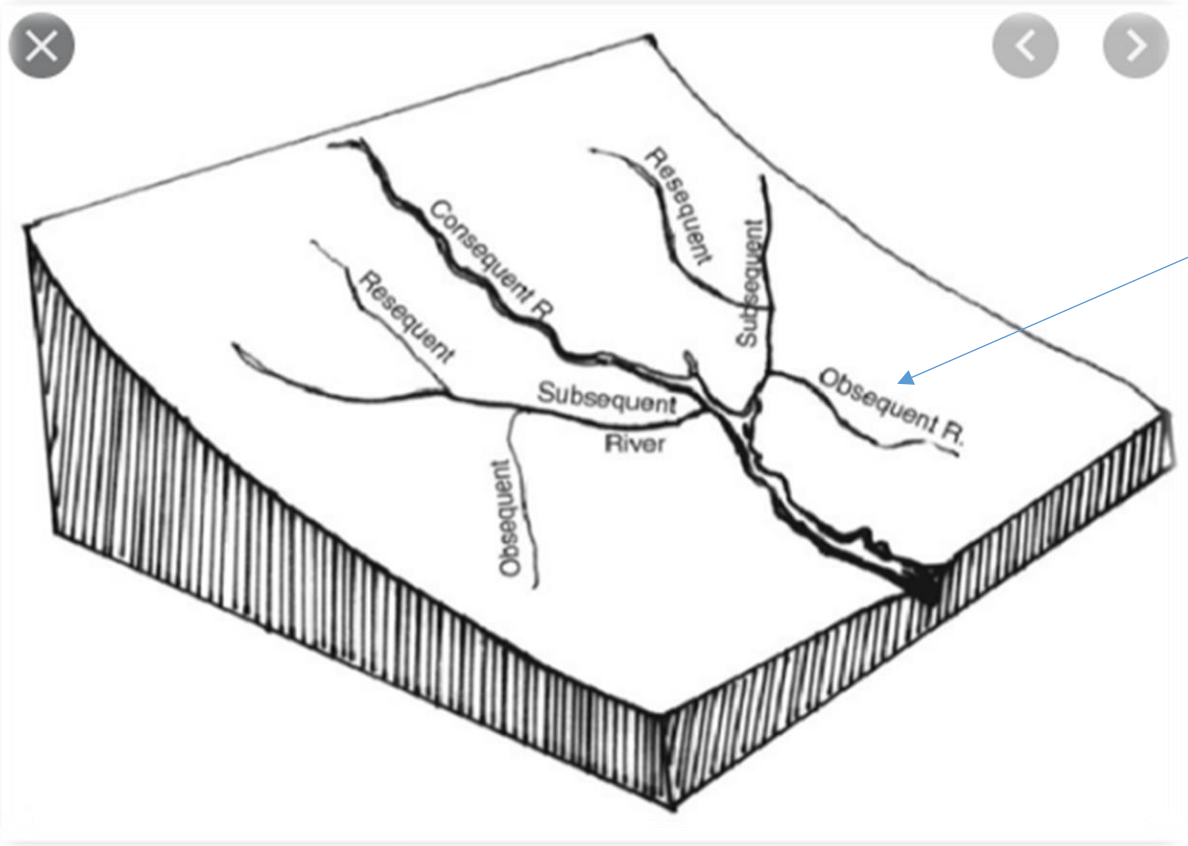
Consequent streams are stream channels developed along the slope of a region as the first formed streams. Their courses are fully influenced by the slopes and natural irregularities of the area. Their size grows due to headward erosion, valley deepening and widening. They develop their own tributaries.

Subsequent streams



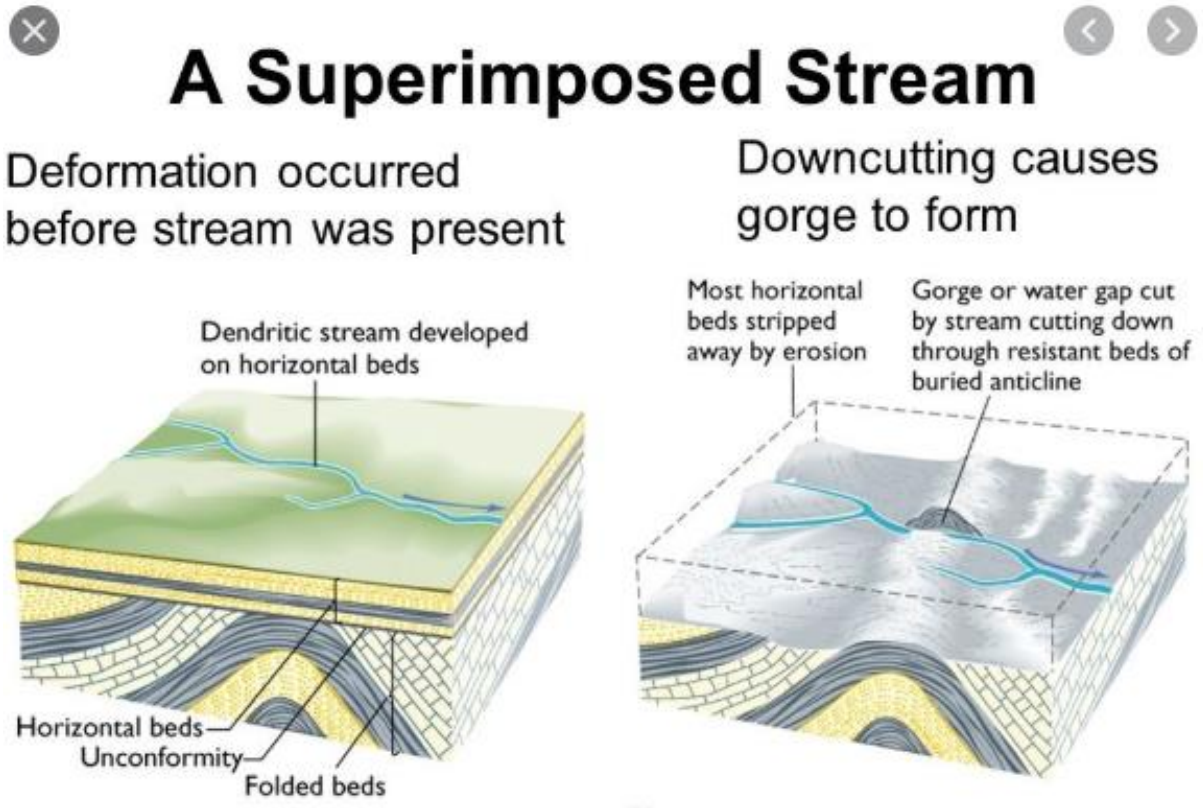
Subsequent streams are developed after the creation of consequent streams. They develop secondary slopes and tributaries with valleys. In these, the tributaries are developed at nearly right angles to the main stream.

Obsequent streams



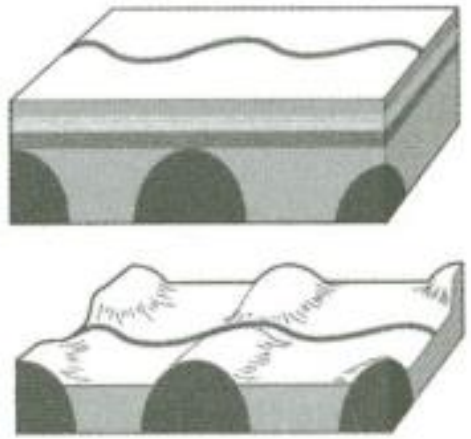
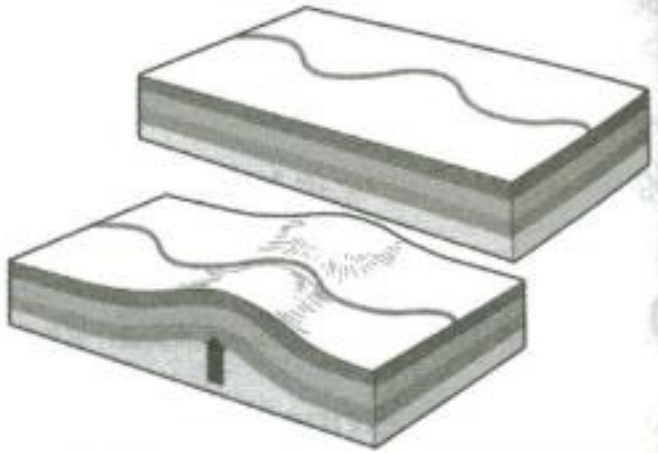
Obsequent streams are tributaries that do not flow at right angles to the main stream. They even flow at opposite directions to the main stream.

Superimposed drainage



superimposed drainage (epigenetic drainage) A drainage pattern that has been established on an earlier surface (perhaps conformable with the immediately underlying strata, and standing well above the present landscape

It is also called as **discordant/epigenetic/superinduced** river. It is formed when a stream with a course originally established on a cover of rock, is now removed by erosion, so that the stream or drainage system is independent of the newly exposed rocks and structures

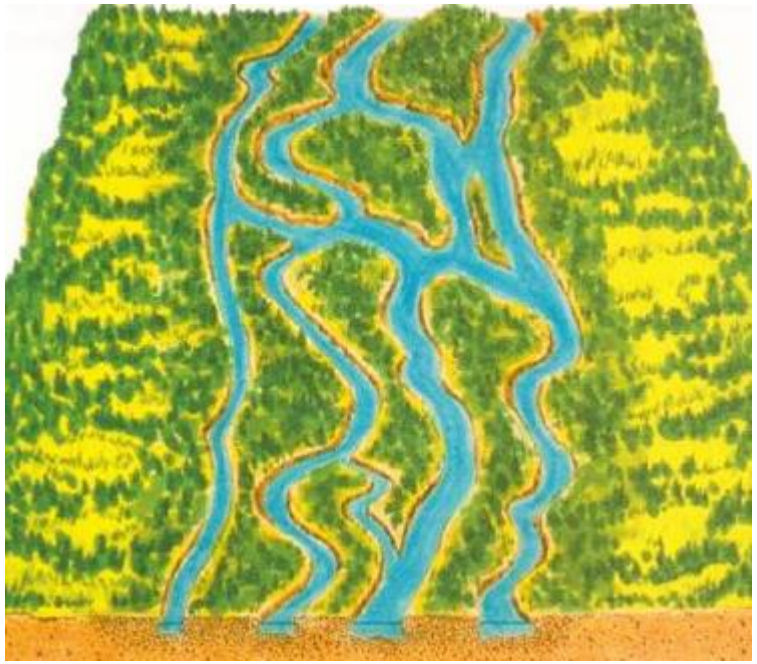
Superimposed drainage	Antecedent drainage
	
• A river flows over an area where sediment covers a previously formed landscape. • The river removes the sediment and then continues to flow over the uncovered landscape. • The river will erode into the exposed structures creating gaps or poorts. • The river is therefore younger than the features it flows over and erodes into.	• The river developed first. • The area then underwent change as a result of faulting, folding, or warping. As these tectonic movements occurred, the river continued in its same course eroding at the same rate that uplift occurred. • The river eroded gaps and poorts. • The river is therefore older than the structures it flows over.

Antecedent drainages develop when there is a tectonic movement of crustal blocks.

Due to mountain building and other tectonic displacements, a river may take a new direction of flow. Such streams are called as antecedent drainages.

Presence of abrupt bends in a river course may indicate this condition.

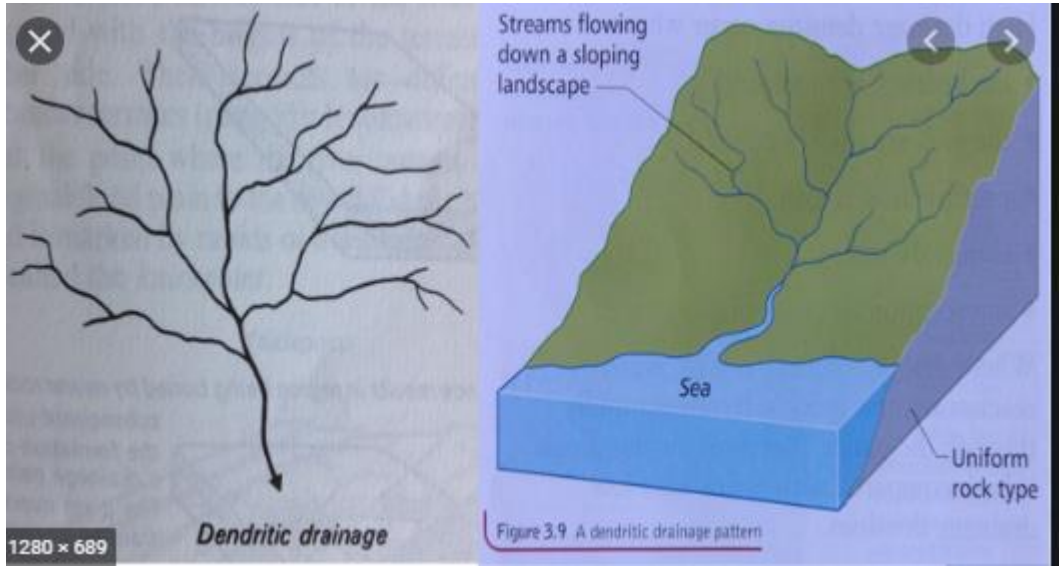
Braided streams



Streams carrying coarse sediments develop sand and gravel bars. These types of bars seen often in braided streams which are common in elevated areas.

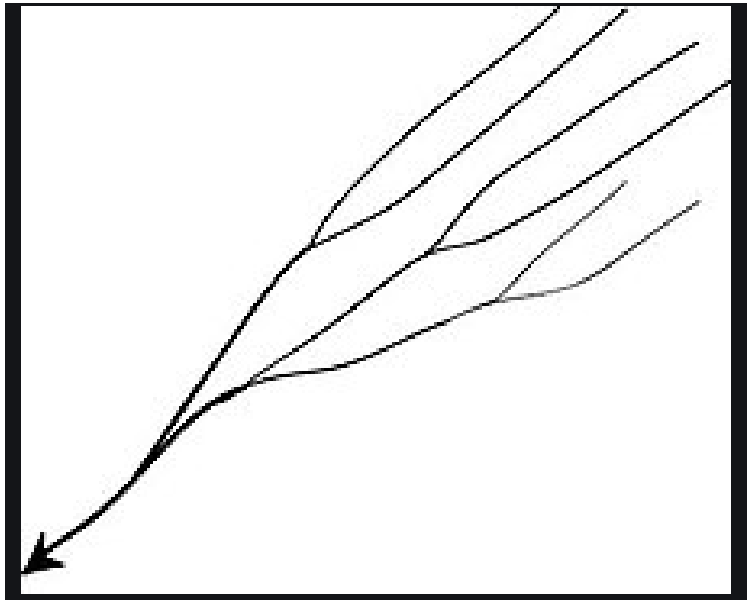
Dendritic pattern

In the Dendritic pattern, the stream network may resemble like the branches of a tree. This pattern develops over a homogeneous geological setting. There is no control over the direction of flow of the tributaries. Most of the tributaries join with the main stream at acute angles (ie. less than 90 degrees).



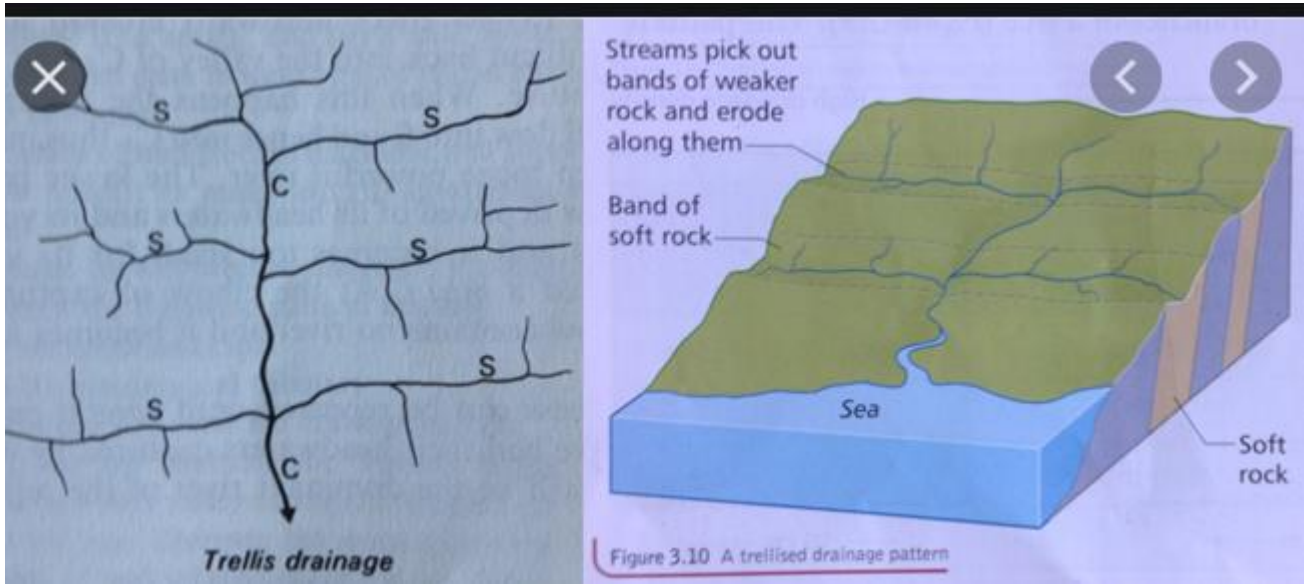
Parallel drainage pattern

In the Parallel drainage pattern, the branching streams follow a parallel course denoting like stripes and join with the main stream.



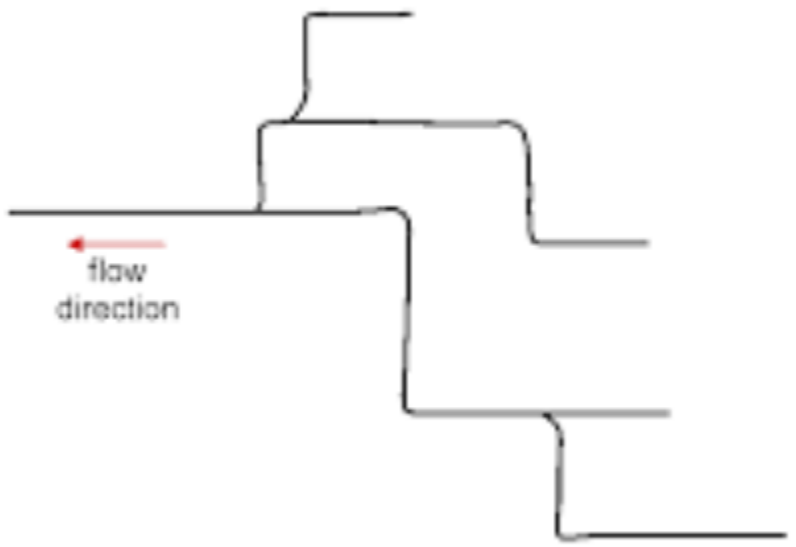
Trellis drainage pattern

In Trellis drainage patterns, the streams may resemble like the garden trellis. Short tributary streams may enter into the main channel at sharp angles.



Rectangular pattern

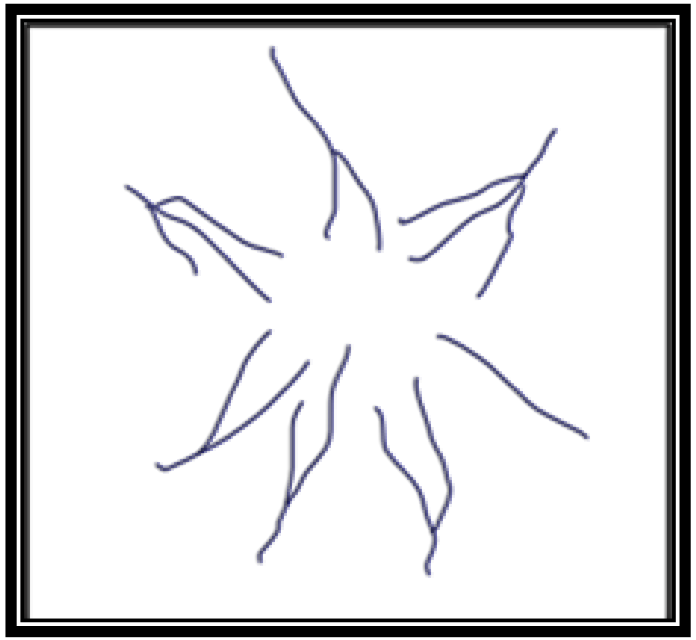
In rectangular pattern, the streams might have been formed due to the presence of rectangular faults. Streams might have followed the path of least resistance along the fault zones.

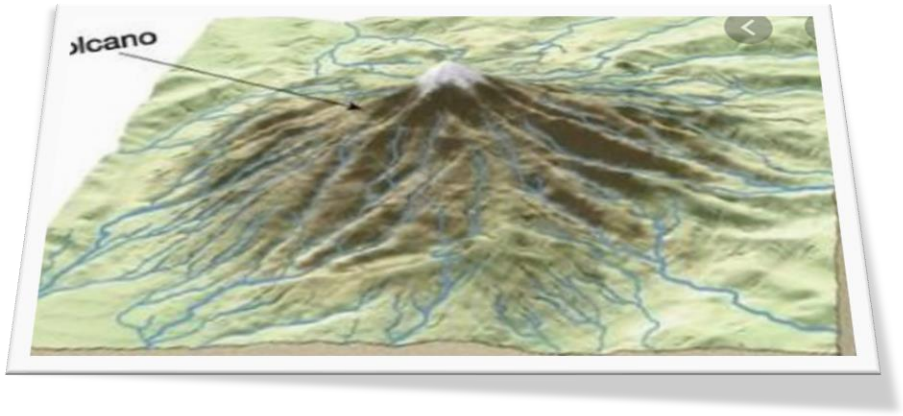


rectangular drainage pattern

Radial Drainage Pattern

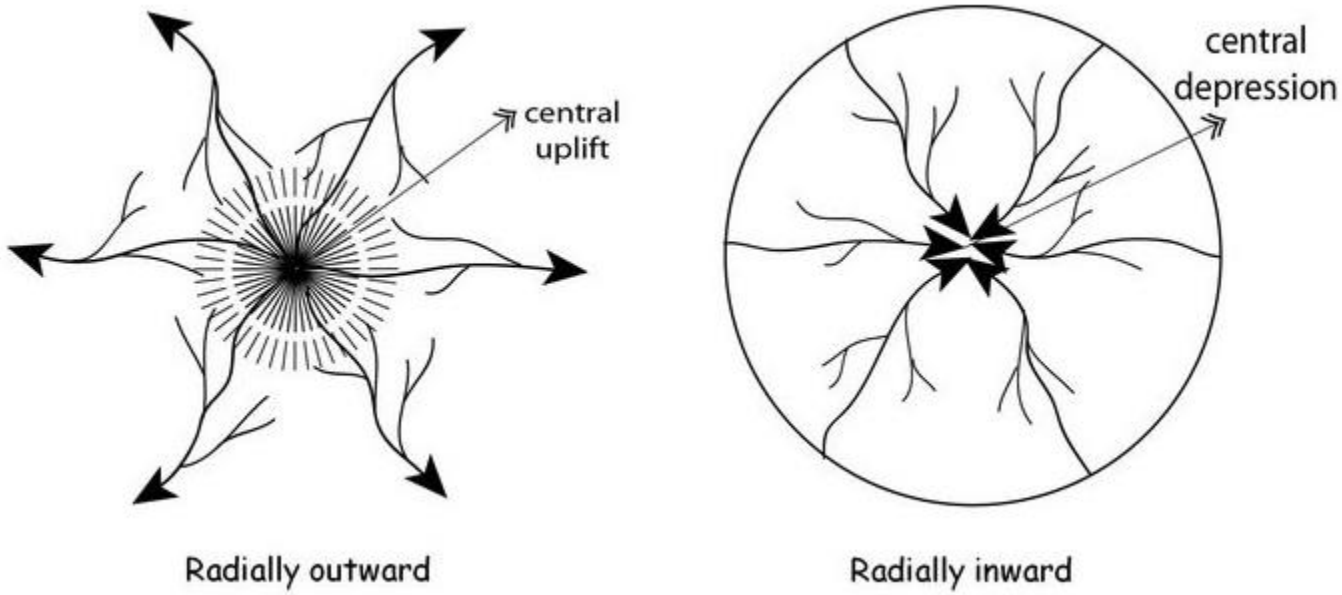
The radial drainage pattern develops around a centrally elevated point. It is common over conically shaped features like volcanoes and domes..





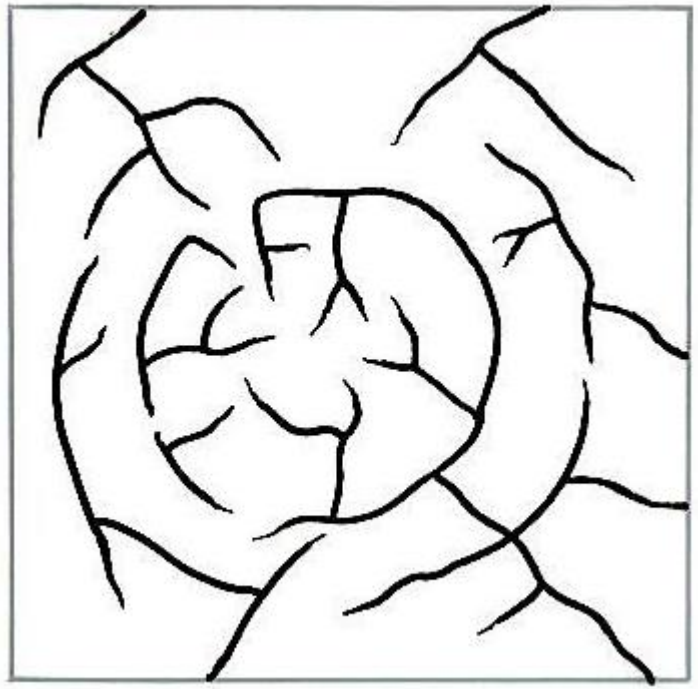
Centripetal Drainage Pattern

The centripetal drainage pattern is just the opposite to that of the radial pattern. All the streams flow towards a centrally located depression. This may be a lake also.



Annular Drainage

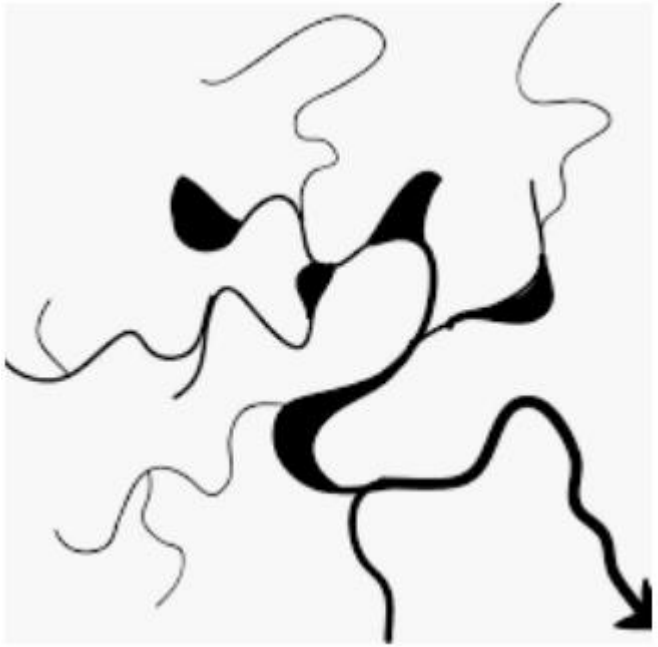
Annular drainage is a ring-shaped drainage system. This type develops over circular underground rock structures like batholiths. The drainage network may develop a series of concentric rings around the batholithic hills.



When the upland has an outer soft stratum, the radial streams develop subsequent tributaries which try to follow a circular drainage around the summit

Deranged Drainage Pattern.

When glacial ice melts, the drainage pattern left behind by the glaciers may be broken and look irregular in their distribution. These irregular, discontinuous and broken drainages belong to the Deranged drainage pattern.



Drainage Basin | Catchment | Watershed | Tributary | Confluence | Stream/River

Perennial or ephemeral streams

Intermittent streams

Consequent

Subsequent

Obsequent

Superimposed Drainage

Antecedent Drainage

Thank You