Fluvial Processes and Landforms

UNIVERSITY OF
South Carolina

College of Arts and Sciences

Part I. Drainage Networks and Watershed Characteristics

A. ***Drainage Density***. Drainage density (D_d) is a measure of how well or how poorly a watershed is drained by stream channels. It is calculated as the total length of all the streams and rivers in a drainage basin divided by the total area of the drainage basin:

$$D_d = \text{total channel length} / \text{drainage area}$$
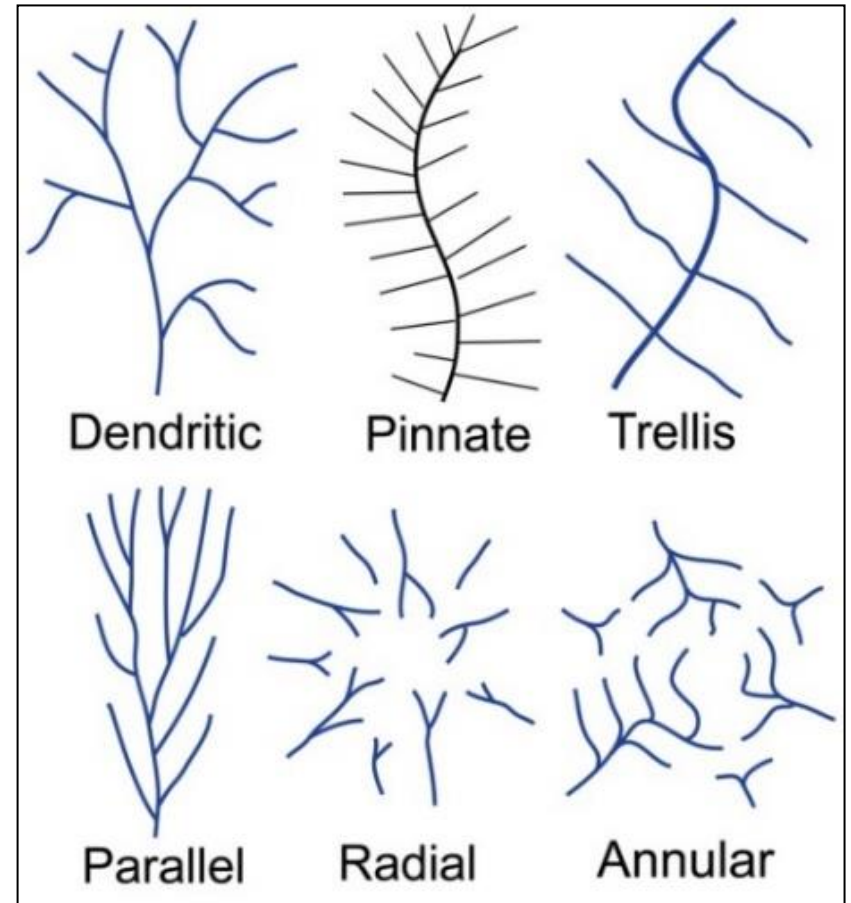
Q1. The Upper Gills Creek watershed contains <u>40 miles</u> of streams and <u>22 square miles</u> of land. Using Equation 1, calculate its drainage density.

$$D_d \;=\; \text{total channel length / drainage area}$$

40 / 22 = 1.8

B. Drainage Pattern. The geometric shape of a drainage network, known as the **drainage pattern**, can occur in configurations ranging from totally random to highly organized. These patterns are often strongly related to geologic structure or history, so their interpretation may be diagnostic of important geologic conditions.

Dendritic Pinnate Trellis

Parallel Radial Annular

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Q2. Look back at the common stream drainage patterns shown in Figure 1. Which best describes the drainage pattern in the Gills Creek watershed?
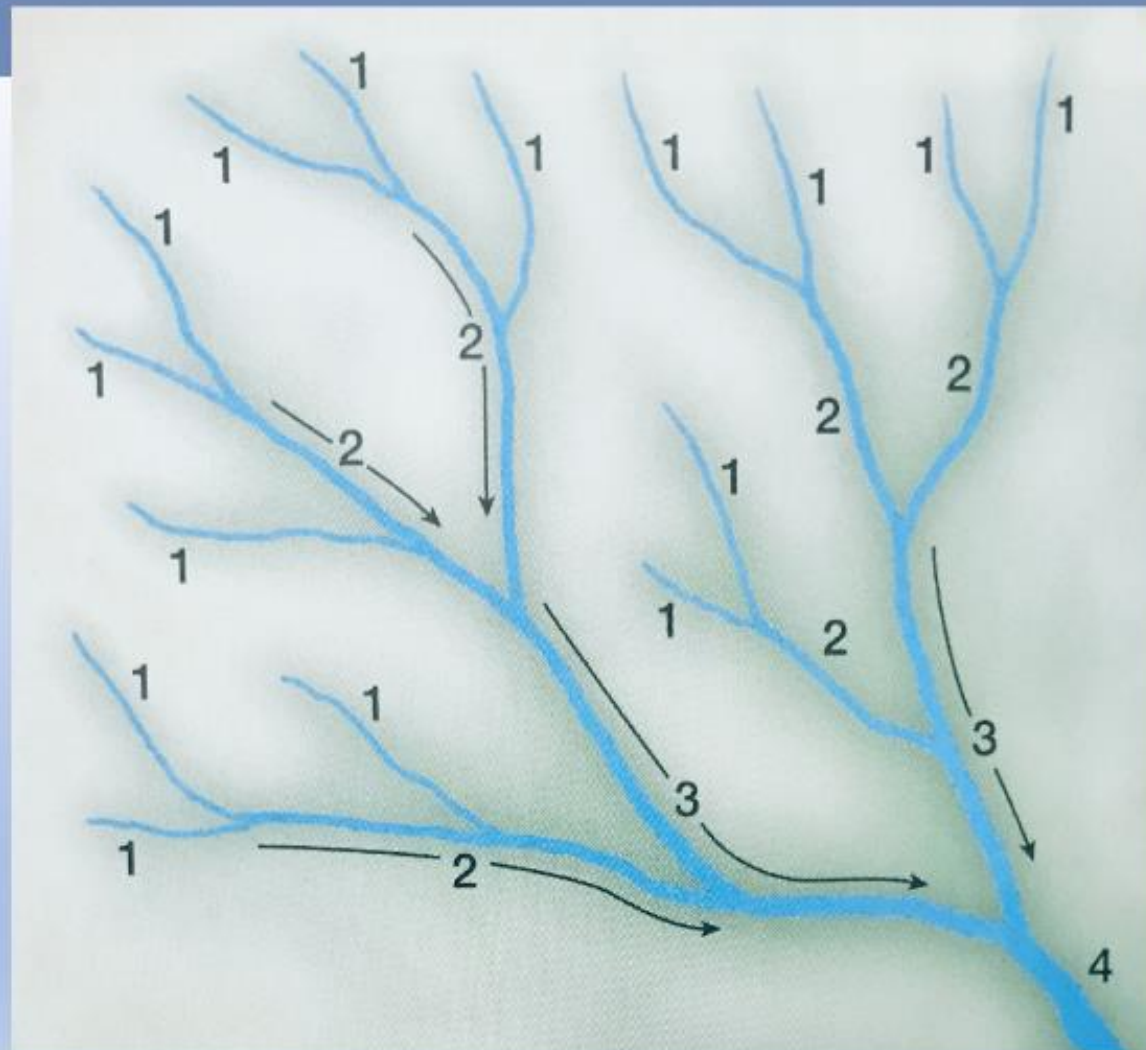
Watershed Characteristics: Stream Ordering

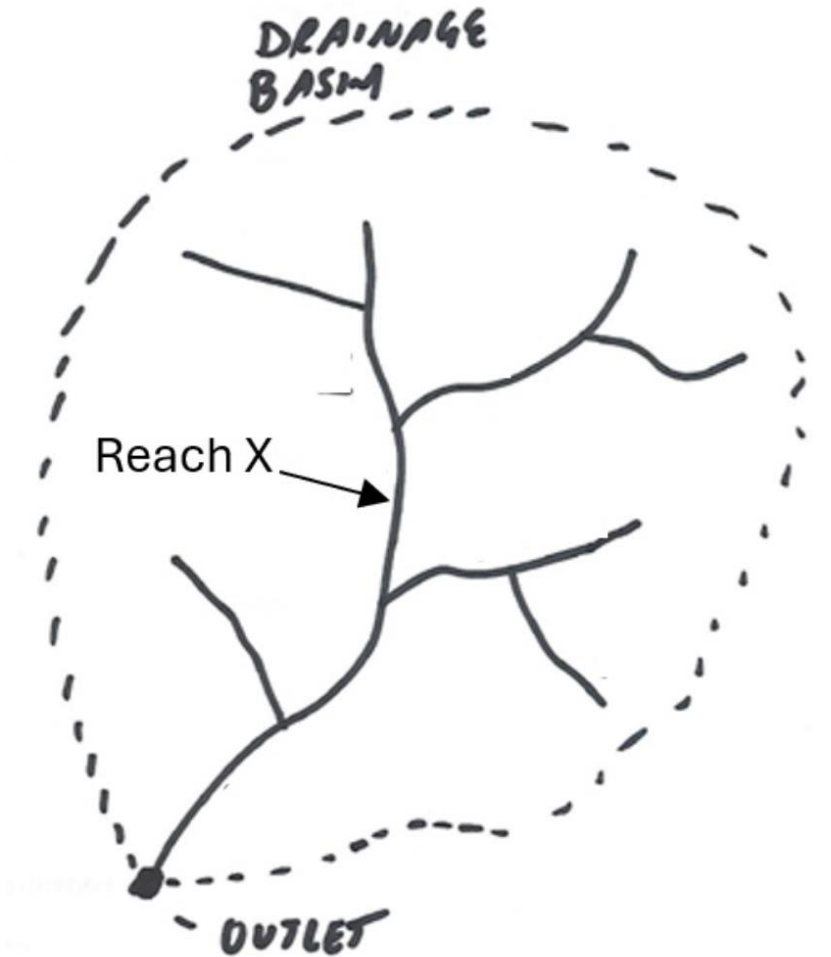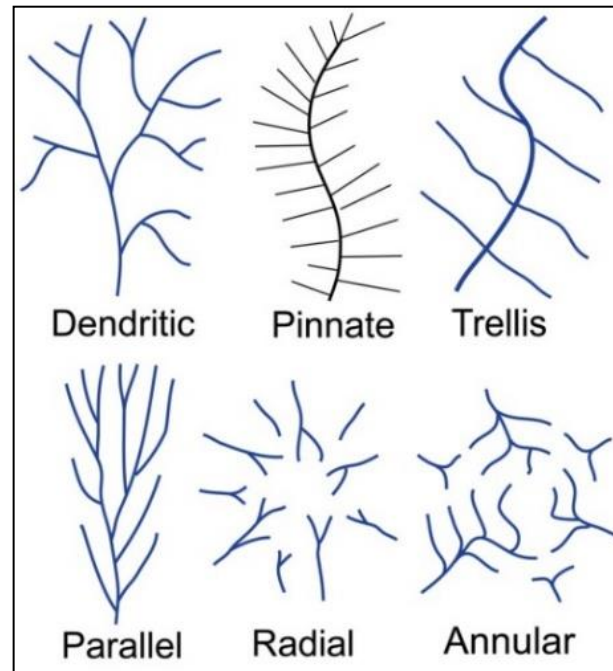**Stream order:** Describes the arrangement and organization of all streams within a watershed

Low numbers have low impact, but are more plentiful

The number of first order streams can equal all other orders combined

Hess and McKnight 2017

The Image Shown is a simple drainage basin and river network. Note the portion of the river labelled Reach **X**.

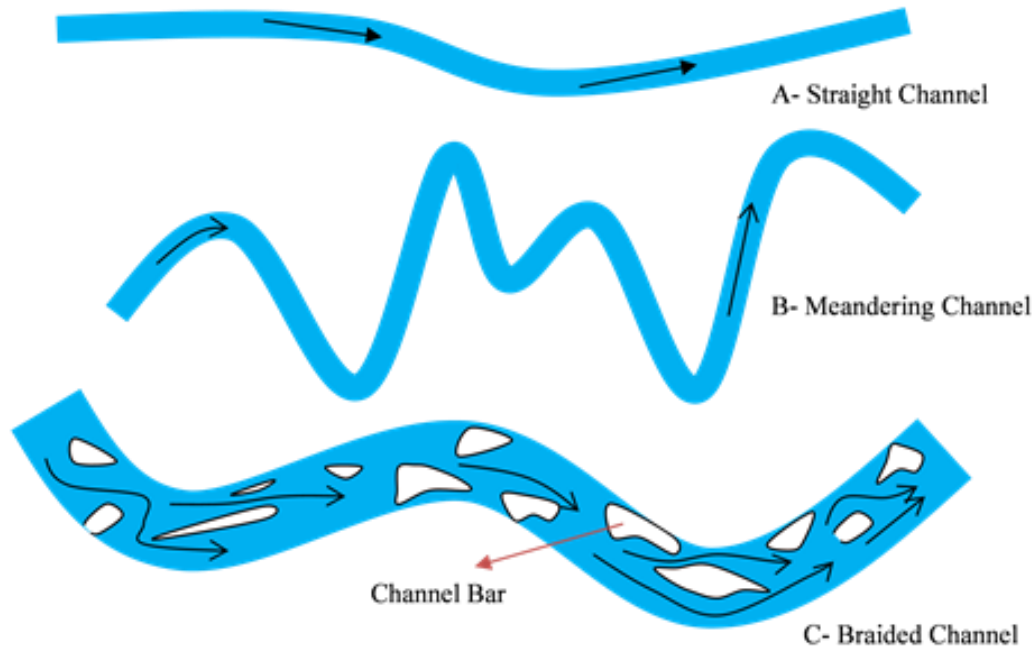Under the Strahler system, what stream order would this be?

Examples of straight, meandering, and braided channel patterns.
Source: https://www.bbc.co.uk/bitesize/guides/zgycwmn/revision/2

Point Bar Formation

https://youtu.be/LCcpS_ATpRY?si=r25a_cnk43VBDnQA

Ox Bow Lake Formation

https://www.youtube.com/watch?v=WbJS_hXrVAc

Source: https://www.youtube.com/watch?v=dOZTrakdlyU