AS Unit F761 – Physical Environments

River Environments

Questions for Investigation

1. What processes and factors are responsible for distinctive fluvial landforms?

2. In what ways can river basins be a multi-use resource?

3. What issues can arise from the development of river basins?

4. What are the management challenges associated with the development of river landscapes?

1. What processes and factors are responsible for distinctive fluvial landforms?

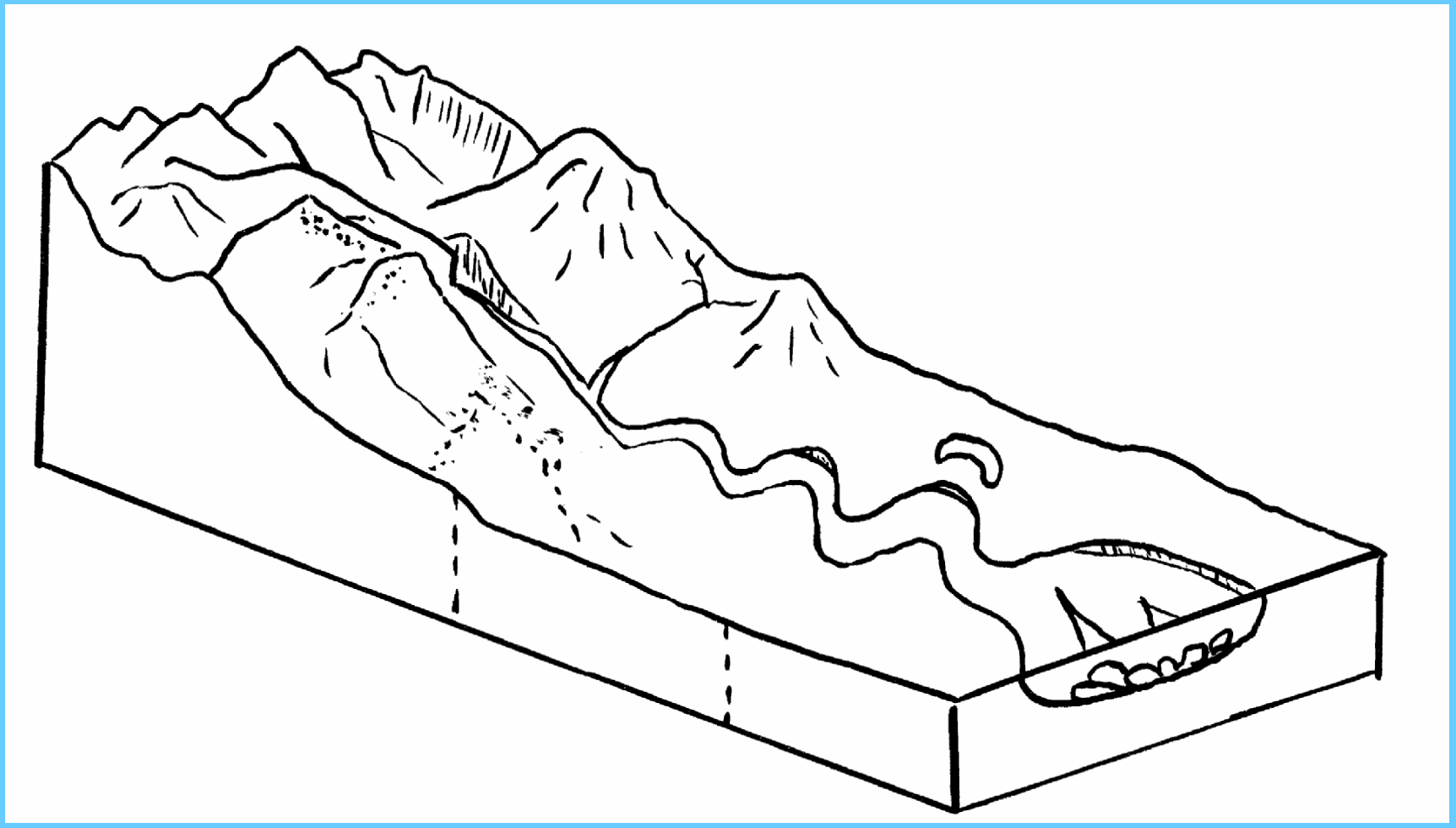
By the end of the lesson you will be able to:

- Identify and explain the difference processes of mass movement that occur on slopes.

- Appreciate the factors that influence slopes and how this effects river processes.

Key Idea: Slope and channel processes give rise to distinctive fluvial landforms. These processes are influenced by a range of factors, which vary from place to place.

To start…Identify the fluvial landforms, then classify them into erosion and depositional



Slope processes

Definition: slopes are defined as any part of the solid land surface where there is an incline (gradient).

Processes operating on slopes have a major impact on fluvial landscapes

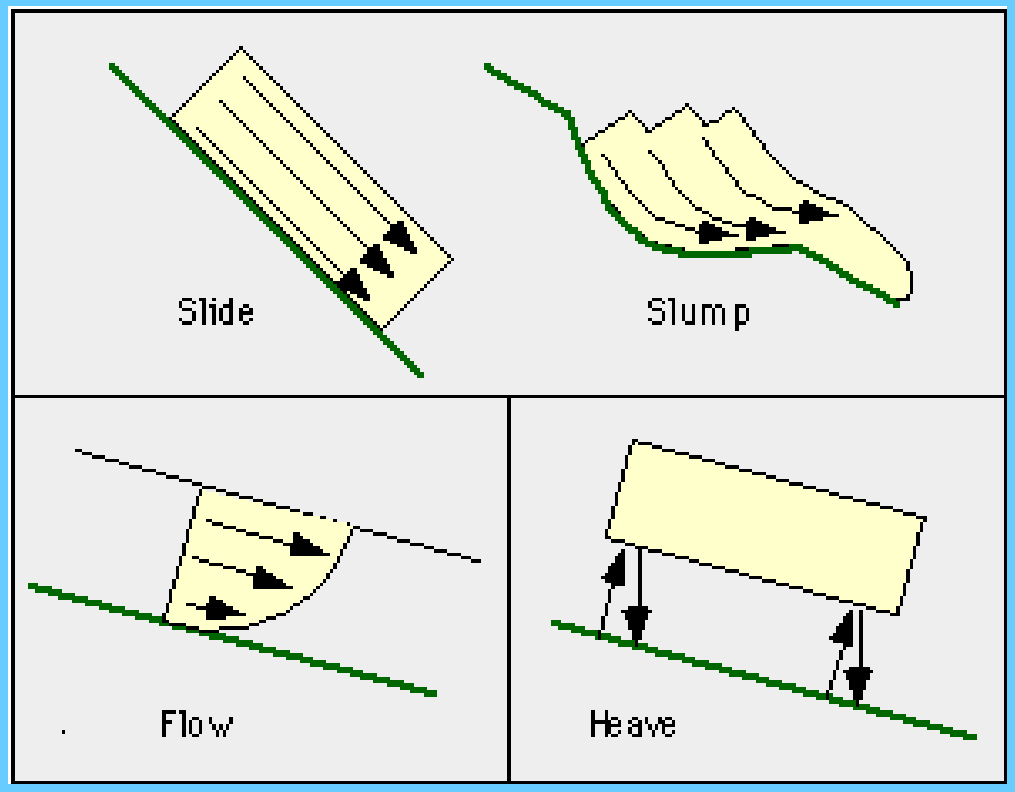
Why?

- Slope processes transfer material down-slope to the river, where it is transported and may be used to erode the channel or bed.

Types of Mass Movement.

Weathered material is moved down a slope under the influence of gravity. This process is called mass movement.

Classification of Mass Movement. Heaves, Slides and Flows.



Classification of mass movement

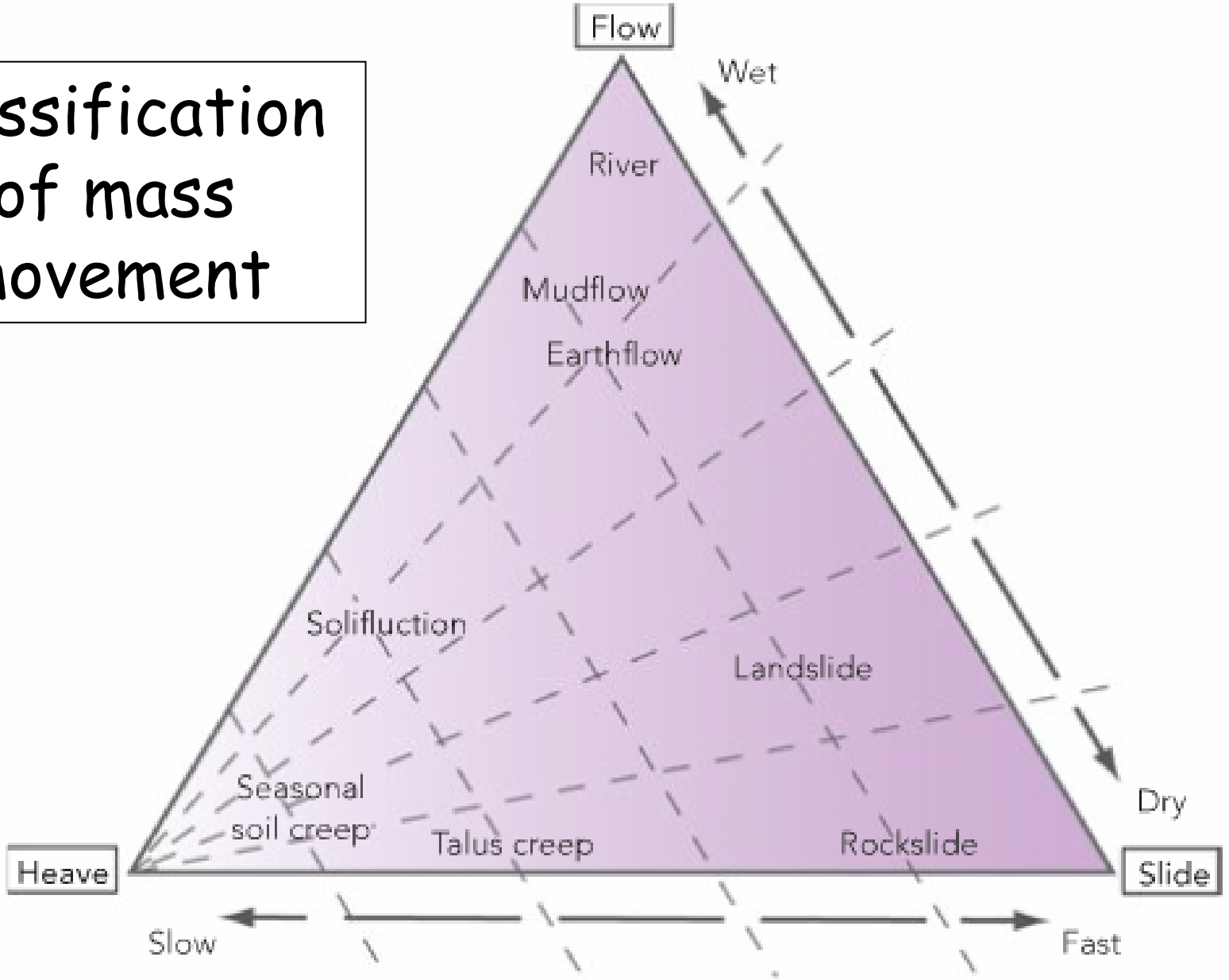
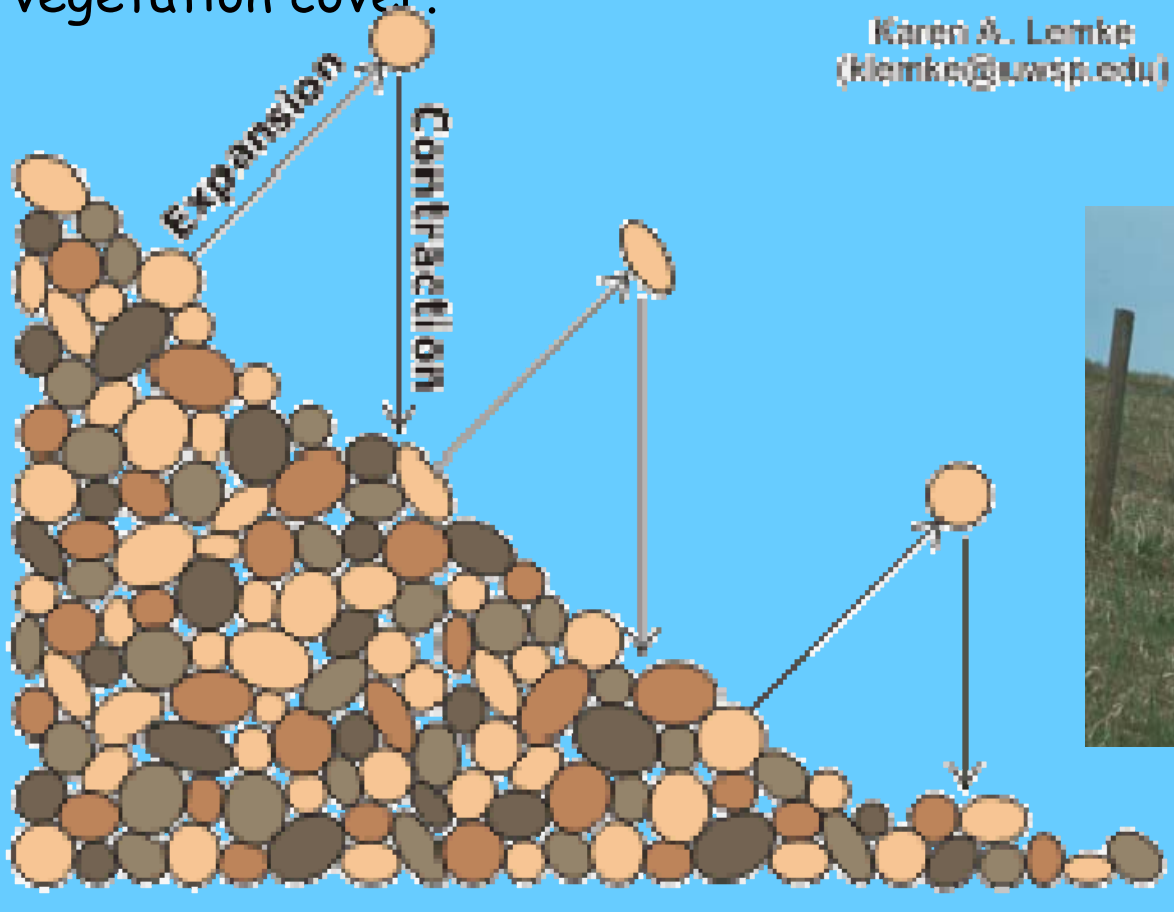


Figure 1.1 Classification of mass movement

<u>Soil Creep (heave)</u> slow movements on a small scale <1mm/yr

•Individual soil particles are pushed/heaved to the surface.

•There are two main causes, wetting and drying and freeze-thaw (ie. where cycles of wet/dry or below/above freezing occur)
•The process is more common on steeper slopes (+5°) and where there is little vegetation cover.



Solifluction – 'flowing soil'

A form of accelerated soil creep (can produce braided rivers).

Found in PERIGLACIAL areas where;

- the surface soil layer is frozen for most of the year but thaws in summer.
- the surface layer gets saturated because water cannot soak into the frozen ground below (permafrost).
- The saturated surface layer flows downhill, even on gentle slopes.

Rain-splash erosion

On flat surfaces raindrops compact the soil and dislodge particles in all directions

But

On slopes the downward component is more effective (due to gravity) and so erosion downslope increases with slope angle

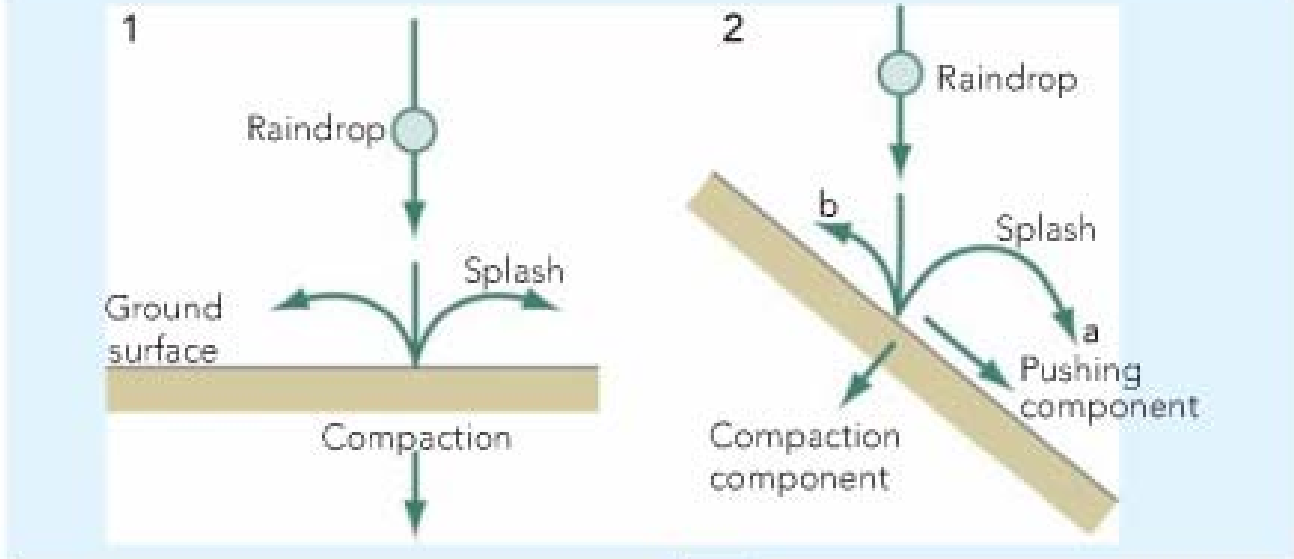


Figure 1.3 Rain-splash erosion

FLOW MOVEMENTS

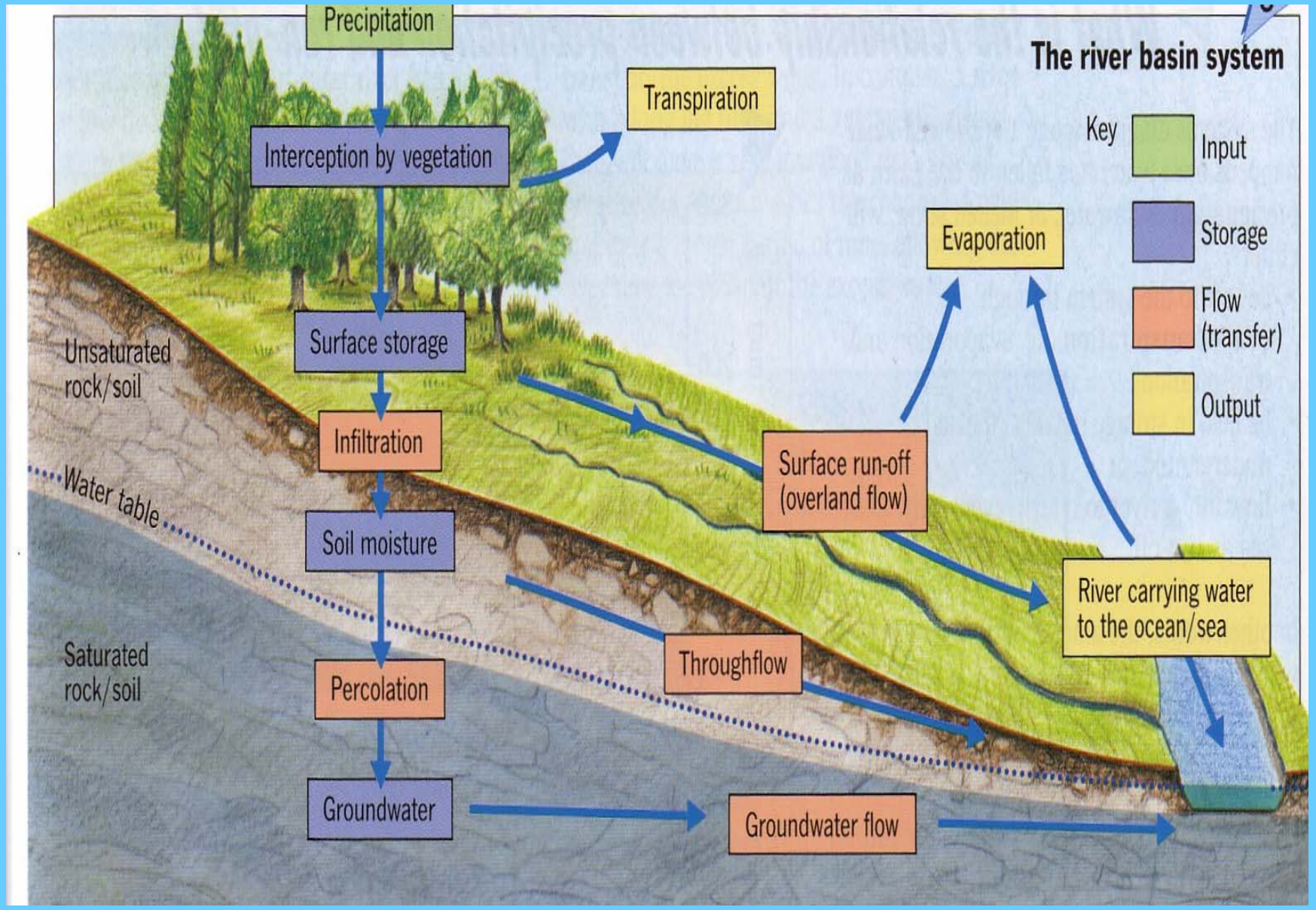
1. **Surface Wash** – occurs when soil's infiltration capacity is exceeded and can lead to the formation of gullies

In UK occurs in winter due to saturated/frozen ground

2. **Sheet wash** – unchannelled flow of water over a soil surface

- Capable of transporting material dislodged by rain-splash
- In UK occurs on moorlands.

3. **Throughflow** – water moving through the soil, can be channelled into natural pipes, this gives it sufficient energy to transport material.


The river basin system
Key
Input
Storage
Flow (transfer)
Output
Precipitation
Transpiration
Interception by vegetation
Evaporation
Surface storage
Unsaturated rock/soil
Infiltration
Water table
Surface run-off (overland flow)
Soil moisture
River carrying water to the ocean/sea
Throughflow
Saturated rock/soil
Percolation
Groundwater
Groundwater flow