RIVER Tees : one river basin - North East of England, from Pennines through Durham and Cumbria.

SOURCE: Pennine Hills; MOUTH: North Sea at Middlesborough

LANDFORMS:

Waterfalls: e.g. High Force near the source of the River Tees. Formed where there's a change in rock from hard Whinstone to soft Sandstone creating a step in the river channel.

V-Shaped valley: e.g. in upper course in the north Pennines Many streams flow down the steep slopes above sea level. Weathering and erosion creates v-shaped valleys.

Meanders: e.g. near Stockton-on-Tees and Yarm. More tributaries join the River Tees making it bigger, with more power to erode. In the middle/lower course river valley becomes wider and flatter, so the river meanders to get rid of energy.

Floodplains: e.g. Lower course. Land is flat (<100m above sea level). Sediment deposited from flood events—some natural levees occur.

PROCESSES AND CLIMATE

CLIMATE: North Pennines = One of the wettest places in the UK, getting intense rainfall. –over 2000mm in the Upper Course. Dries to the east, with conditions seeind less than 600mm a year.

TEMPERATURE: can be colder on higher ground, e.g in upper course. Decreases with 0.5degC with every 100m. Can create freeze-thaw weathering as reach –0.5degC, resulting in mass movement like landslides. This goes into the rivers which can increase the erosive power of the river to make waterfalls and v-shaped valleys by abrasion. July temperatures are warmer reaching 17-21 along the course of the river.

RAINFALL: ground can become saturated during intense rainfall. Causing river banks to slide and slump into river channels. Heavy rain can flow quickly over the surface into the River Tees—water volumes increases rapidly, increasing transportation of material by the river, causing more erosion e.g. in upper course.

PROCESSES AND GEOLOGY (ROCK TYPE

- **Harder rocks** around the edge of the basin have remained as high ground . Harder Whinstone is exposed to freeze-thaw weathering.
- **Igneous rocks** like those in the west are impermeable (no water let in) meaning high rainfall makes lots of surface steams, eroding vertically creating the V-shaped valleys
- **Softer rock (sandstone/Limestone**): are in the middle and lower valleys. Meaning there is lots of laterally (sideways) erosion widening river channel making the meanders

HUMAN ACTIVITY

Managed due to being a flashy river with impermeable rocks in the basin. Can see the river level rise over 1 metre in 15 metres at times of peak rainfall.

1. **Dredging** : Along the River Tees E.g. Seaton Port to reduce sediment from river. Makes wider and deeper becoming more navigable. Does increase erosion downstream and encourage mass movement.
2. **Meander cut-offs:** Victorian era—river straightened at Stockton-on-Tees to make more navigable. Mandale loop shortened river 4km. Does increase velocity and erosion, decreasing deposition. Encourages flooding downstream.
3. **Reservoirs built:** e.g. on Cow Green Reservoi. 2 miles long built in 1967 This limits the natural flow of water downstream. Material is deposited in the reservoir increasing erosion downstream and reducing the natural build-up of the floodplain in the lower course. Stores 41 million m^3 of water
4. **Trees planted**: 1000s of trees have been planed to reduce flooding and erosion by stabilising the soil. Trees intercept water, reducing water in the channel as it doesn't get there so quickly. River has less energy, reducing lateral and ventricle erosion. Meanders and ox-bow lakes less likely to be created.

One river basin in the UK

RIVER TEES

Distinctive landscapes topic