Case study: The River Tees

Where is the river Tees?
The River Tees is located in north-east England. Its source area is high in the Pennines in the west and the river flows eastwards into the North Sea.

Describe the main features of the upper course
The source of the River Tees lies on Cross Fell in the Pennines, 893m above sea level, where rainfall is over 200mm per year. Run-off is high because of the impermeable rocks and the steep slopes. The valley cross-section is steep sided and a V-shaped and the long profile has a steep gradient. The river occupies the whole of the valley floor. The river is turbulent and clear, although often stained brown by the peat which covers much of the moorlands. The river bed is rocky and there are many rapids and a waterfall at High Force. Along this section of the river is one of England's largest waterfalls, with a very deep plunge pool at its base. The cap rock is made of a very resistant igneous rock called *whinstone.* Below the whinstone, there are bands of sandstone and shales as well as some very thin coal seams.

Why does the river Tees have to be managed?
The River Tees has a long history of flooding. The first documented flood was at Croft on the lower Tees in 1356. The Tees valley is also home to a large population and many industries, all requiring a reliable water supply. The river is managed to provide a water supply and to control flooding. In recent years there have also been developments to increase its potential for recreation and tourism.
Cow Green reservoir was built in 1970 to provide water for the growing industries on Teesside. It is a regulating reservoir, storing water in times of plenty and releasing enough for the needs of industry in limes of low flow.

How is the lower Tees Valley managed?
1) The Tees Barrage-was completed in 1995 and cost £54 million. The water is fresher and cleaner and does not mix with the tidal, salt water in the lower estuary. The barrage also reduces the risk of flooding at very high tides or during a storm surge.
2) Dredging-the lower stretches of the Tees estuary periodically improve navigation by maintaining a deep-water channel
3) Cutting of meanders-in 1810, across the neck of the large Mandale loop near Stockton created a shorted route for the river allowing the water to move faster along the channel, reducing the flood risk.
4) Yarm's flood defence scheme-was built after a serious flood in 1995. It cost £2.1 million and has been built with:
- Reinforced concrete walls with flood gates for access by people and vehicles
- Earth embankments
- Gabion (baskets filled with stones) to protect the walls and embankments from erosion.
- Fishing platforms, street lighting and replanting to improve the environment
- Building materials approved by English Heritage to be in keeping with the existing architecture.

5) Improved flood warning systems-now have better liaison with the Meteorological Office, police and other emergency services.
6) New development discouraged-as low-lying land is flood-prone