

The River

- 3800 km in length
- Over 100 major tributaries
- DB covers more than 1/2 of USA
- Flood plain is 200km at it's widest point
- Massively important for economic reasons
- Huge variation between Upper, Middle and Lower courses makes management very difficult
 - Steep upper courses subject to erosion
 - Meandering middle/ lower course, susceptible to flooding

Upper Course

Vulnerable to erosion

Processes

1. Missouri/ Mississippi tribs
 - Steep, high V
 - Lots of MM
 - Low S.Load, mostly bedload
2. Arkansas tribs
 - Mostly dry then lots of rain
 - Temperate grassland replaced by arable crops
 - Excessive sheetwash during heavy rain
 - Rills & gullies
 - Variable S.Load
3. Ohio/ Tennessee tribs
 - Heavy rain, cyclonic + orographic
 - Erosion exacerbated by deforestation & poor farming techniques
 - High S.Load
 - Deep gulleying

Management

1. M&M: No major strategies necessary, little erosion
Dams downstream prevent sediment causing issues downstream
2. Ark: Adaption of farming techniques to semi-arid climate e.g less arable, more pastoral
Stabilisation with more permanent grassland and brushwooding gullies
3. Ohio & Ten: 1930: Tennessee Valley Authority (TVA) established. Soil erosion reduced by:
 - Afforestation
 - Fertilisers
 - Contour ploughing
 - Cover crops
 - Diversification
 - Scientific Agr. Education

Flood Causes

- Excessive rainfall in Appalachians
- Snowmelt Jan-May from Appalachians
- Excessive meanders, low V
- Wide flood plain

Middle Course

Meanders vulnerable to flooding

Management

Construction of levees

- Prevents overtopping but also prevents water re-entering channel after a flood
- And sediment no longer deposited on flood plain, instead in river channel, lowering Q

Dams & Reservoirs

Channelisation

- But river fights, gradient steepened and speed downstream is increased
- Cuts length by 150 miles

Afforestation

Wing dykes increase scour at tips

The Pressures

Social: The flood plain is important for housing.
Large cities such as St. Louis and New Orleans necessitated stabilisation of the meanders and flood prevention

Economic: The middle courses play host to huge maize and cotton crops, huge industry
The Mississippi must be navigable to facilitate economic growth
Delta has it's own industries of oil/gas, fishing and tourism

Environmental: Extensive afforestation required, as well as reinstating of grasslands
More ecocentric tech needed (see below)

Lower Course

Dynamic Delta Deposition

Formation

- Due to excessive sediment load into shallow Gulf of Mexico
- 7 major deltas in the last 9000 years
- River used to flood naturally, allowing growth of delta
- Change of sediment in channels led to deviation of delta

Management

- Flood controls upstream have reduced sediment load
- Levees have prevented annual flood
- Channelisation has increased V at mouth, so delta is elongated
- Lower peak Q leads to salinisation
- Delta is very useful for oil/gas, seafood, farming, and all are under threat as the delta is constantly trying to change

1993 floods

- » 50 000 evacuees
- » 26 000 km² flooded
- » 43 deaths
- » \$12 billion damages

Controversy

- » The USAEC changed the cross section of the river, almost definitely affecting it's bankfull Q
- » Ambiguity about past flood measurements. Flood levels appear to be rising
- » If the levees hadn't burst St. Louis would have been destroyed
- » Levees exacerbated the flood levels, and had been built only for a 100 year recurrence interval

