

What runs but never walks,
Has a mouth but never talks,
Has a bed but never sleeps,
Has a head but never weeps?

River Basics

River Basics

- ▶ Rivers and Streams are areas where the water table meets the earth's surface



Headwaters

- ▶ Beginning of a river
- ▶ Usually found in the mountains
- ▶ Runoff from mountains flow into valleys, valleys become saturated
- ▶ Flows to lowest point



Tributaries

- ▶ Smaller rivers that feed into a big river
- ▶ More found in mountains than on flat land



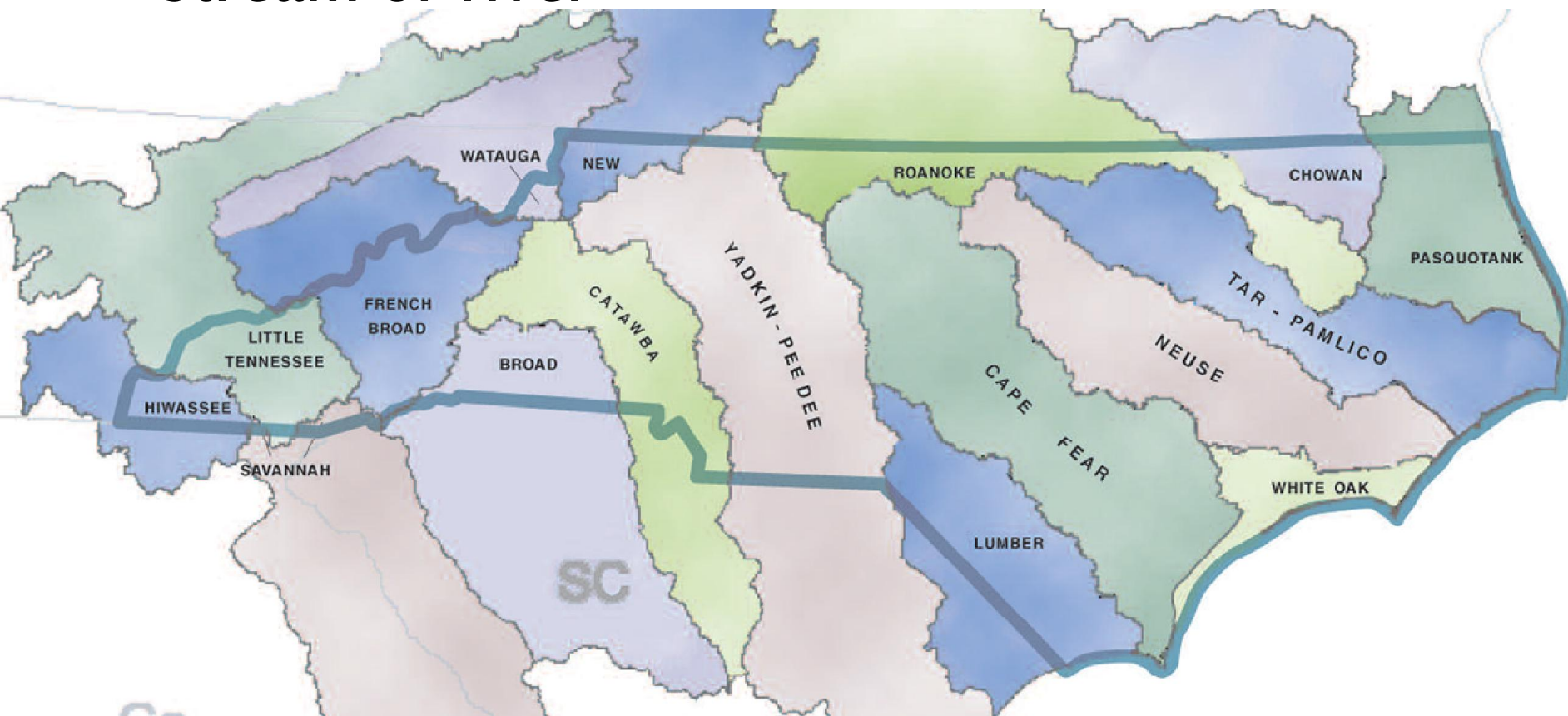
Mouth

- ▶ Where the river flows into a larger body of water (lake, ocean, another river)



Rivers and Streams

- ▶ Watershed/River Basin/Drainage Basin: A region of land that contributes water to a stream or river

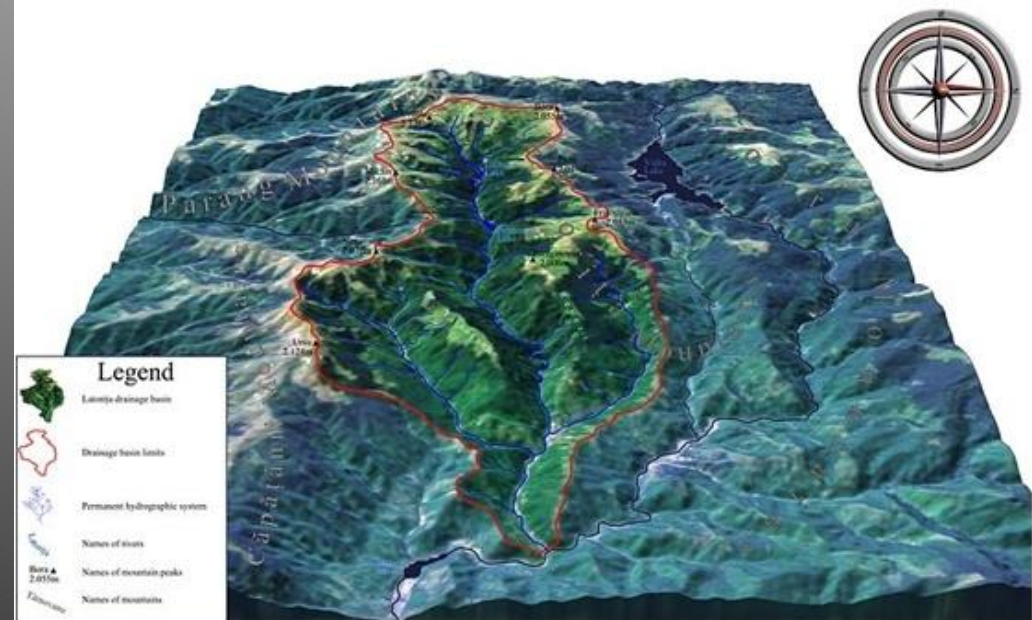


Divide

- ▶ Divide – boundaries that separate streams of adjacent watersheds



Latorița River, tributary of the Lotru River



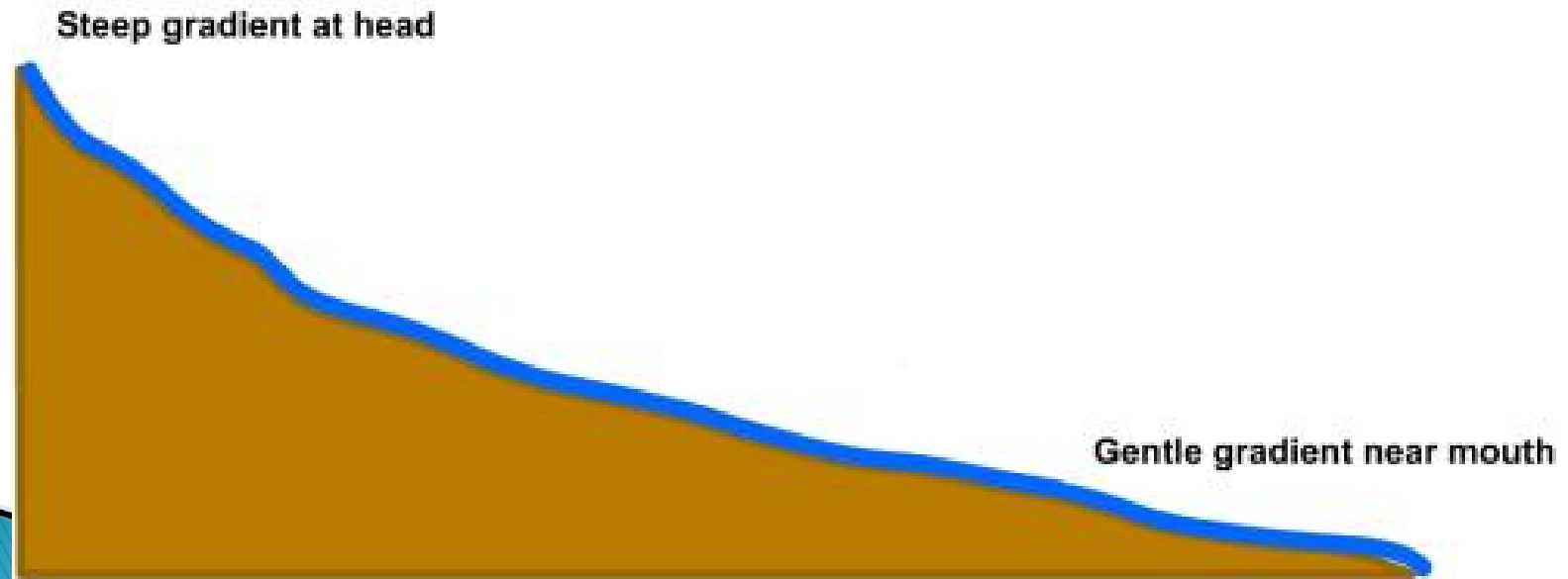
Channel

- ▶ The course the water in a river or stream follows



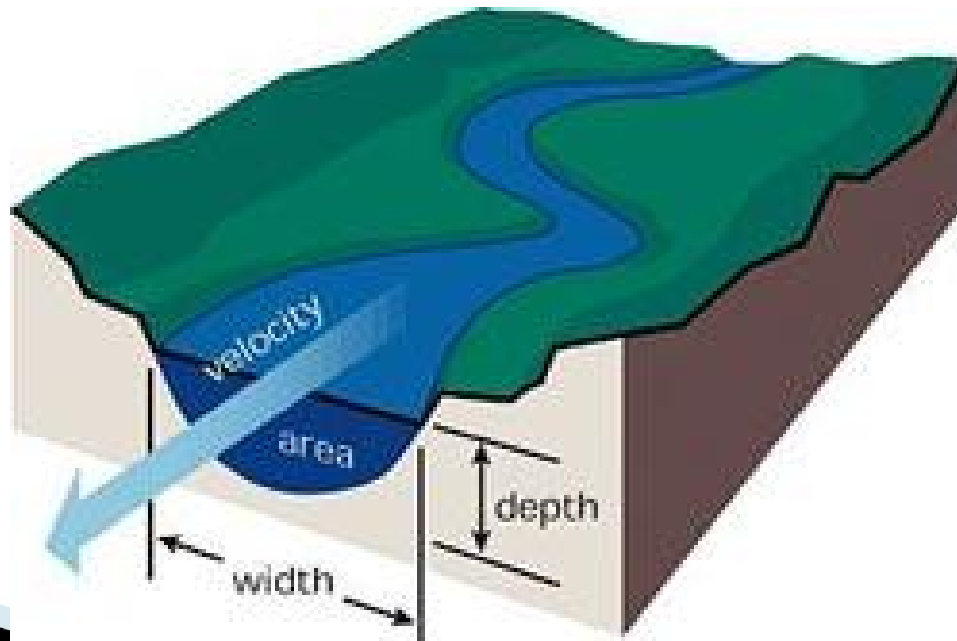
Gradient

- ▶ The slope or steepness of a stream channel
- ▶ Usually expressed as the vertical drop of a stream over a certain distance (change in elevation)




Discharge of a Stream

- ▶ The volume of water flowing past a certain point in a given unit of time
- ▶ Usually measured in cubic meters per second

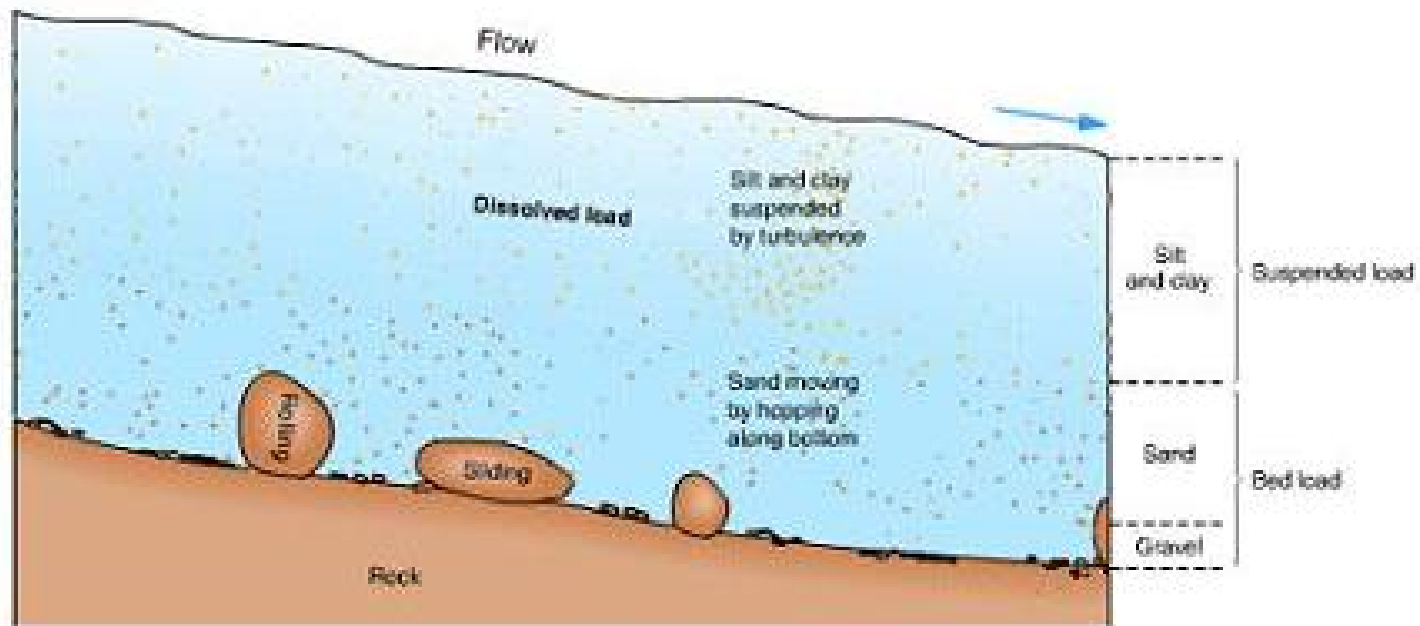


What are the top 10 river discharges in the world?

- ▶ 1. Amazon 175,000 cubic feet per second
 - ▶ 2. Congo. 39,000
 - ▶ 3. Yangtze. 32,190
 - ▶ 4. Plata-Parana-Grande. 22,900
 - ▶ 5. Brahmaputra. 19,200
 - ▶ 6. Orinoco. 18,000
 - ▶ 7. Yenisey. 18,000
 - ▶ 8. Missouri-Mississippi. 17,270
 - ▶ 9. Lena. 16,100
 - ▶ 10. Zambezi. 16,000
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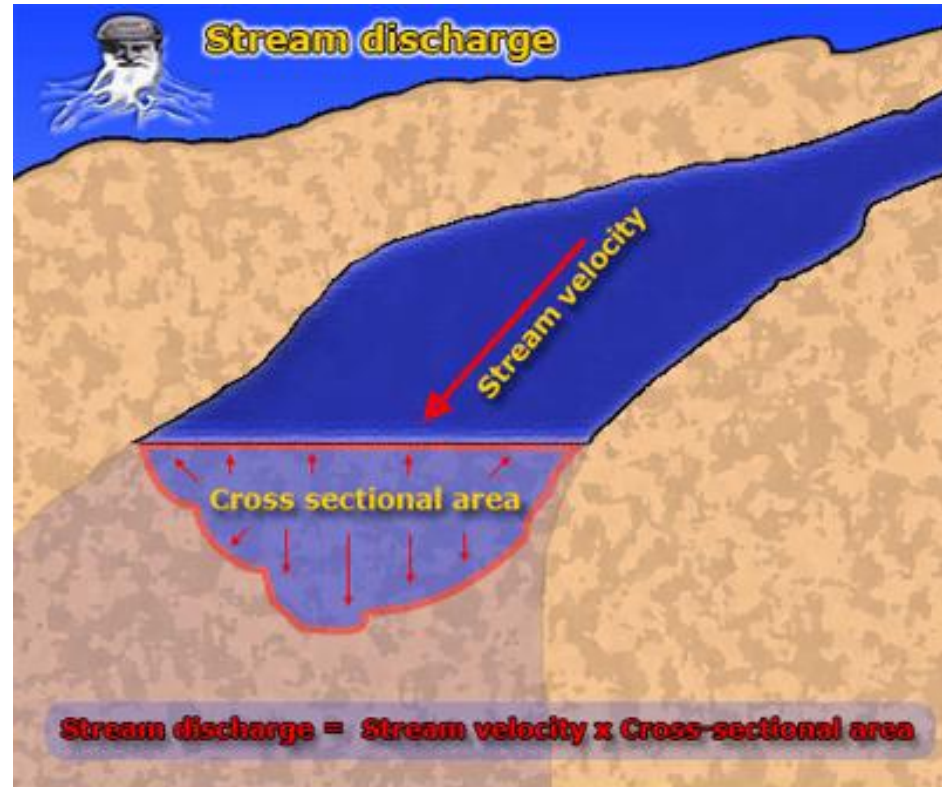
Stream Load

- ▶ Stream load is the solid matter carried by a stream.
- ▶ Erosion removes mineral material from the stream banks adding this material to the regular flow of water.



Stream load


- Higher stream velocity equals higher stream load capacity—streams that move fast erode more and carry more sediment.



Stream Erosion and Deposition

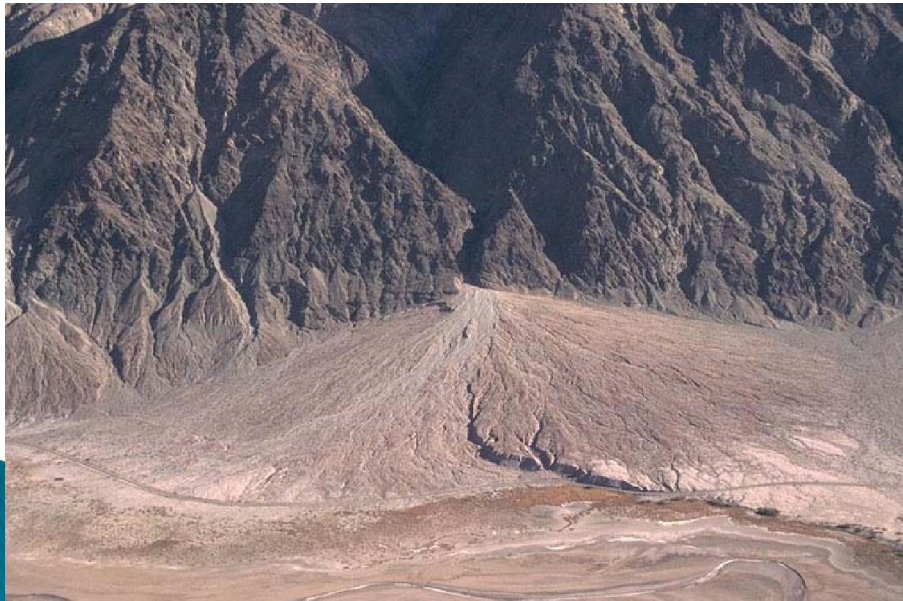


Sediment Deposition

- ▶ Sediment is deposited in a stream when there is a decrease in the speed of the water.
 - ▶ Speed may decrease because of:
 1. Change in gradient
 2. Bed widening
 3. Obstructions
 - ▶ Stream deposition can create landforms or change the river valley
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Alluvial Fan

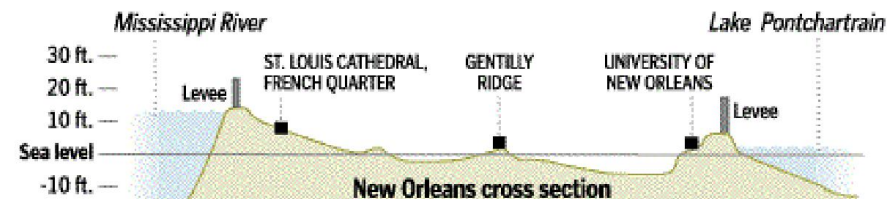
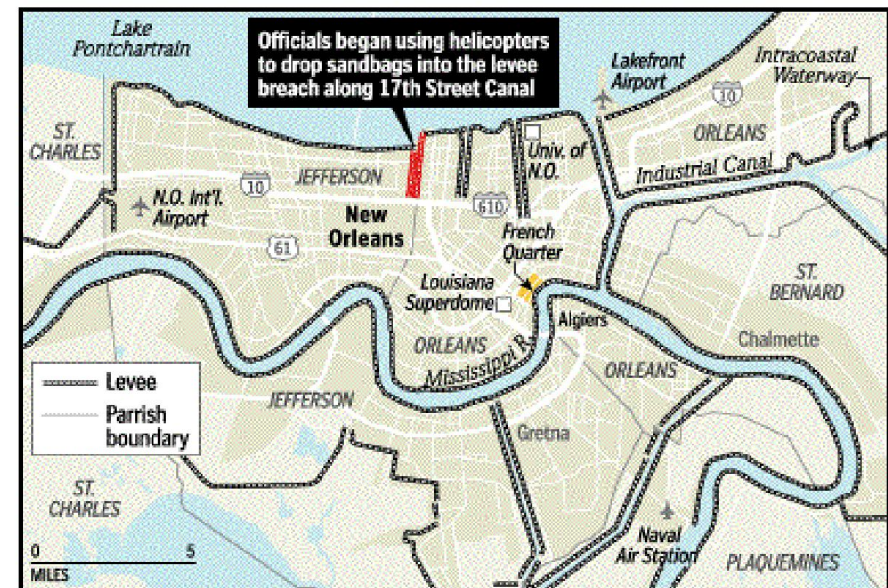
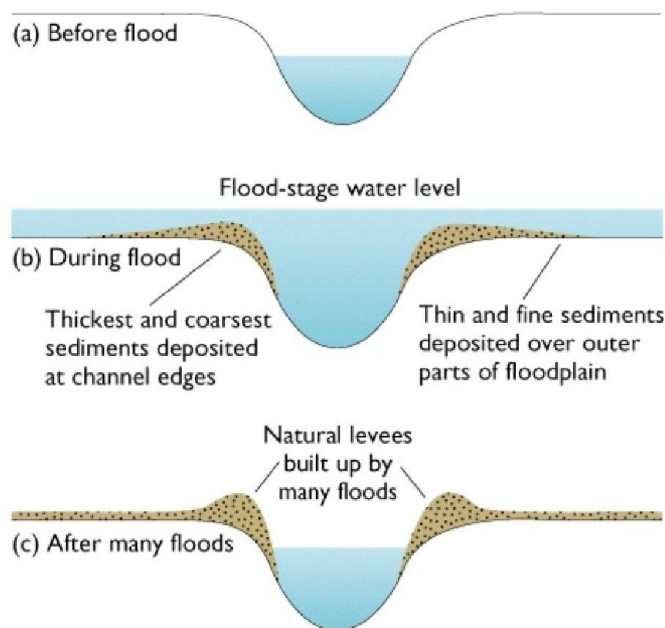
- ▶ Alluvial fan – sloping fan shaped deposit of sediments
 - Occurs where a stream descending a steep slope reaches flat land.



Levees

- ▶ Natural Levees – raised river banks caused by flooding.
- ▶ Artificial Levees – an embankment built to prevent the overflow of a river.

Formation of Natural Levees



Floodplain

- ▶ Floodplain: part of the valley floor covered with water during a flood
- ▶ A floodplain forms where a stream cuts mainly side to side
- ▶ Sediment is deposited making flood plains fertile.



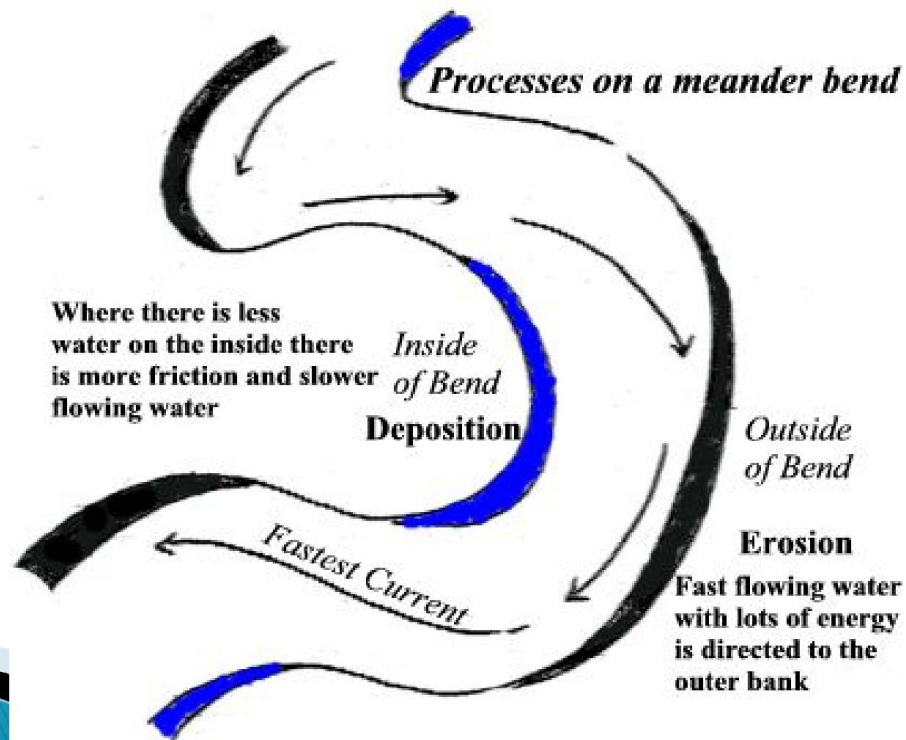
Nile River Floodplain

Flooding Precautions

- ▶ Artificial levees
- ▶ Flood insurance if you own a home in a high-risk area
- ▶ Be prepared to evacuate if need be
- ▶ Limit floodplain development
- ▶ Why limit floodplain development?
 - Allows floodplains to absorb floodwaters
 - Prevents structures from being put in harms way

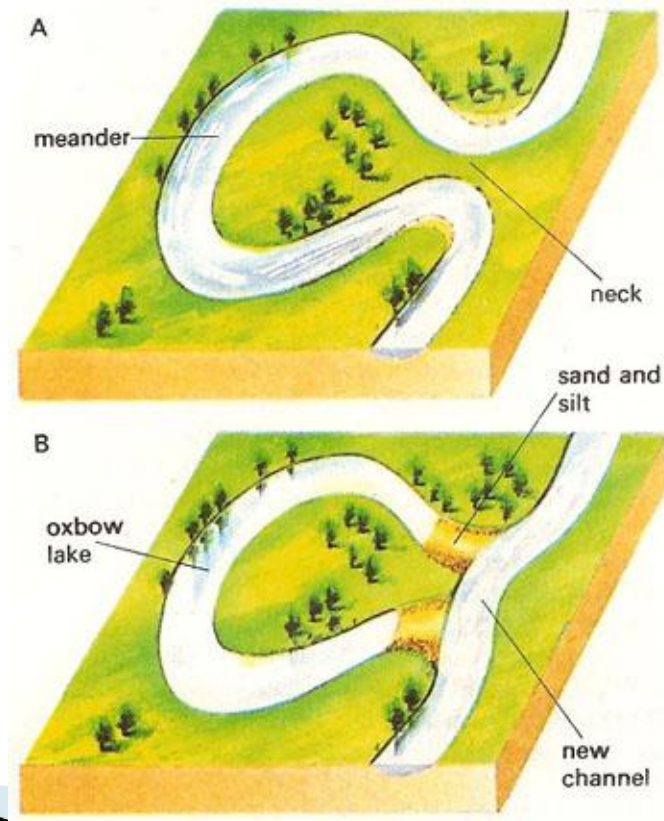
Meander

- ▶ Meanders – curves in a river caused by an obstruction;
 - Erosion occurs on outside of a bend
 - Deposition occurs on the inside of a bend.



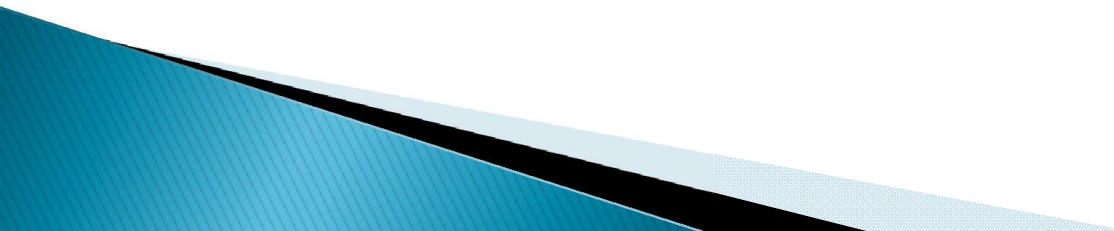
Oxbow Lake

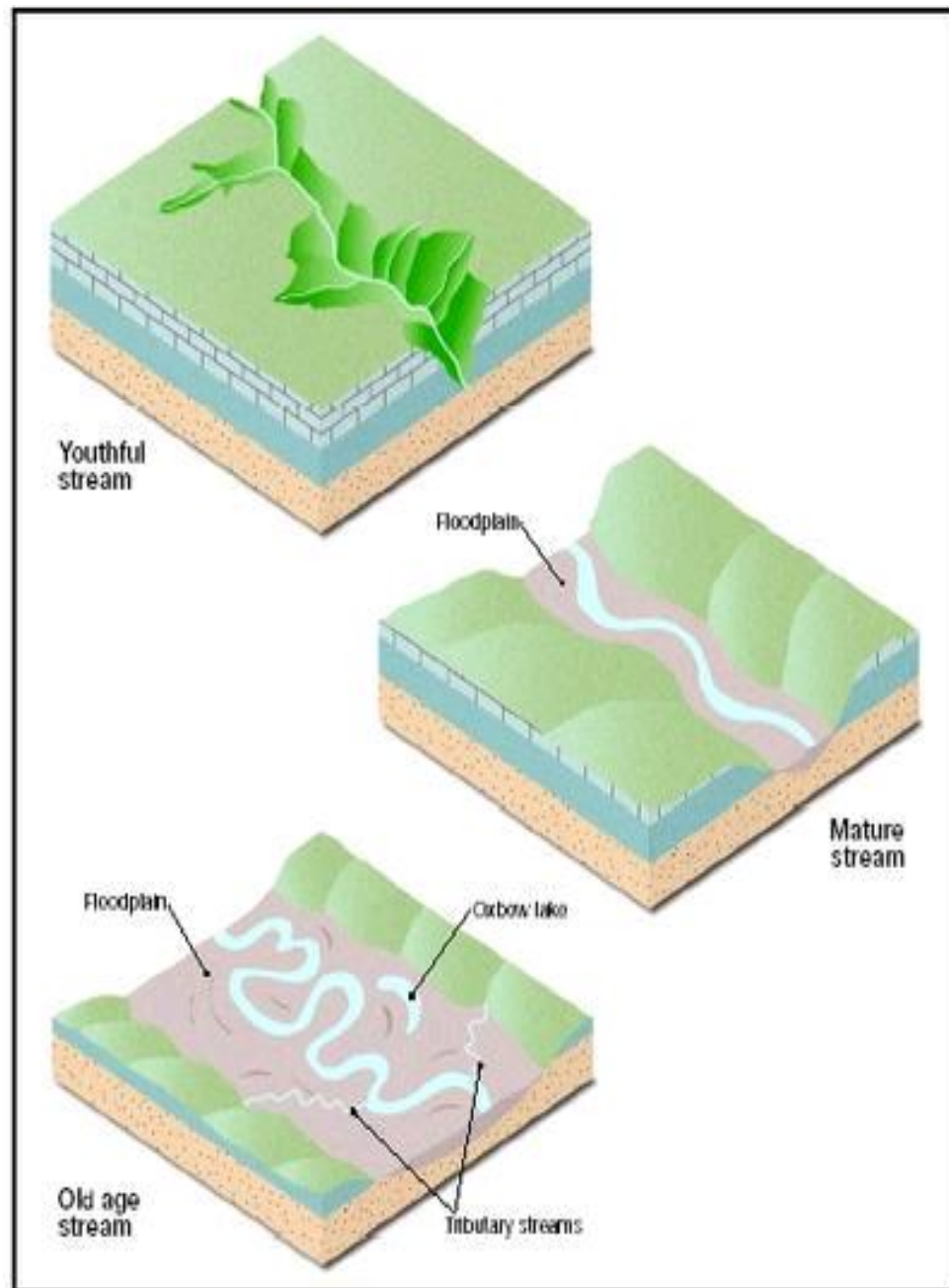
- ▶ Oxbow Lake – crescent shaped body of water resulting when a part of a meander is cut off and abandoned by the river.





Stages of development of a river:

- ▶ Young river– V-shaped channel with steep sides
 - ▶ Mature river: U-shaped channel with more sloping sides and some meanders
 - ▶ Old river: flatter U-shaped channel with sloping sides, lots of meanders, and oxbow lakes
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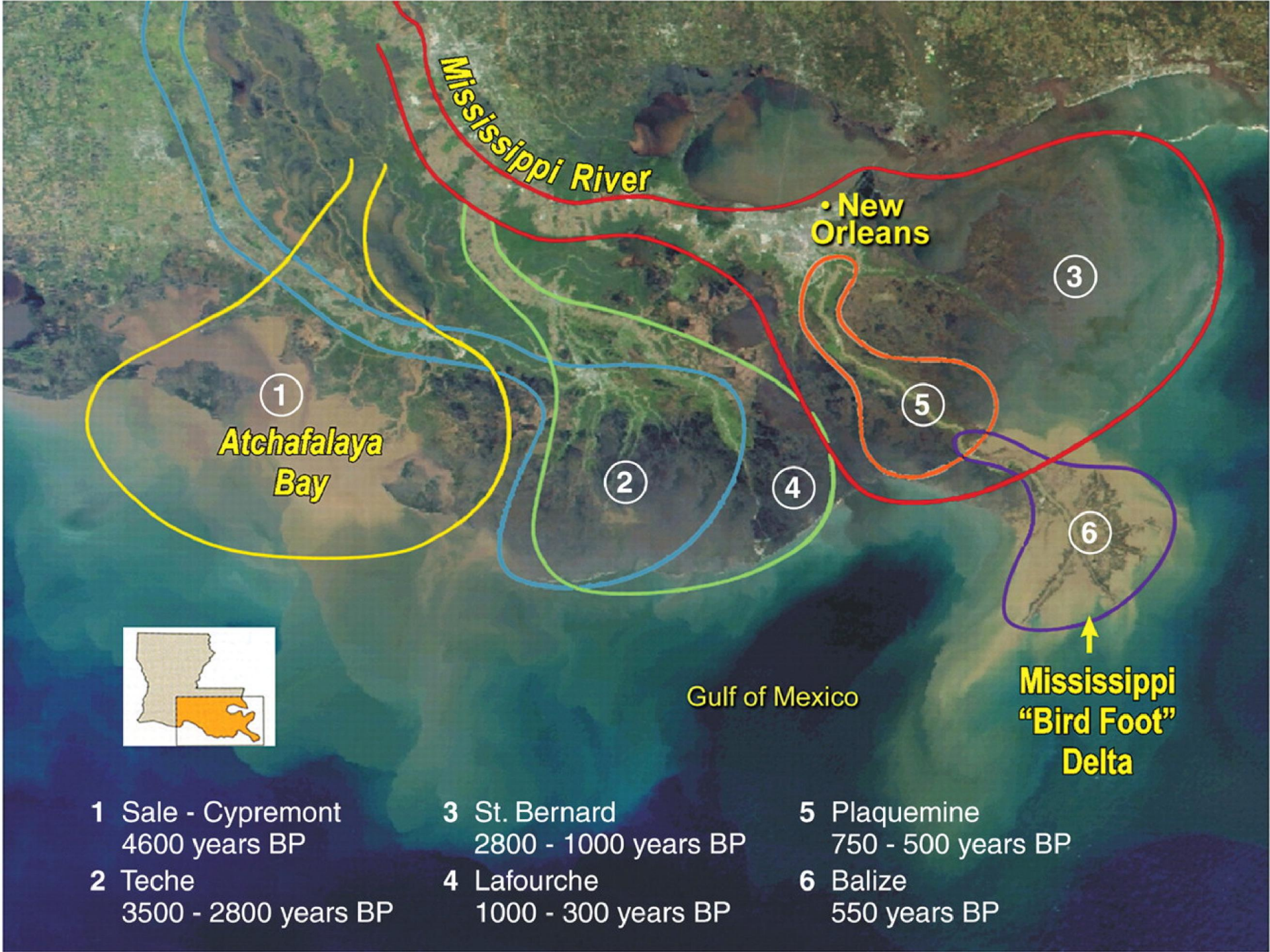


Delta

- ▶ Delta – depositional feature of built up sediment that forms where a stream enters a lake or ocean
 - Occurs because the water slows down as it is emptied into another body of water.

Nile River Delta





Mississippi River

• New Orleans

1

Atchafalaya Bay

2

4

5

3

6

Gulf of Mexico

Mississippi
"Bird Foot"
Delta



1 Sale - Cypremont
4600 years BP

2 Teche
3500 - 2800 years BP

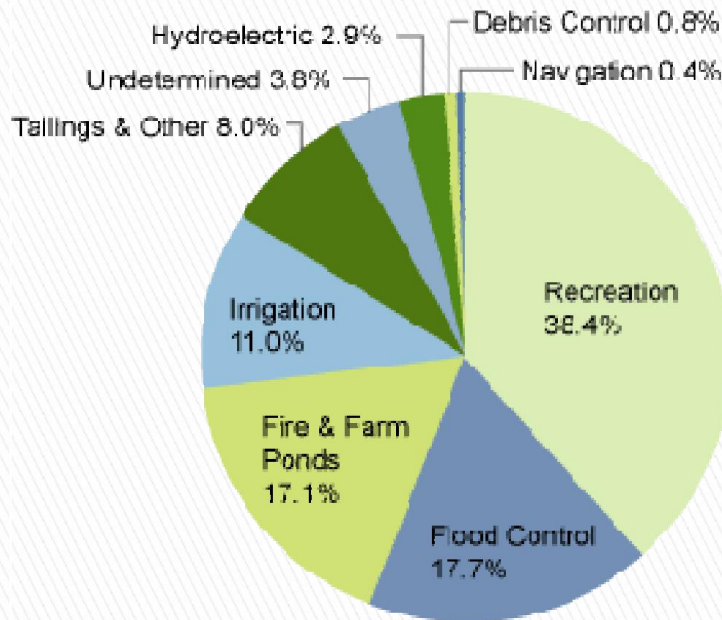
3 St. Bernard
2800 - 1000 years BP

4 Lafourche
1000 - 300 years BP

5 Plaquemine
750 - 500 years BP

6 Balize
550 years BP

Dam – a barrier to obstruct the flow of water



- ▶ Storage place for water
- ▶ Hydroelectric power
- ▶ Recreational facilities
- ▶ Irrigation

ADVANTAGES

- ▶ Increase accumulation of sediment in water
- ▶ Expensive to build
- ▶ Destruction of natural habitat for plants and animals

DISADVANTAGES



Three Gorges Dam on the
Yangtze River in China



Three Gorges Dam – largest hydroelectric in the world

St. Francis Dam Disaster – 1926



The New York Times.

THE WEATHER
Colder today, with rain this morning; tomorrow, fair and colder.
Temperature tomorrow: 40 to 50.
80° for weather report on page 12.

NEW YORK, WEDNESDAY, MARCH 14, 1926.

TWO CENTS

**FOR AMERICA
LORD INCHCAPE;
HEADS OUT TO SEA**

GREAT AERIAL ADVENTURE.

THE LORD INCHCAPE.
Trying to escape from Lord Inchcape, who is
Hinchliffe's passenger.

**MELLON AND BUTLER
DEFEND OIL SILENCE;
HAYS UNDER HOT FIRE**

**Secretary and Chairman Say
Their Refusal of Bonds
Justified Reticence.**

'IRRELEVANCY,' HAYS'S PLEA

**Ex-Chairman Testifies 'Dumny'
Gift Deals Have No Bearing
on Oil Cases.**

WALSH ABSOLVES MELLON

**Calls His Course Creditable—
\$249,000 Oiler Deposit Linked
to Republican Fund.**

Special to The New York Times.
WASHINGTON, March 13.—The
Senate oil investigating committee
turned a heavy fire of questioning
today upon Andrew W. Mellon, Sec-
retary of the Treasury; William M.
Butler, Chairman of the Republican
National Committee; and Will H.
Hays, former National Republican
Chairman, in an effort to have the
three party leaders explain their
silence of more than four years re-
garding Mr. Hays's efforts to con-
ceal \$200,000 in Liberty bonds given
by H. F. Sinclair to help wipe out
the 1922 Republican campaign defi-
cit.
Secretary Mellon and Chairman
Butler gave as their reason for not

**274 PERISH, 700 MISSING, IN TORRENT
FLOOD BY BURSTING CALIFORNIA DAM;
FLOOD ENGULFS VICTIMS AS THEY SLEEP**

THE RUINS OF THE BROKEN ST. FRANCIS DAM.

This picture, showing the shattered dam through which twelve billion gallons of water rushed to engulf the
Santa Clara Valley in California, was taken yesterday morning and reached The Times
Amos yesterday afternoon. Coming over the American Telephone and
Telegraph Company's wires, it was transmitted in seven minutes.

WATER WALL 78 FEET HIGH

**Homes, Ranches and
Roads Are Swept Away
in 20-Mile Canyon.**

PACK TRAINS HUNT BODIES

**Many Are Buried in Silt Left by
Loss of Huge Reservoir
North of Los Angeles.**

TOWNS ESTABLISH MORGUES

**Red Cross Units and 1,500 Offi-
cers Carry On Relief—Troops
Are Mobilized.**

Special to The New York Times.
LOS ANGELES, March 12.—Col-
lapses of the great St. Francis Dam
of the Los Angeles water supply
system this morning caused a sudden
flood into the San Francisco Can-
yon, from which the known death
toll tonight stood at 274 persons,
700 missing.

Failure of Teton Dam – 1976



<https://www.youtube.com/watch?v=cdOGPBnfoKE>