



Streams Flooding



Flooding

- Actions of water, ice and wind.
- Local climate plays a major role in these processes.

Factors Governing Flood Severity

- The quantity of water involved.
- The rate of water enters the stream system.



Effects of Water

- Water is the most important agent sculpturing the earth's surface.
- Mountains raised by the action of plate tectonics and volcanism, but they are shaped primarily by water.
- Streams carve valleys.
- move tremendous amounts of sediment from place to place.
- Some floods are the result of unusual events, (collapse of a dam,)



Factors governing surface runoff

Infiltration:

- porosity and permeability of soil.

Topography:

- steeper terrain, more water runs off over the surface.
- less terrain, water sink into the soil.

The rate of surface runoff

Vegetation:

- **reduce flood hazards, provide a physical barrier, Decreasing velocity of surface runoff.**
- **Tends to increase the soil's permeability, hence infiltration.**



The rate of surface runoff

Meteorologic fluctuations:

- Soil saturated from previous storms cannot absorb more water, the solidly frozen ground of cold regions prevents infiltration.



Effects of development on flood Hazards:

- **The materials cover the ground, such as asphalt and concrete.**
- **Reduce infiltration, then more surface runoff.**
- **Buildings in a floodplain increase flood heights.**

- Vegetation is removed and erosion increased, much more soil can be washed into streams then **Reducing stream's capacity to carry water away quickly.**



Strategies for Reducing Flood Hazards

1- Restrictive Zoning:

- Careful mapping coupled with accurate.

stream discharge data allow identification of those areas threatened by floods.

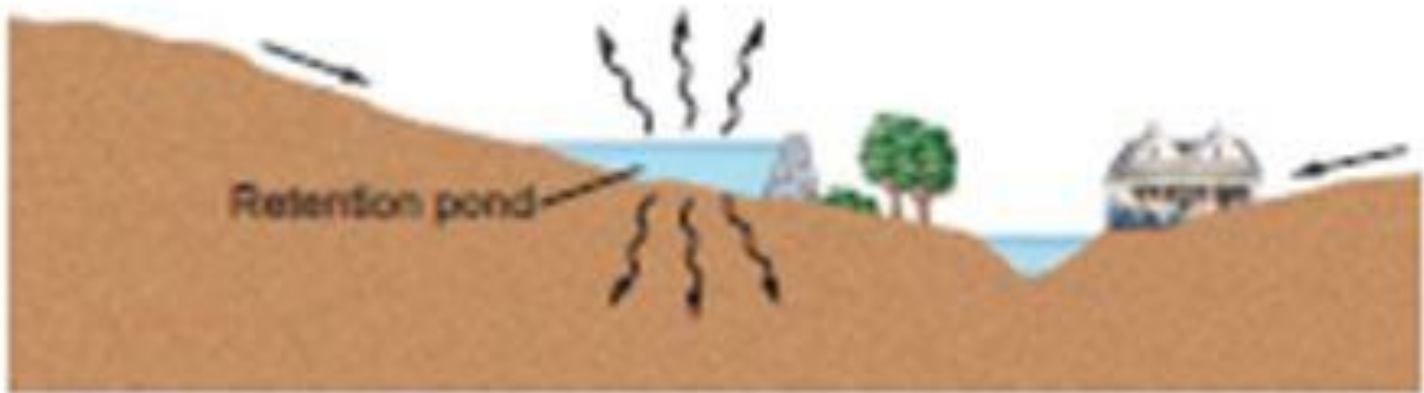
- Buildings can be raised that the lowest floor is above the expected two-hundred-year flood stage.

2- Retention Ponds:

- Large basins that trap some of the surface runoff, keeping it from flowing immediately into the stream.**
- Allows the land to be used for other purposes, such as farming.**



A



B

3- Diversion Channels:

- Redirect some of the water flow into areas adjacent to the stream where flooding will cause minimal damage.
- Diversion of water into farmland or recreational land and away from built-up areas, to reduce loss of life and property damage.

4- Channelization:

- Various modifications of the stream channel itself that are usually intended to increase the velocity of water flow.
- Thus increase the discharge of the stream and hence the rate at which surplus water is carried away.

- A stream channel might be rerouted for example, by cutting off meanders to provide a more direct path for the water flow.
- Maintenance is required to limit erosion in the straightened channel.

5- Levees:

- Some streams form low natural levees sediment deposition during flood events.
- purposely be enlarged, or created where none exist naturally.

6- Flood-Control Dams:

- Construction of flood-control dams at one or more points along the stream.
- Excess water is held behind a dam in the reservoir formed upstream and may then be released at a controlled rate that does not overwhelm the capacity of the channel beyond.

- Their associated reservoirs (artificial lakes) may include availability of the water for irrigation.
- Generation of hydroelectric power at the dam sites.
- Swimming, boating, and fishing at the reservoir.
- Silting-up of the reservoir, decreases it's volume, so it becomes less effective as a flood control.

Samarra Barrage

**Is a multi-purpose barrage on the Tigris River
(west) of Samarra and north of Baghdad, Iraq.
The main purpose of the dam is to divert
floodwater in the Tigris River to Lake
Tharthar.**

The intent was to use water stored from the and the Ramadi Barrage for irrigation. However, evaporation on Lakes Habbaniyah and Tharthar lead to reduces storage and high salinity.

It was completed in 1956 by the German company Züblin. The power station was commissioned in 1972.

Its has 17 gates capable of passing 7.000 m³/s of water to the Tigris River, while the Tharthar regulator can divert up to 9,000 m³/s into a canal with 36 gates.

The reservoir's design capacity is 150.000.000 m³, but much of that is filled with sediment, Water height 65 m.



- ارتفاع الخزين المائي الى 43.62 m^3 مليار مقارنة ب 14.3 m^3 بنفس التوقيت من العام الماضي.
- منسوب نهر دجلة في بيجي 106.92 m ما يعادل تصريف $8300 \text{ m}^3/\text{sec}$.
- التصريف المطلق باتجاه بحيرة الرثار $10000 \text{ m}^3/\text{sec}$.
- التصريف من سدة سامراء باتجاه بغداد $400 \text{ m}^3/\text{sec}$.
- ارتفاع مناسب مياه سدة سامراء الى اعلى مستوى له منذ عام 1956.

- تستمر الموجات المائية مقدم سدة سامراء نتيجة للامطار المتساقطة وذوبان الثلوج تقابلها اجراءات مستمرة من قبل المركز الوطني لادارة الموارد المائية للسيطرة على تلك الموجات وتحويلها للخرن في بحيرة الثرثار.

- تم تخفيض اطلاق التصارييف من سد الموصل الى $1500 \text{ m}^3/\text{sec}$ بدلا من $2500 \text{ m}^3/\text{sec}$.

- من سد دوكان الى $500 \text{ m}^3/\text{sec}$ بدلا من $900 \text{ m}^3/\text{sec}$.