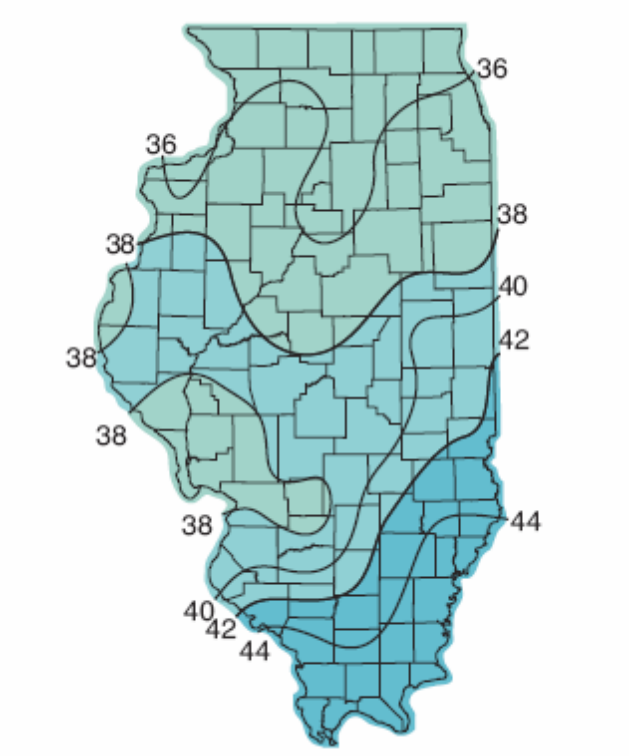
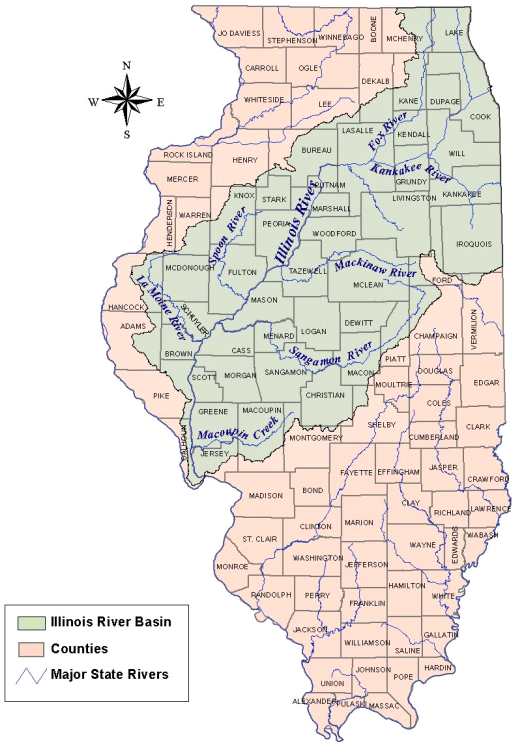
What happens when it rains in the Illinois River Watershed?



The map on the left shows mean annual precipitation in inches across Illinois during the period 1971-2000. (Illinois State Water Survey).



The map on the right shows the counties in the Illinois River Basin. (IDNR - Office of Resource Conservation, March 10, 2004).

The water cycle depicts water moving through the atmosphere and on and under the surface of the earth. Another term for the water cycle is the hydrologic cycle. In the hydrologic cycle, water moves:

- downward as **precipitation**, into the soil and through the unsaturated zone as **infiltration**, and through the saturated zone to shallow and deep aquifers as **recharge**;
- laterally on the surface as **surface runoff** to lakes, wetlands, streams, and rivers and underground as **ground-water flow**;
- upward as **evapotranspiration** from lakes, wetlands, streams, and rivers, plants, soil, and groundwater, and as **groundwater discharge** to surface waters; and
- laterally aloft as atmospheric moisture, where **condensation** forms clouds.

** Reference: www.sws.uiuc.edu/docs/watercycle

Runoff drains or flows from the land surface to rivers, streams and lakes.
Groundwater recharge is water that soaks into the ground, but is not used by plants.
Impervious surface runoff is runoff due to paved or roofed surfaces, such as parking lots, buildings, homes, sidewalks, and roads.
Evaporation is the conversion of water to water vapor.
Transpiration is the transfer of water to the atmosphere by plants and vegetation.
Evapotranspiration is the process by which plants take up water from the soil and evaporation occurs from the leaves in the sunlight. (For this discussion, evapotranspiration is the sum total of evaporation and transpiration.)

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Throughout the Illinois River Watershed, the average annual rainfall is approximately 36 inches. Listed below are approximate numbers for a hydrologic budget for two scenarios in the Illinois River Watershed - a rural, non-developed area and an urban, developed area with considerable impervious surfaces. The numbers used in the two water budgets depicted below are estimates – they are for educational, not for engineering or hydrological design uses. (Adapted from IDNR Fact Sheet – Where Does Rainfall Go?)

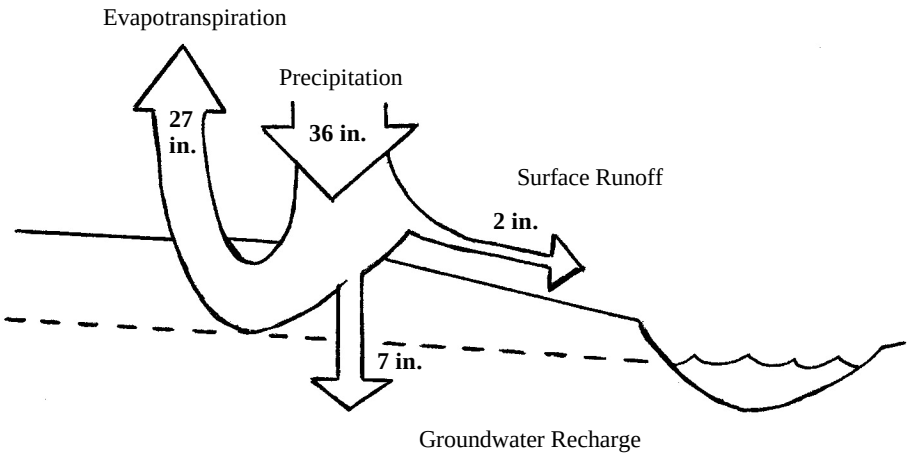

Figure 1. Rural, non-developed area

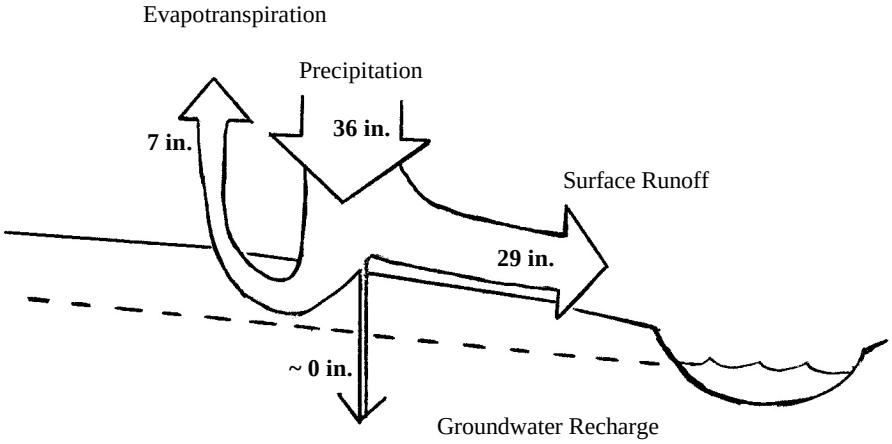

Figure 2. Urban, developed area with considerable impervious surfaces

As depicted above, the water cycle is dramatically different in a rural, non-developed area, as compared to an urban, developed area. In general, in urban areas, 80% of rainfall becomes impervious surface runoff and 20% evaporates. Impervious surfaces prevent the rain from soaking into the ground, causing increased runoff and flooding, decreased groundwater recharge, and decreased water availability for plants. Increased volumes and velocities of runoff typically accelerate soil erosion and pollution from surface contaminates.

Proper land use and management, in both urban and rural areas, is essential to protecting and preserving the Illinois River and its watershed for the future!

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