

The Urban Water Cycle

Water Cycle

- Aka hydrological cycle
- Inputs of water mainly from precipitation
 - Rain, snow, dew
 - Some water transfers through ground, surface runoff
- Total input/discharge: Q

Water Cycle

- Natural watersheds show major evaporation/evapotranspiration
 - Approx 70% of Q
- Mainly thanks to vegetation

Water Cycle

- The remaining 30% of Q
 - Some water soaks into ground, enters groundwater
 - Some runs off in surface waters, rivers etc.,

Urban Water Cycle

- Urban areas tend to remove, degrade vegetation cover
 - Reduces evaporation/evapotranspiration

Urban Water Cycle

- Urban areas tend to pave, seal and cover ground surfaces
 - Reduces groundwater recharge, forces it to become surface runoff

Urban Water Cycle

- Urban areas tend to drain with concrete
- Rivers become storm sewers, minor creeks converted into sewers
- Urban drains forced to take 100% of the urban Q
 - Greatly increases the flood risk

Water Cycle

- Natural watersheds retain much of the precipitation, release it slowly
- Maintain water levels in surface watercourses, wetlands
- Surface waters deeper, cooler

Urban Water Cycle

- Urban watercourses tend to alternate between accentuated floods and low-flow states
- In low flow: waters shallow and warm in summer

Urban Water Cycle

- Contaminants tend to concentrate in low flow, and store in catch basins
- Flood conditions release a spike of stored contaminants followed by dilution
- Makes urban waters difficult for multi-cellular life