
Stormwater 101

- **Technical Issues** – How did we get to this situation?
 - **Institutional Barriers** – Why is it difficult to find a solution?
 - **Guidelines for Selecting a Solution** - What are tradeoffs and realities?
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Technical Issues

- Hydrologic Cycle – rain and flow take multiple paths.

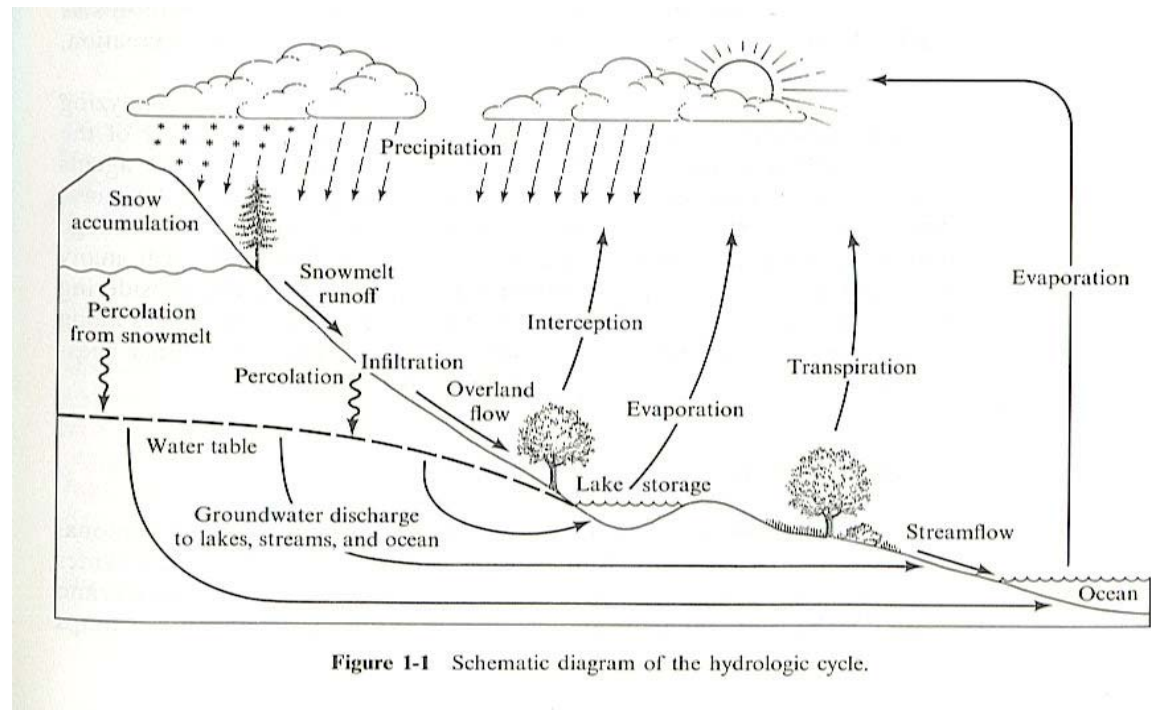


Figure 1-1 Schematic diagram of the hydrologic cycle.

Technical Issues

- Hydrograph – watershed responds to rainfall.

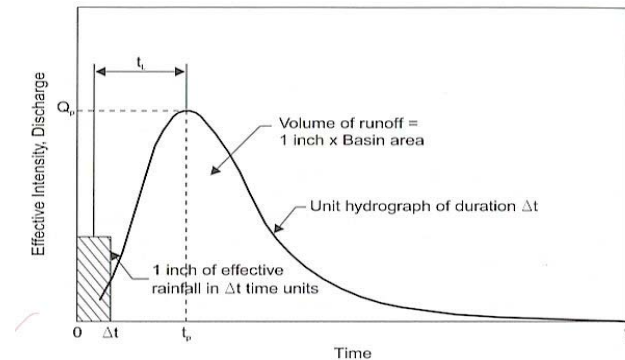


Figure 2-17: Unit Hydrograph Resulting from 1 in. of Effective Rainfall (Runoff) over Time (Δt)

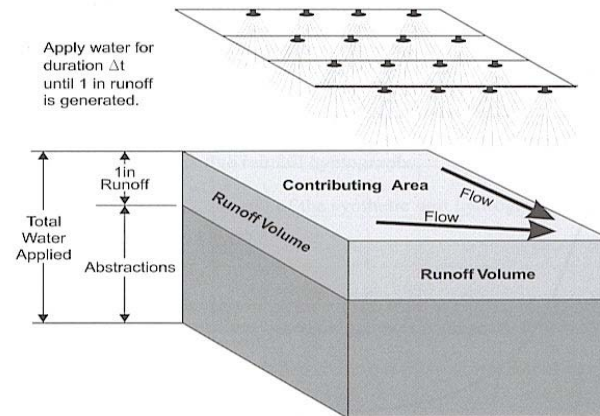
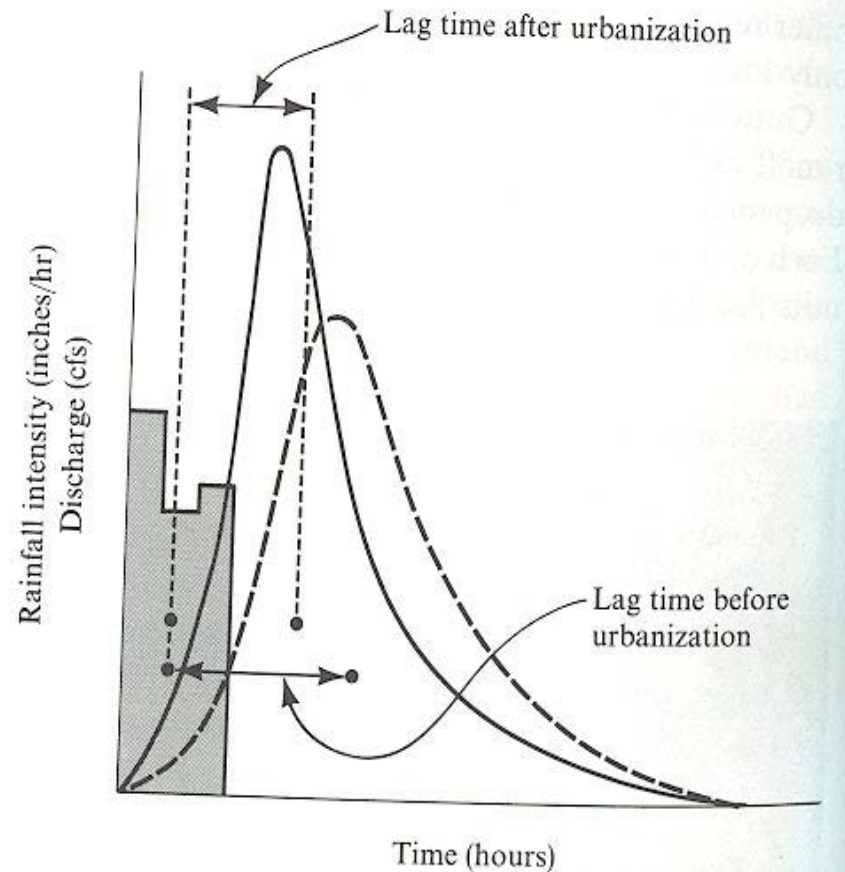


Figure 2-18: Visualizing the Unit Hydrograph Concept

Technical Issues

- Urban Hydrograph – impervious cover disturbs cycle.
- Stormwater Management – control measures attempt to restore cycle.



Technical Issues

- Storm frequency
 - Water shed response
 - Example: 2 yr storm - 2 yr flow
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Technical Issues - Historical Development

- Assimilation (18th and 19th century)
 - Nuisance, trespass, relocate (18th and 19th century)
 - Transport off site (19th century)
 - Peak rate control (circa 1970)
 - Volume and water quality control (circa 2000)
 - Retroactive control (TBD)
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Technical Issues

- Peak Rate Control
- Volume Control



Barriers

- Technical
 - Legal
 - Financial
 - Institutional
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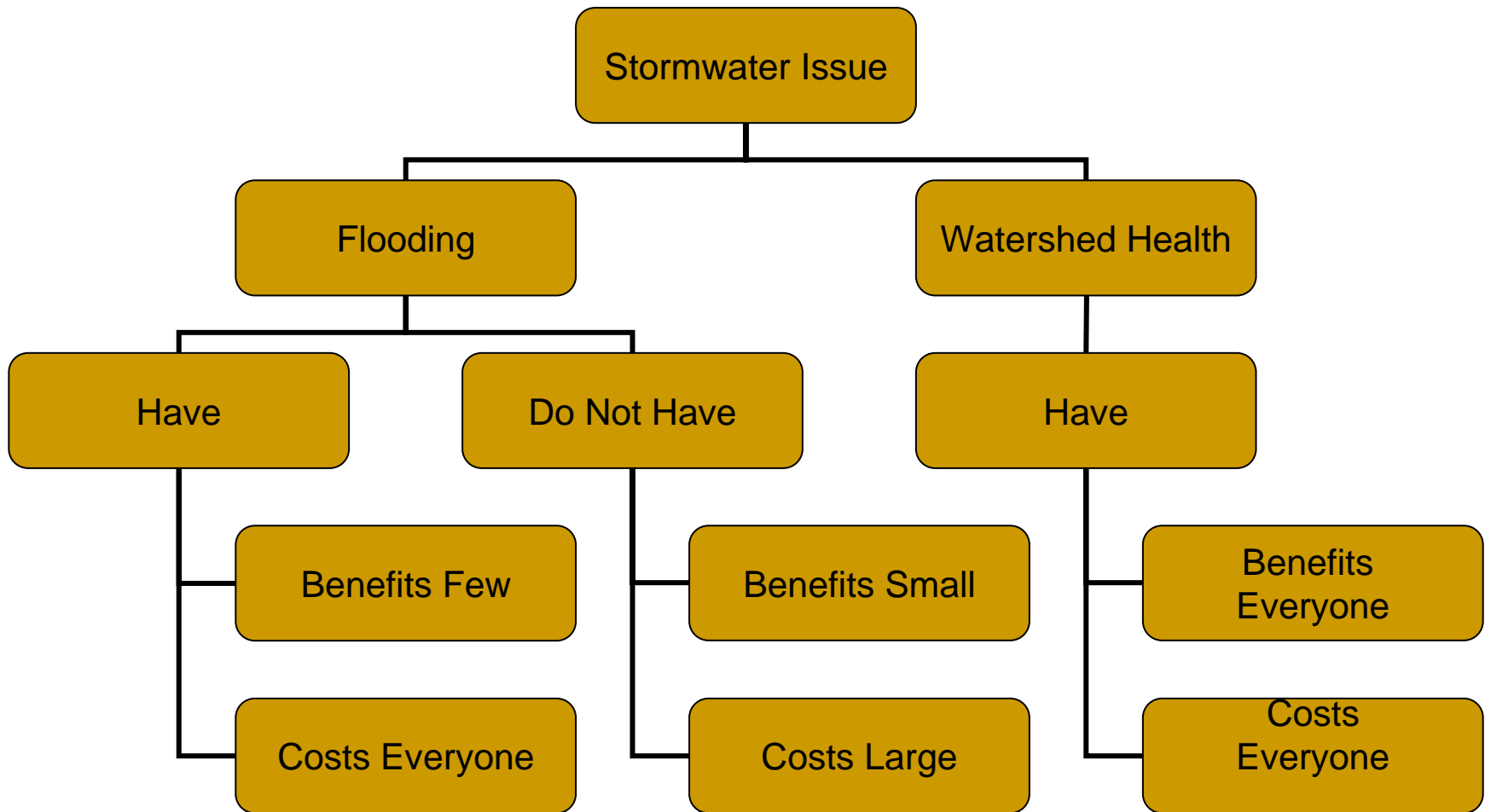
Institutional Barriers

- Transportation Policy
 - Housing Policy
 - Irreversibility of Infrastructure
 - Benefits Flow Like Water
 - Middle Class Land Use
 - Less Shock than 1969
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Political Barrier

- Explains historical nature of the problem
 - Summation of supply and demand for strict control
 - Broad but not deep
 - Mostly financial and institutional
 - Not retroactive
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Political Barrier



Guidelines

- Recognize alignment of powerful forces.
 - Recognize the distinction between flooding and WQ
 - Recognize dual nature (structural and non structural).
 - Recognize incremental nature of solution.
 - Piggyback on other direct benefits.
 - Be realistic.
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