An Idea Whose Time Has Come

Green Infrastructure: Challenges at the Watershed Scale

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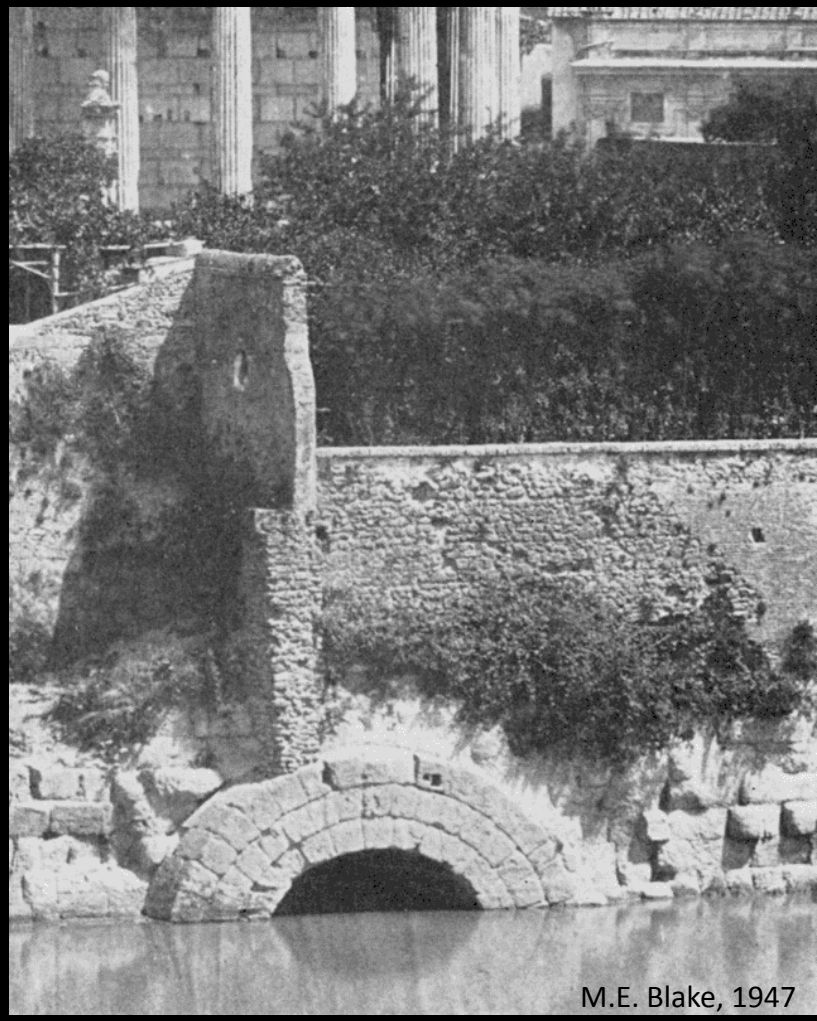
Long History of Urban Water Management

Segovia Aqueduct, Spain: Built between AD 98- 117



Outlet of the Cloaca Maxima on the Tiber River, Rome

From Stormwater as Nuisance

To Stormwater as Amenity

NE Siskyou Green Street - Landscaped Curb Extension
Portland, OR

Major Points

- Idea of green infrastructure has been with us for a long time.
- “Natural” solutions for urban areas were avoided in the past in favor of “guaranteed” results with centralized treatment. Circumstances today suggest that a new perspective is warranted.
- Green infrastructure primarily tested as site treatment; effects on watershed scale are only now being studied.
- Major research fronts? Onondaga County and the City of Syracuse have the potential to be a national leaders.

Historical Precedents:
Multifunctional Planning and Design

Back Bay Fens

Frederick Law Olmsted (1857)

Single-purpose planning is often short-sighted and problematic

Muddy River Improvements, Boston, MA (1880s)

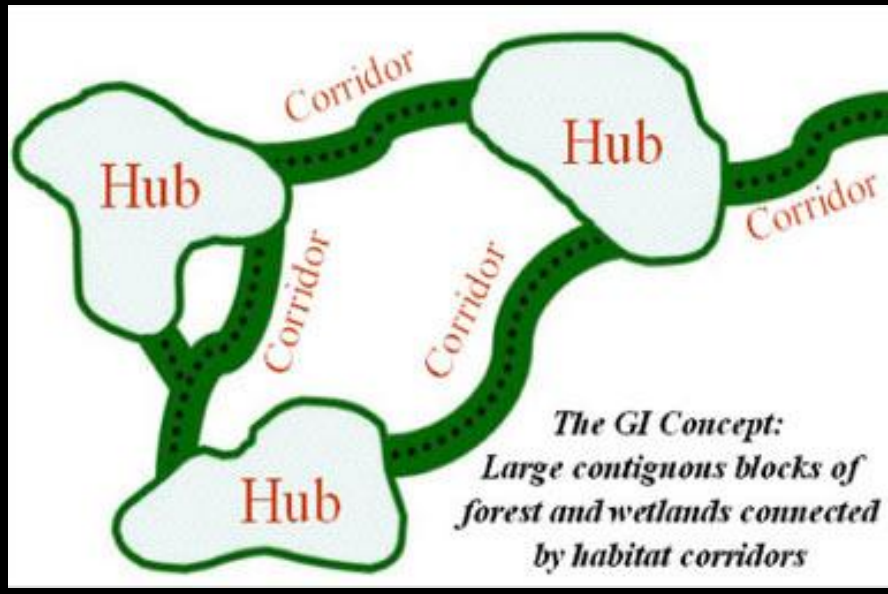
Water-Sensitive Planning

Planning Commissioners Journal (2009)

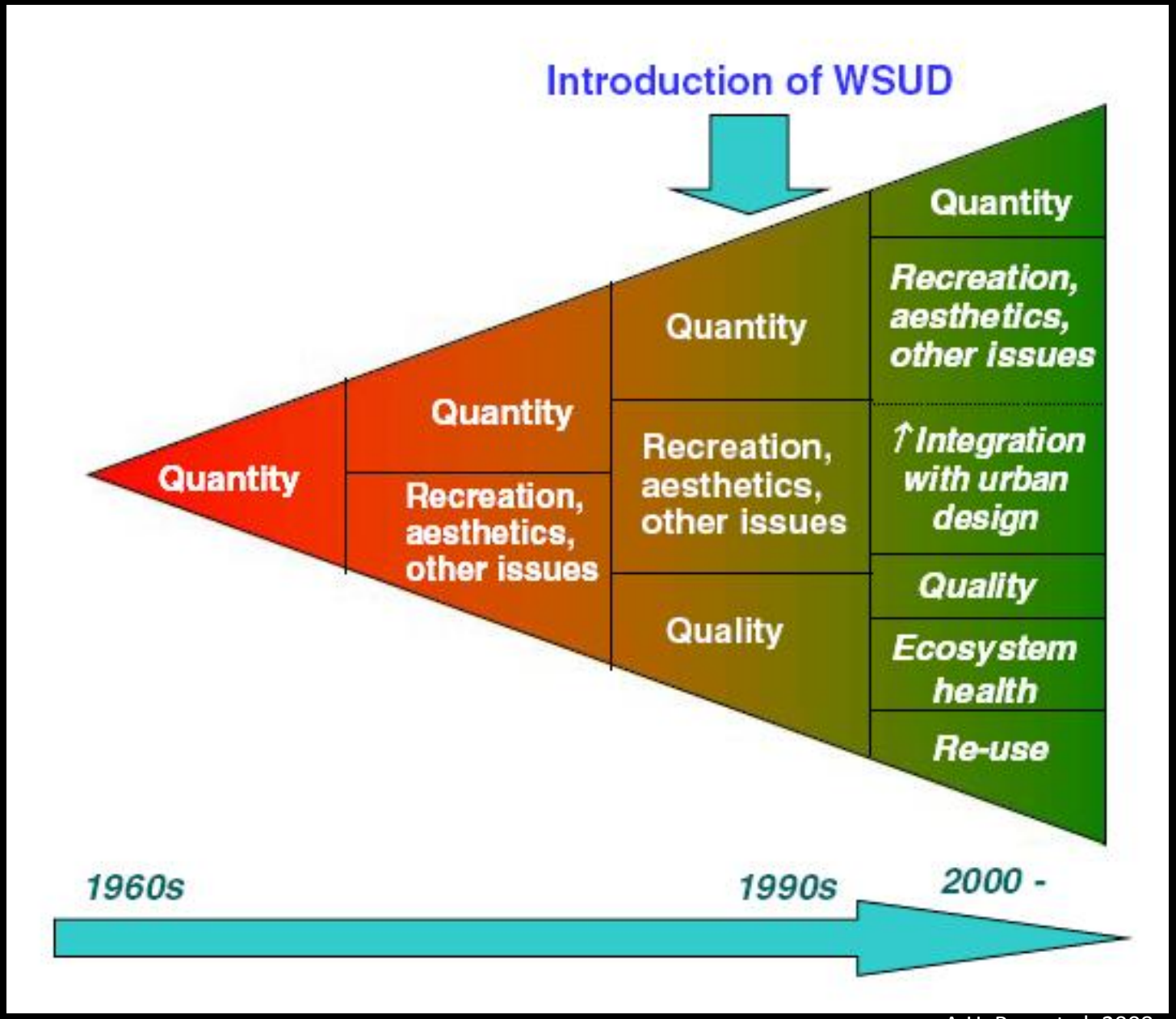
A broader definition of

“green infrastructure”

… multiple opportunities for urban neighborhoods



Maryland DNR

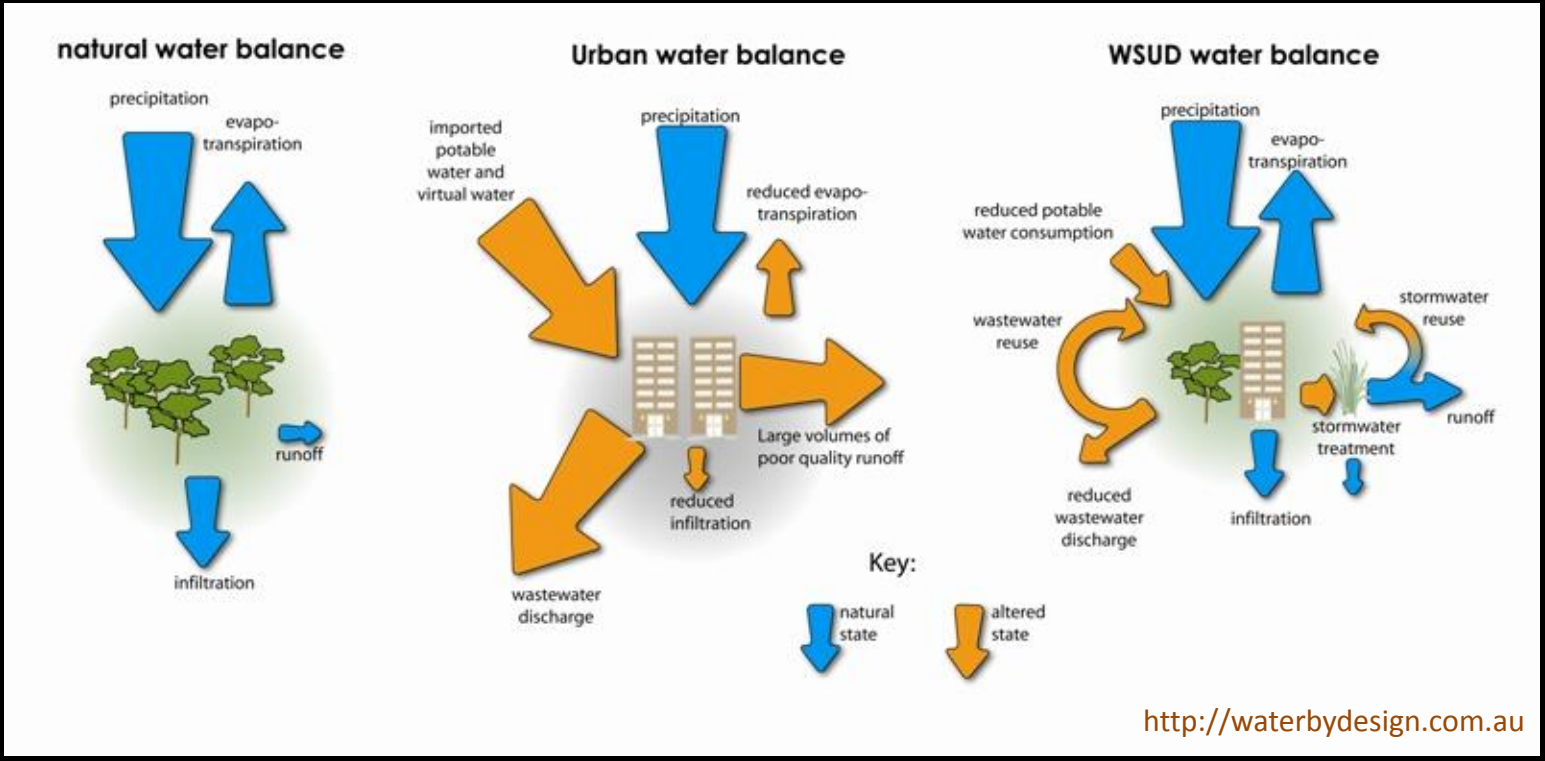


A.H. Roy, et al. 2008

Maintaining the natural hydrologic balance is preferred

Some basic principles

- Minimize the difference in runoff volume/discharge leaving an area after development as compared to the volume before construction
- Minimize the pollutant load in the runoff leaving the developed area



Water Sensitive Urban Design

Water Sensitive Planning and Design

- Urban land use practices
  - Increasing development density (lower run-off per household) and mixed use development
- Land cover design aimed at infiltration
  - Reduce impervious areas
  - Intersperse pervious and impervious
  - Pass runoff through vegetated patches and/or through soil
  - Maximize infiltration as close to the source as possible
- Constructed facilities
  - Point structures like recharge wells and sand filters
  - Linear structures like infiltration channels and swales
  - Local reservoirs

preference is for *small, simple, and cheap* –
used simultaneously and synergistically

Seven Major Impediments

- Uncertainties in performance and cost
- Insufficient engineering standards and guidelines
- Fragmented responsibilities
- Lack of institutional capacity
- Lack of legislative mandate
- Lack of funding and effective market strategies
- Resistance to change

Identified by Roy *et al.* (2008) in *Environmental Management*

Implementing Green Infrastructure in Syracuse

In it for the long run

Open to experimentation and documenting results

Focused efforts will be more likely to yield identifiable results

Value as a national model