

# BANGOR CLEAR STREAMS PROJECT – AND THE STONEFLY RESURRECTION

Wendy Warren  
Environmental Coordinator  
City of Bangor  
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- Goal of presentation =
  - Create awareness of municipal efforts and how it relates to current research
  - Highlight big concerns for municipalities
  - Generate ideas for research that could assist in solving municipal WQ problems



## Urban Stormwater Management in the United States

National Research Council, 2008

[http://www.epa.gov/npdes/pubs/nrc\\_stormwaterreport.pdf](http://www.epa.gov/npdes/pubs/nrc_stormwaterreport.pdf)

“Stormwater runoff from the **built environment** remains one of the **great challenges of modern water pollution control**, as this source of contamination is a principal contributor to water quality impairment of waterbodies nationwide.”

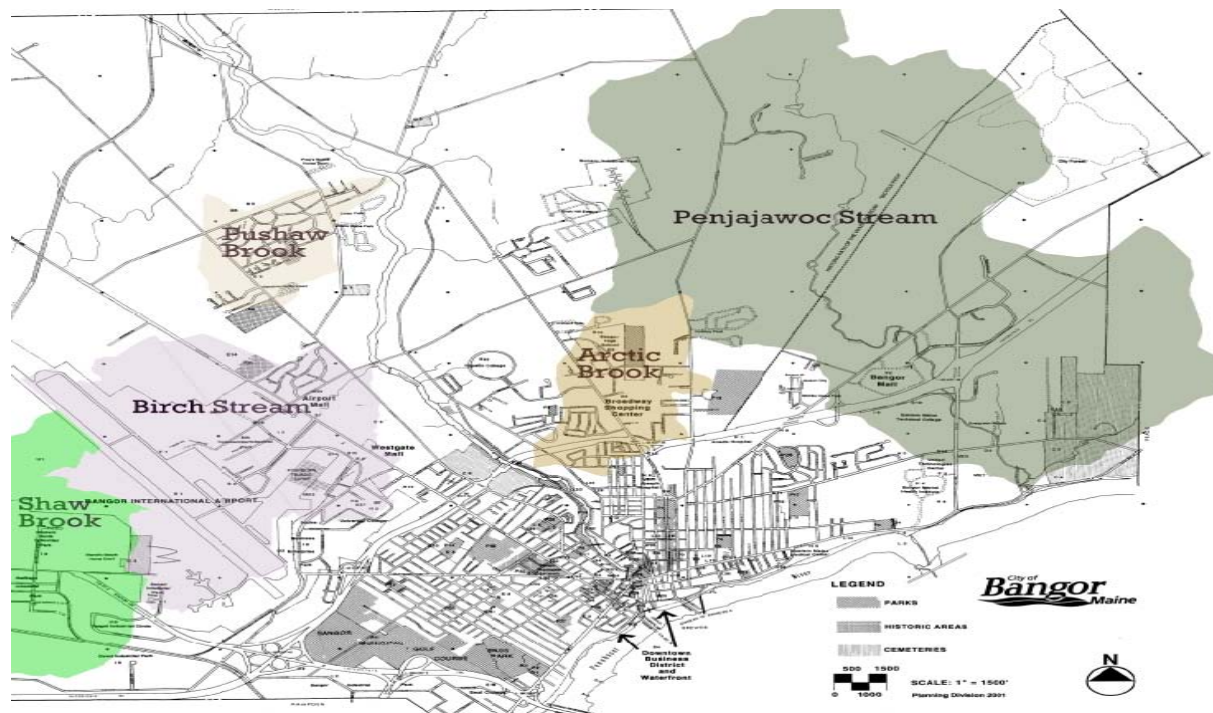


“In addition to entrainment of **chemical and microbial** contaminants as stormwater runs over roads, rooftops, and compacted land, stormwater discharge **poses a physical hazard to aquatic habitats and stream function**, owing to the increase in water velocity and volume that inevitably result on a watershed scale as many individually managed sources are combined.”





“Given the shift of the world’s population to urban settings, and that this trend is expected to be accompanied by continued wholesale landscape alteration to accommodate population increases, **the magnitude of the stormwater problem is only expected to grow.**”





# BANGOR CLEAR STREAMS PROJECT

- One of the greatest pollutants of Water Quality today is **STORMWATER**
  - Big point source polluters are under control ~
  - Non-point small source pollutants accumulate
  - Result = Urban Impaired Streams = Big problems
- Everything we do on **LAND** (in urbanized areas) affects the **RIVERS**





# BANGOR CLEAR STREAMS PROJECT

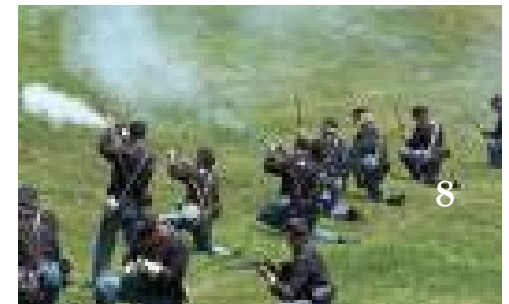
- Urban Impaired Streams may be the determining factor for fish restoration ~
  - Equal to or Bigger than Damn Removal, Fish Passage, Holtrachem, WWTP discharges
  - Equal to pharmaceuticals & personal care products
  - Behavior Change, Paradigm Shifts
  - Invisible Commodity





# BANGOR CLEAR STREAMS PROJECT

- Municipal governments are on the **FRONTLINE** of the battle for clean water (involuntarily)
  - Federal EPA Clean Water Act relies on State
  - State places burden on municipal gov't
    - Municipal Permits (WWTP & Stormwater & Industrial)
    - Setting WQ goals through TMDL reports
    - Lack of funding (or political will) for comprehensive enforcement of State rules (i.e., soil erosion, haz waste)
    - Exception = Industrial SW program that permits individual businesses (program self sustaining)







## BANGOR CLEAR STREAMS PROJECT

- WQ measured by bugs - habitat vs. individual pollutants (good, but creates difficulties)

Multiple targets -Volume, Sediment,  
Temp, pH, Toxics, DO, Base flow,  
Nutrients

BMPs can treat all of these with  
injection of \$\$\$ Million

Except for Chloride

Goal to restore the Stonefly, therefore,  
must target all of the above





# BANGOR CLEAR STREAMS PROJECT

- Municipal efforts include:
  - Watershed management plans
  - Installation of State recommended (LID) Stormwater treatment systems
  - Experimenting with Non-traditional SW treatment systems
  - Zoning, ordinances, education, outreach
  - Preservation of Green Infrastructure





# BANGOR CLEAR STREAMS PROJECT

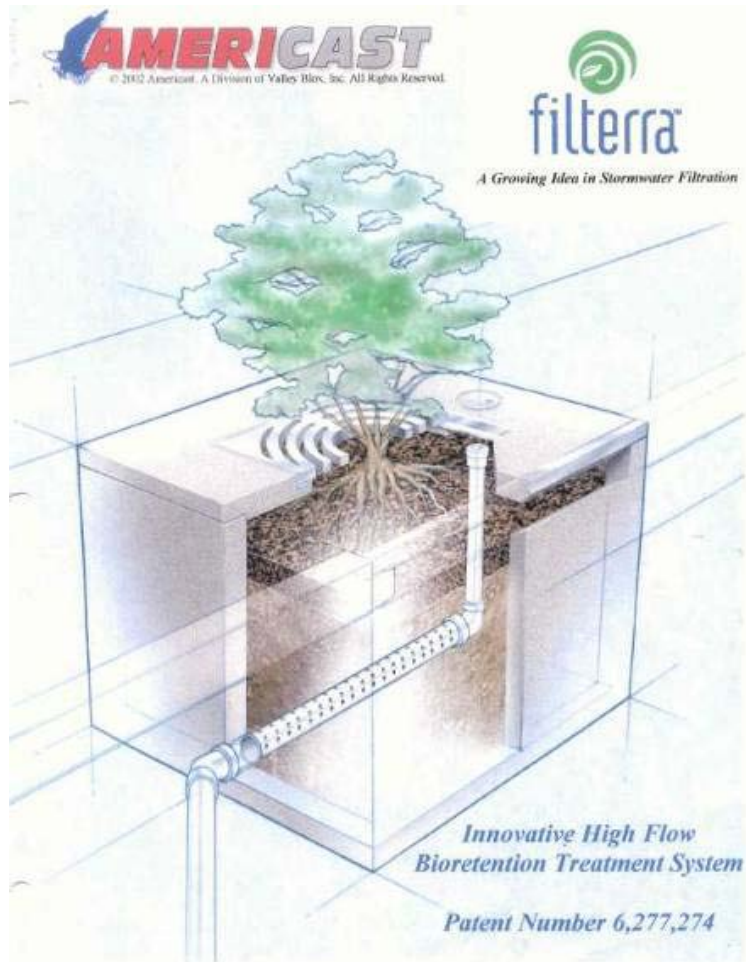
- Municipal efforts include:
  - Watershed management plans that propose Stormwater treatment systems installed on public & PRIVATE PROPERTIES;





# BANGOR CLEAR STREAMS PROJECT

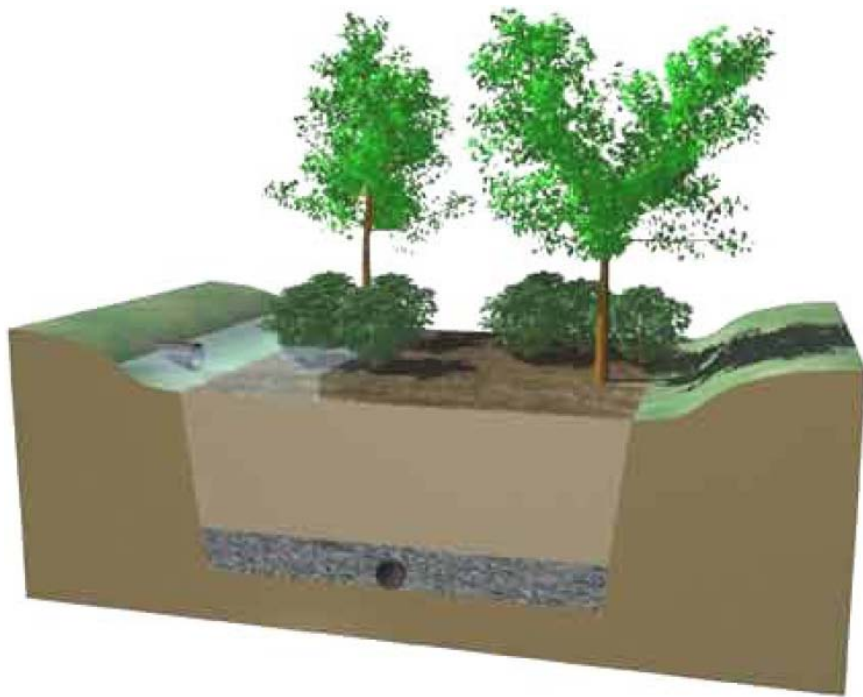
- Municipal efforts include: Tree boxes;





# BANGOR CLEAR STREAMS PROJECT

- Municipal efforts include: Bio-filtration systems;





- Municipal efforts include: Riparian Improvement;





# BANGOR CLEAR STREAMS PROJECT

- Municipal efforts include: Underground systems; StormTech System, Bangor Waterfront, photo by Art Morgan





# BANGOR CLEAR STREAMS PROJECT

- Municipal efforts include: Non-traditional methods – floating islands, windmills, ssf wetlands;







- Municipal efforts include: Rainwater collection (harvest);



Home Depot - Emsco 60 Gal. Deluxe Rain Barrel with Downspout



# BANGOR CLEAR STREAMS PROJECT

- Municipal efforts include: Ordinance changes, education, outreach, zoning;



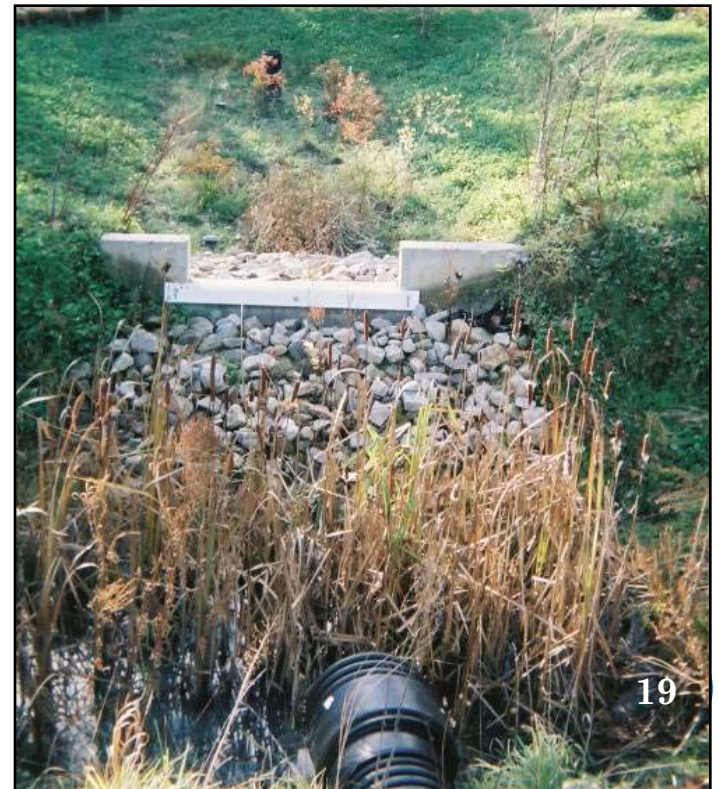


# BANGOR CLEAR STREAMS PROJECT

- Municipal efforts include: Green infrastructure – open spaces, buffers have value – Can we document the value?



Is growth necessary?  
Can we afford the loss of green infrastructure?





# BANGOR CLEAR STREAMS PROJECT

- Need for Research –
  - What streams can support the Stone fly?
  - Is it possible to attract them? Can we stock them?
  - If so, can we measure how long they will stay to determine if our streams are improving?
  - Is there one indicator to use for stone fly
  - What affect does chloride have on rivers/stone flies?
  - Are bugs a good measure for salmon recovery?
  - How can we measure the health of the stream quickly and cost effectively?
  - Should we focus on “recoverable” streams only?
  - What is the impact of direct discharges to the river? (snow dumps, towns with outfalls but no streams)



- How can we work together?
  - Be aware of on-going efforts, challenges
  - Collaborate on grant writing, research efforts, investigations, resources, labs, volunteers
  - PROPAC equipment
  
- Thoughts? Questions?