

# Strategies for Fixing Puget Sound's Stormwater Problem

May 2, 2014

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# Stormwater Paradigm

Time Period	Paradigm	Description
Prior to 1992	Drainage Efficiency	Convey water downhill as efficiently as possible
1992 – 2013	Reduce New Impacts	Reduce harm from new construction with flow control and treatment
Future	Reduce New and Existing Impacts	Capture, infiltrate, detain, and treat stormwater everywhere to protect and rehabilitate receiving waters

# Estimated Stormwater Needs

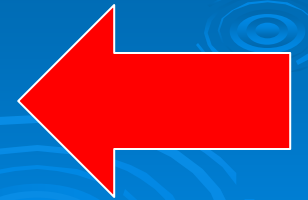
- \$3B - \$15B for treatment in Puget Sound
  - Capital costs, no O&M, no land costs
- \$1.4B for Juanita Creek basin (7 sq miles)
  - Full lifecycle cost
- \$1.1B for 64 small basins in unincorporated King County
  - Full lifecycle costs

# Stormwater Retrofit Planning for WRIA 9

- \$1M grant from EPA, \$335K match
- 4 years
- Model stormwater retrofit needs in WRIA 9
- Work with stakeholders
- Present retrofit options analysis to WRIA 9 Watershed Ecosystem Forum
- Extrapolate cost estimates to all Puget Sound

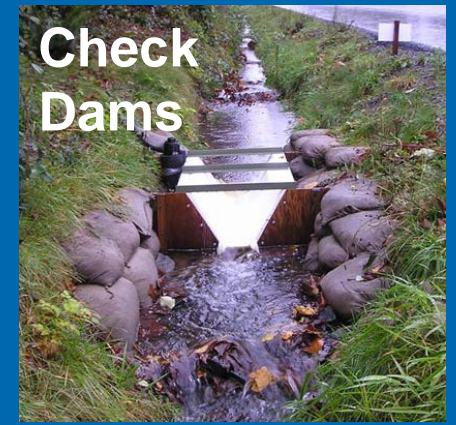
# Project Benefits

- Planning-level estimate of facility and funding needs
- Cost vs stream improvement
- Demonstrate use of modeling tools
- Influence capital project planning
- Influence future NPDES permits
- Influence discussion on new funding





# Stormwater Retrofit Examples

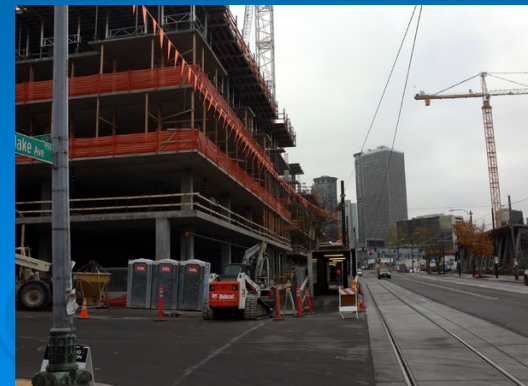


# Existing Facilities

- Large existing facilities not included in SUSTAIN model
- About 1/2 inch of storage/treatment exists
- Decreases estimated need

# Addressing Redevelopment

- Redevelopment improves stormwater management
- Nearly ½ of project area to have new or re development by 2040
- More expected beyond 2040
- Decreases estimated need





# Addressing Climate Change

- Three approaches for assessing impacts
  - Analysis of precipitation patterns for downscaled global climate model output
  - Impacts of climate change on hypothetical pond sizing
  - Impacts of climate change on high pulse count in hypothetical basin
- Likely need about 10% more flow control, but model variability is large

# Policy and Planning Horizon are Everything

- How stringent are stormwater requirements for redevelopment?
- How aggressively do public programs build facilities?
- How long in the future do we aim for success?

# What If?

- Assume new and redevelopment builds on-site facilities and developers contributes funds to build off-site facilities (ponds)
- Assume public funds used to build everything else
- Assume all stormwater facilities built within either 30 years

# Annual Public Costs

	Capital	Operation and Maintenance	Inspection and Enforcement
New and Re-Development	\$88M	\$4M	\$320M
Roads and Highways	\$21M	\$19M	\$28M
Everything Else	\$98M	\$89M	\$170M
<b>Total</b>	<b>\$207M</b>	<b>\$112M</b>	<b>\$518M</b>

# The Big Questions

- How quickly do we want to improve stream flows and water quality?
- To what degree do we want to improve stream flows and water quality?
- Where does capital funding come from?
- Where does operating funding come from?



# Project Team

- Don Robinett, SeaTac
- Ben Parrish, Covington
- Chris Thorn, Auburn
- Jeff, Burkey, Curtis DeGasperi, David Funke, Larry Jones, Chris Knudson, Beth leDoux, Doug Navetski, Elissa Ostergaard, Giles Pettifor, Dan Smith, Allison Vasallo, Mark Wilgus, Olivia Wright, King County
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