

# Development of a Stormwater Retrofit Plan for WRIA 9

February 27, 2014

Jim Simmonds

King County Water and Land Resources Division

[Jim.Simmonds@kingcounty.gov](mailto:Jim.Simmonds@kingcounty.gov)

# 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
- Model stormwater retrofit needs in WRIA 9
- Cost effectiveness
- Work with stakeholders
- Present retrofit options analysis to WRIA 9 Watershed Ecosystem Forum
- Extrapolate cost estimates to all Puget Sound

# Project Team and Funding

Organization	EPA Funding	Local Match
USEPA*		
King County	\$707k	\$300k
University of Washington	\$243k	\$20k
Department of Ecology**		
City of Auburn	0	\$5k
City of Covington	0	\$5k
City of SeaTac	0	\$5k
Kellogg Consulting	\$50k	0

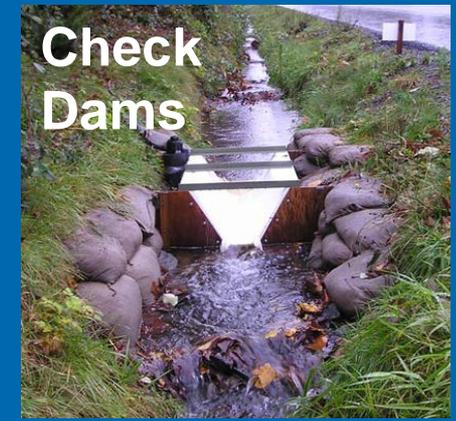
\* USEPA contributing \$1M in grant funding, and staff time to project management team

\*\* Ecology contributing staff time to project management team and updating retrofit database

# What Are Stormwater Retrofits

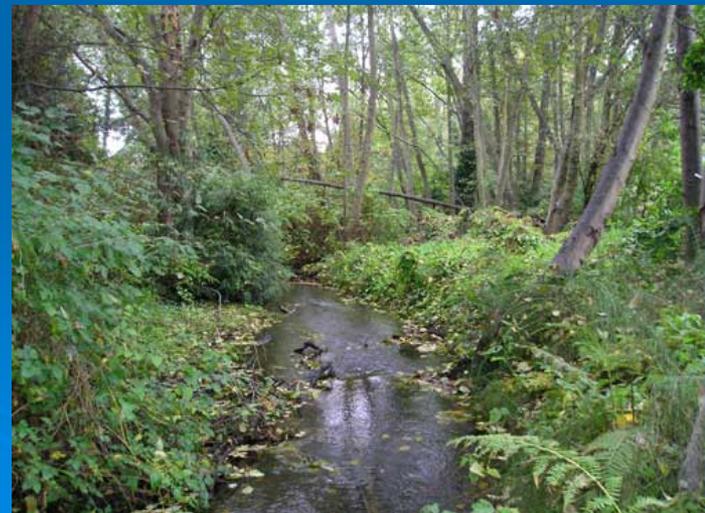
- Construction projects to control stormwater
- Locations that have previously been developed
- Sited where existing stormwater controls are inadequate
- Not part of redevelopment

# Stormwater Retrofit Examples



# Project Area

- WRIA 9 except
  - Headwaters above Howard Hanson Dam (forested)
  - City of Seattle (combined system)
  - Vashon Island
- Focus on streams

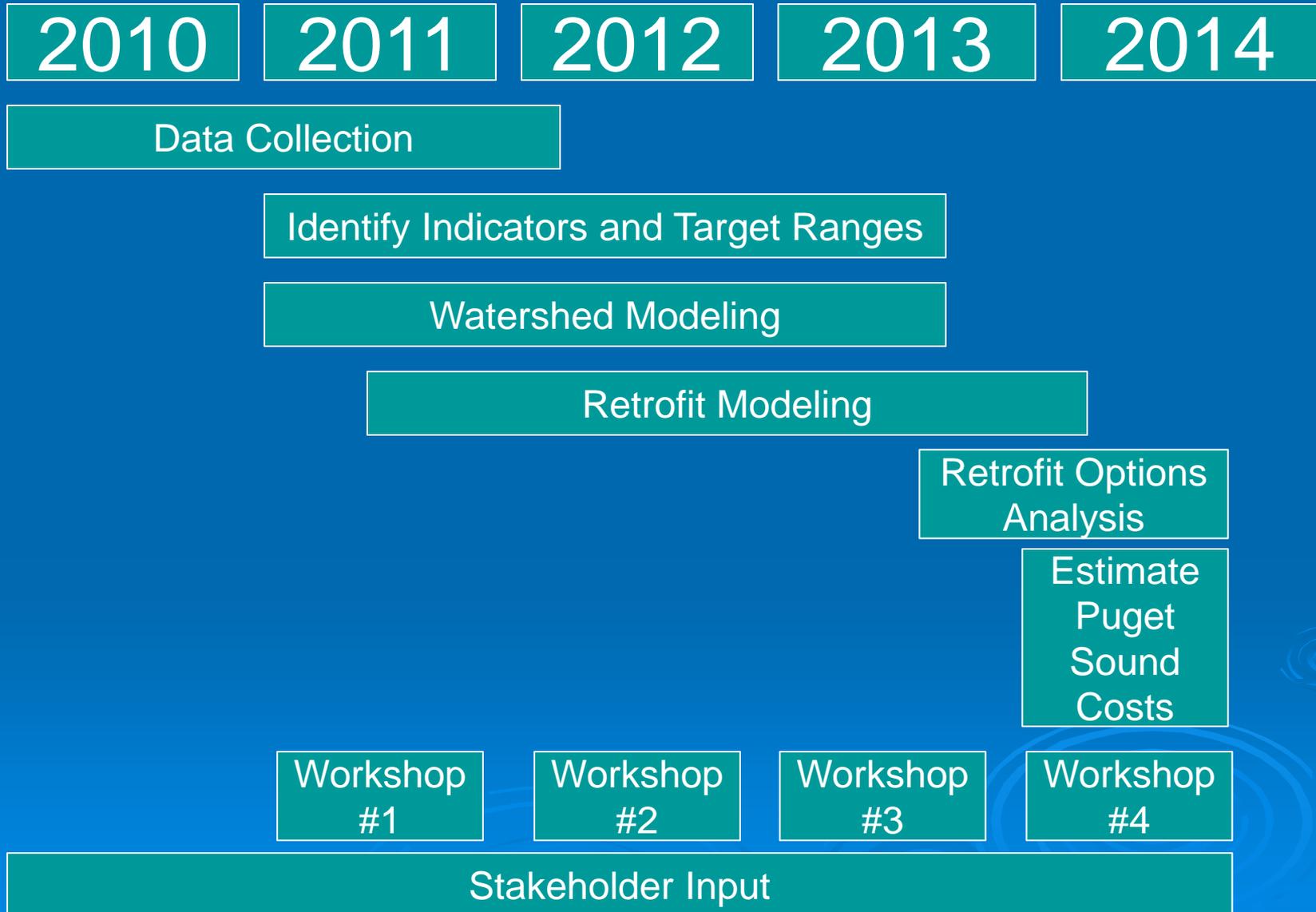


# Project Benefits

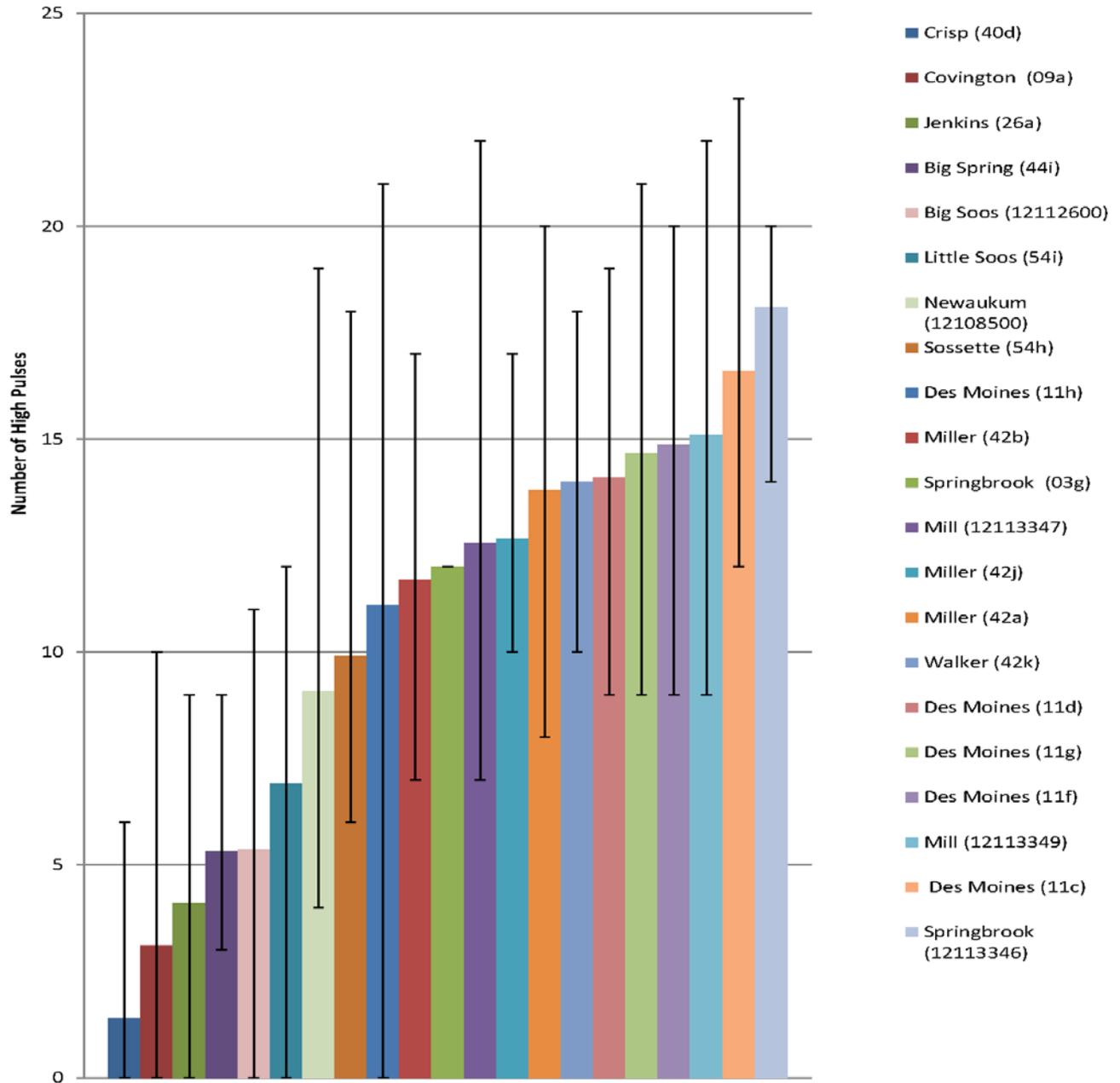
- Planning-level estimate of facility and funding needs
- Cost vs stream improvement
- Demonstrate use of modeling tools
- Influence capital project planning
- Influence discussion on new funding
- Influence future NPDES permits

# Project Schedule

We Are Here



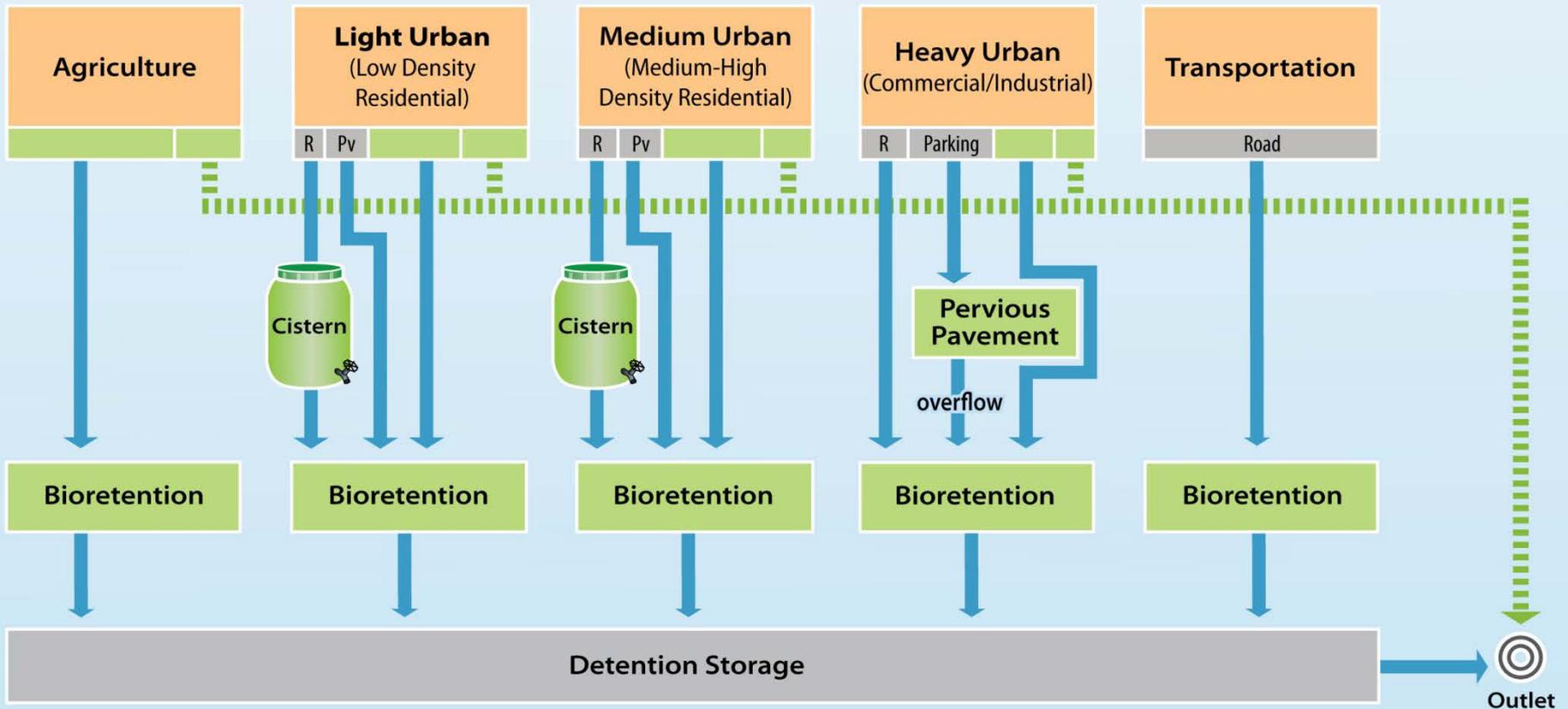
## Mean Yearly High Pulse Count (Error Bars Display Min/Max)



# BMPs Being Modeled

- 3,000 gallon cisterns
- 10 x 10 residential rain gardens
- 10 x 10 roadside bioretention
- Porous pavement
- Stacked wet/dry ponds

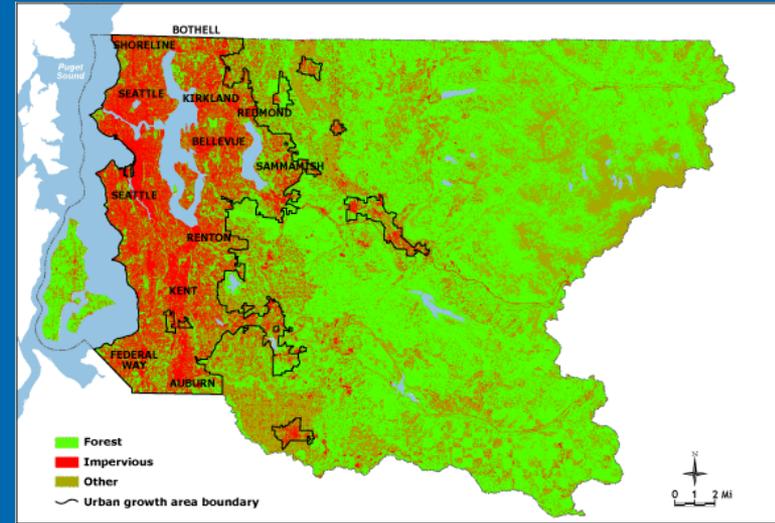
# Natural Drainage Treatment Train & Gray Infrastructure



File: 1311\_3637a\_NaturalDrainTreatment.ai aroul

# Addressing Redevelopment

- Redevelopment improves stormwater management
- Nearly 1/2 of project area to have new or re development by 2040
- More expected beyond 2040



# Addressing Climate Change

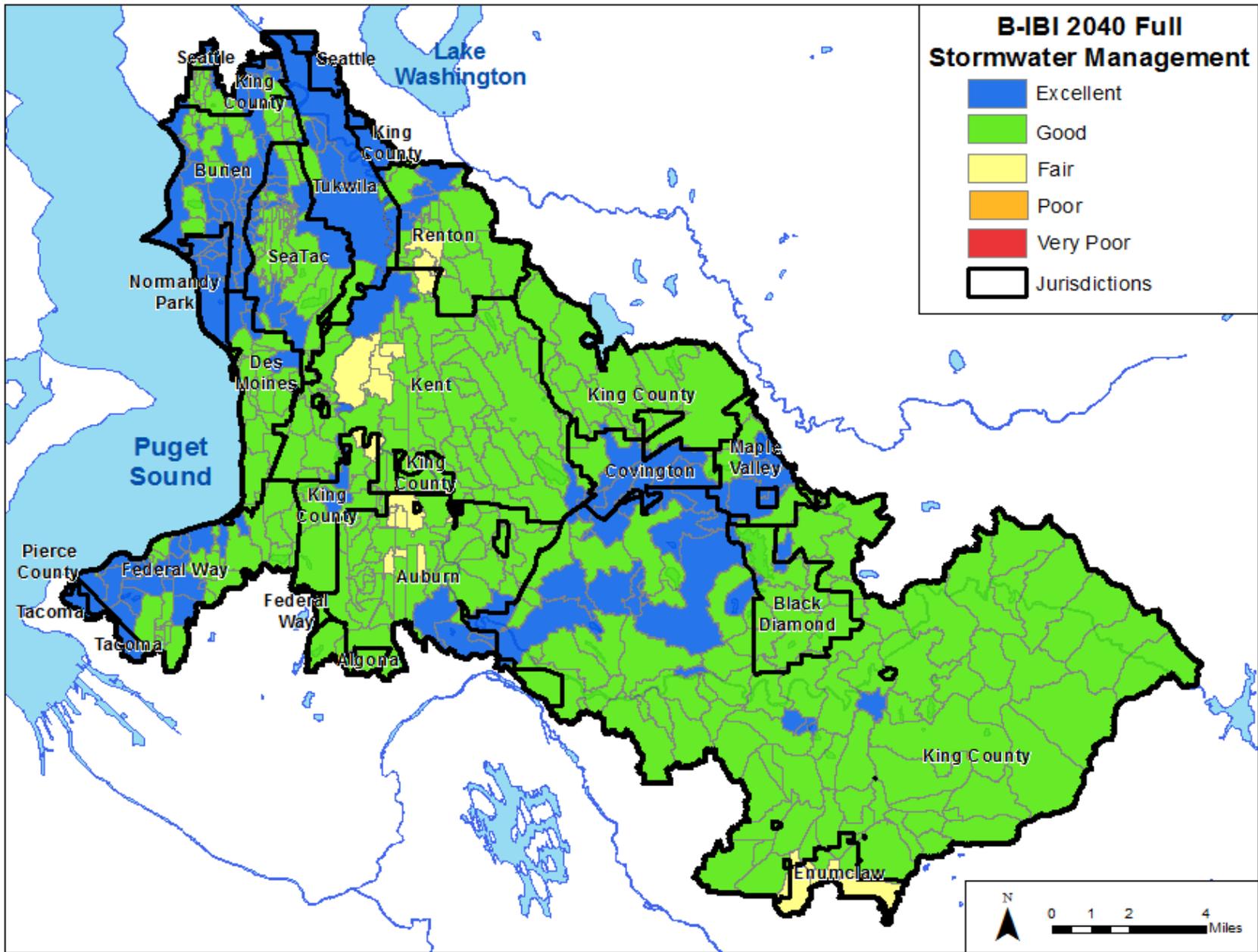
- Three approaches for assessing impacts
  - Analysis of precipitation patterns for downscaled global climate model output
  - Impacts of climate change on hypothetical pond sizing
  - Impacts of climate change on high pulse count in hypothetical basin
- Likely need about 10% more flow control, but model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

# Facilities Needed

- Nearly ½ of project area will have some stormwater facilities built in next 30 years as part of new and redevelopment
- Stormwater facilities for roads and highways are needed
- The remaining needed facilities can be built as part of a public program in next 30 years OR can be built as part of new and redevelopment by 2100

### B-IBI 2040 Full Stormwater Management

- Excellent
- Good
- Fair
- Poor
- Very Poor
- Jurisdictions



# New and Redevelopment Stormwater Program Costs

- Capital: about \$100M per year for 30 years for regional facilities
- Inspect Private Facilities: increase over time to over \$100M per year

# Road and Highway Stormwater Program Costs

- Capital: over \$20M per year for 30 years
- Operating: increases over time to over \$20M per year

# Remaining Developed Land Stormwater Program Costs

- Capital: over \$100M per year for 30 years
- Operating: increases over time to over \$100M per year

# 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?

# Next Steps

- March: Draft existing facility report
- March 20: Comments due on 4 draft reports
- April: Comments due on draft existing facility report
- Spring 2014: Finalize reports