

# SUSTAIN Modeling Results

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Stormwater Retrofit Project Management Team Meeting

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# Stormwater Treatment Options

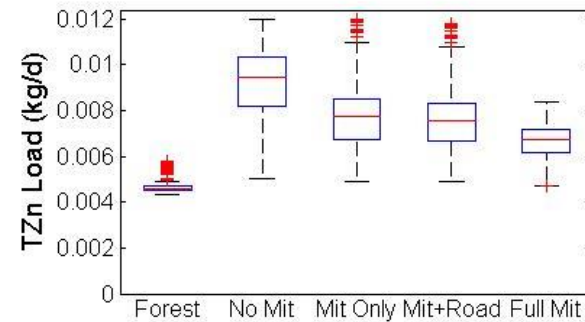
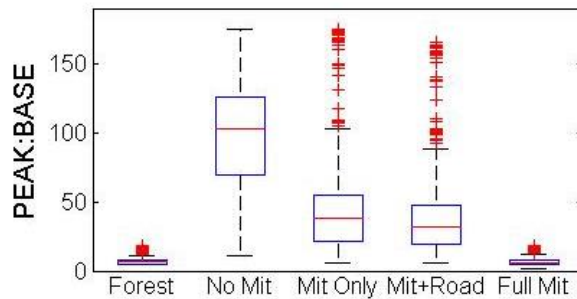
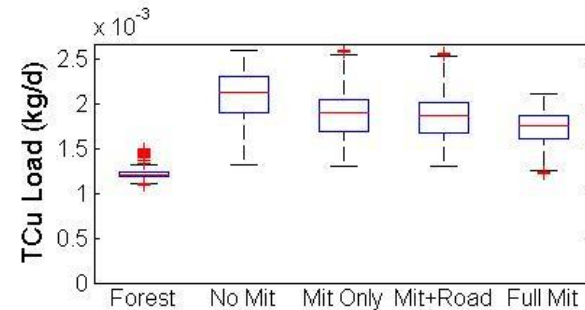
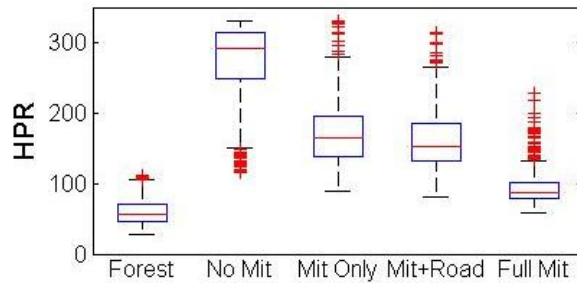
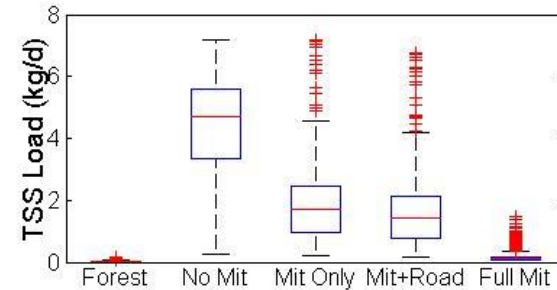
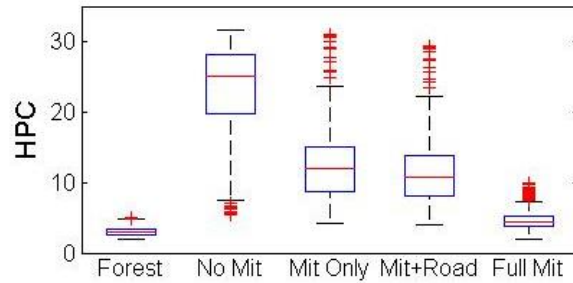
**Scaled hypothetical catchment results to future land use land cover of study area considering three stormwater treatment options:**

1. Required mitigation occurring with new and redevelopment
2. Required mitigation and additional stormwater treatment of roads and highways
3. Full mitigation of the developed lands in the study area

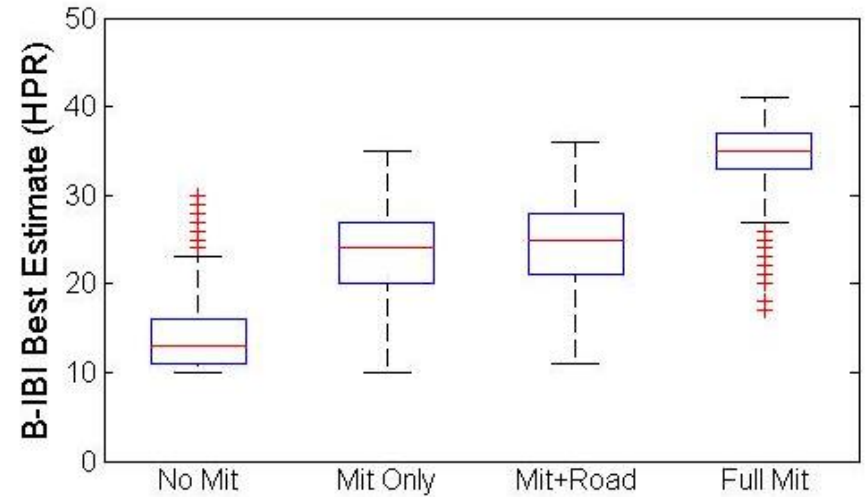
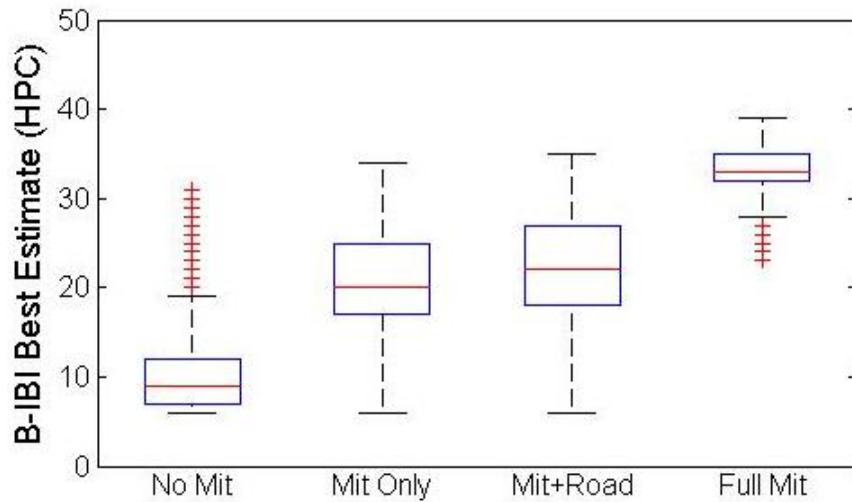
# Number of BMP units

<b>BMP Type</b>	<b>New and Redevelopment</b>	<b>Road and Highway</b>	<b>Additional Units for Stormwater Program</b>
<b>Cisterns</b>	21,000	-	13,000
<b>Rain Gardens</b>	1,700,000	-	950,000
<b>Roadside Bioretention</b>	-	190,000	-
<b>Detention Ponds</b>	46,000	5,000	25,000

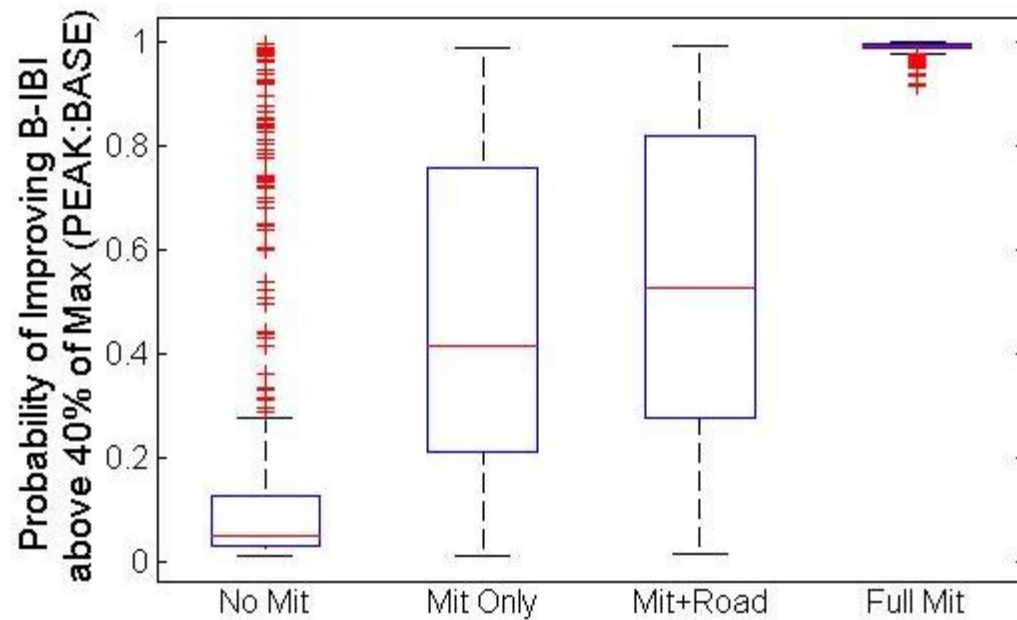
# Study Area Catchment Indicator Results



# Potential B-IBI Improvement: HPC and HPR

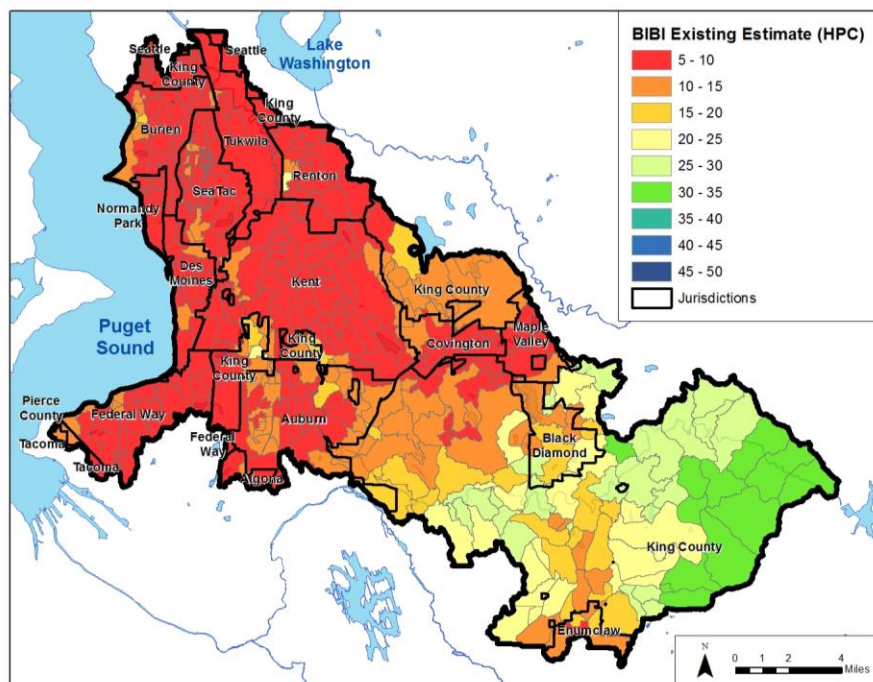


# Potential B-IBI Improvement: PEAK:BASE

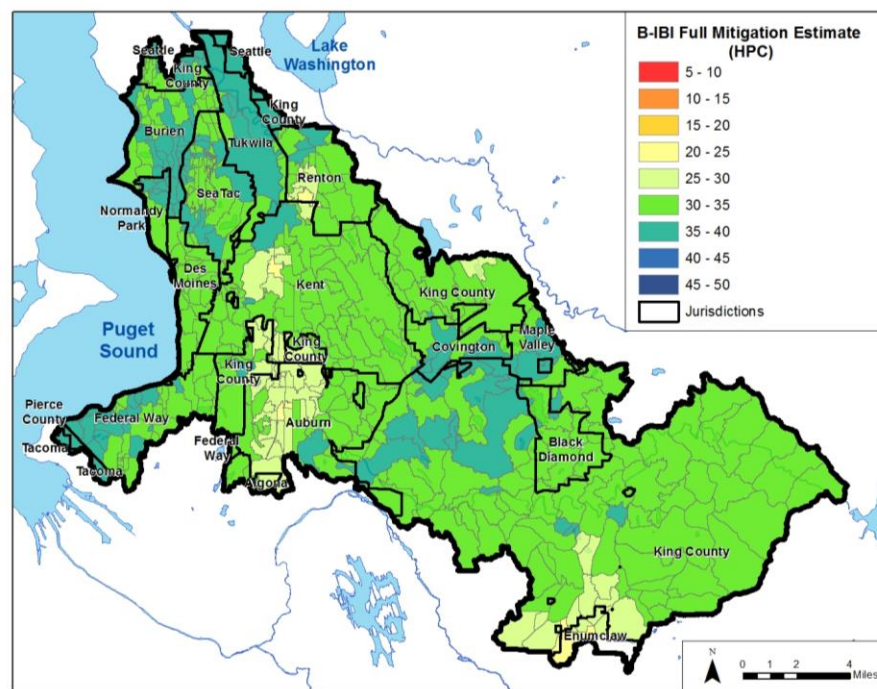


# Potential B-IBI Improvement

## B-IBI Best Estimate: Future Existing Conditions



## B-IBI Best Estimate: Full Mitigation



**Next Step:** Compare King County's observed benthos data collected for Soos Creek to modeled Soos Creek B-IBI scores

# Stormwater Program Costs: Required Mitigation Only

Required Mitigation			
BMP Type	Capital (\$M)	O&M (\$M)	I&E (\$M)
Cisterns	\$18.00	-	\$11.00
Rain Gardens	\$1,900.00	\$1,200.00	\$2,200.00
Roadside Bio	-	-	-
Detention Ponds	\$1,600.00	\$21.00	-

\*total present value costs in 2013 dollars

**Stormwater Program Cost: \$2.3B**



# Stormwater Program Costs: Mitigation of Roads and Highways

Road and Highway Mitigation			
BMP Type	Capital (\$M)	O&M (\$M)	I&E (\$M)
Cisterns	-	-	-
Rain Gardens	-	-	-
Roadside Bio	\$210.00	\$130.00	\$200.00
Detention Ponds	\$180.00	\$2.30	-

\*total present value costs in 2013 dollars

**Stormwater Program Cost: \$0.7B**

# Stormwater Program Costs: Mitigation of Other Developed Land

Mitigation of other development			
BMP Type	Capital (\$M)	O&M (\$M)	I&E (\$M)
Cisterns	\$11.00	-	\$7.00
Rain Gardens	\$1,000.00	\$640.00	\$1,300.00
Roadside Bio	-	-	-
Detention Ponds	\$870.00	\$11.00	-

\*total present value costs in 2013 dollars

**Stormwater Program Cost: \$3.8B**

# Summary of Potential Stormwater Program Costs

Mitigation Option	Total PV Stormwater Program Costs (\$B)
Required Mitigation	\$2.30
Required Mitigation + Roads	\$3.00
Full Mitigation	\$6.80

\*total present value costs in 2013 dollars

# Model limitations and uncertainty

- Simplifying the future land use land cover into 135 hypothetical catchments
- BMP types, design, costs, discount rates
- Development will follow simulated 2040 land use land cover
- Estimated effectiveness: scaling hydrologic and water quality indicators

# Conclusions

- Three potential public stormwater treatment programs.
- Full stormwater treatment of development reduced the hydrologic indicator values and medians close to forested conditions.
- Stormwater treatment of the road area provided a small additional improvement in indicator values and B-IBI scores.
- Stormwater program costs ranged from \$2.3B for required mitigation to \$6.8B for full mitigation.
- Project specific analysis is recommended to select the most appropriate BMPs, associated life cycle costs and discount rate that meet project goals.