King County's Water Quality Benefits Evaluation (WQBE)

King County

Science Seminar November 2019

Water and Land Resources Division

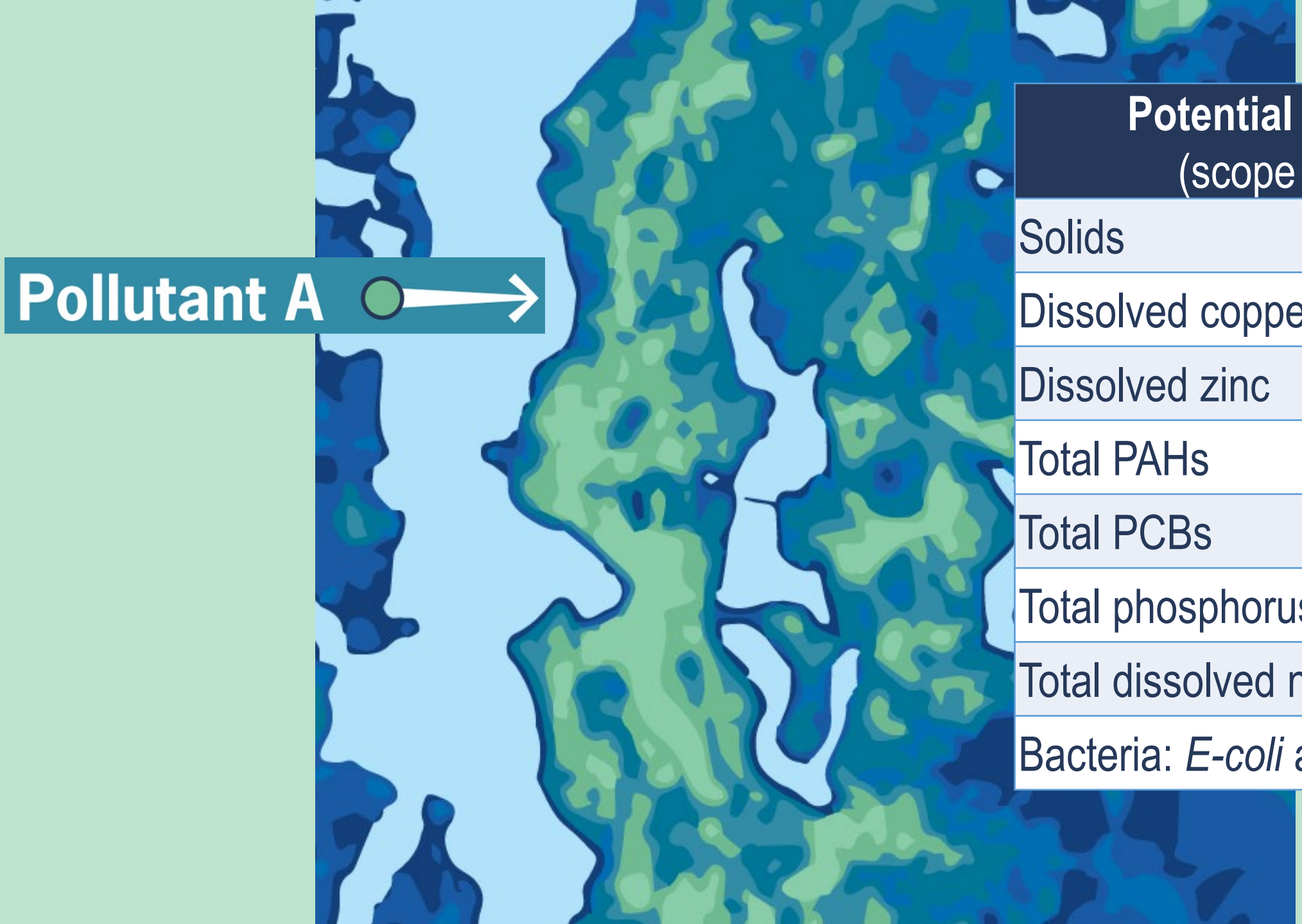
A project for Clean Water Healthy Habitat

Phase I Objective: Develop and apply an adaptable toolkit that provides transparent, standardized methods for evaluating water quality benefits of projects and programs.

Key Deliverables: Pollutant loading model, SUSTAIN model, causal model, evaluation and summary report

POTENTIAL PROJECTS AND PROGRAMS	LOAD REDUCTIONS			THREAT REDUCTIONS				
	Pollutant A	Pollutant B	Pollutant C	Edible fish	Swimming	Shellfish harvesting	Chinook salmon	Orca
Package A	●	○	○	○	●	●	○	○
Package B	○	●	○	●	○	○	◒	◒
Package C	◒	○	●	◒	○	◒	◒	◒

SYMBOLS: ● High reduction ◒ Medium reduction ○ Low reduction



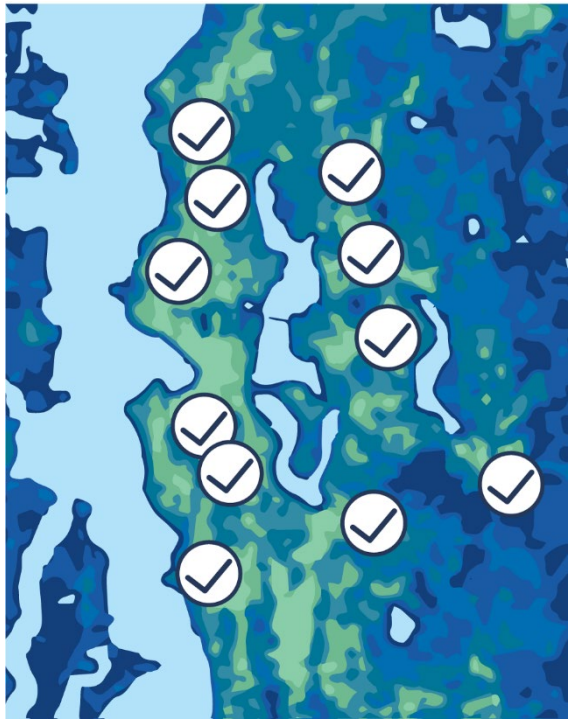
Potential Pollutants (scope for ~10)
Solids
Dissolved copper
Dissolved zinc
Total PAHs
Total PCBs
Total phosphorus
Total dissolved nitrogen
Bacteria: *E-coli* and fecal coliform

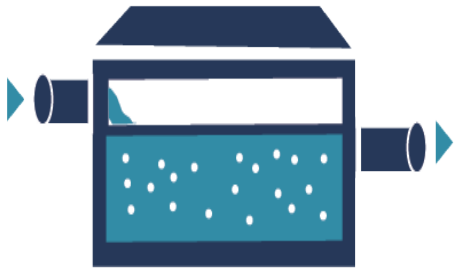
Per unit:

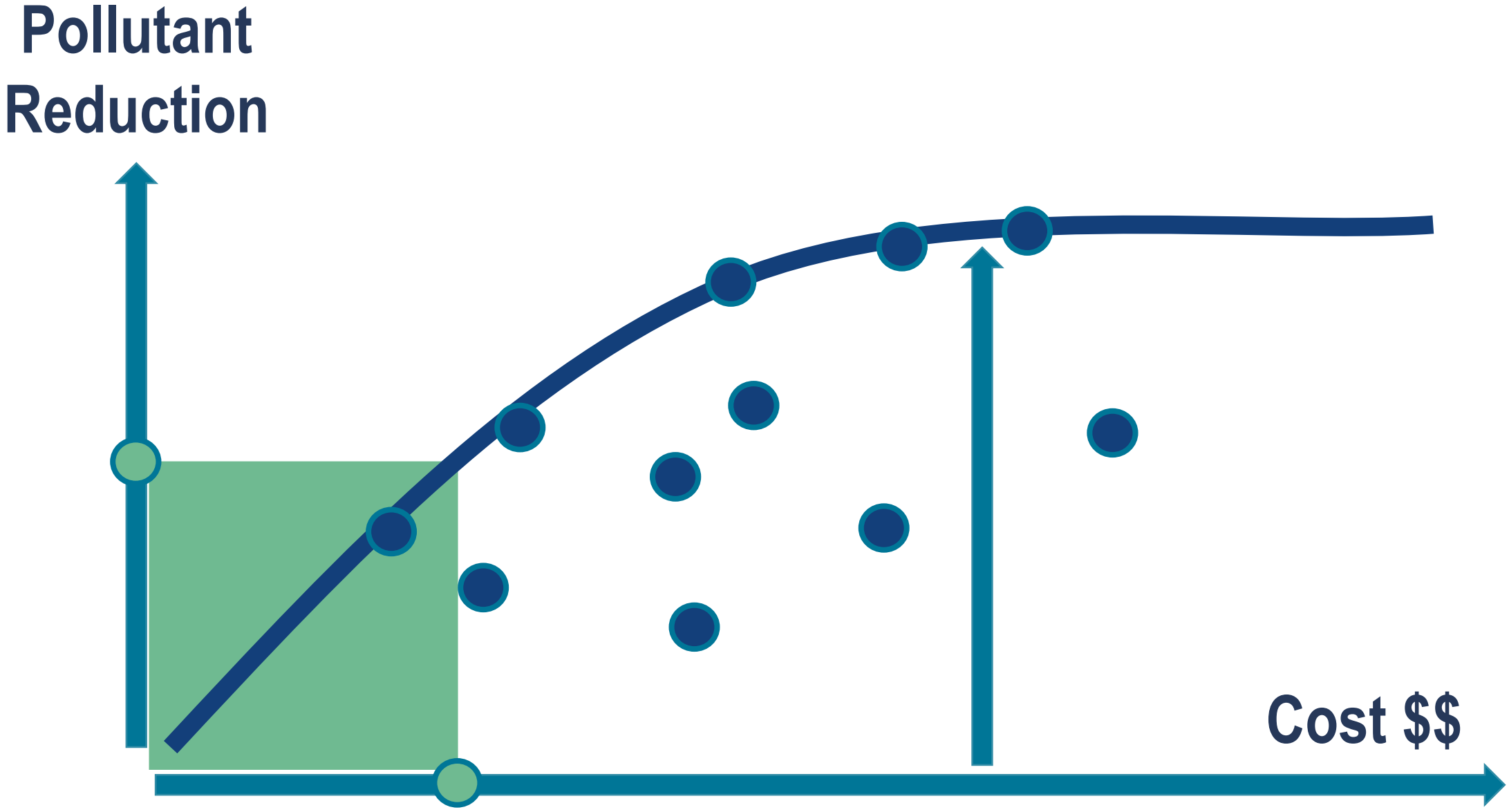
Cost $_____

Pollutant reduction _____

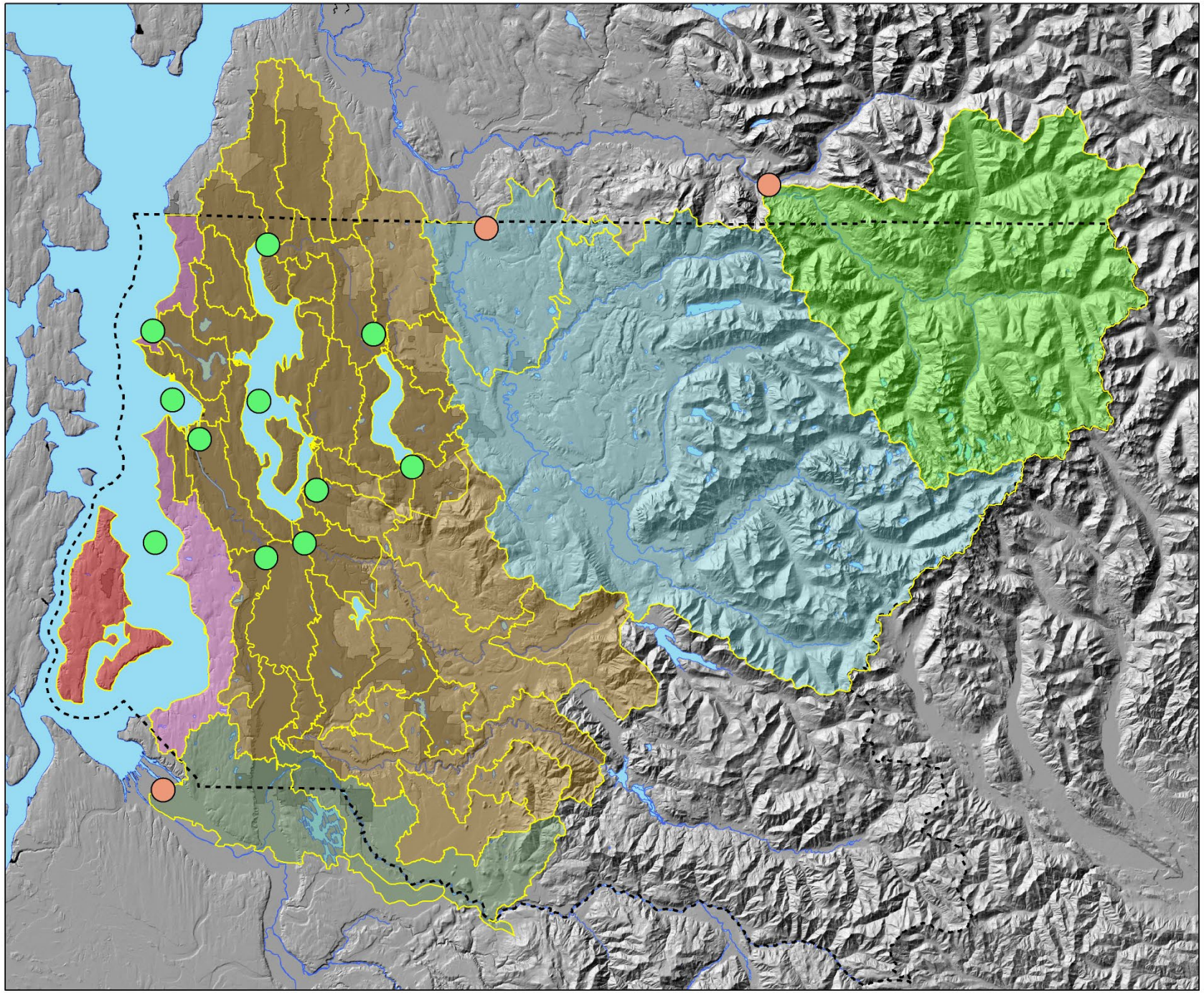
Other benefits _____






Pollutant Reduction
Cost $$

Potential Basins for Pollutant Loading and Cost-Effectiveness Analysis



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Legend

Assessment Points

- Outside WTD Service Area (3)
- WTD Service Area (11)
- Basin Catchments
- King County

Description

- Drains to Service Area (40)
- Nearshore (2)
- Skykomish (1)
- Snoqualmie (2)
- Vashon Island (1)
- White (2)

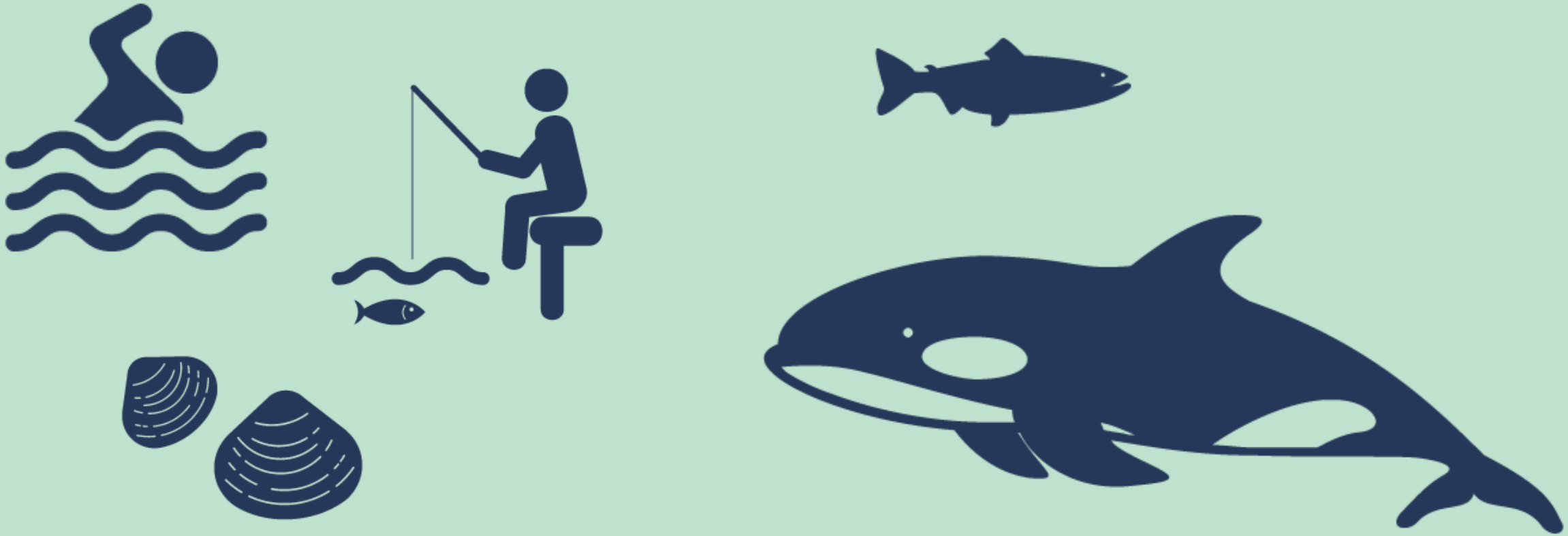
0 2 4 8 12 16 Miles

DRAFT August 26, 2019

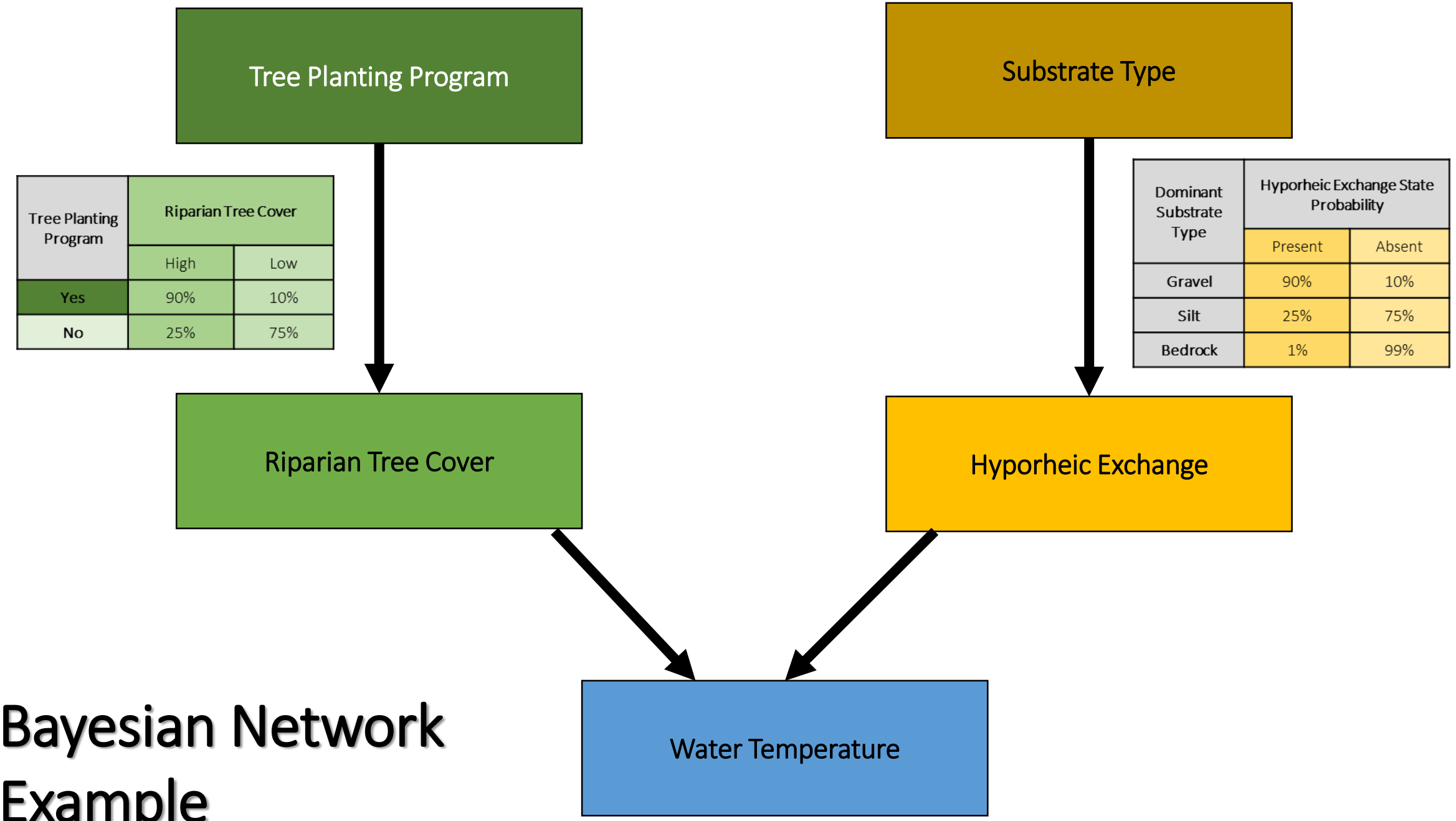
POTENTIAL PROJECTS AND PROGRAMS	LOAD REDUCTIONS		
	Pollutant A	Pollutant B	Pollutant C
Package A	●	○	○
Package B	○	●	○
Package C	◒	○	●

SYMBOLS: ● High reduction ◒ Medium reduction ○ Low reduction

We improve water quality to protect:




Sources
Pathways
Pollutant A
Pollutant B
Pollutant C



Tree Planting Program	Riparian Tree Cover	
	High	Low
Yes	90%	10%
No	25%	75%

Dominant Substrate Type	Hyporheic Exchange State Probability	
	Present	Absent
Gravel	90%	10%
Silt	25%	75%
Bedrock	1%	99%

Bayesian Network Example

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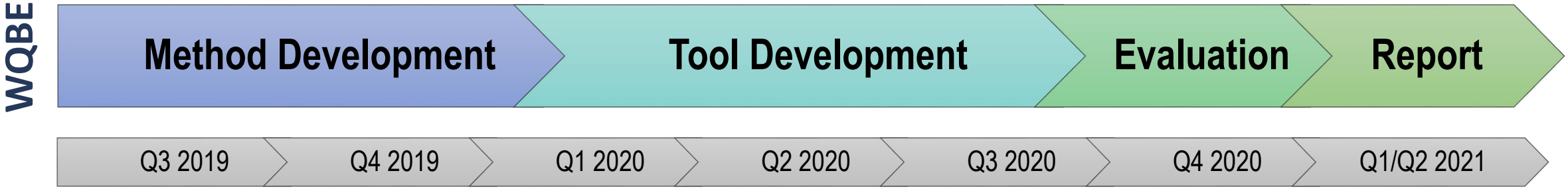
Package A	●	○	○	○	●	●	○	○
Package B	○	●	○	●	○	○	◒	◒
Package C	◒	○	●	◒	○	◒	◒	◒

SYMBOLS: ● High reduction ◒ Medium reduction ○ Low reduction

Schedule



Project milestones:

- Water Quality Endpoints Selected
- Water Quality Projects and Programs Selected
- Water Quality Projects and Program Fact Sheets Completed
- Pollutant Loading Model Completed
- Causal Model Completed
- SUSTAIN Model Completed
- Evaluation and Summary Table Completed
- Synthesis Report Completed

Project Team Overview

Project managers:

- Carly Greyell (KC); John Lenth (Herrera)

Project/program development leads:

- Blair Scott (KC); Alice Lancaster and Brian Busiek (Herrera)

Pollutant loading and SUSTAIN modeling leads:

- Jeff Burkey (KC); John Riverson and Steve Carter (Paradigm)

Causal modeling team:

- Jenée Colton (KC) – overall task and orca model
- Timothy Clark (KC) – technical methods and swimming beach model
- Jennifer Lanksbury (KC) – fish/shellfish consumption models
- Kollin Higgins (KC) – Chinook salmon models
- Beth Sosik (KC) – technical support

Additional Acknowledgements

Several local causal model experts are providing guidance and technical support for this project:

- Phil Levin (UW/The Nature Conservancy)
- Tessa Francis (Puget Sound Institute)
- Dr. Bruce Marcot (U.S. Forest Service)
- More to come!

King County

Thank you.

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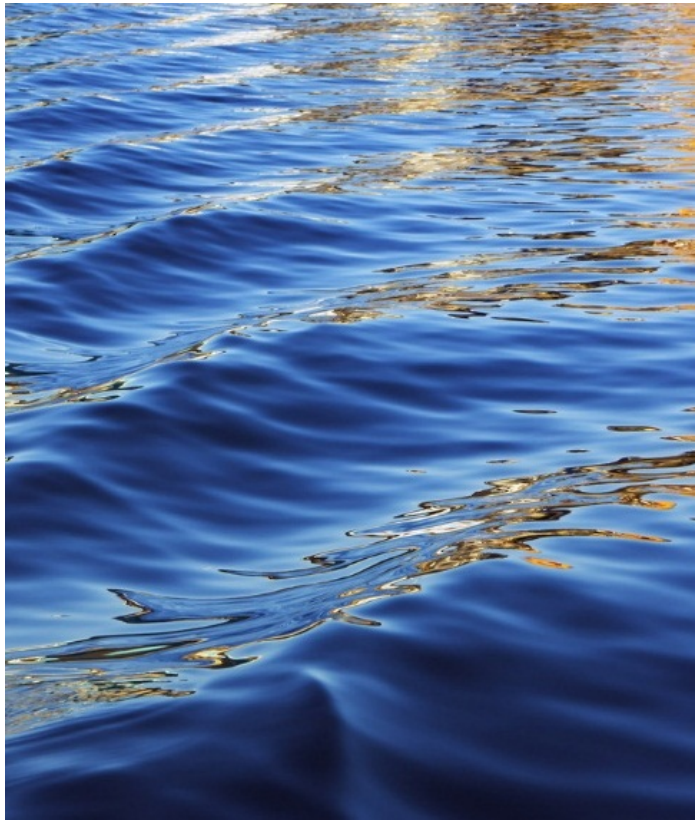

A project for
Clean Water
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