

Green Shores 2020: Impact, Value and Lessons Learned using a Triple Bottom Line Evaluation



**Adaptation Platform Webinar
12th November, 2020**

Canada's Climate Change Adaptation Platform Coastal Management Working Group (CMWG)



- CMWG consists of representatives from federal, provincial and territorial governments, academia as well as professional and other organisations working to advance adaptation and increase resilience to climate change along Canada's coasts.
- The CMWG is co-chaired by: Natural Resources Canada and the Government of Prince Edward Island
- August 2017 Adaptation Platform call for proposals. Coastal Management: Alternative and Innovative Options to Hard Protection Infrastructure Solutions.



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Natural Resources
Canada

Ressources naturelles
Canada

Canada

Webinar Presenters

Jimena Eyzaguirre

International Team Director and Business Lead for climate change adaptation at ESSA Technologies Ltd.



Richard Boyd

Director of Research at All One Sky Foundation



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Green Shores 2020: Impact, Value and Lessons Learned using a Triple Bottom Line Evaluation

November 12, 2020

Presented by:

DG Blair, Stewardship Centre for BC

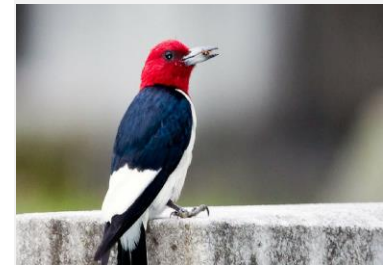
Richard Boyd, All One Sky Foundation

Jimena Eyzaguirre, ESSA Technologies Ltd.



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Connect.
Understand.
Act.



Green Shores Program

Four Guiding Principles:

- ❖ Preserve or restore shoreline physical processes
- ❖ Maintain or enhance habitat function and diversity
- ❖ Prevent or reduce pollutants entering the aquatic environment
- ❖ Avoid or reduce cumulative impacts

1 Green Shores for Shoreline Development

2 Green Shores for Homes (Residential)

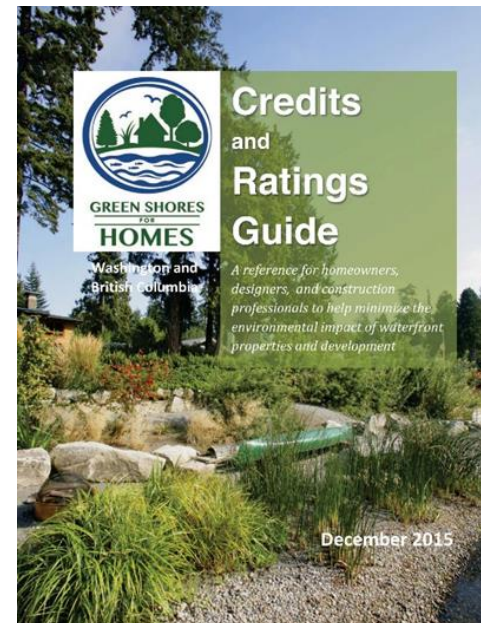
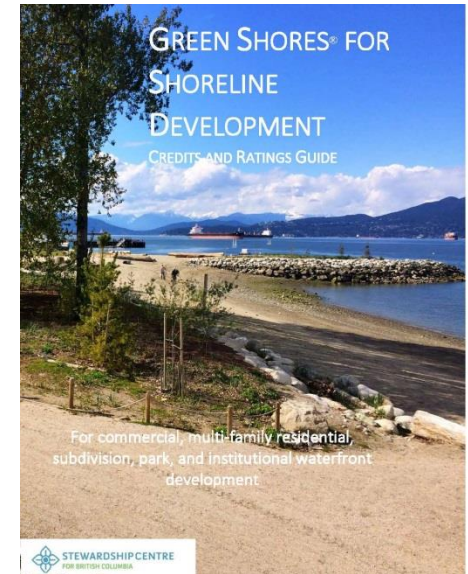
3 Green Shores for Local Government



Green Shores Program

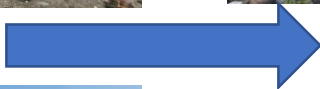
❖ **Credits and Ratings Guides** created as tools to develop properties in a “shore friendly” way

❖ Both are built on a format similar to Built Green™ and LEED™ using a **credit and rating system** framework





Green Shores Program





Green Shores Impacts in BC to date



Habitat

~ 7,000m of
shoreline in BC

22 projects
enrolled or
certified



Training

~**600**
people trained

70+
professionals
have taken
advanced
training (L2)



Policy

26% BC coastal
local govts
demonstrate strong
alignment with
Green Shores'
principles,

9% directly
reference Green
Shores in policies
and/or bylaws



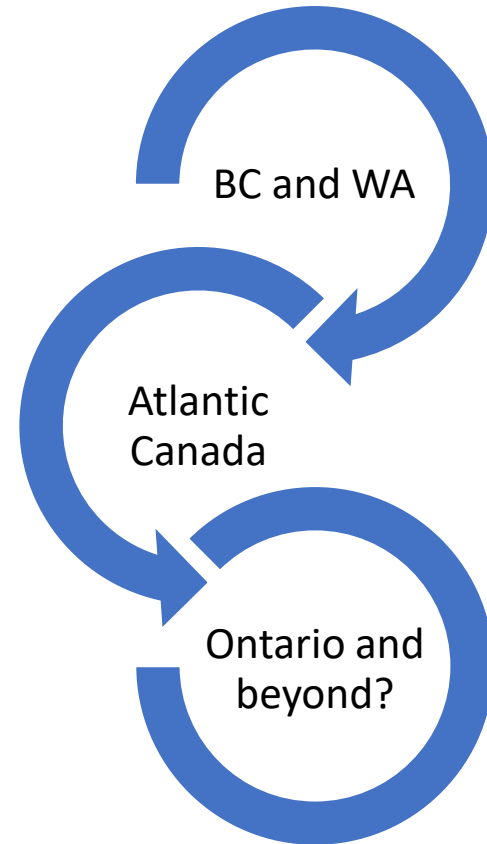
Communities

11 local
governments
participating in
Green Shores
Working Group



Green Shores TBL Evaluation


- ❖ understand the potential for improvements and wider applicability
- ❖ demonstrate its value in economic terms
- ❖ interest in expanding the program





Green Shores TBL Evaluation





Overview

1. Objective and concepts
2. Key aspects of methodology
3. Spreadsheet tool
4. Results

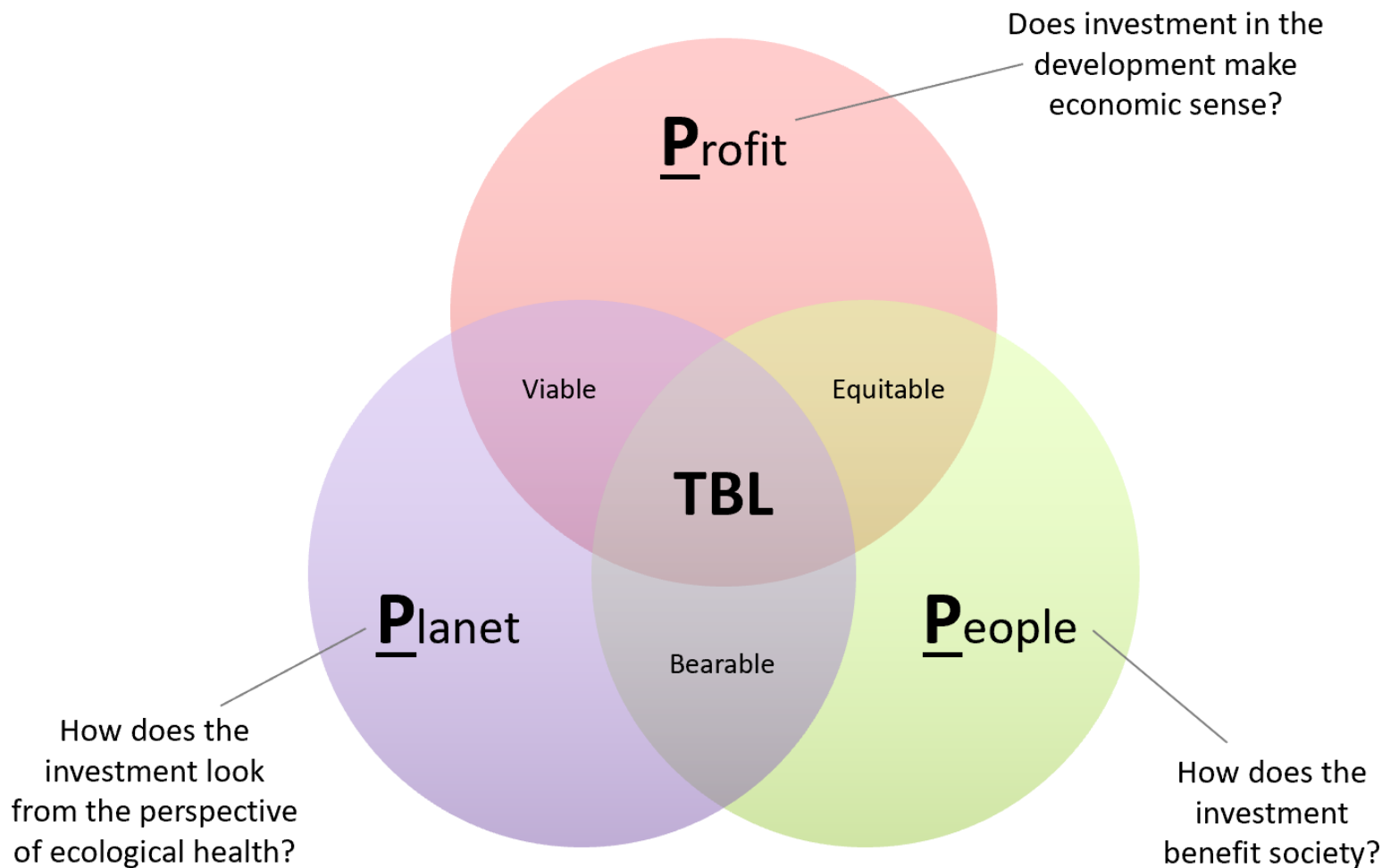


Objectives of TBL evaluation

- ✓ Demonstrate value of GS approach to shoreline development using monetary metrics
- ✓ Adopt a societal (or triple bottom line) perspective
- ✓ Develop practical and scalable methodology for sites
- ✓ Build transferable tool to support analysis
- ✓ Apply tool to case study sites and evaluate program

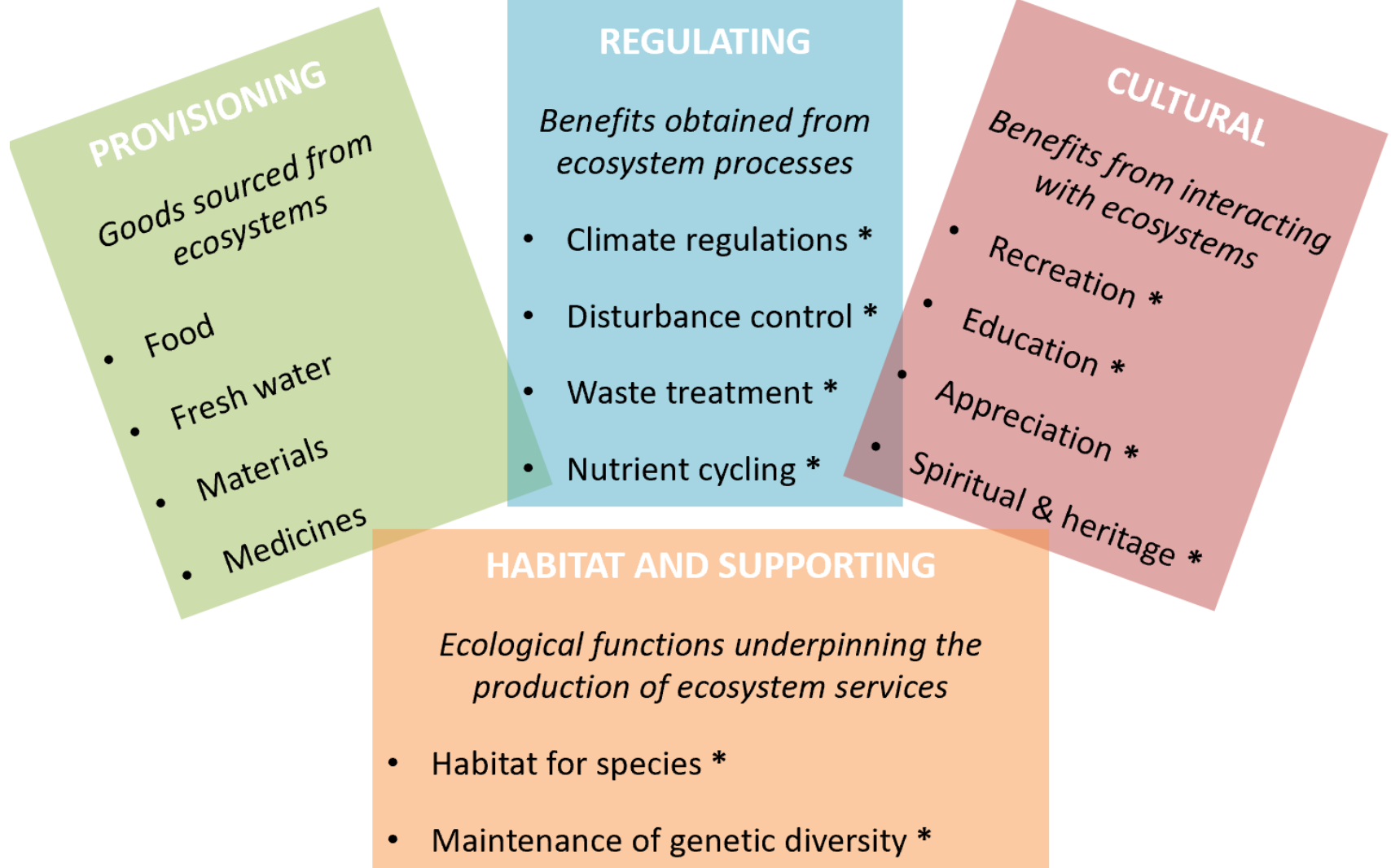


Triple bottom line evaluation – 3Ps accounting framework



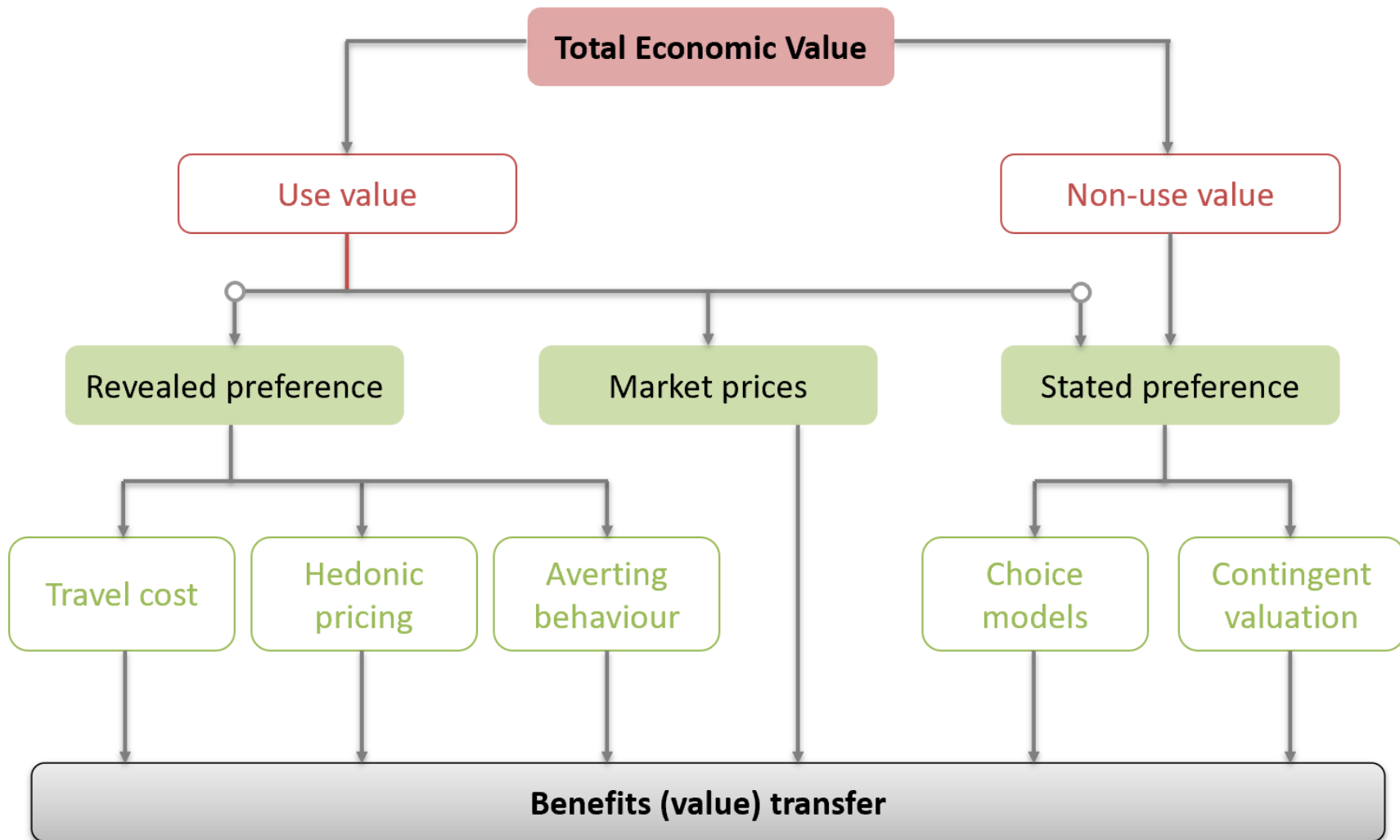


Ecosystem services based approach

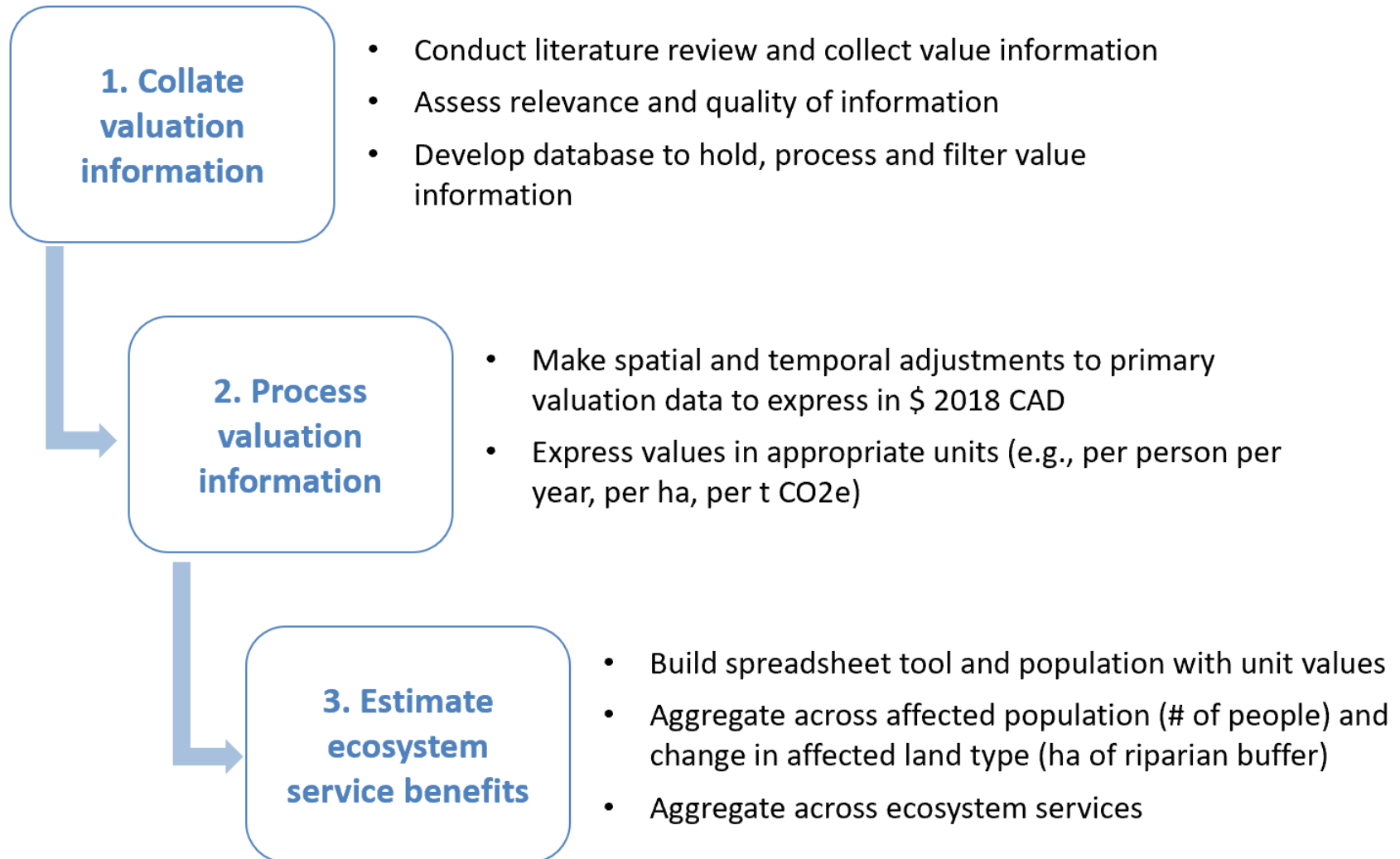




Valuing program costs and benefits

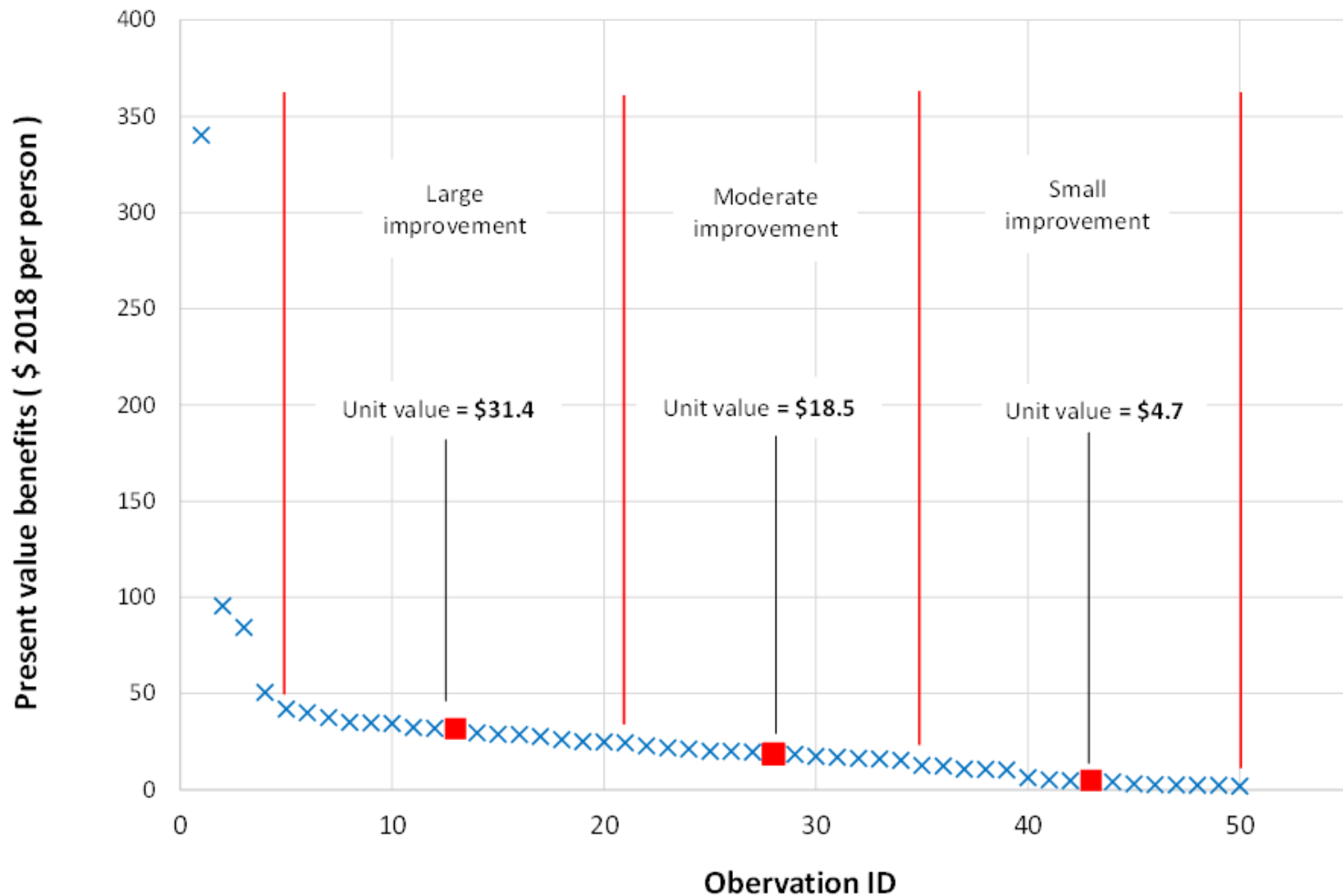


Our approach to benefits transfer





Example of habitat service valuation





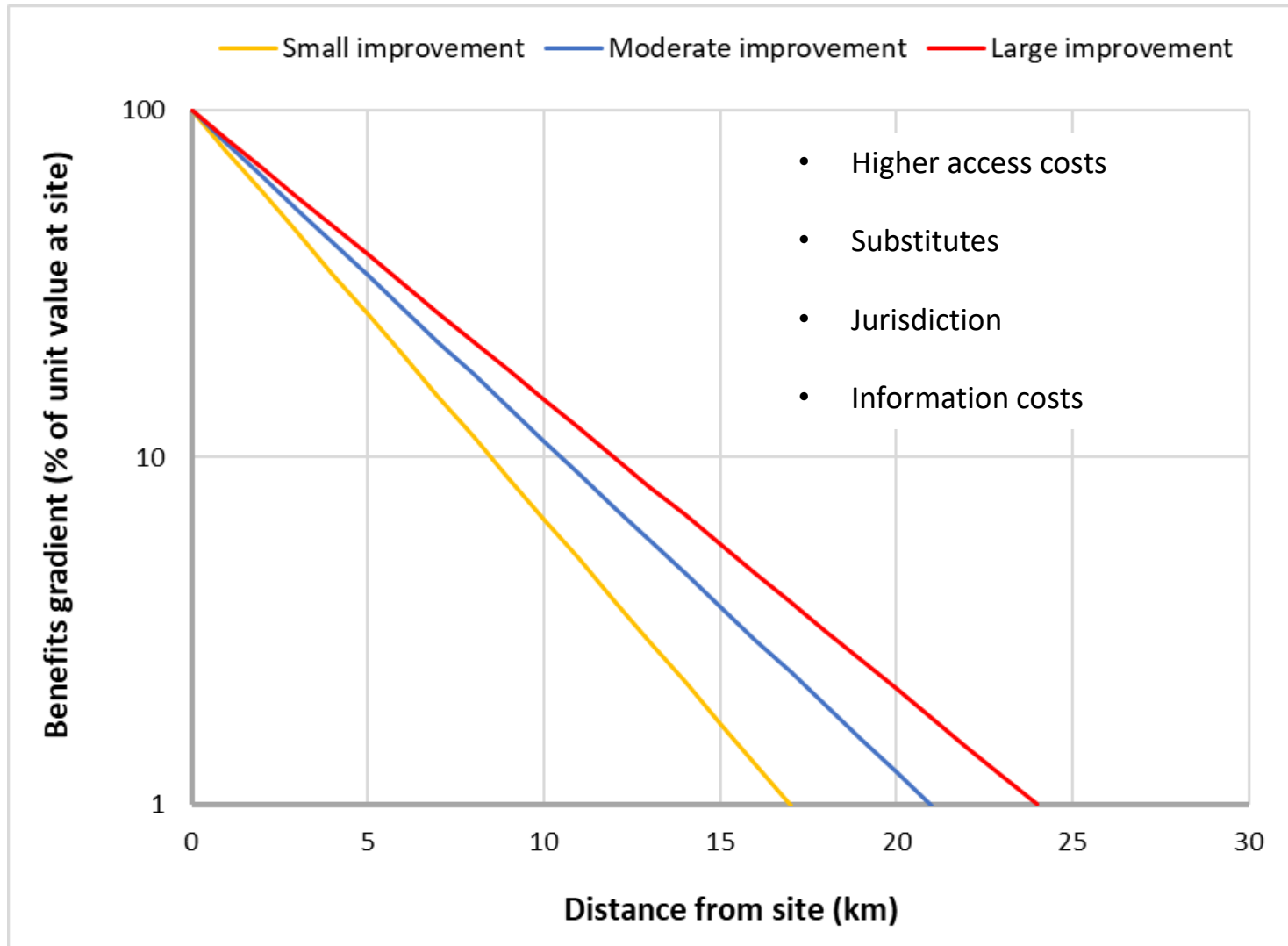
Example of habitat service valuation

Credits regarding ...		
Credit 1 *	Site design with conservation of shore zone	1-3 points
Credit 2	Shore friendly access	1-2 points
Credit 3 *	Redevelopment of contaminated sites	2 points
Credit 4 *	Restoration or enhancement of shoreline sediment and tidal processes	2-9 points
Credit 5 *	Restoration or enhancement of shoreline habitats	1-10 points
Credit 6 *	Enhanced riparian zone protection	1-3 points
Credit 7 *	Integrated stormwater planning and design	3-4 points
Credit 8	Climate change adaptation plan	2-5 points
Credit 9	Exceptional performance and innovation	1-2 points
Credit 10	Outreach and public education	1-2 points

** Analysis was based on 2019 version of credits guide, which has since been updated.

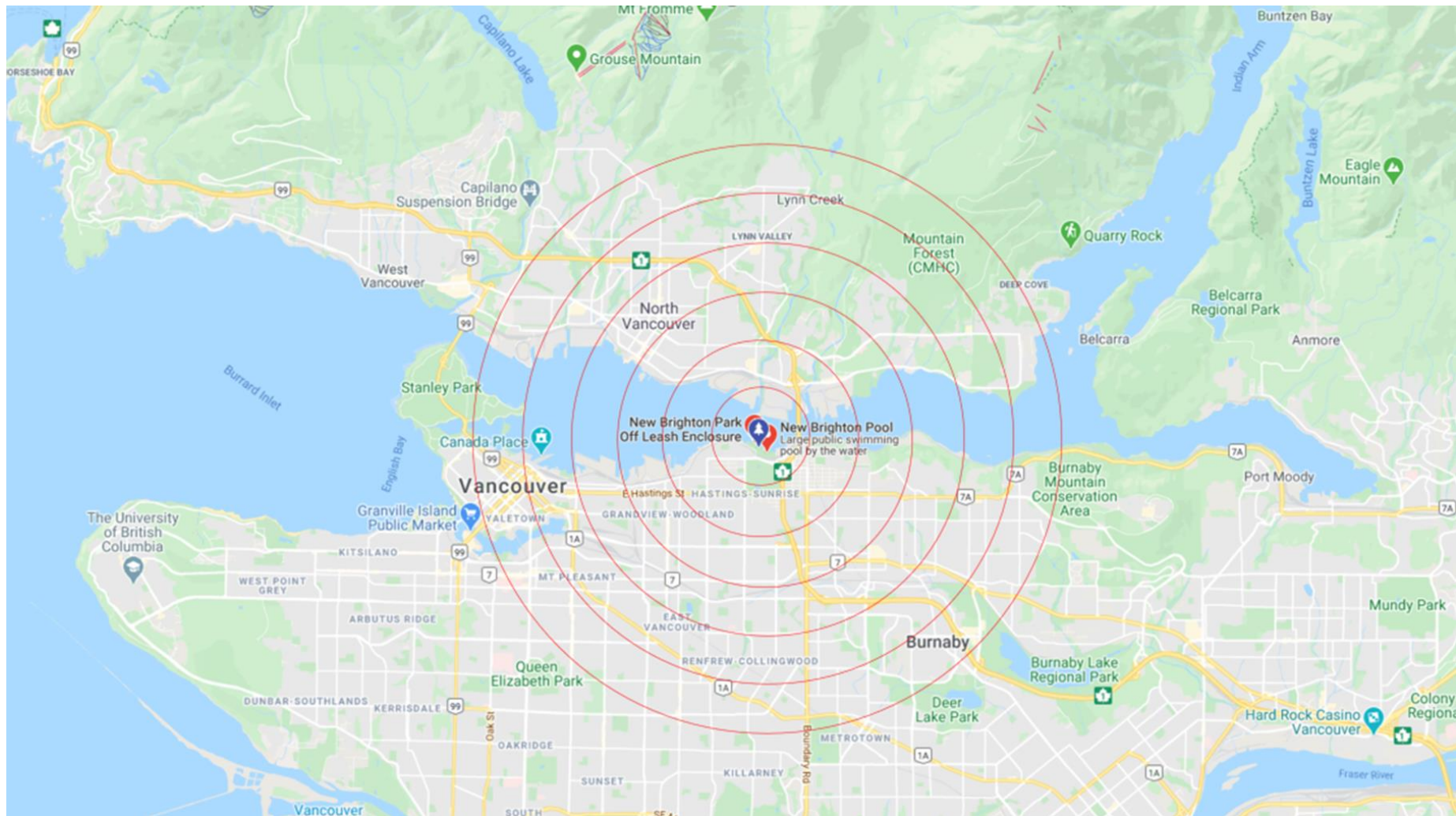


Impact of distance on values held by people





Affected population with cultural and habitat service values





Measuring wider economic impacts

I-O Industry Classification	Simple multipliers					
Industry	Output	Labour income	GDP at basic prices	Taxes on products	Taxes on production	Jobs
	Per \$ of output	Per \$ of output	Per \$ of output	Per \$ of output	Per \$ of output	Per Mn. \$ of output
Residential building construction	1.448	0.403	0.635	0.034	0.054	7.087
Non-residential building construction	1.418	0.468	0.672	0.028	0.058	7.049
Other activities of the construction industry	1.168	0.330	0.784	0.029	0.061	5.281
Legal services	1.259	0.589	0.858	0.011	0.010	8.078
Architectural, engineering and related services	1.301	0.608	0.816	0.014	0.007	8.557
Management, scientific and technical consulting services	1.314	0.528	0.837	0.012	0.008	9.066
Services to buildings and dwellings	1.304	0.573	0.759	0.026	0.008	21.004
Grant-making, civic, and similar organizations	1.504	0.591	0.732	0.034	0.014	12.979



Spreadsheet tool for site level evaluations

Project name:

Riverbend

Nearest city:

Burnaby, BC

How much area at the site includes new, restored or enhanced trees (coniferous or deciduous), riparian buffer, saltwater wetland, freshwater wetland, or intertidal wetland? Enter the estimated square metres in the space provided.

Habitat Type	Square Metres	Hectares
Trees: coniferous*		0.00
Trees: deciduous*		0.00
Riparian buffer (shrubs, grasses)	15,750	1.58
Saltwater wetland: salt marsh, swamp, estuary		0.00
Freshwater wetland: bog, fen, marsh		0.00
Intertidal wetland: eelgrass		0.00
Total treed area	0	0.00
Total wetland	0	0.00
Total wetland and riparian buffer	15,750	1.58

Note: if only the number of trees is known, assume a decorative planting density of one tree per ten metres (100 trees per hectare)



Site Description

Population Inputs

Disturbance Regulation Points

Habitat Services Points

Habitat Reference Values

Cultural Services ...





Spreadsheet tool for site level evaluations

Population Inputs for Site			
Spatial boundary of population ring (km)			Population
0	-	1	47
1	-	2	3,202
2	-	3	16,628
3	-	4	39,428
4	-	5	67,943
5	-	6	76,683
6	-	7	83,697
7	-	8	98,942
8	-	9	122,056
9	-	10	157,088
10	-	11	196,571
11	-	12	172,051
12	-	13	142,470
13	-	14	172,358
14	-	15	166,904
15	-	16	169,910
16	-	17	102,621
17	-	18	79,015

► Site Description **Population Inputs** Disturbance Regulation Points Habitat Services Points Habitat Reference Values Cultural Services ... (+)



Spreadsheet tool for site level evaluations

Disturbance regulation risk index						
Rating:		1 (very low)	2 (low)	3 (moderate)	4 (high)	5 (very high)
Geomorphology	What geomorphology best characterizes the site's shoreline?	Rocky, high cliffs, seawalls	Medium cliffs, indented coast, bulkheads and small sea walls	Low cliffs, revetments, rip-rap walls	Cobble beach, estuary, lagoon, bluff	Barrier beach, sand beach, mud flat, delta
	<i>Enter "1" in most appropriate cell</i>				1	
Relief	How high is the site above sea-level?	> 1.50 m	1.25 m to 1.50 m	0.730 m to 1.25 m	0.375 m to 0.730 m	< 0.375 m
	<i>Enter "1" in most appropriate cell</i>				1	
Habitat	What natural habitat is present on the site's shoreline?	Reefs, coastal forests	High dune, marshes, wetlands	Low dune	Seagrass, eelgrass, kelp	No natural habitat buffer
	<i>Enter "1" in most appropriate cell</i>					1
Wind exposure	In what direction does the site's shoreline face?	NE, NW, S, SW	N	SE	W	E
	<i>Enter "1" in most appropriate cell</i>			1		
Wave potential	Is the site's shoreline exposed to the open ocean and oceanic waves?	Not at all	Slightly	Partly	Mostly	Fully
	<i>Enter "1" in most appropriate cell</i>	1				
Dwelling density	What is the housing density of the local census subdivision?	<650 dwellings/km ²	651-1,300 dwellings/km ²	1,301-1,950 dwellings/km ²	1,951-2,600 dwellings/km ²	> 2,600 dwellings/km ²
			1			

Disturbance **risk** potential: **4 (high)**

Climate change adaptation plan to address sea-level rise (Credit 8 in "Credit and Rating Guide")		
Did the submittal include documentation of projected change in the location of the natural boundary on the site due to sea-level rise over 50 years or the life of the project, whichever is greatest?	<i>If yes, enter "1"</i>	1
AND		
Did the project include strategies to AVOID the need for protective measures to mitigate the impacts of sea-level rise?	<i>If yes, enter "1"</i>	
AND		

▶ ... Habitat Reference Values Cultural Services Points Cultural Reference Values Distance Decay Function Economic Impact of Expenditures Site Cost Benefit Analysis (+) ◀ ▶



Spreadsheet tool for site level evaluations

SUMMARY OF PROJECT NET BENEFITS

BENEFITS	
Ecosystem services	Annualized PV benefits (\$ 2018)
Habitat services	\$703,070
Cultural services	\$151,923
Climate regulation services	\$20,718
Waste treatment services	\$1,511
Nutrient cycling services	\$58
Disturbance regulation services	\$19,883
Total	\$897,162

COSTS		
Items		Annualized PV costs (\$ 2018)
Investment costs:	Residential building construction	\$0
	Non-residential building construction	\$0
	Other civil engineering construction	\$85,655
	Legal services	\$0
	Architectural, engineering and related services	\$42,827
	Scientific and technical consulting services	\$1,713
	Landscaping services	\$85,655
	GS program costs	\$2,912
Annual recurring costs:	Residential building construction	\$0
	Non-residential building construction	\$0
	Other civil engineering construction	\$0
	Legal services	\$0
	Architectural, engineering and related services	\$0
	Scientific and technical consulting services	\$18,287
	Landscaping services	\$0
	GS program expenses	\$0
Total annualized PV costs:		\$237,049

ECONOMIC PERFORMANCE OF PROJECT	
Net annual benefits	\$660,113
Benefit cost ratio	3.46

Breakdown of present value benefits by ecosystem service

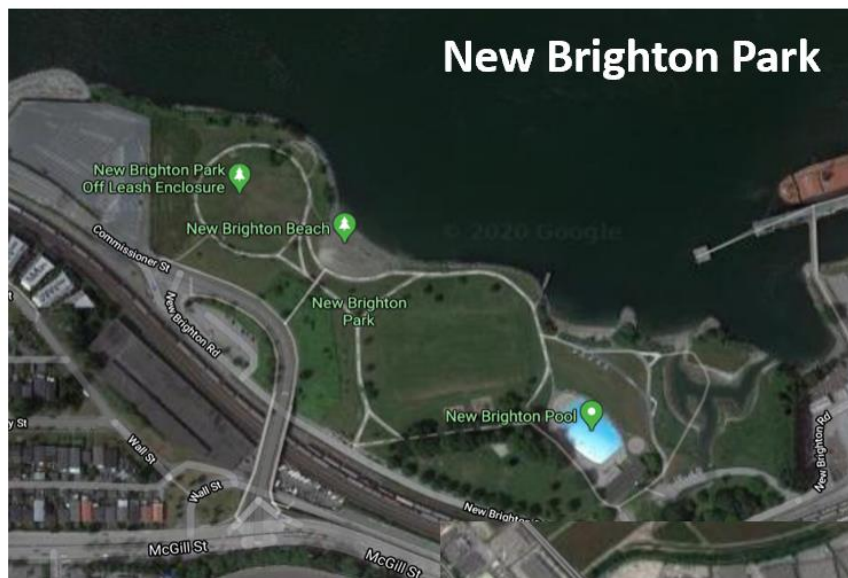


EAB, EAC and NAB





Case study development sites





GSSD program costs, benefits, and net benefits

Social welfare increased by about **\$7** for each **\$1** invested by the GSSD program

Metric	New Brighton Park	Jericho Beach Park	Riverbend Business Park	GSSD program
Equivalent annualized benefits	\$1.2	\$4.9	\$0.9	\$7.0
Equivalent annualized costs	\$0.4	\$0.2	\$0.2	\$0.9
Net annualized Benefits	\$0.8	\$4.7	\$0.7	\$6.1
Benefit cost ratio	2.5	20.3	3.5	7.1



Contribution to B.C. economy

\$5.9-6.9 million to GDP, generating **\$0.5-0.7** million in tax revenues, and supporting roughly **80** jobs

Metric	Output	Labour income	GDP at basic prices	Tax revenue	Jobs
Low	\$9.3	\$3.3	\$5.9	\$0.5	75 jobs
High	\$10.8	\$3.7	\$6.9	\$0.7	85 jobs

** Upper bound estimates - do not account for opportunity costs of alternative uses of program funds **

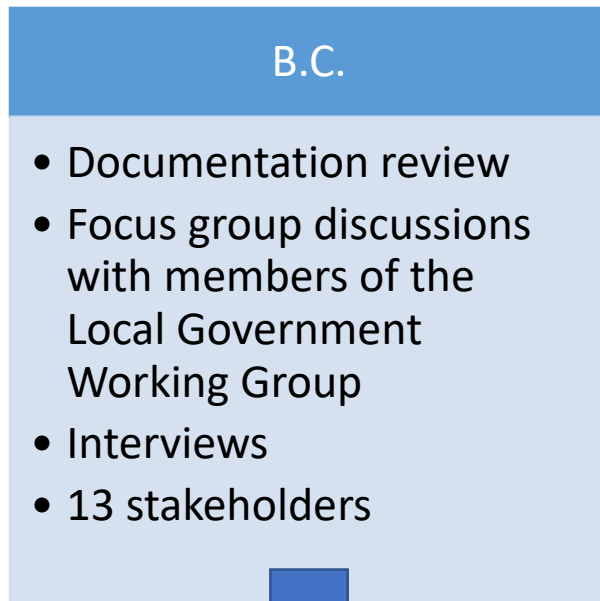


Taking Green Shores to scale

What are promising strategies and actions to accelerate uptake of Green Shores at scale?



Information sources and outputs



- Challenges / opportunities
- Results chain
- Recommendations for improving Green Shores in B.C.



- Readiness
- Knowledge and attitudes
- Recommendations on approach to roll out in the Atlantic region



Implementation challenges and opportunities in B.C.

Stakeholder group	Challenges	Opportunities
Local government & elected officials	<ul style="list-style-type: none">• Perceived high costs of implementation• Complexities of coastal ecosystems• Varying knowledge of and attitudes toward soft shoreline solutions	<ul style="list-style-type: none">• Policy changes• Provision of baseline information (e.g., coastal processes)
Technical advisors & shoreline professionals	<ul style="list-style-type: none">• Misaligned incentives: public good of naturalized shoreline not reflected in government fiscal frameworks• Limited history of implementation success	<ul style="list-style-type: none">• Increased awareness of climate change impacts and links to shoreline protection• Cumulative effects lens as a way to promote shoreline restoration at the right scale• Growing the cadre of trained contractors
Funders	<ul style="list-style-type: none">• Need for financial incentives since Green Shores creates or restores a public good• Inconsistent terminology	<ul style="list-style-type: none">• Establishment of communities of practice focused on natural solutions to support climate resilience• New Brighton Park to showcase natural ized shorelines





What is the impact of Green Shores programming in B.C?

Building **awareness** of Green Shores approaches and their benefits as well as **knowledge, skills and confidence** to explain and implement Green Shores practices

Providing **access to funding and expertise** on where and when to apply Green Shores



Increases **integration** of Green Shores concepts and requirements into existing instruments and university curricula

Increases **trust and collaboration** across disciplines



An **enabling institutional environment, enhanced capacity** to support adoption of Green Shores and **active Green Shores champions** increases the uptake of Green Shores



Demonstrable benefits for waterfront property owners and coastal environments

-**protection** from erosion, flooding and sea-level rise

-improved **functioning** of coastal processes

-decreased coastal pollution

-**reduced cumulative impacts** on shoreline ecosystems

-enhanced **status** and reputation



How can further uptake of Green Shores in B.C. be supported?





Readiness for Green Shores in Atlantic Canada

At least four reasons to pursue opportunities to scale Green Shores to the Atlantic region at present:

- ✓ Conventional approaches to coastal protection using hard structures are proving insufficient
- ✓ Soft shorelines can address issues of concern for Atlantic Canadians
- ✓ Degree of political will present and an expanding community of interest / practice
- ✓ Federal attention and funding

Waterfront property owners (n=66)...

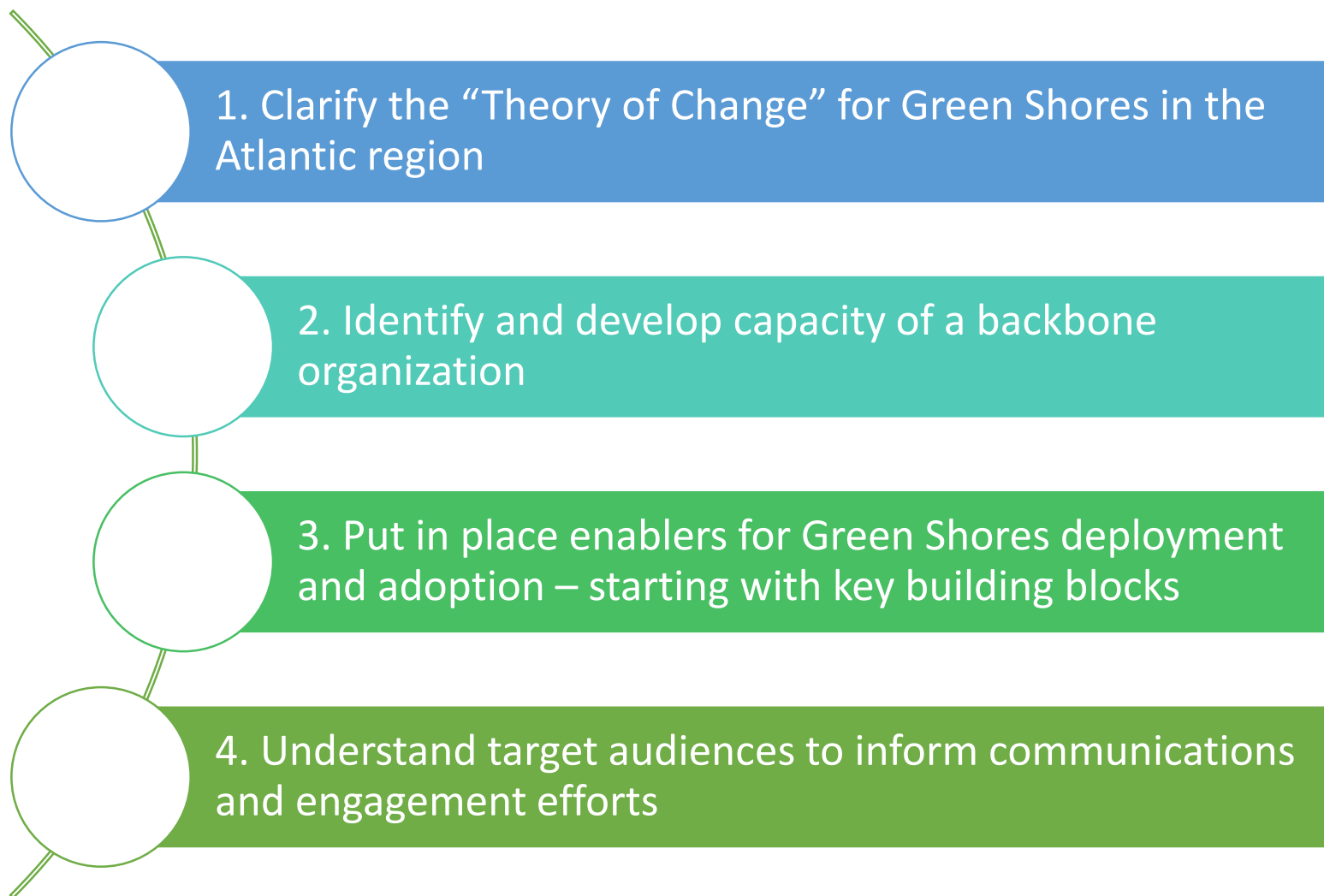
- rated shoreline erosion, water quality and pollution as extremely important shoreline-development concerns
- are most familiar with 1) the use and preservation of vegetation as protective and landscape features and with 2) boardwalks over ecologically-sensitive areas
- are largely unaware of different programs encouraging the application of soft shoreline techniques

Shoreline professionals (n=23)...

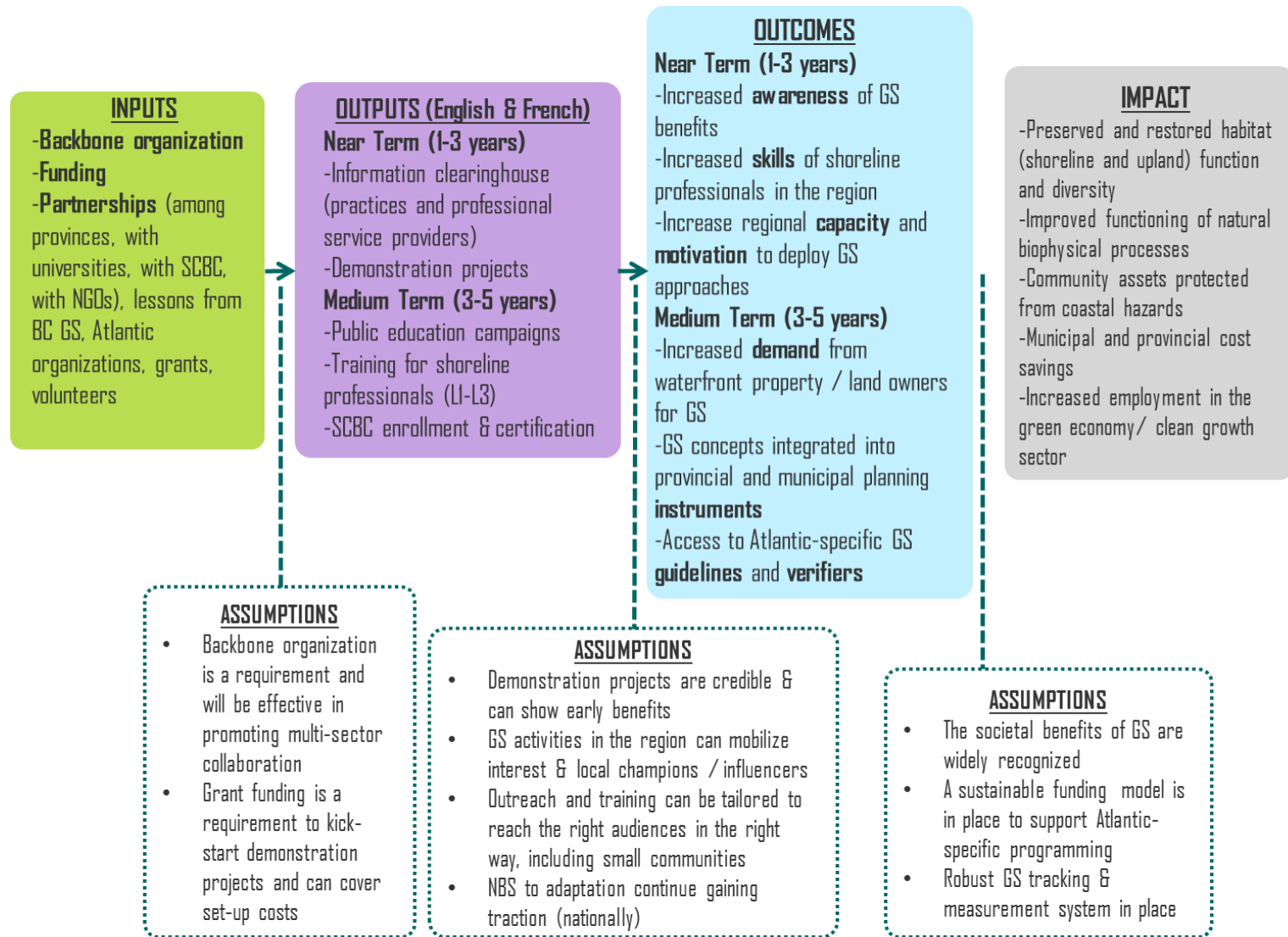
- are mainly contractors, environmental consultants and staff from local governments and NGOs, working with homeowners and public developers
- rated shoreline erosion, water quality and seasonal storm surge flooding as extremely important shoreline-development concerns
- are at least moderately familiar with a range of soft shoreline techniques, and most familiar with the use and preservation of vegetation as protective and landscape features
- are moderately familiar with Living Shorelines and slightly familiar with Green Shores
- view 1) waterfront property homes with no pre-existing hard shoreline structures, 2) shore protection in parks and recreational areas and 3) private residential developments as cases with most potential for Green Shores uptake
- view non-governmental organizations as the most suitable type of organization to deliver soft shoreline programming such as the kind Green Shores® provides



How can Green Shores programming be rolled out in the Atlantic region?



“Theory of Change” for Green Shores in Atlantic Canada





Next Steps

- ❖ Work with Atlantic partners to build capacity in Nova Scotia (and beyond) for Green Shores implementation
 - ❖ Training
 - ❖ Pilot projects
- ❖ Update Green Shores for Homes for Pacific and Atlantic (GSH 2023)
 - ❖ Piloting GSH credits
- ❖ Continuous improvement for BC and mentor Nova Scotia Local Government Working Group





Thank you!

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