

ADAPT-ACTION IN A CHANGING CLIMATE

INTACT CENTRE
ON CLIMATE ADAPTATION



Working With Nature as Normal

Progress and examples of efforts to mainstream consideration of nature-based solutions, ranging from strategic approaches and technical guidance, to integration in municipal management and financial reporting

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Generously supported by



Outline



Roots



Knowledge



Optimism



Action



BALANCE

Northern and Southern England

French and English

Engineers and Ecologists

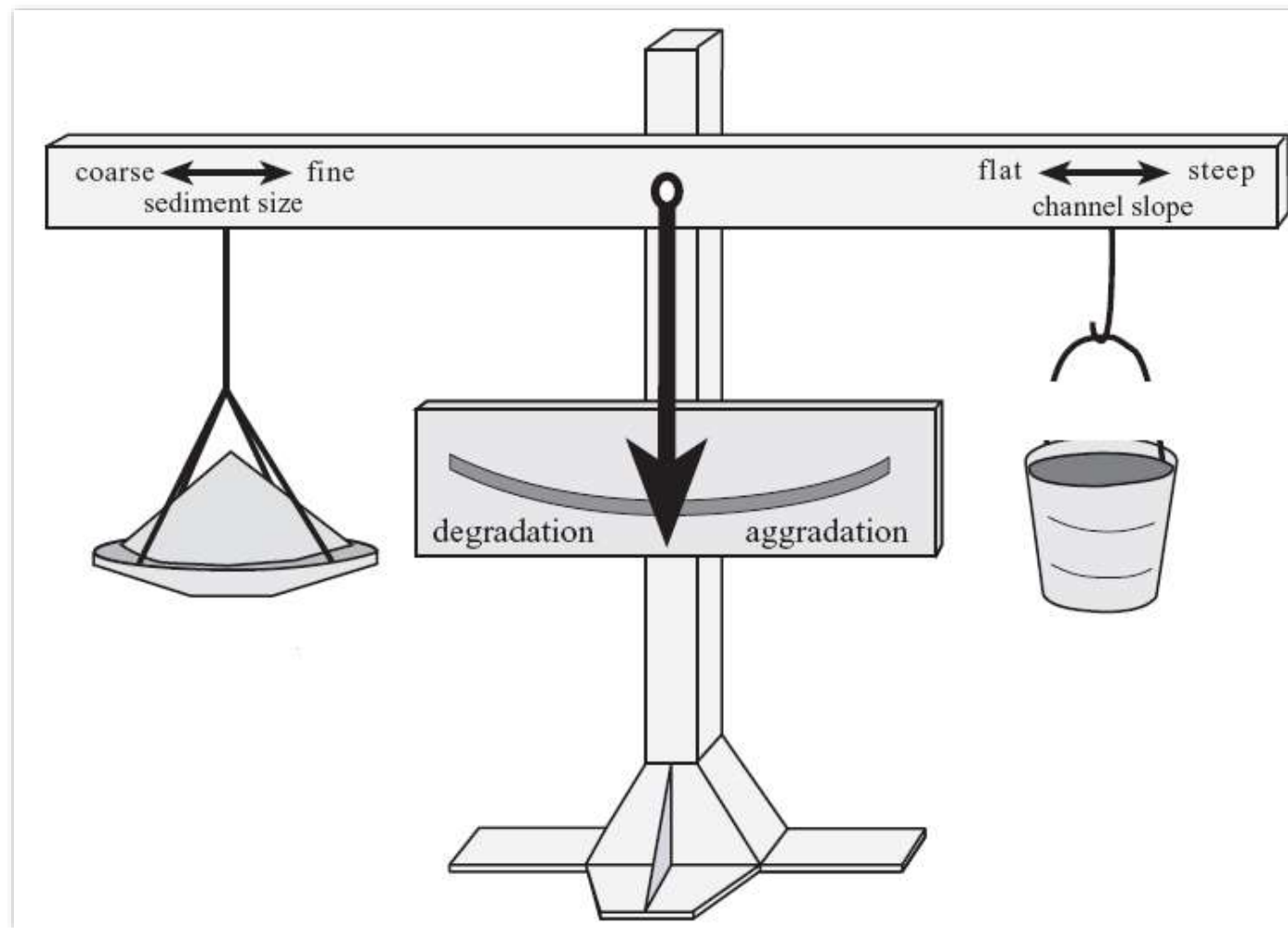
Grey and Natural Infrastructure

People within Nature

.....



Lane's Balance (1955) – Dynamic Equilibrium



Equilibrium model for aggradation and degradation of river channels. From a figure of the USA Bureau of Reclamation based on Lane (1955). Figure from Blum et Tornquist (2000).



How DYNAMITE

streamlines streams



Straightening of Pequest River in New Jersey by CCC workers stopped its yearly floods. Location of new channel is seen at right. Note temporary dam at left to provide volume of water for scouring blasted channel.

Explosion of dynamite charge by propagation excavates new channel.

Immediately after explosion, water is entering new channel, whose banks will be smoothed and "stream-lined" by the speedier flow of water.



CROOKED STREAMS are a menace to life and crops in the areas bordering on their banks. The twisting and turning of the channel retards the flow and reduces the capacity of the stream to handle large volumes of water. Floods result. Crops are ruined. Lives are lost. Banks are undermined, causing cave-ins that steal valuable acreage.

In many instances straightening out a stream has doubled its capacity for disposing of run-off water.

DYNAMITE may be used most efficiently and economically in taking the kinks out of a crooked stream. The dynamite is loaded along the length of "cut-off" channel. When fired, the dirt and other debris is heaved high in the air and is scattered over the adjoining territory—leaving practically no spoil-banks. In addition to the material actually thrown out, much dirt is loosened and is later scoured out by the water which rushes swiftly through the straightened channel.

Du Pont Dynamite has straightened many thousands of miles of crooked streams. Du Pont engineers have worked for years to develop the best blasting methods for the cleaning out and straightening of streams. All their data is in a 48-page book, "Ditching with Dynamite." It is for your use. Write for it.

Dynamite can help you do other jobs, too. It can help you build highways, dams; fight soil erosion; work quarries. Du Pont has an explosive for every purpose.



E. I. du Pont de Nemours & Co. Inc.
Explosives Department
6107 du Pont Building
Wilmington, Del.

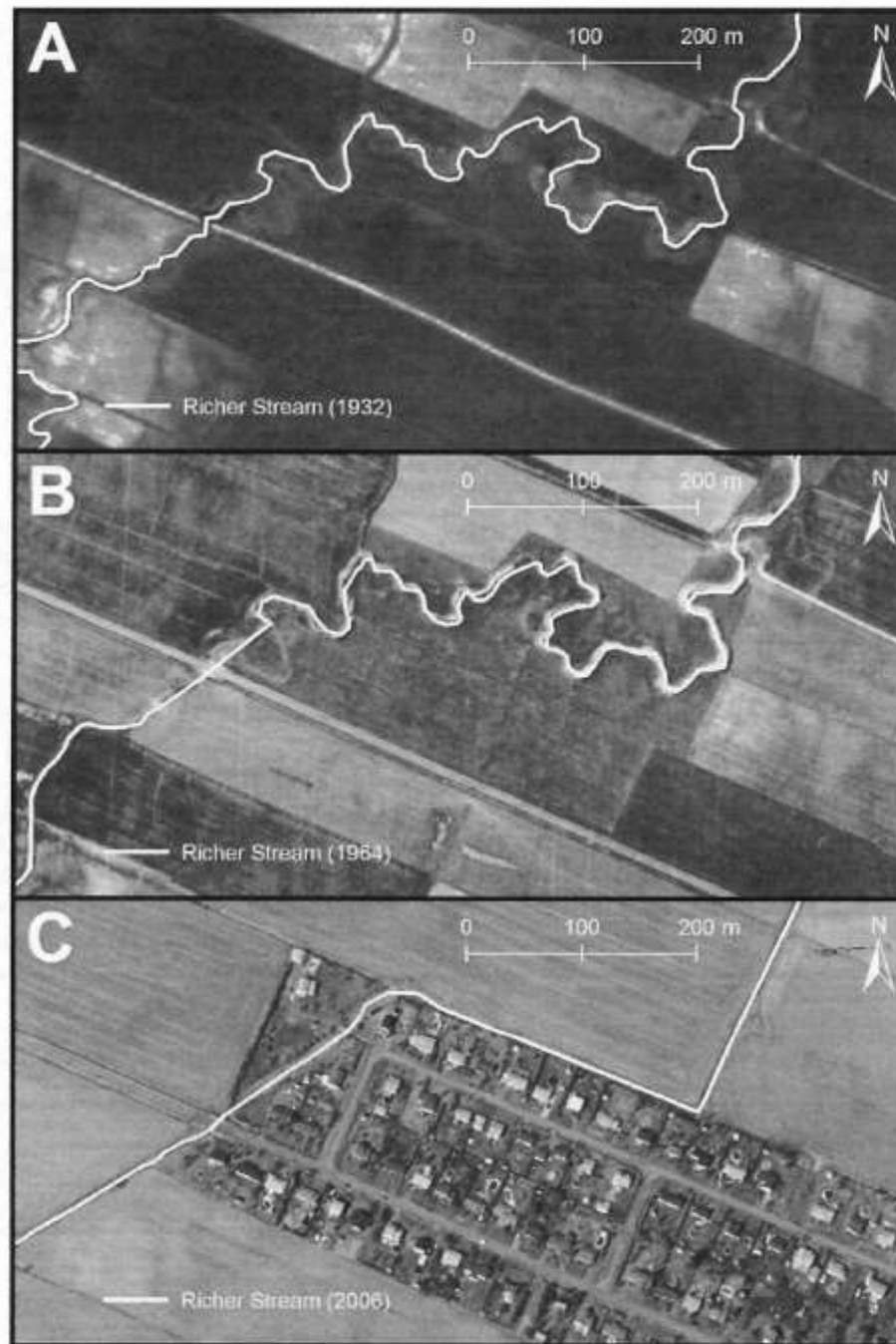
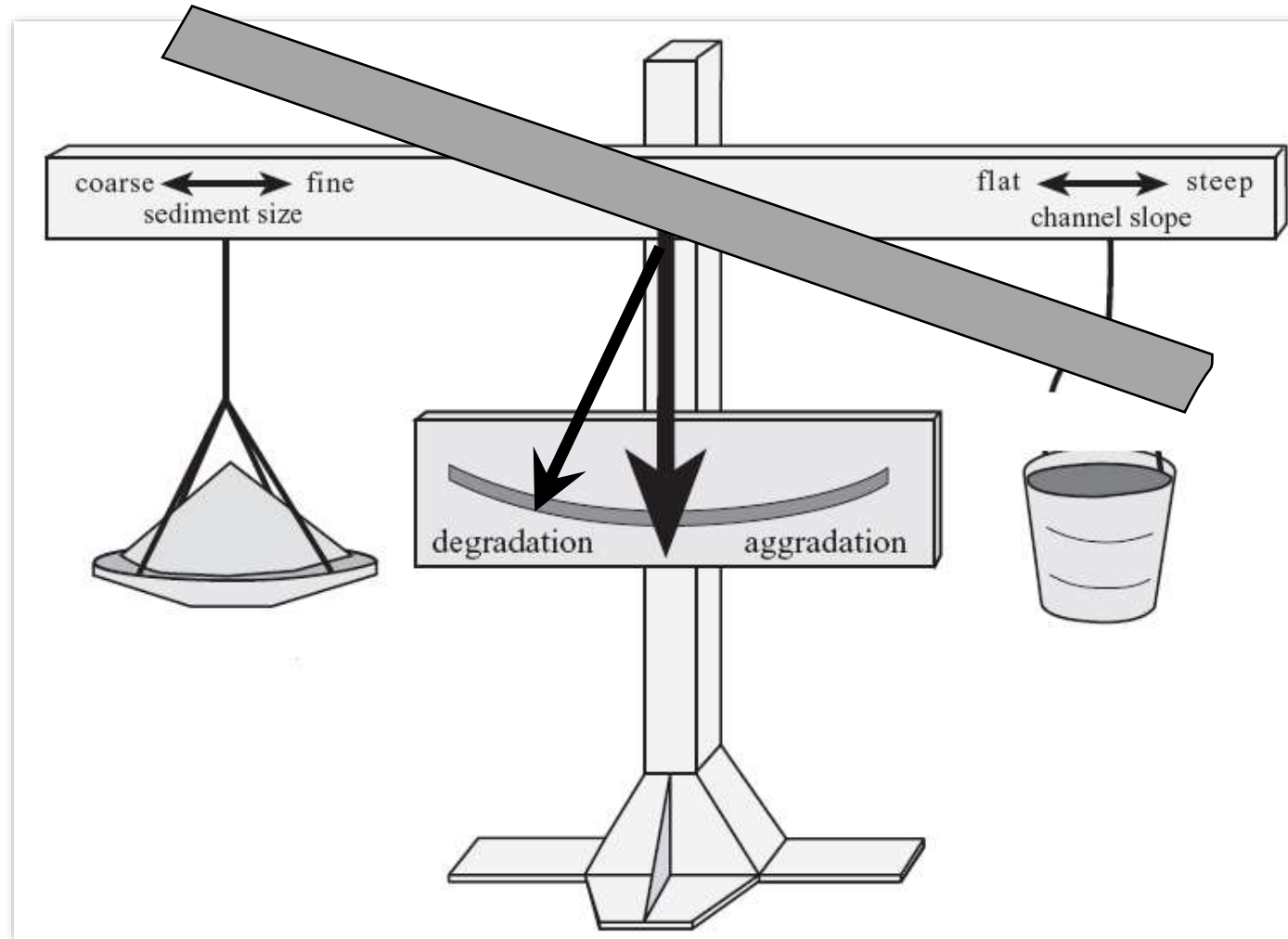


Figure 2. Aerial photographs of the residential reach in a) 1932, b) 1964 and c) 2006. Flow is from left to right.

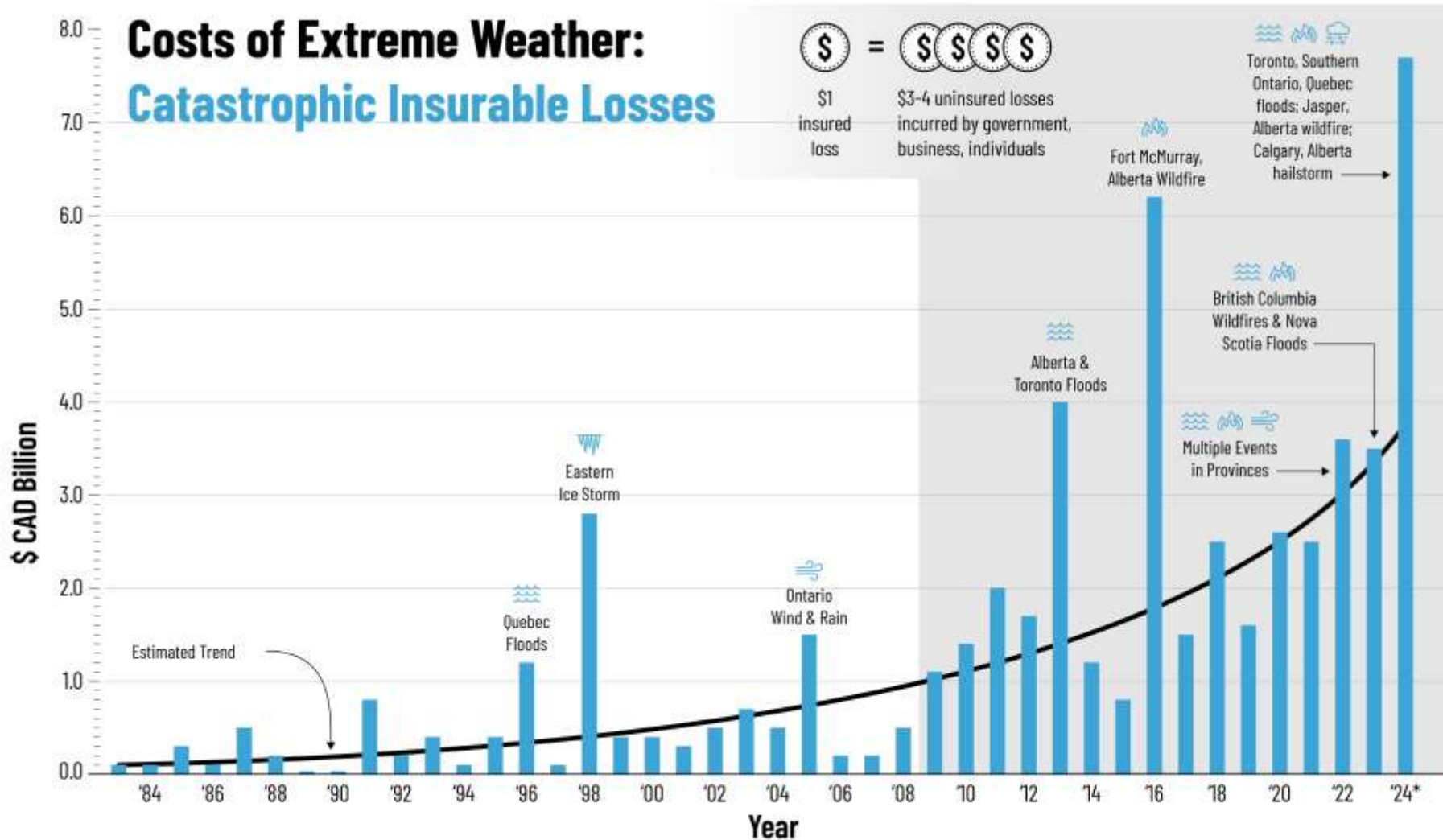
Natural balance is sensitive to change!

If...

- We **reduce sediment load** (dam construction, bank protection...)
- We **increase slope** (straightening)
- We **increase discharge** (climate change).....



When natural systems are out of balance.... ...our economy and wellbeing suffers.



Source: IBC Facts Book, PCS, CatIQ, Swiss Re, Munich Re & Deloitte

*2024 preliminary values in 2024\$ CAD, corrected for inflation and per capita wealth accumulation.

- Most losses are not insured.
- Catastrophic losses are not all “financial”, particularly with extreme heat

**Restoring balance within our
natural systems,
working with rather than
controlling natural processes,
is central to our future wellbeing.**

The belief that underpins my work on natural infrastructure



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Defining Nature-based Solutions



IUCN Global Standard for Nature-based Solutions

A user-friendly framework for the verification.

*“actions to **protect, sustainably manage, and restore** natural or modified ecosystems, that address **societal challenges** effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.”*



Green or Natural Infrastructure?

The use of preserved, restored or enhanced elements or combinations of vegetation and associated biology, land, water and naturally occurring ecological processes to meet targeted infrastructure outcomes” (CCME 2018)



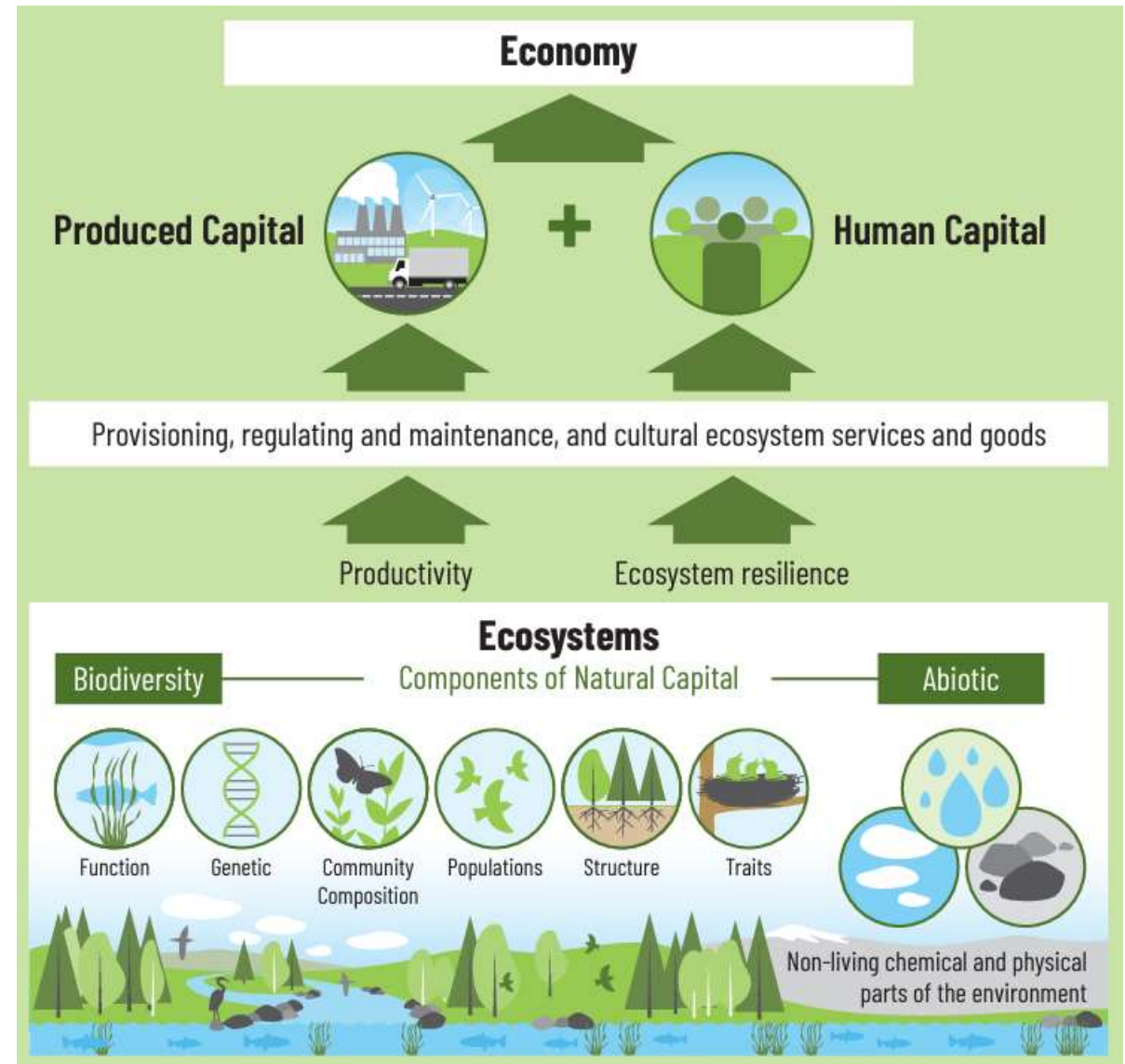
Image courtesy of City of Calgary

Natural Infrastructure Provide Services to People

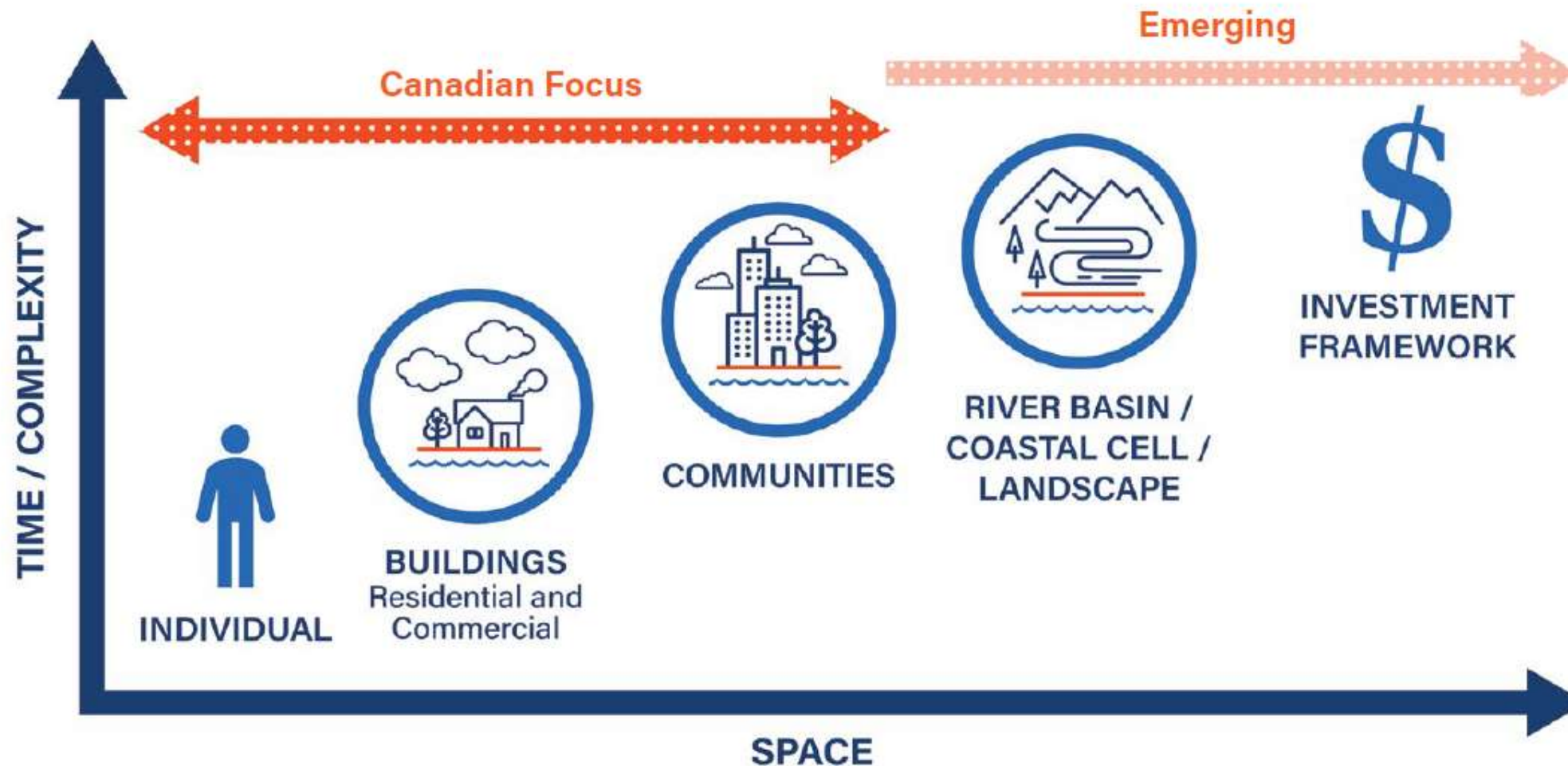
Nature-based Solutions provide
 « **ecosystem goods and services** »

- **Provisioning**
 - Wood
 - Fish and shellfish
- **Regulation and support**
 - Flooding and erosion
 - Temperature control
 - Air and water quality
 - Carbon storage and sequestration
 - Biodiversity and habitats
- **Cultural**
 - Recreation opportunities
 - Aesthetic value

*These services are not all offered by
 « grey » infrastructure*



Natural Infrastructure Works at Different Scales



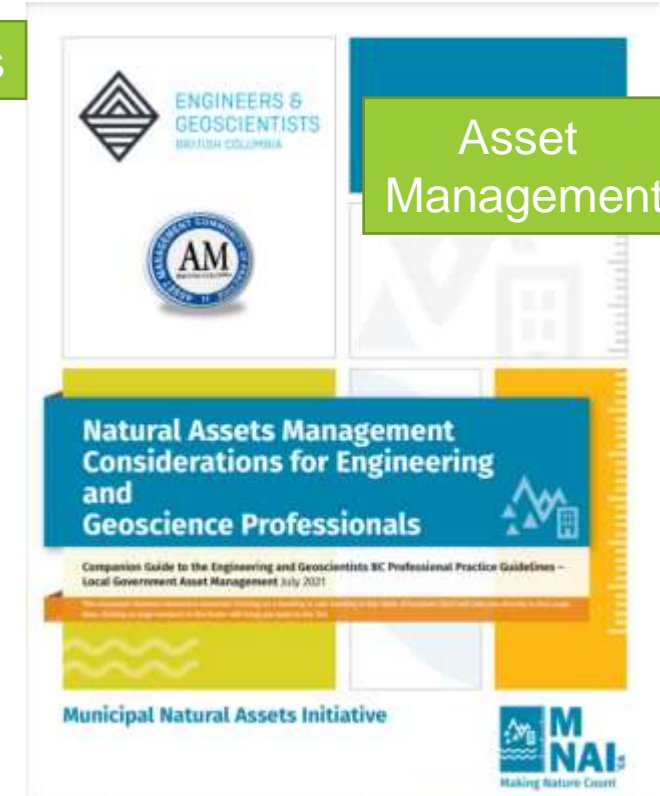
Rapidly Evolving Canadian NbS Guidance



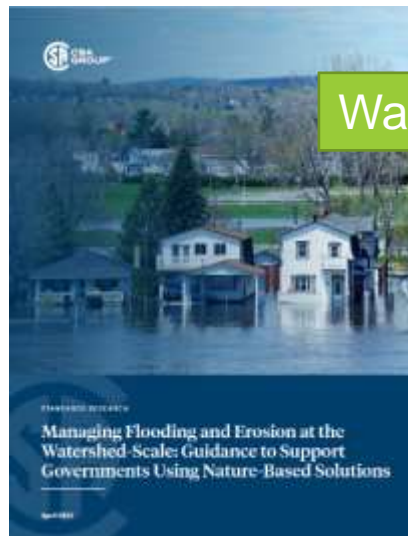
Flood and Erosion



Coasts



Asset Management



Watersheds

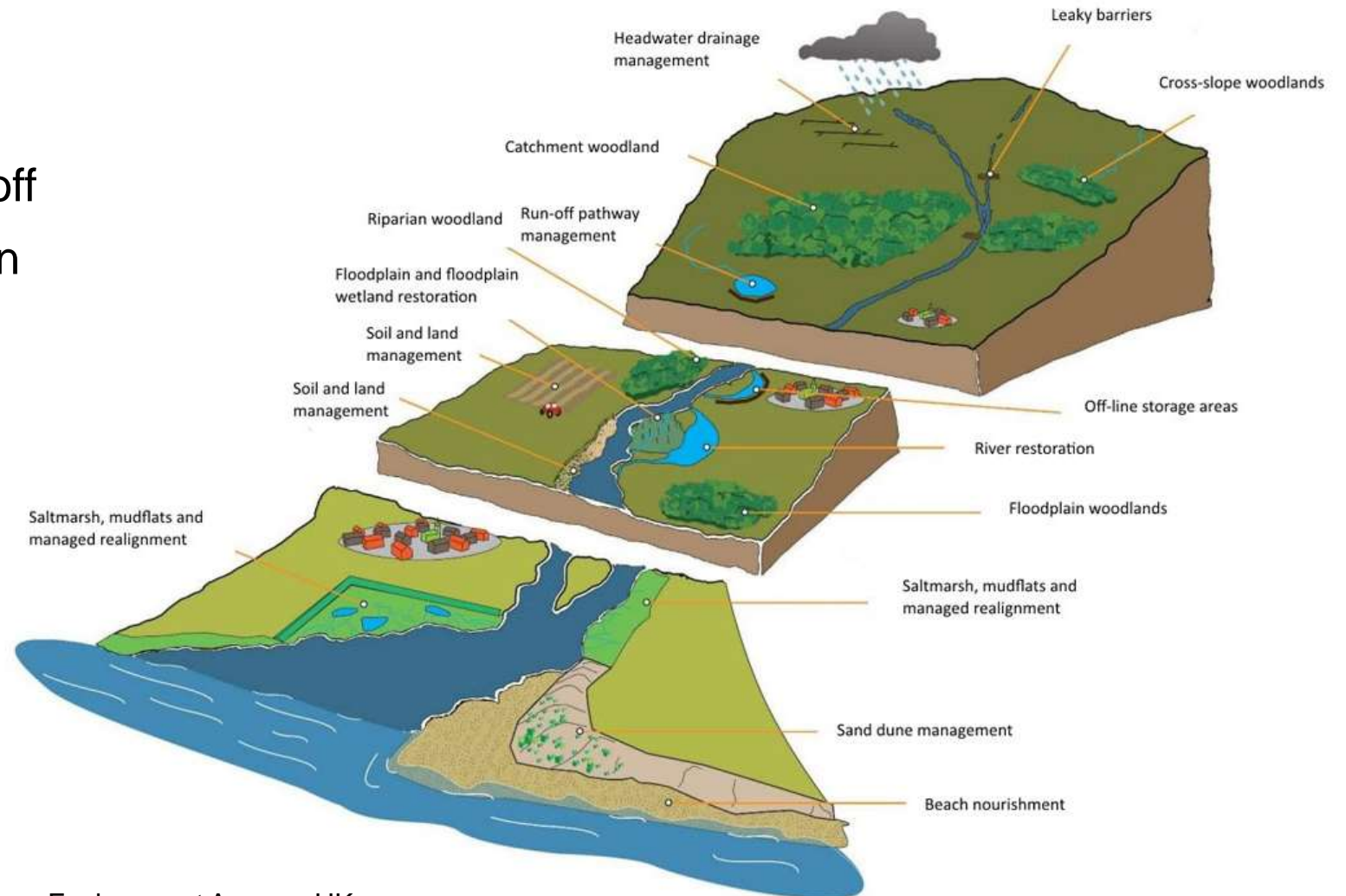


Urban Heat

NbS are a key focus for future standards development

Natural Infrastructure Reduces Flooding, Erosion and Drought

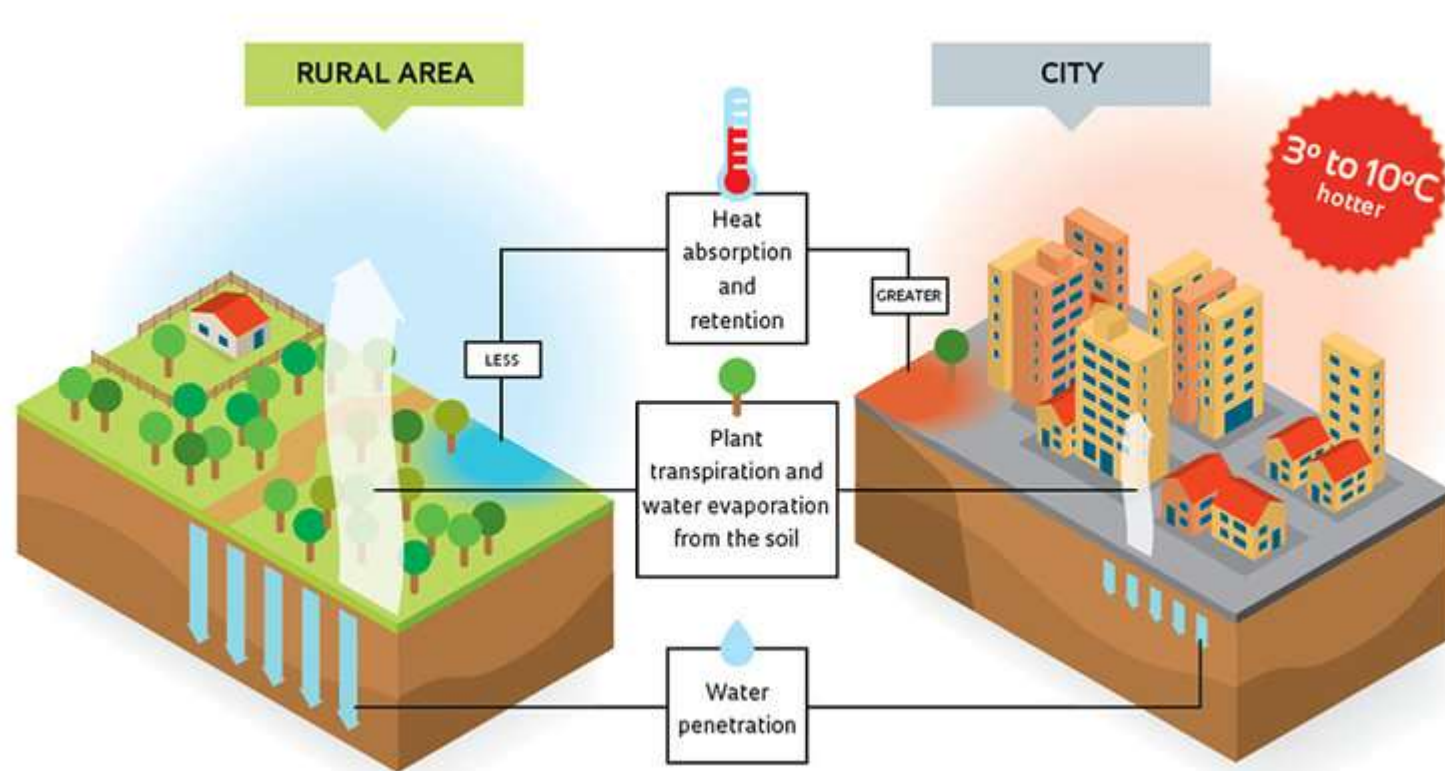
- Store water
- Slow down water
- Reduce volume of peak runoff
- Reduce soil and river erosion



Source: Burgess-Gamble et al. (2018)

[Working with Natural Processes – Evidence Directory](#). Environment Agency, UK.

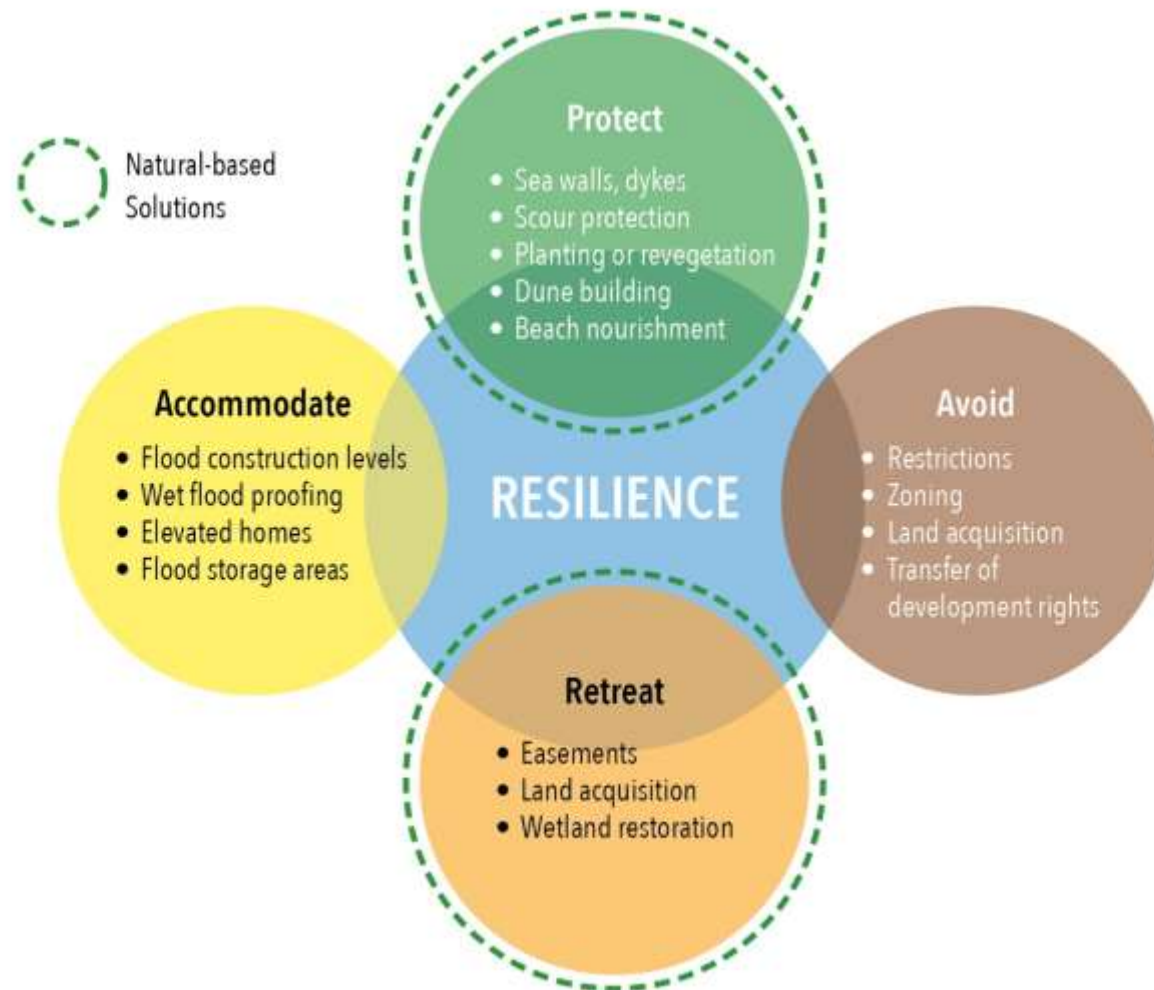
Natural Infrastructure Reduces Extreme Heat



Source: ecoRi (2019) Cool Ideas for Reducing Urban Heat-Island Effect

<https://www.ecori.org/green-tip/2019/8/9/cool-ideas-for-reducing-urban-heat-island-effect>

NbS for Different Adaptation Approaches



Nature can help “protect” and provided multiple other benefits when people and nature work together.....

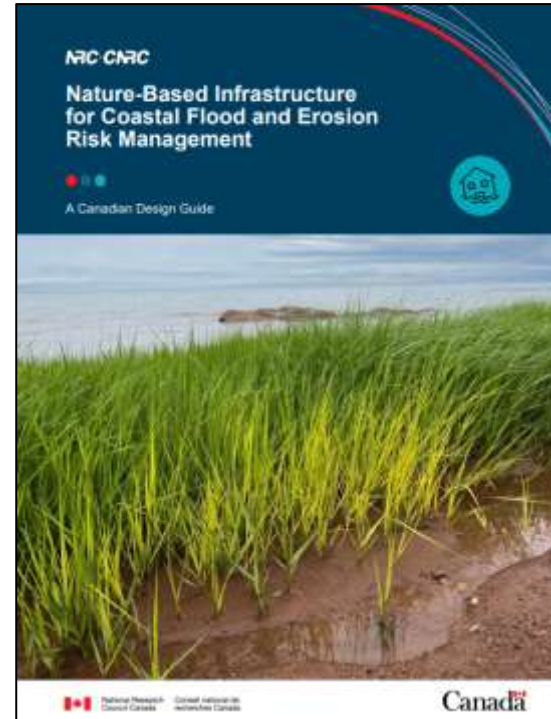
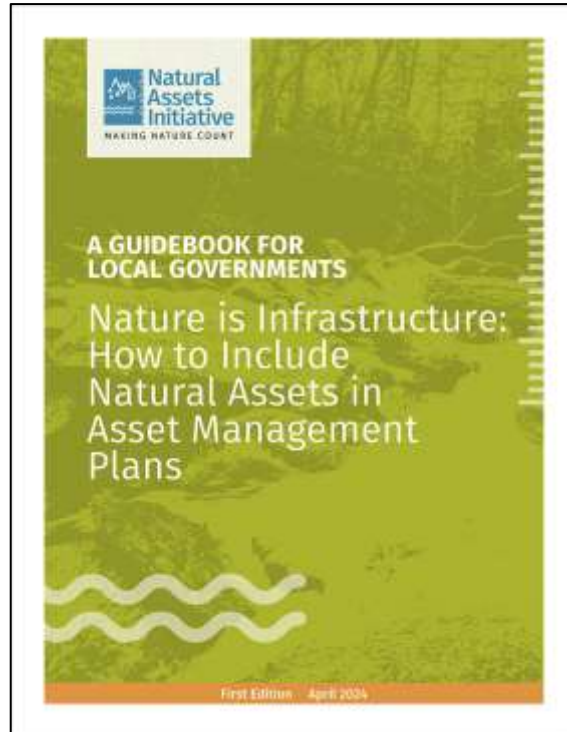


The Natural Shift

REASONS FOR OPTIMISM



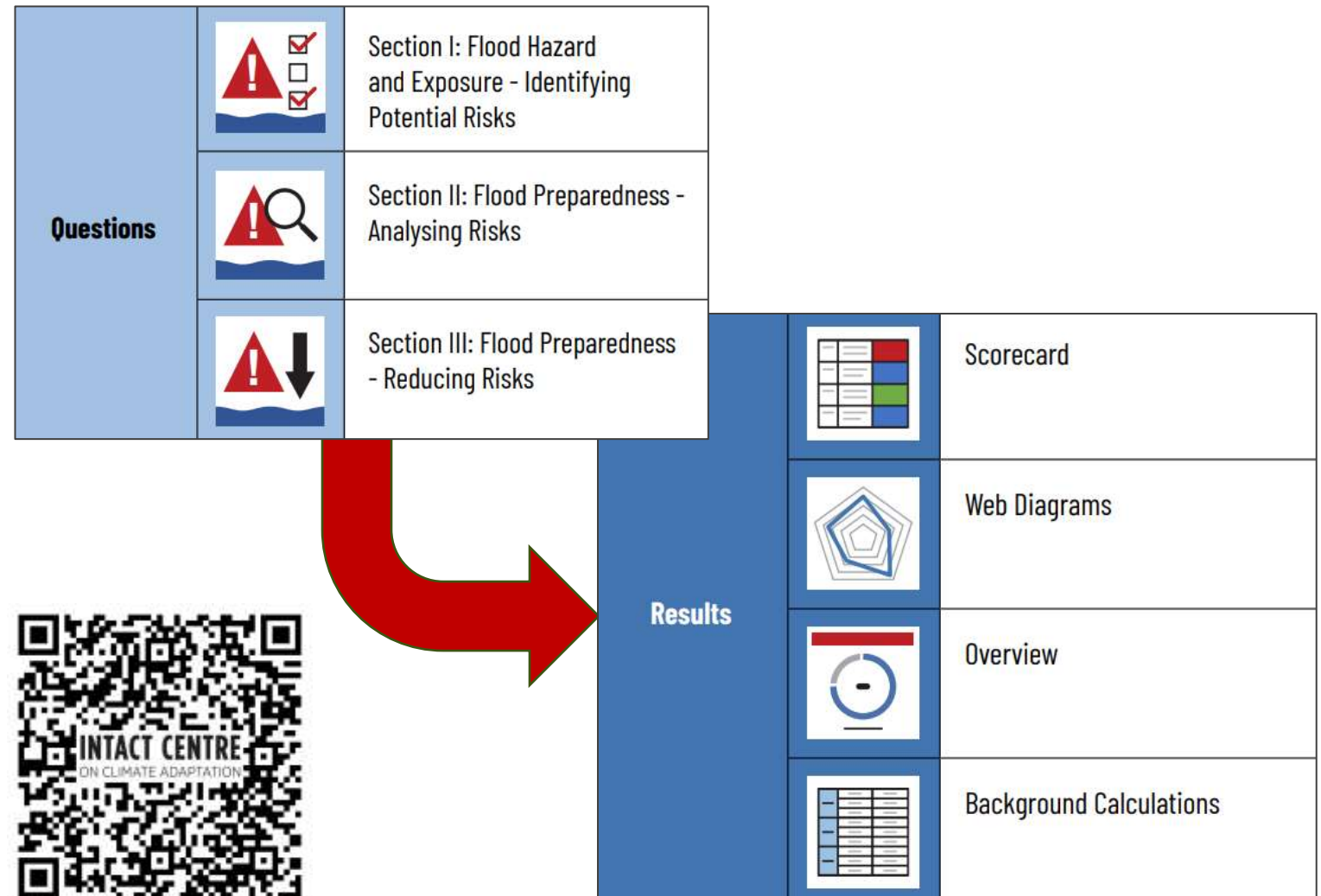
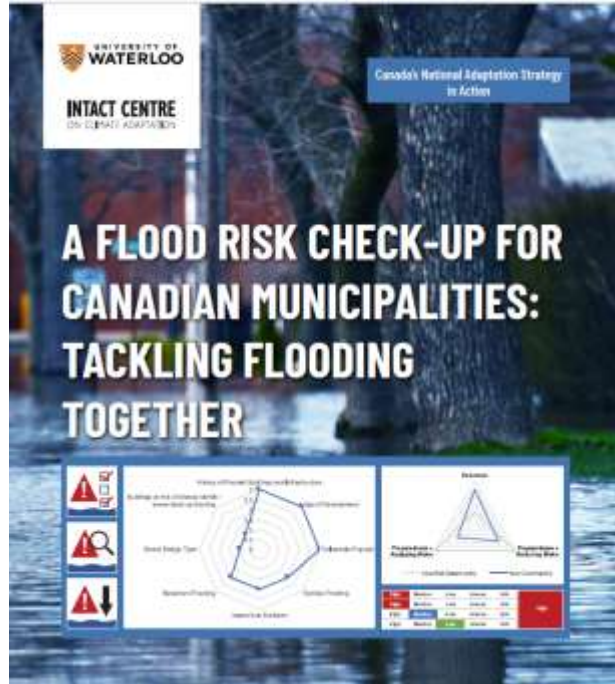
New Tools: Evolving Guidance and Standards



Projects in progress – to come in 2025.....

- Shoreline Management Planning Guidance (SCC / Intact Centre)
- Coastal Project Options Appraisal Guide (SCC / CRI et al)
- Nature-based Infrastructure for River Flood and Erosion Risk Management (NRC)
- Municipal Flood Resilience in Action Training (FCM / Intact Centre)

New Tools: Municipal Flood Risk Check-Up



New Tools: Municipal Flood Risk Check-Up



Section III: Flood Preparedness - Reducing Risks

Measure A4: Natural Asset Management

The municipality has an asset management plan that addresses the role of natural assets in managing flood risk. The plan includes the investments required for protection, rehabilitation and management of *natural assets* to maintain appropriate levels of services in relation to flood risk management.

High: Measure implemented (prepared)

Medium: Some elements of measure implemented or underway (preparing)

Low: Measure not implemented (unprepared)

Unsure: Insufficient information is available to select a High, Medium or Low response (rated the same at "Low")

Natural Assets



Natural Assets and Natural Infrastructure



Plan addresses role of natural
assets in managing flood risk

Select your answer

Plan includes investments in natural
assets to manage future flood risk

Select your answer

New Tools: Municipal Flood Risk Check-Up



Section III: Flood Preparedness - Reducing Risks

Measure D2: Coastal / Shoreline Flood Management

The municipality, or organizations adjacent, have implemented appropriate flood mitigation measures, including grey and natural infrastructure solutions, their maintenance, and non-structural solutions, to avoid coastal/lake flooding of buildings and critical infrastructure or serious threat to public safety.

Natural Assets and Natural Infrastructure



High: Measure implemented (prepared)

Medium: Some elements of measure implemented or underway (preparing)

Low: Measure not implemented (unprepared)

Unsure: Insufficient information is available to select a High, Medium or Low response

N/A: Not Applicable

Select your answer

A Widening Audience / New Partners are Listening: Public Policy, Finance and Accounting

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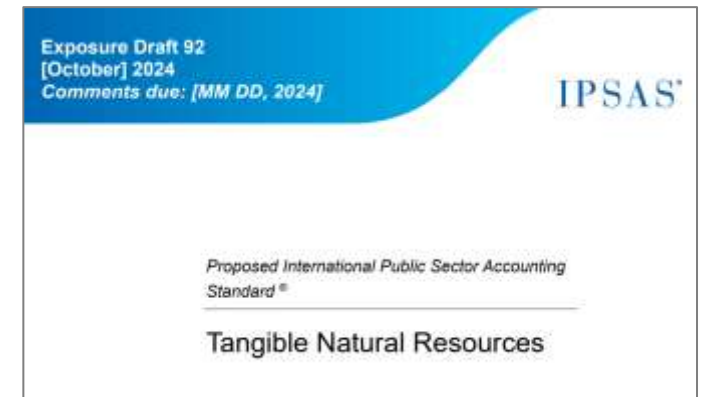
C.D. Howe Institute Intelligence Memo

<https://www.cdhowe.org/intelligence-memos/eyquem-van-dijk-and-stewart-clear-and-overdue-path-accounting-natural-assets>



Canadian Institute of Actuaries

<https://www.seeingbeyondrisk.ca/2024/08/getting-to-grips-with-nature-and-biodiversity-risks/>



International Public Sector Accounting Standards Board

International Sustainability Standards Board

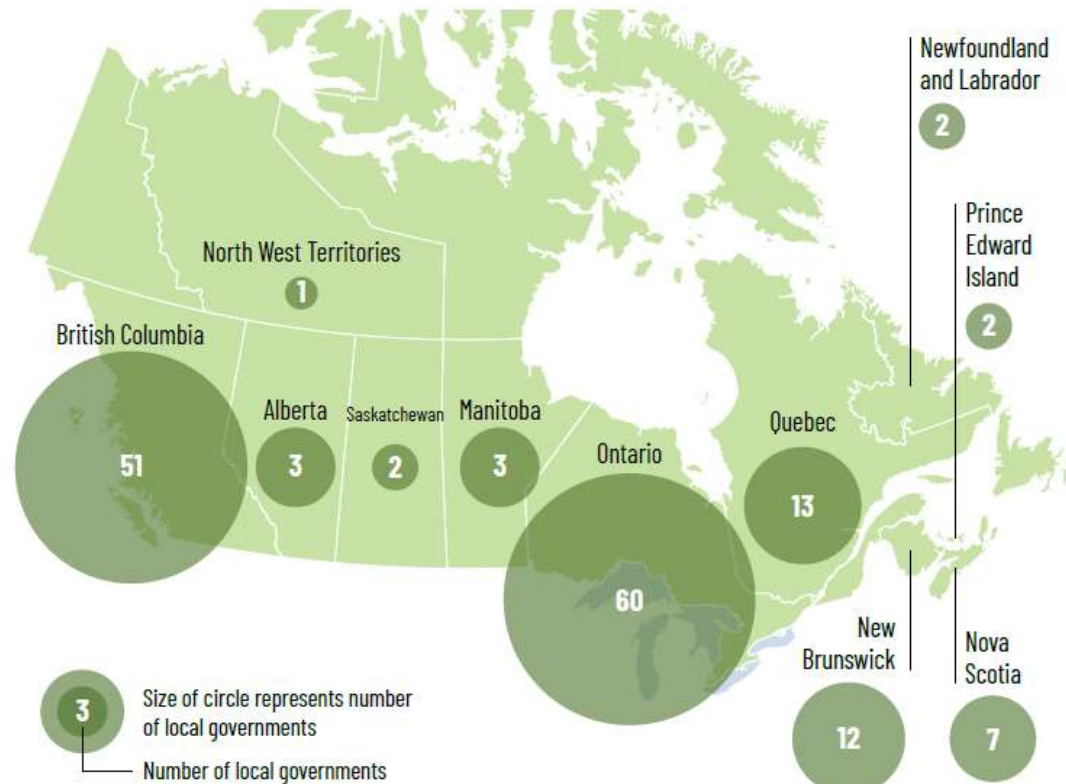
<https://www.ipsasb.org/consultations-projects/natural-resources>

Municipal Action: Local Government Natural Asset Management and Disclosures in Financial Reporting

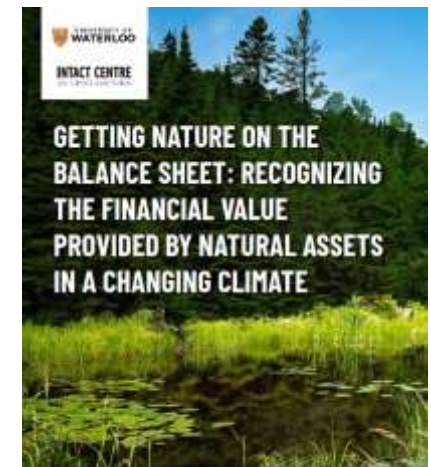
150+ local governments are already managing and valuing natural assets - our largest cities are on board.

Natural Asset Disclosure Guidance Coming Jan 2025! (SCC/Intact Centre)

- Local government guidance on natural asset disclosures
- Over 200 contributors to the project

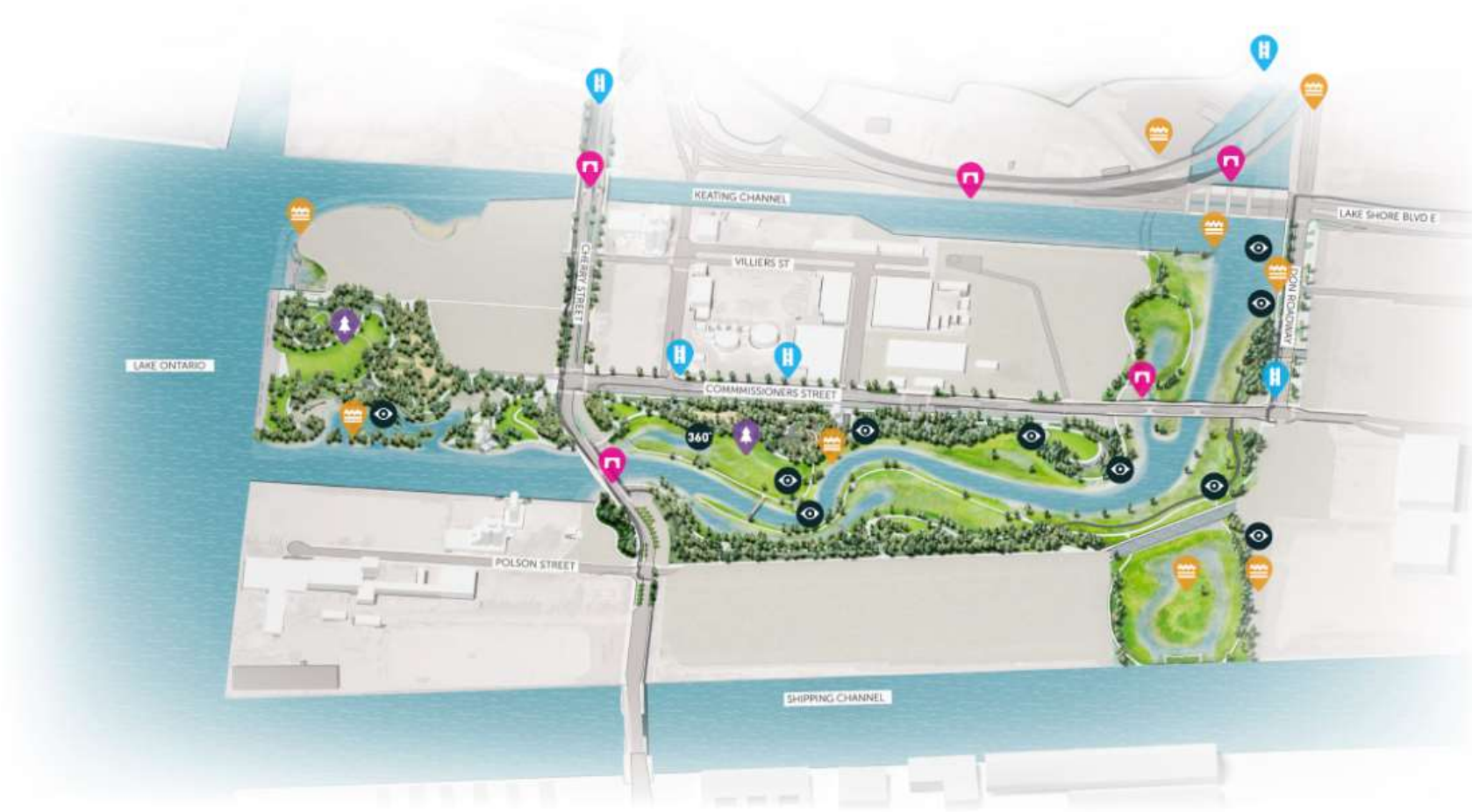


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Projets on the Ground: River Don Mouth A Large-Scale Canadian Example

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Tools for Residents

Management of flooding and heat is complementary

THREE WAYS TO REDUCE CLIMATE RISK WORKING WITH NATURE AT HOME

HEAT AND FLOOD PROTECTION For areas not at risk of wildfire

Complete simple upgrades

Do-it-yourself, for under \$250



1 Maintain existing shade trees.



2 Grow plants climbing up your walls.



3 Green your balcony or deck with potted or hanging plants.



4 Join or start a community greening program.

Complete more complex upgrades

Work with a contractor, for over \$250



1 Plant new shade trees, along south, east, and west facing walls.



2 Convert paved areas to vegetation which absorbs less heat and more water.



3 Install a rain garden to collect stormwater (at least 5 m from the foundation).



4 Install a green (vegetated) roof.

Note: Seek local advice on appropriate native species that will tolerate future climate conditions, and, in places at risk of wildfire, consider the FireSmartTM guidance below.

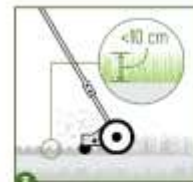
WILDFIRE PROTECTION For areas at risk of wildfire



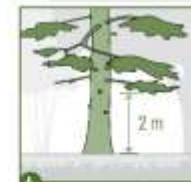
1 Remove all combustible ground cover (mulch and plants) within 1.5 m of the house perimeter.



2 Remove conifer trees that are within 10 m of the house.



3 Mow the lawn to <10 cm and plant low-growing, well-spaced shrubs and other fire-resistant plants.



4 Prune trees to create a 2 m clearance from the ground to the lowest tree branches.

Note: Not all actions will be applicable to each home. Completing these steps does not guarantee the prevention of fire.



3 Key Thoughts in Scoping Action

1. **Municipalities and communities** are on the frontlines of managing climate and nature-related risks – local action is key and you can help.
2. **Landscape Architects can use NbS for:**
 - Climate risk management
 - Maximising benefits to communities
3. **Making the value of nature's services transparent can help us:**
 - Make better choices
 - Restore relationships with nature and each other



Find out more:

<https://www.intactcentreclimateadaptation.ca>

Actions – My To Do List

1. Engage provinces and territories
2. Embed consideration of natural infrastructure as « normal » in decision-making for infrastructure, including for adaptation, within all levels of government
3. Mainstream natural asset management
4. Bridge nature asset accounting (public) and nature-related risk management (private)



Actions – Your To Do List

1. Work from « green » to « grey » when considering infrastructure options
2. Actively seek ways to restore natural processes (not only appearances) and reconnect people with nature.
3. Consider natural asset management in your work, and encourage communities to start their journey
4. Share your stories of success working with nature.



What else can we achieve through adaptation?

What if we approached tackling climate change by focusing on different ways we can **make life better** while also reducing risk?

The Natural Shift will take us there...



Opinion | What if climate change meant not doom — but abundance?

washingtonpost.com • 4 min read

Intact Centre: Tools Freely Available to Reduce Risk

FLOOD



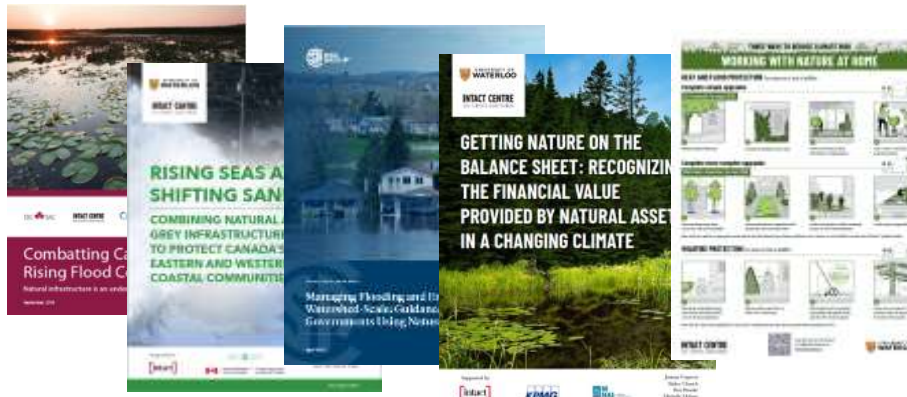
WILDFIRE



EXTREME HEAT



NATURAL INFRASTRUCTURE



HEALTH



CAPITAL MARKETS

