



SOURCE TO STREAM

2024 Conference

Canada's Premier
Stormwater and Erosion
and Sediment Control
Conference

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Nature-Based Solutions as “Second Nature”

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Outline



Roots



Knowledge



Optimism



Action





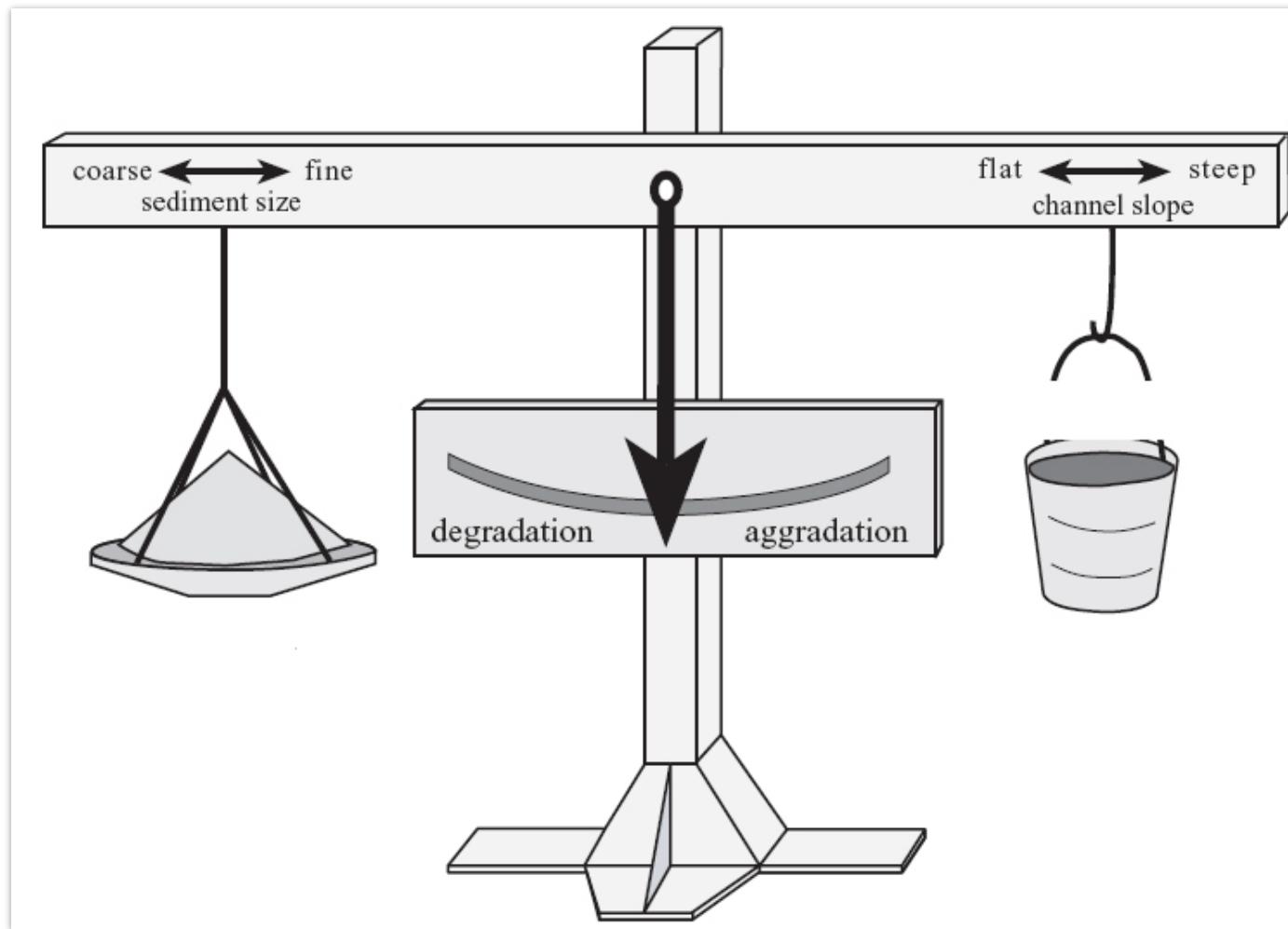
BALANCE

Northern and Southern England
French and English
Engineers and Ecologists
People with Nature
Grey and Natural Infrastructure

.....



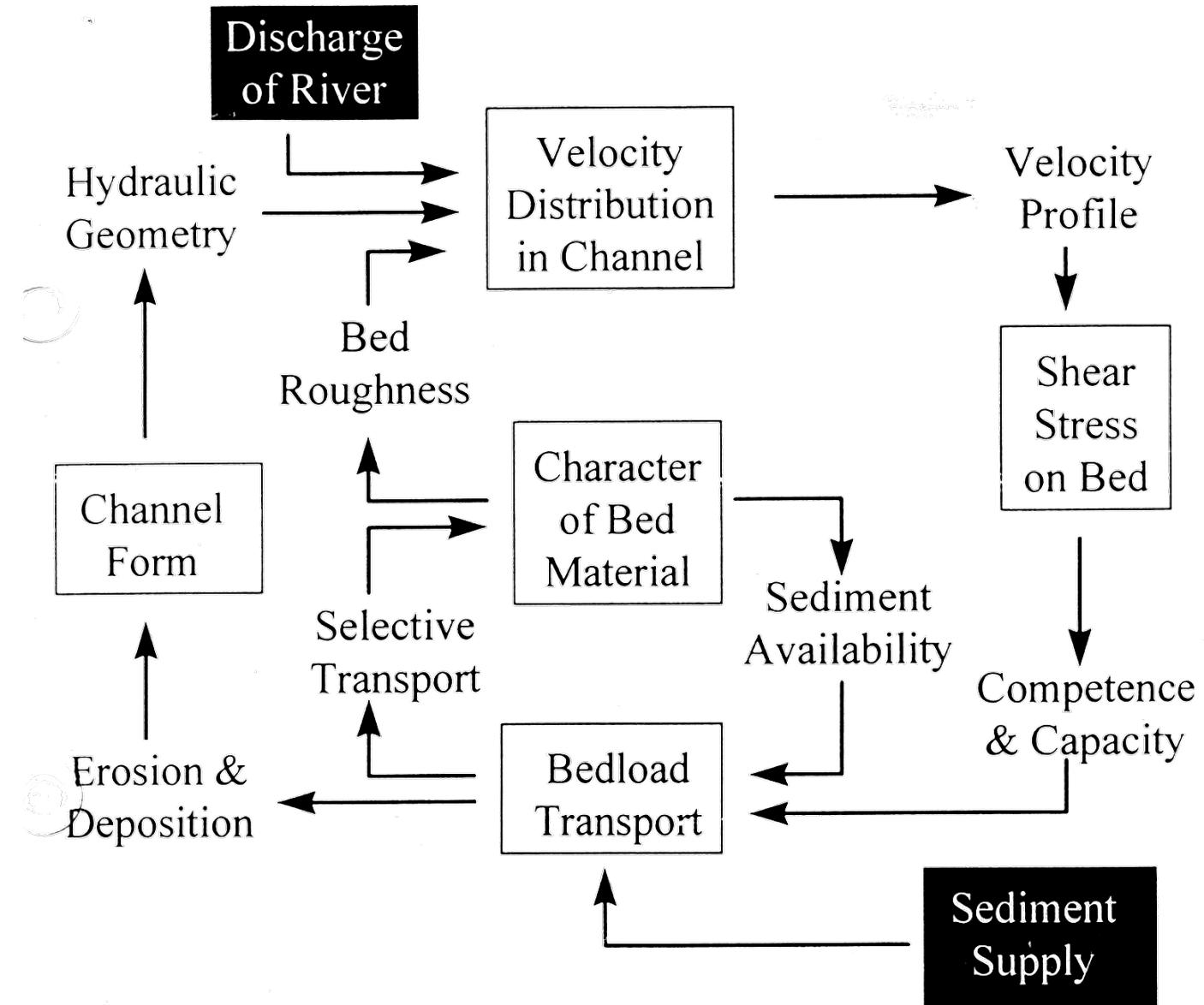
Lane's Balance (1955) – Dynamic Equilibrium



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).



Feedbacks



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 propellant 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 scourd 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.

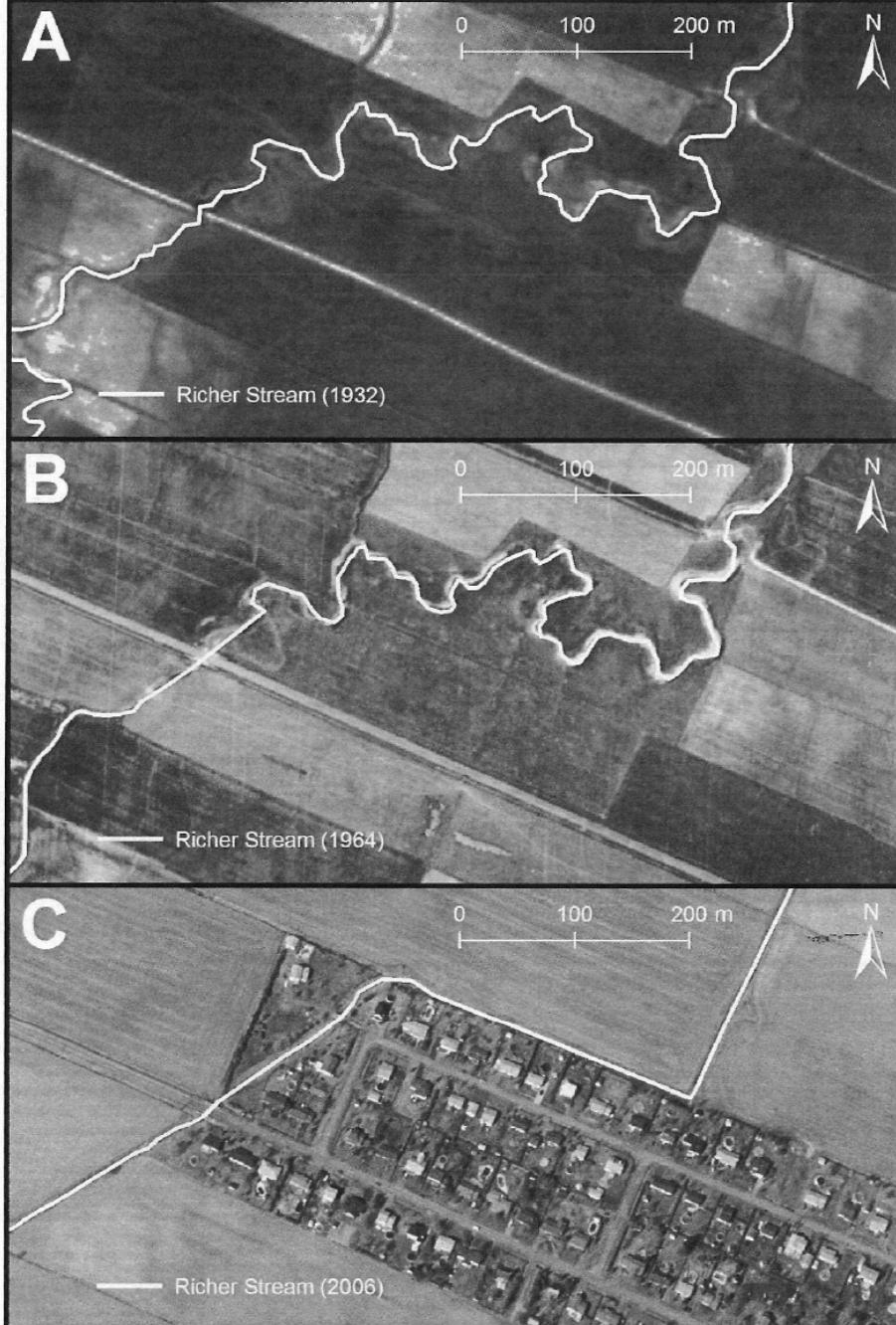
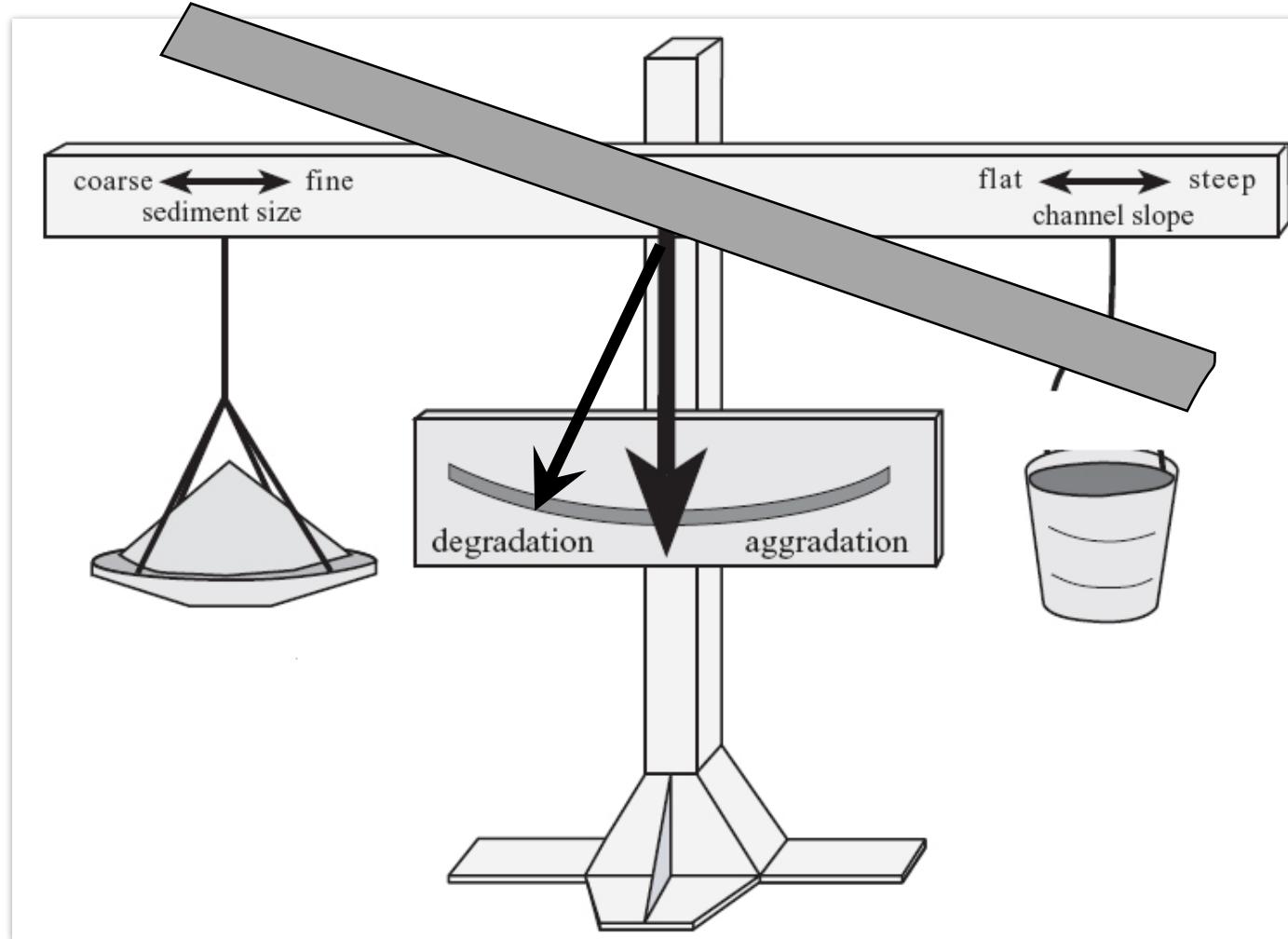


Figure 2. Aerial photographs of the residential reach in a) 1932, b) 1964 and c) 2006. Flow is from left to right.

...

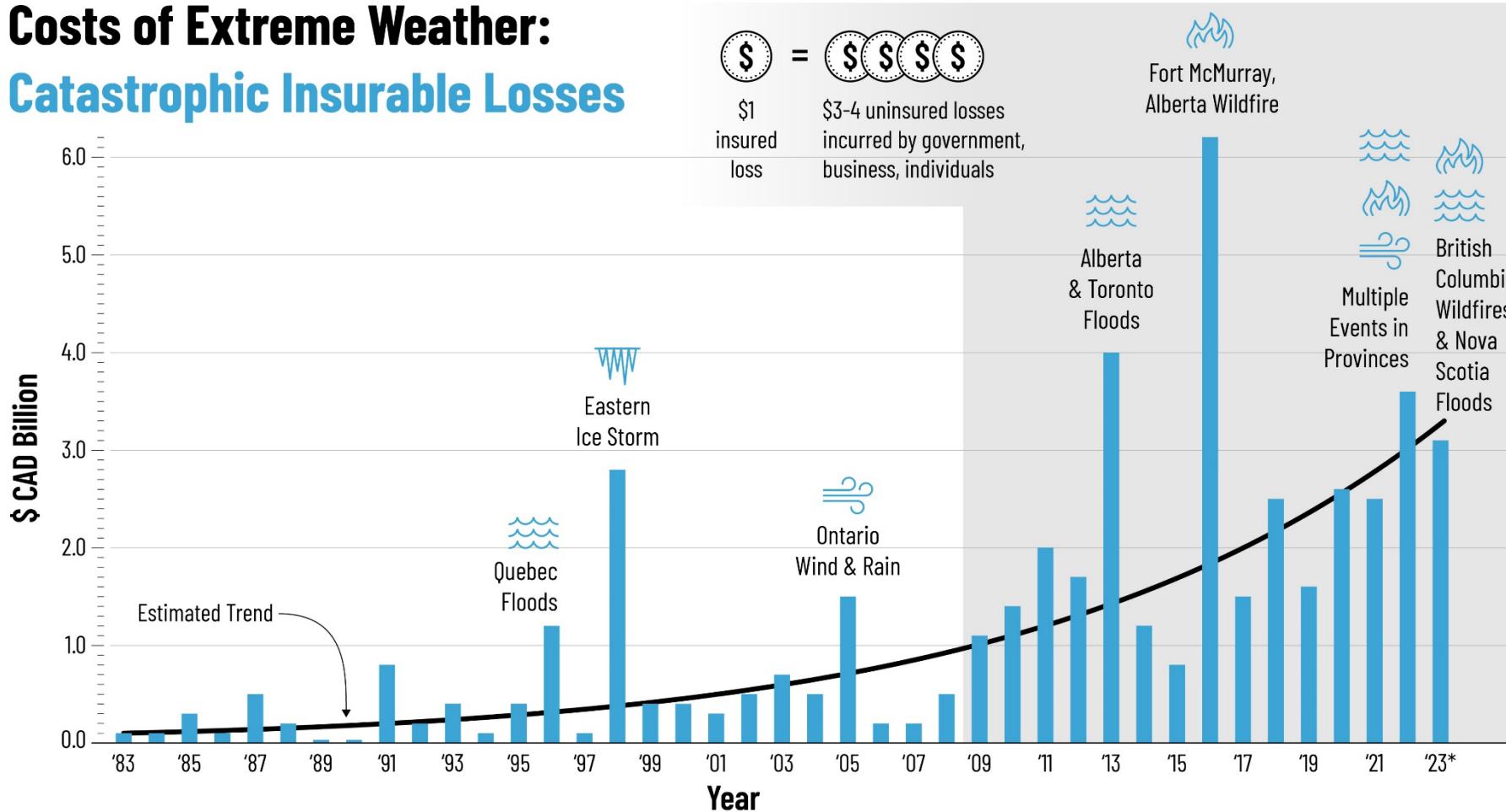
If...

- 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.

Costs of Extreme Weather: Catastrophic Insurable Losses



- Most recently over \$2billion insured losses
- 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



Outline



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Action

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)

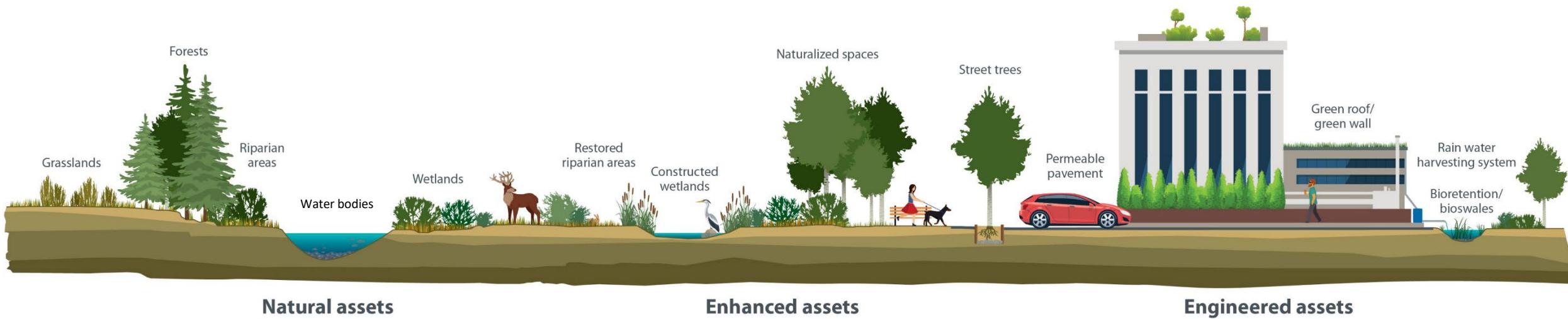


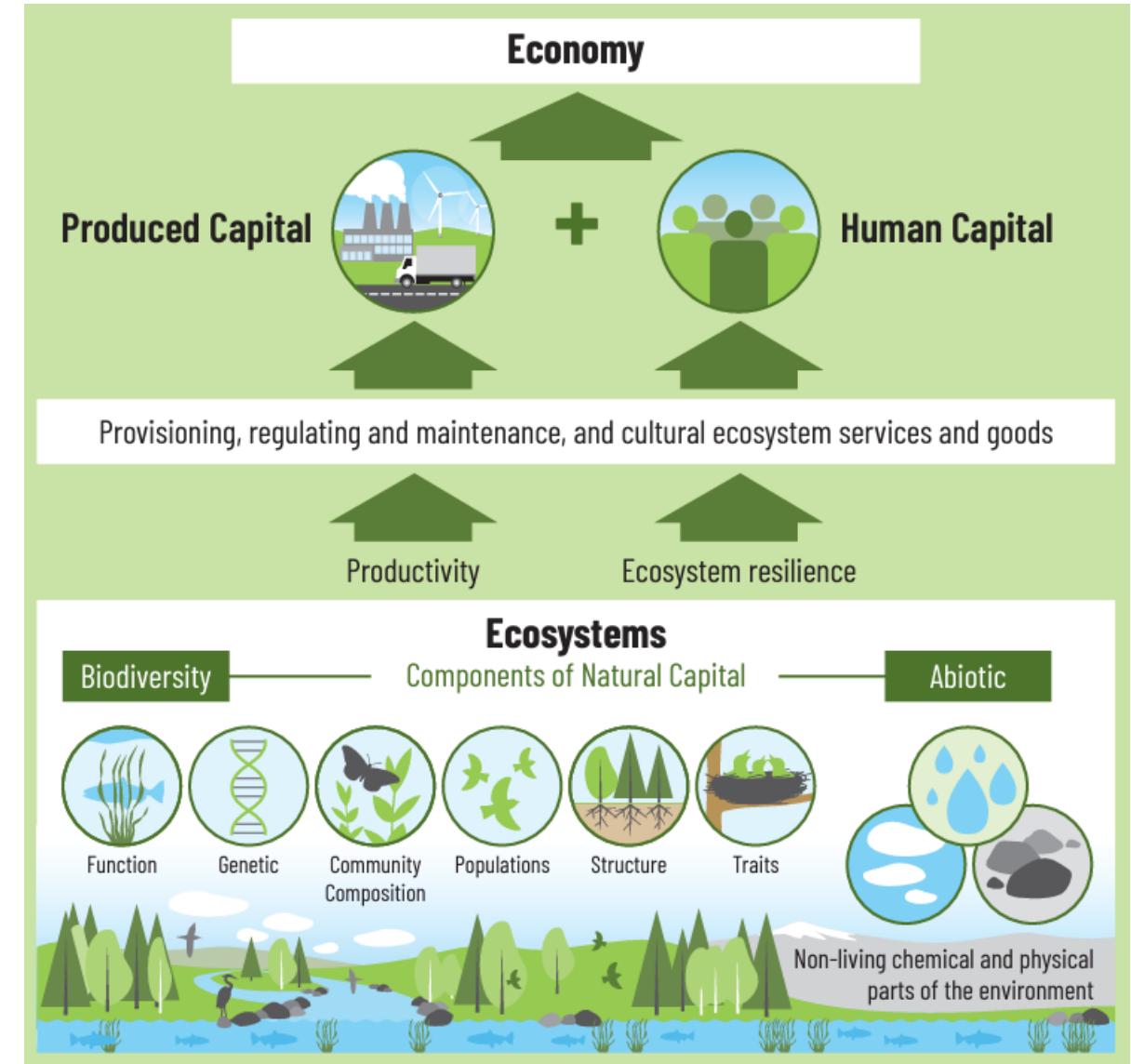
Image courtesy of City of Calgary

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

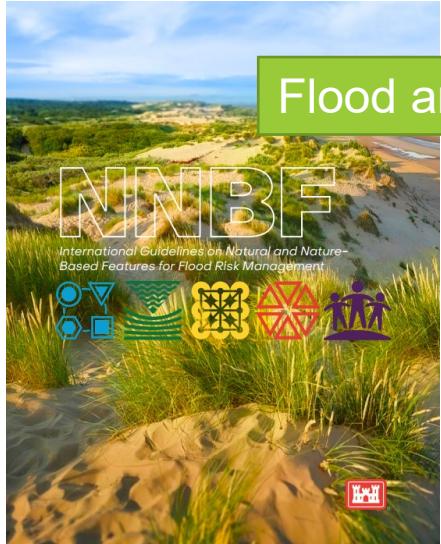
*These services are not all offered by
 « grey » infrastructure*



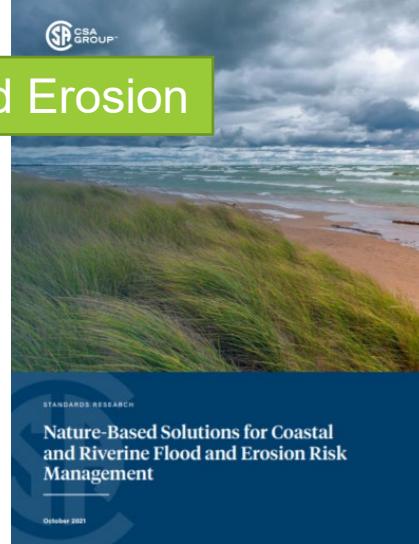
Natural Infrastructure Works at Different Scales



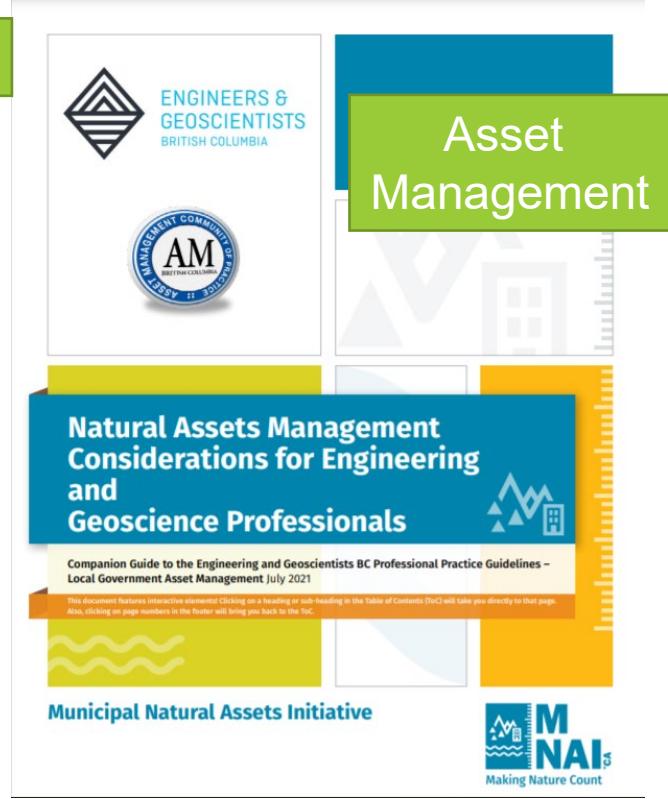
Rapidly Evolving Canadian NbS Guidance



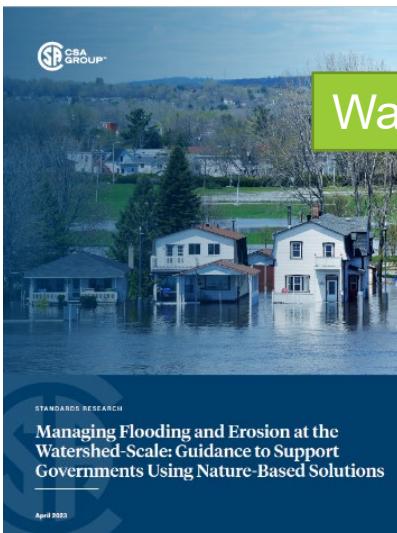
Flood and Erosion



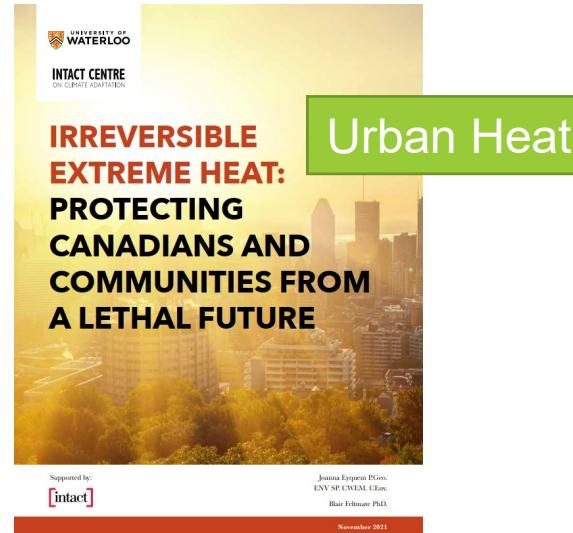
Coasts



Asset Management



Watersheds

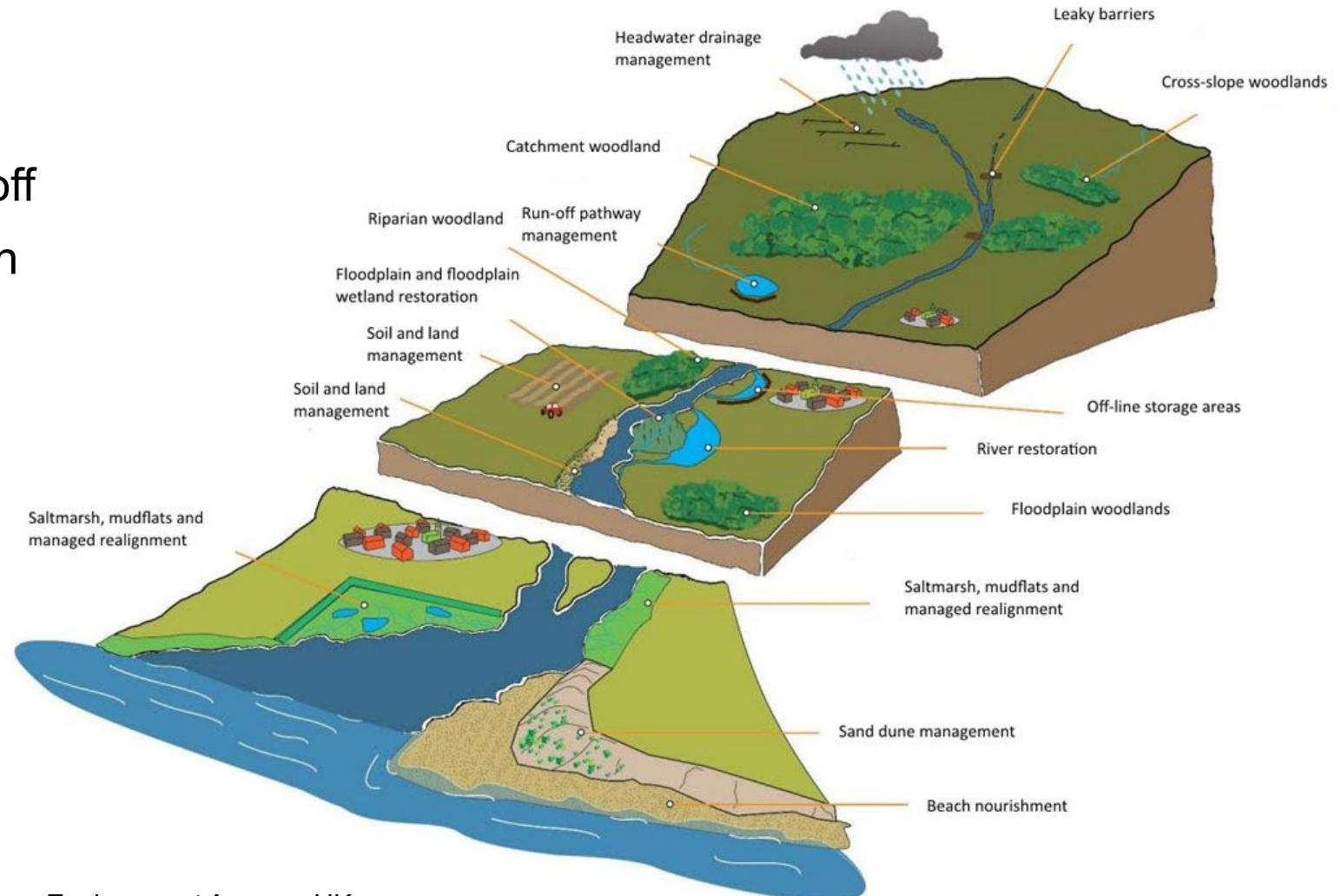


Urban Heat

NbS are a key focus for future standards development

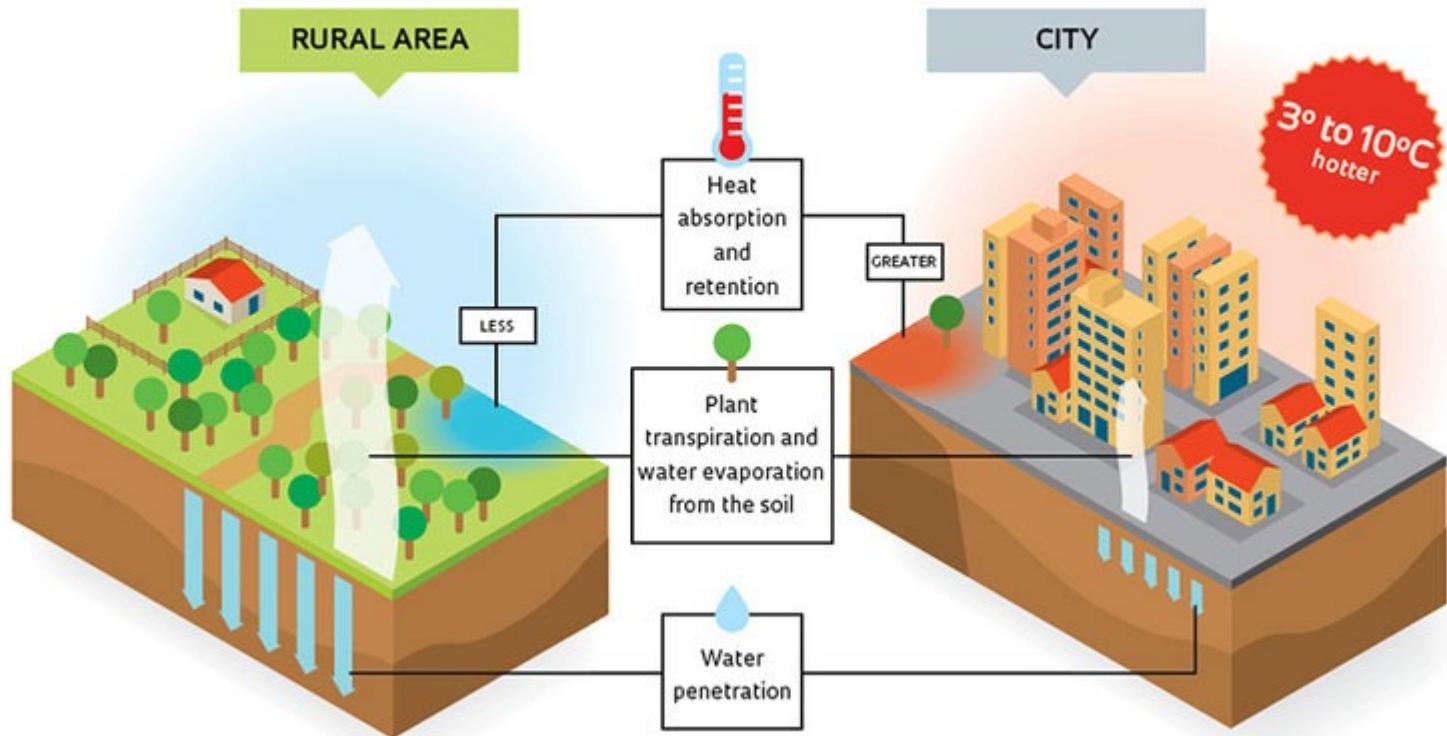
Natural Infrastructure Reduces Flooding, Erosion and Drought

- 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



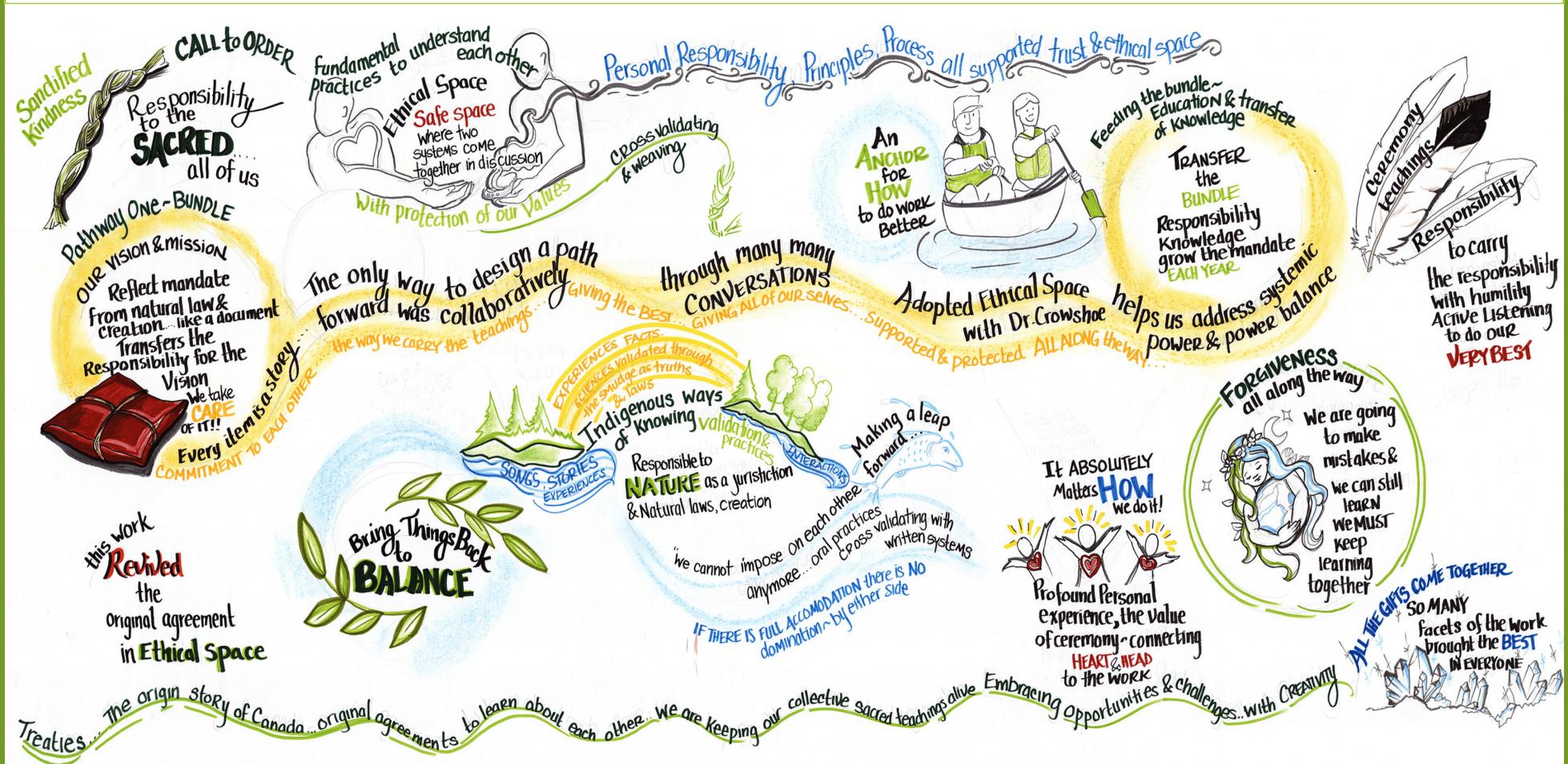
Source: ecoRi (2019) Cool Ideas for Reducing Urban Heat-Island Effect
<https://www.ecore.org/green-tip/2019/8/9/cool-ideas-for-reducing-urban-heat-island-effect>

The Natural Shift

10 REASONS FOR OPTIMISM



1) Indigenous-led Opportunities



Stories of Ethical Space
From Pathway to Canada Target 1

June 2021

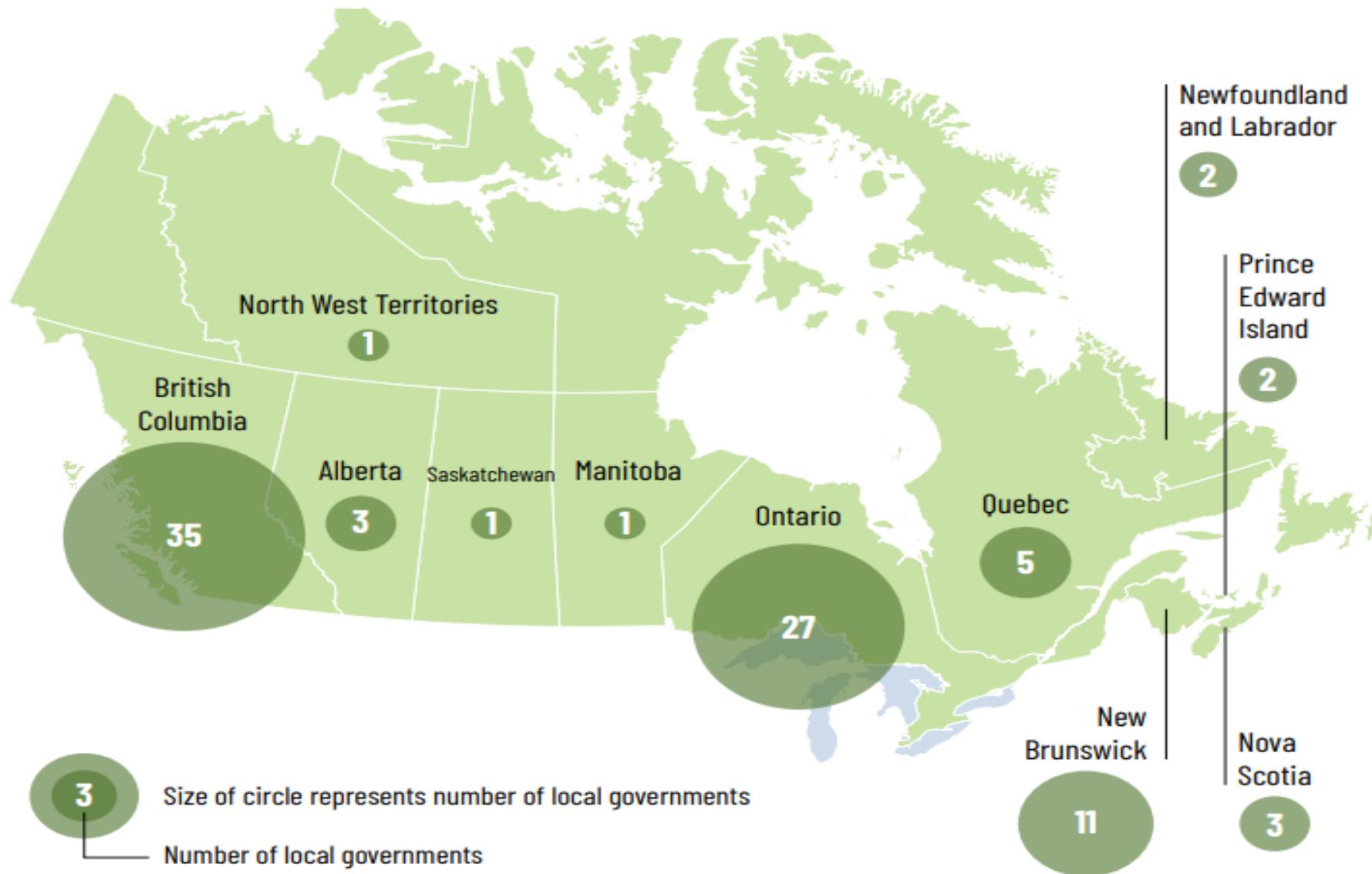
2) Federal Government (inc INFC) has Taken Notice of Natural Infrastructure



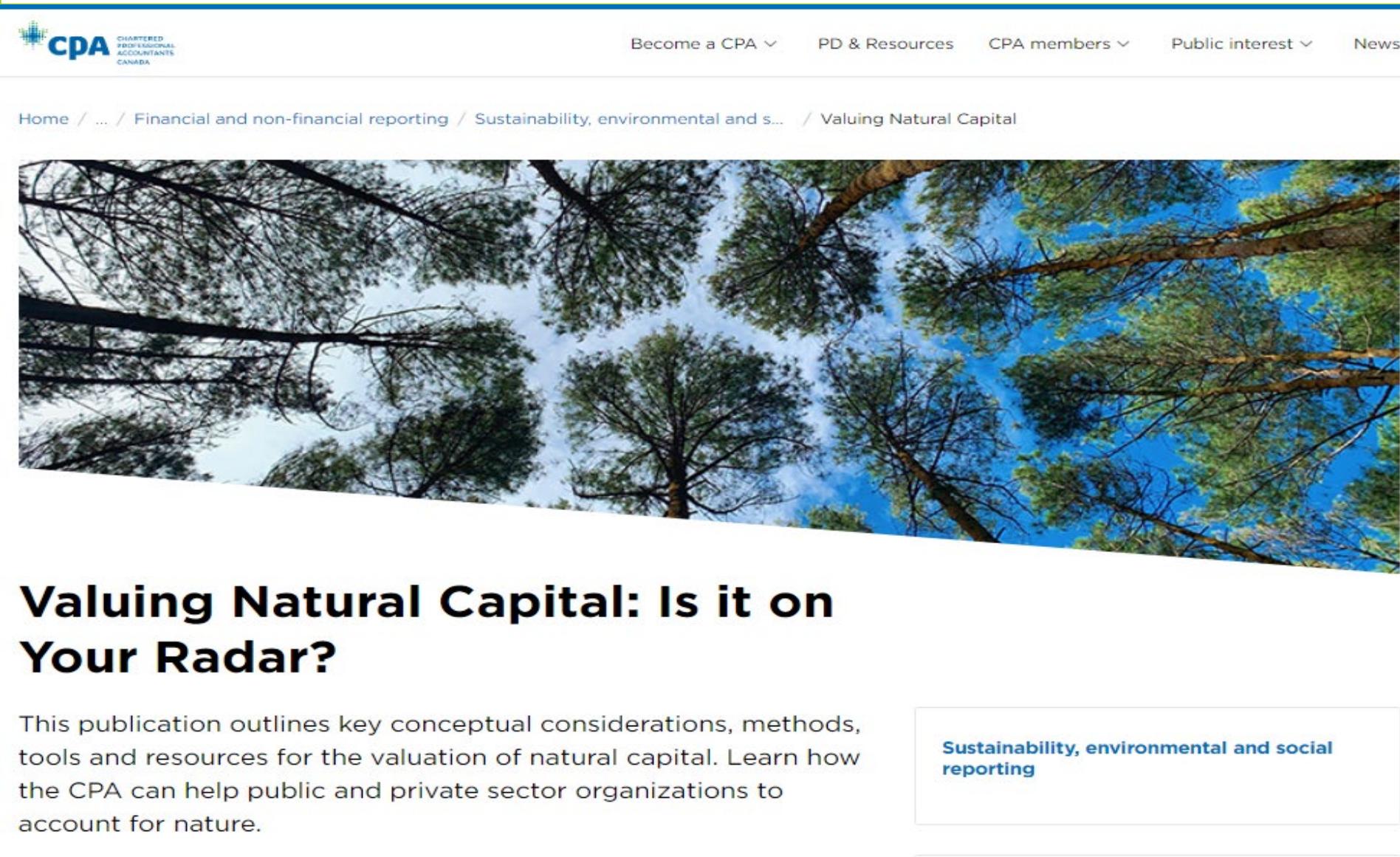
3) Case Studies of NbS for Resilience are Multiplying



4) Local Governments are Managing Natural Assets



5) Accountants are Informing Their Own Members



The screenshot shows the CPA Canada website. The top navigation bar includes links for 'Become a CPA', 'PD & Resources', 'CPA members', 'Public interest', and 'News'. Below the navigation, a breadcrumb trail shows the path: 'Home / ... / Financial and non-financial reporting / Sustainability, environmental and s... / Valuing Natural Capital'. The main content features a large image of tall pine trees against a blue sky. Below the image, the title 'Valuing Natural Capital: Is it on Your Radar?' is displayed in large, bold, black text. A teal icon of two stylized figures is located in the bottom left corner. A text box in the bottom right corner contains the text 'Sustainability, environmental and social reporting'.

Valuing Natural Capital: Is it on Your Radar?

This publication outlines key conceptual considerations, methods, tools and resources for the valuation of natural capital. Learn how the CPA can help public and private sector organizations to account for nature.

Sustainability, environmental and social reporting

6) More Standards Are Coming!



CSA W218:23
National Standard of Canada

Specifications for natural asset inventories



SCC ccn

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Technical guidance for nature-based solutions
Proposed topics for consultation
August 2023



Standards Council of Canada

Open a world of possibilities.

Canada

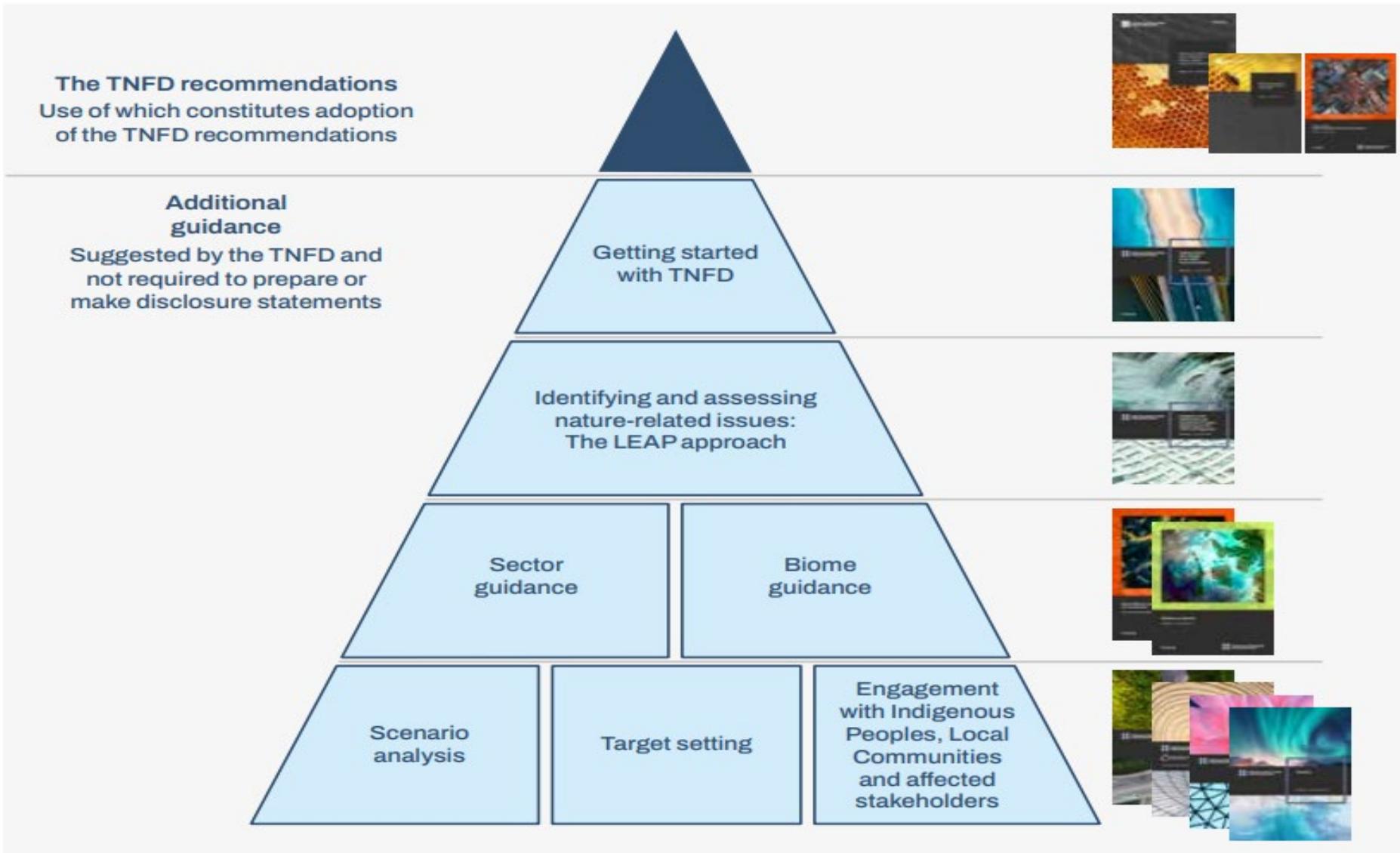


7) ESG, Sustainability, Climate Community are Integrating Nature

2) S



8) Taskforce for Nature-Related Financial Disclosures is Operational (6 adopters from Canada)



9) Canada Will be Implementing the Kuming-Montreal Global Biodiversity Agreement

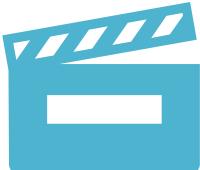


10) The media is helping communicate messaging



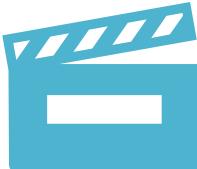
Actions – My To Do List

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)
3. Start or continue your natural asset management journey
4. Share your stories of success



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

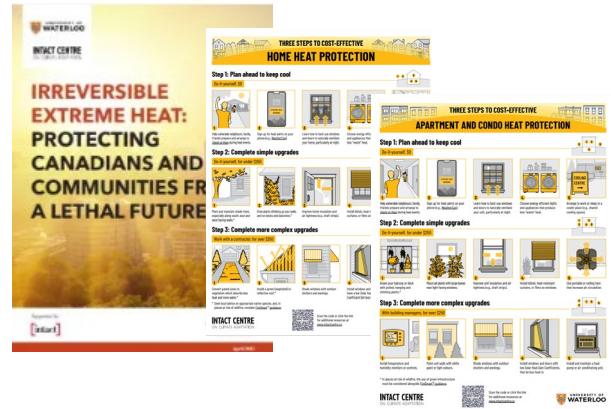


1) Home, 2) Existing Communities, 3) New Community Design, 4) Commercial Real Estate, 5) Coastal Communities, 6) Integrated Solutions, 7) Cities, Provinces, Territories, 8) Home Protection Infographic

WILDFIRE



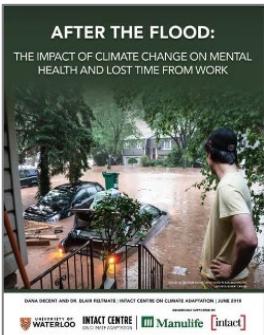
EXTREME HEAT



NATURAL INFRASTRUCTURE



HEALTH

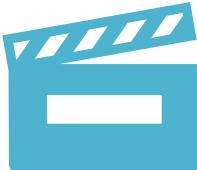


CAPITAL MARKETS



Actions – Your To Do List

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