



SOURCE OF 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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**SOURCE
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CONFERENCE

Canada's Premier
Stormwater and Erosion
and Sediment Control
Conference



INTACT CENTRE
ON CLIMATE ADAPTATION



**UNIVERSITY OF
WATERLOO**

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[intact]

Outline



Roots



Knowledge



Optimism



Action





BALANCE

Northern and Southern England

French and English

Engineers and Ecologists

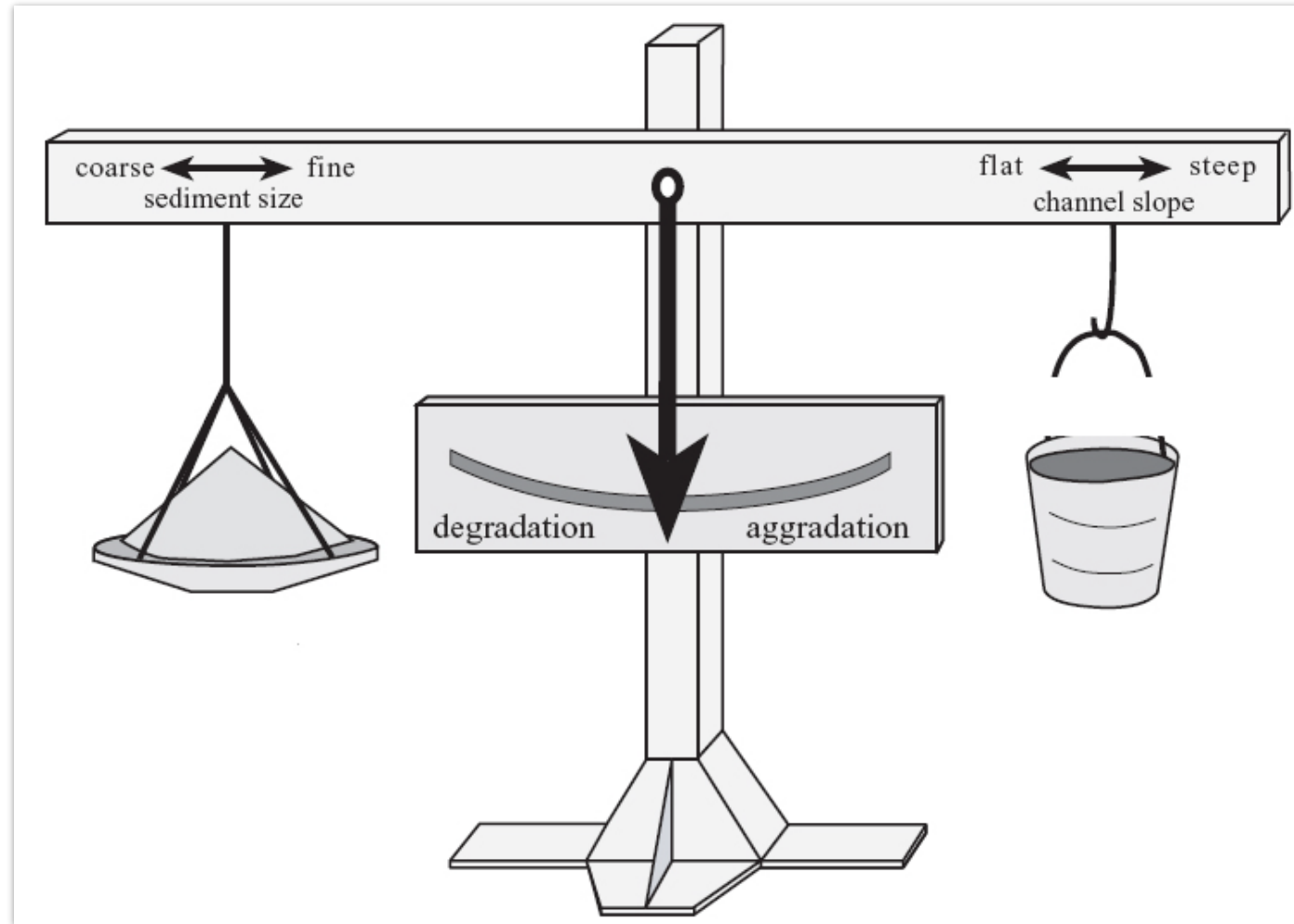
People with Nature

Grey and Natural Infrastructure

.....



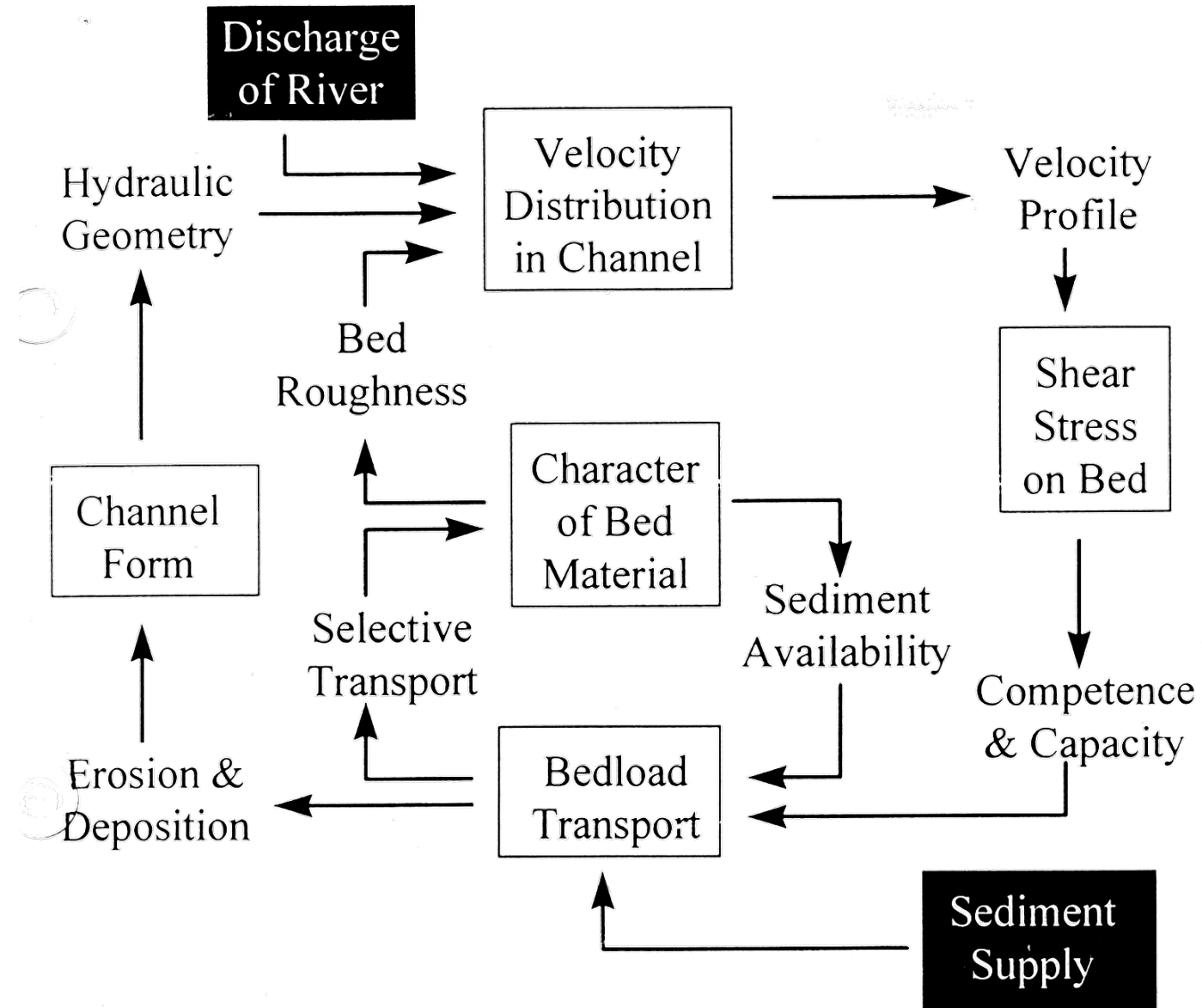
Lane's Balance (1955) – Dynamic Equilibrium



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).

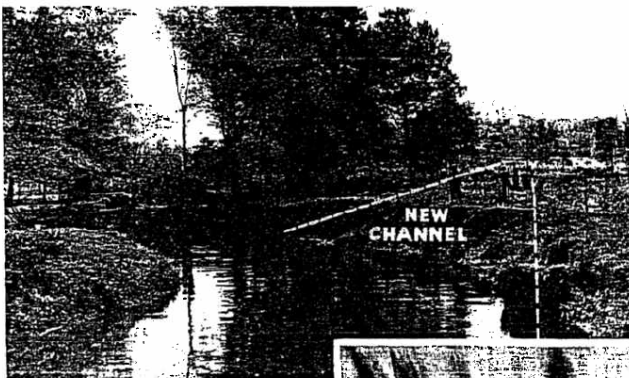


Feedbacks



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 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.

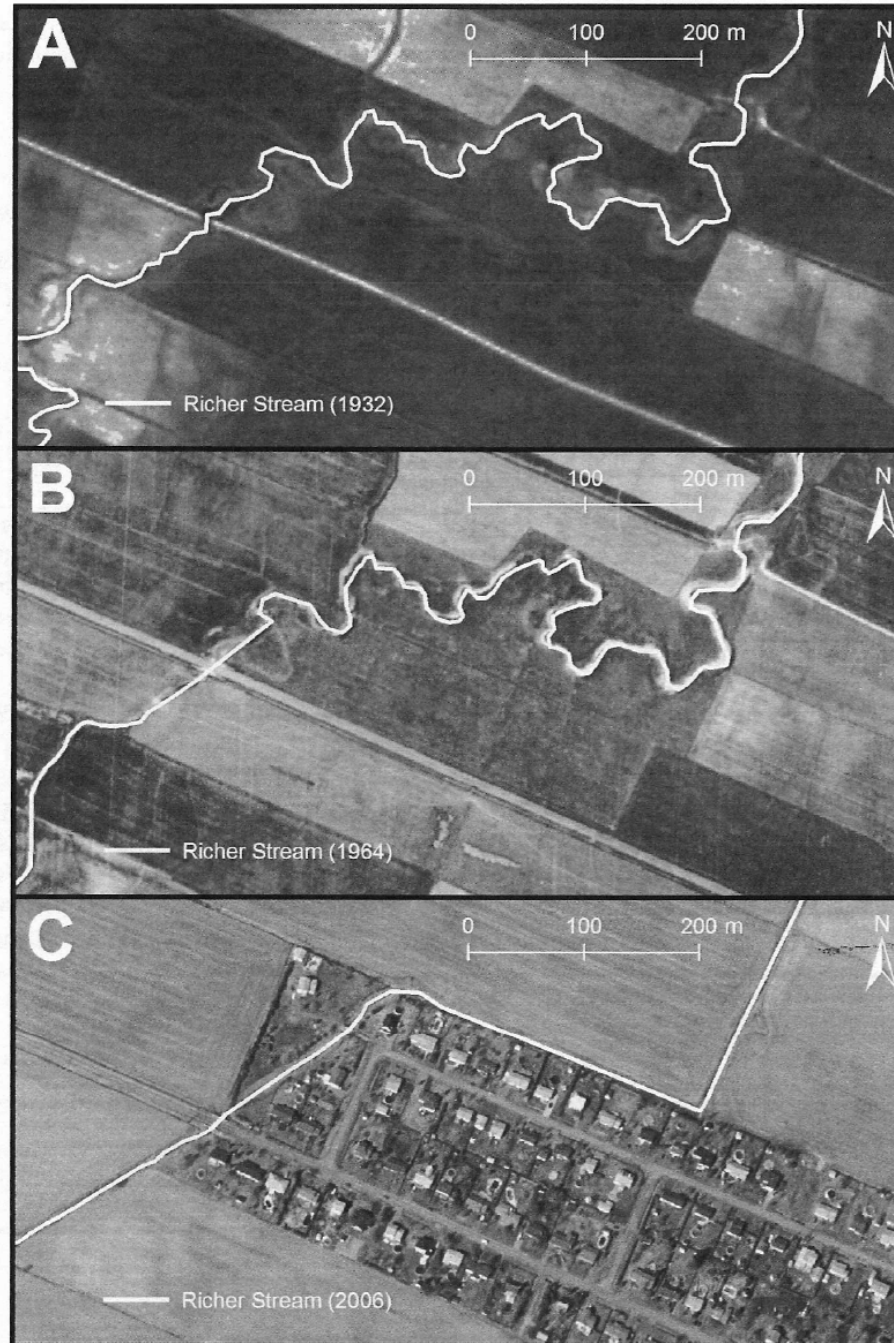
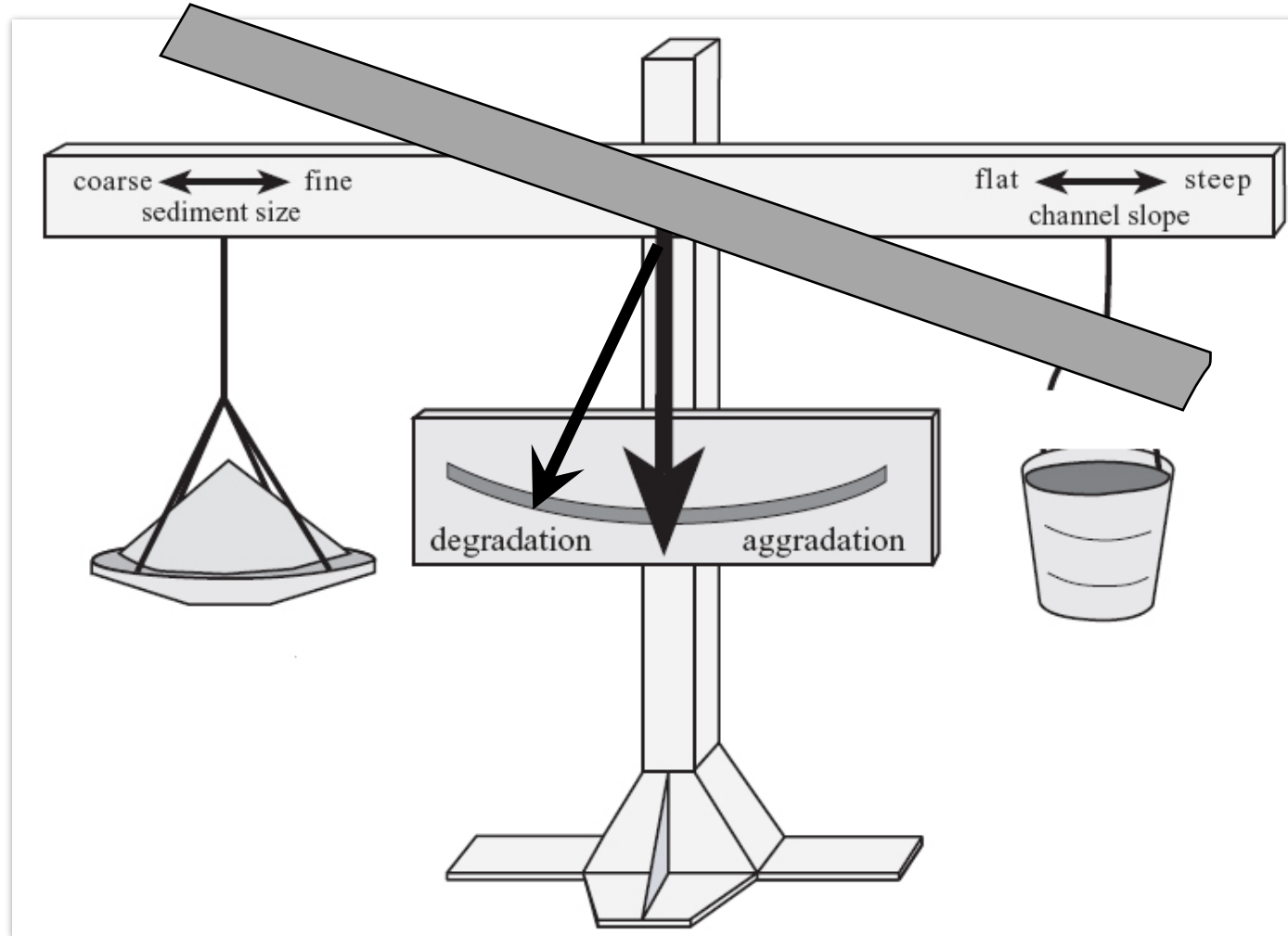


Figure 2. Aerial photographs of the residential reach in a) 1932, b) 1964 and c) 2006. Flow is from left to right.

...

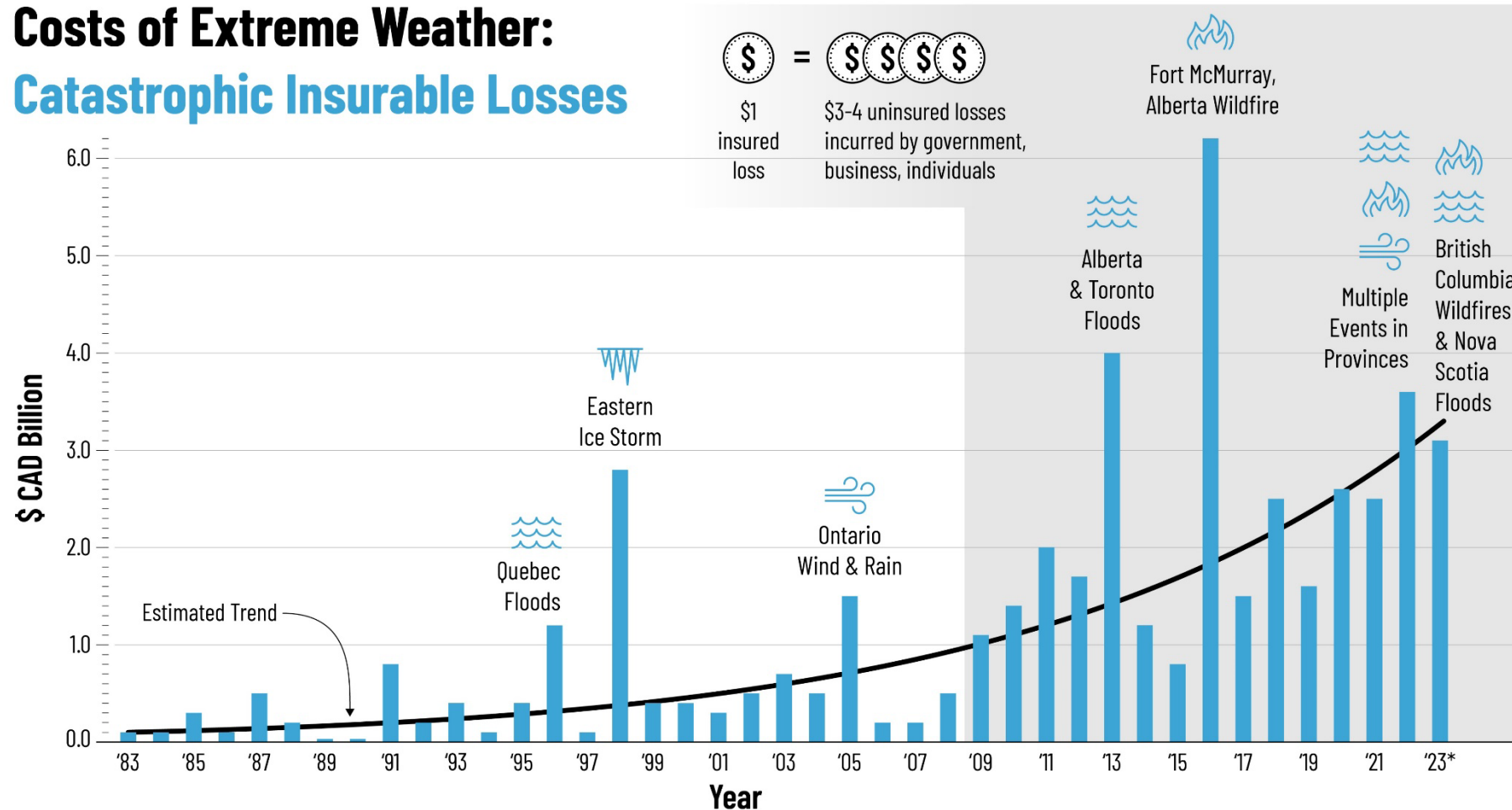
If...

- 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



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

*2023 preliminary values in 2023\$ CAD, corrected for inflation and per capita wealth accumulation.

- Most recently over \$2 billion 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



Roots



Knowledge



Optimism



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)

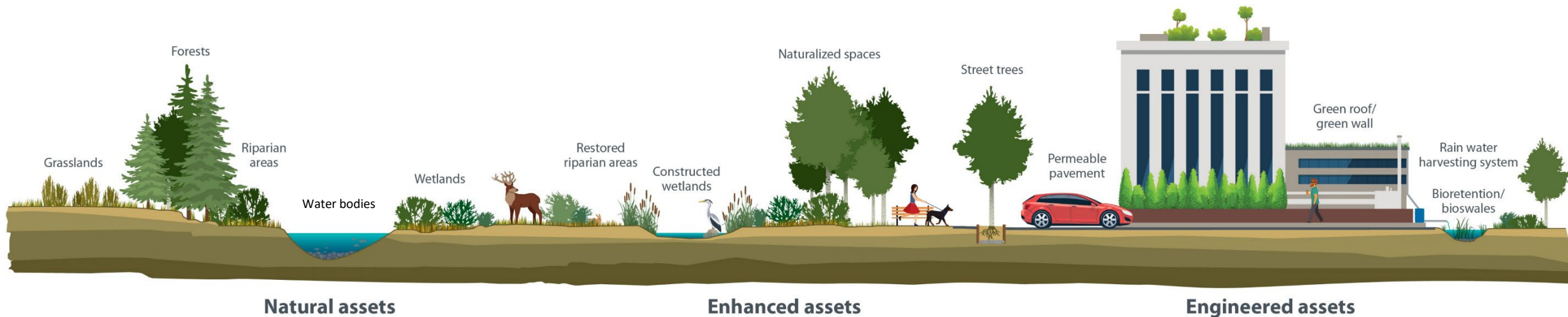


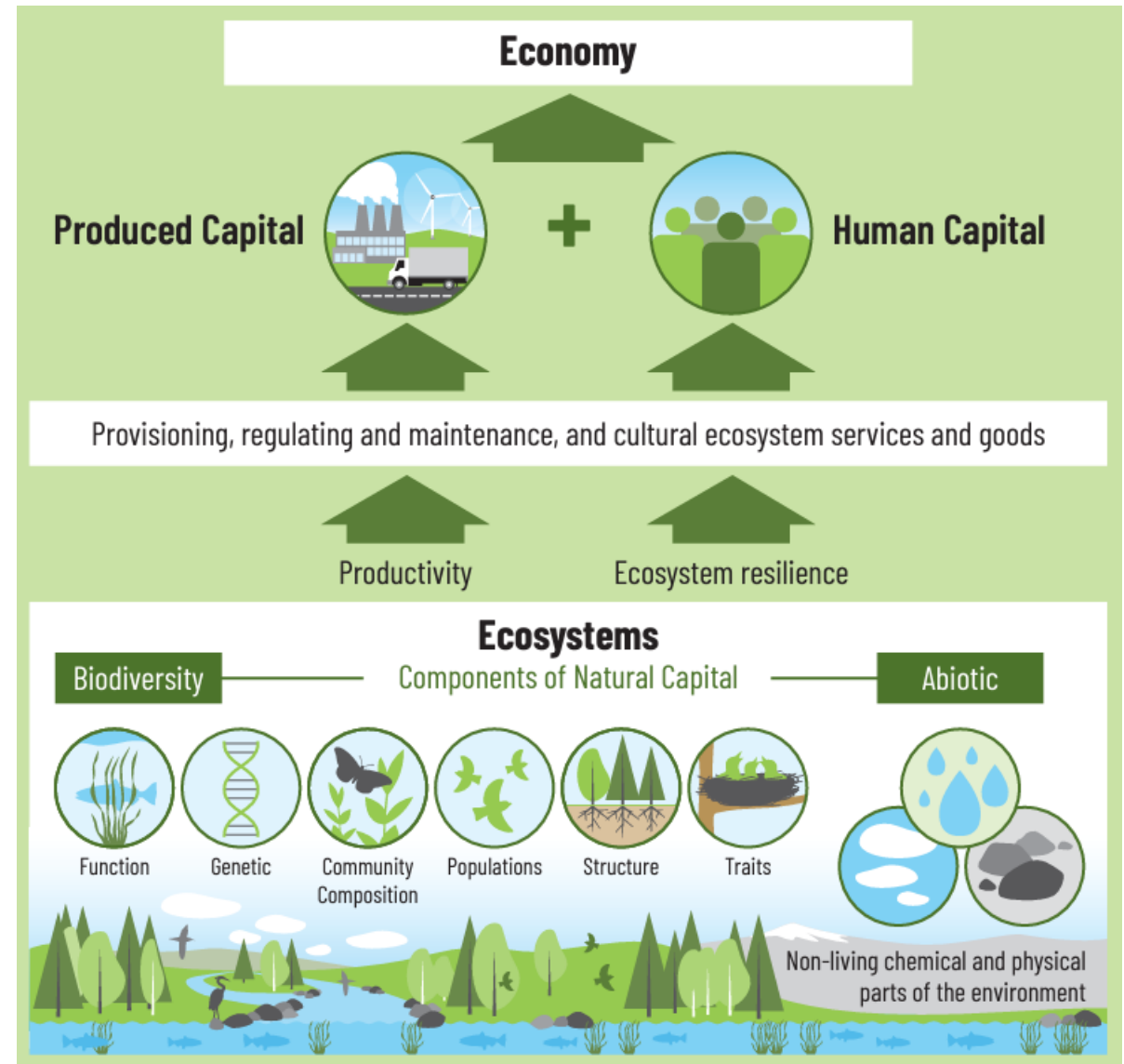
Image courtesy of City of Calgary

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

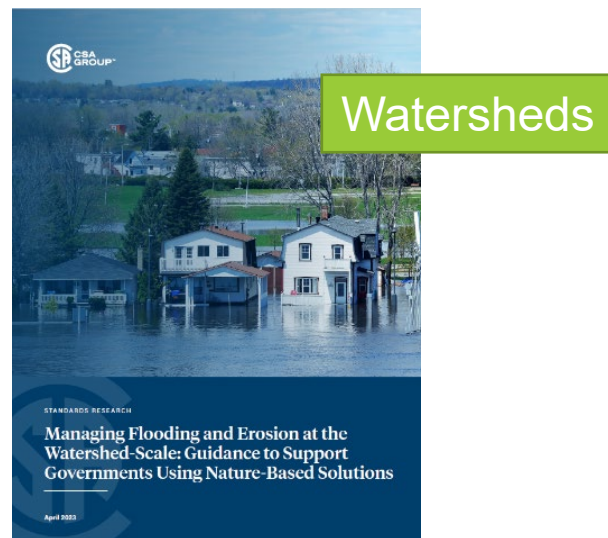
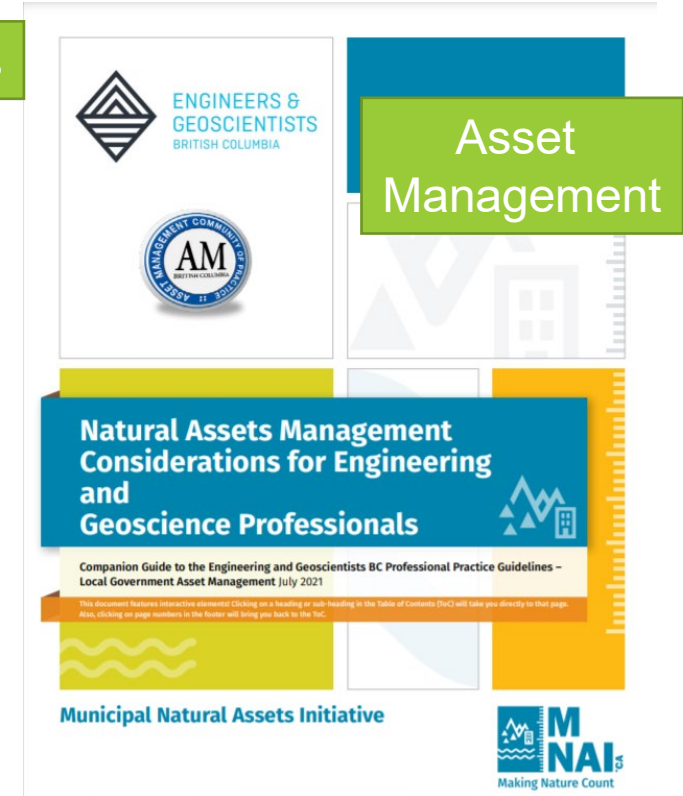
*These services are not all offered by
 « grey » infrastructure*



Natural Infrastructure Works at Different Scales



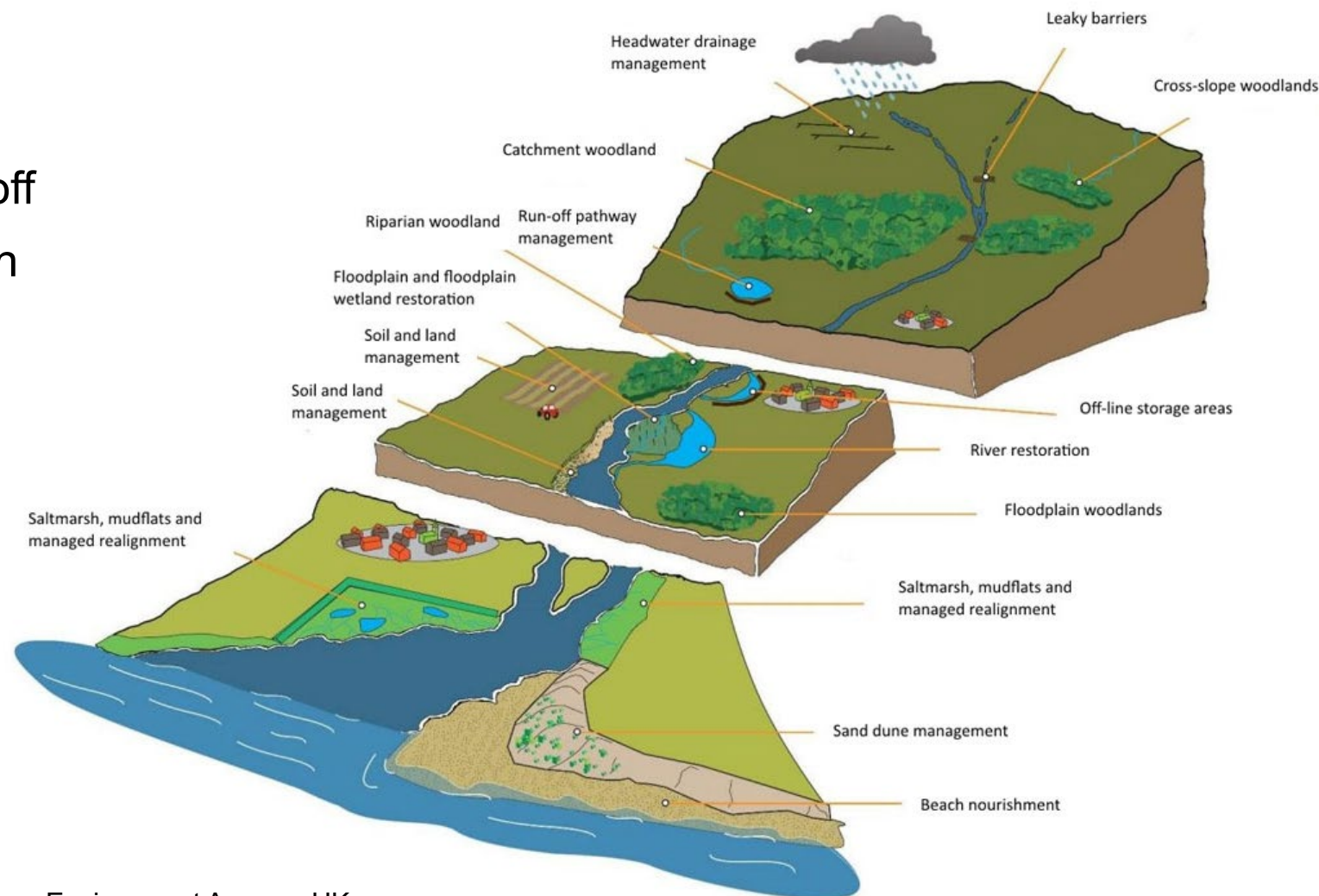
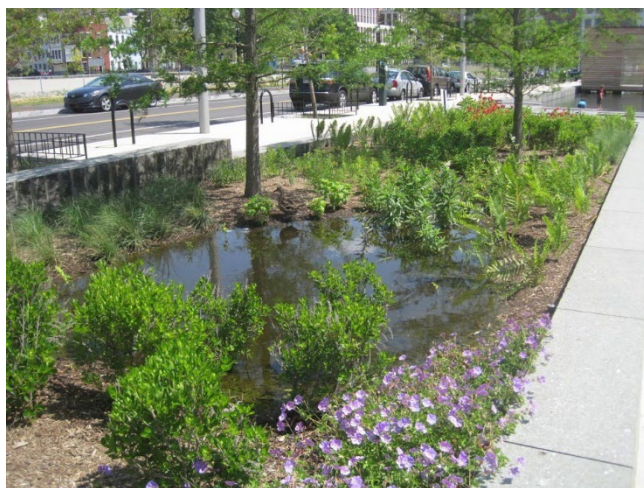
Rapidly Evolving Canadian NbS Guidance



NbS are a key focus for future standards development

Natural Infrastructure Reduces Flooding, Erosion and Drought

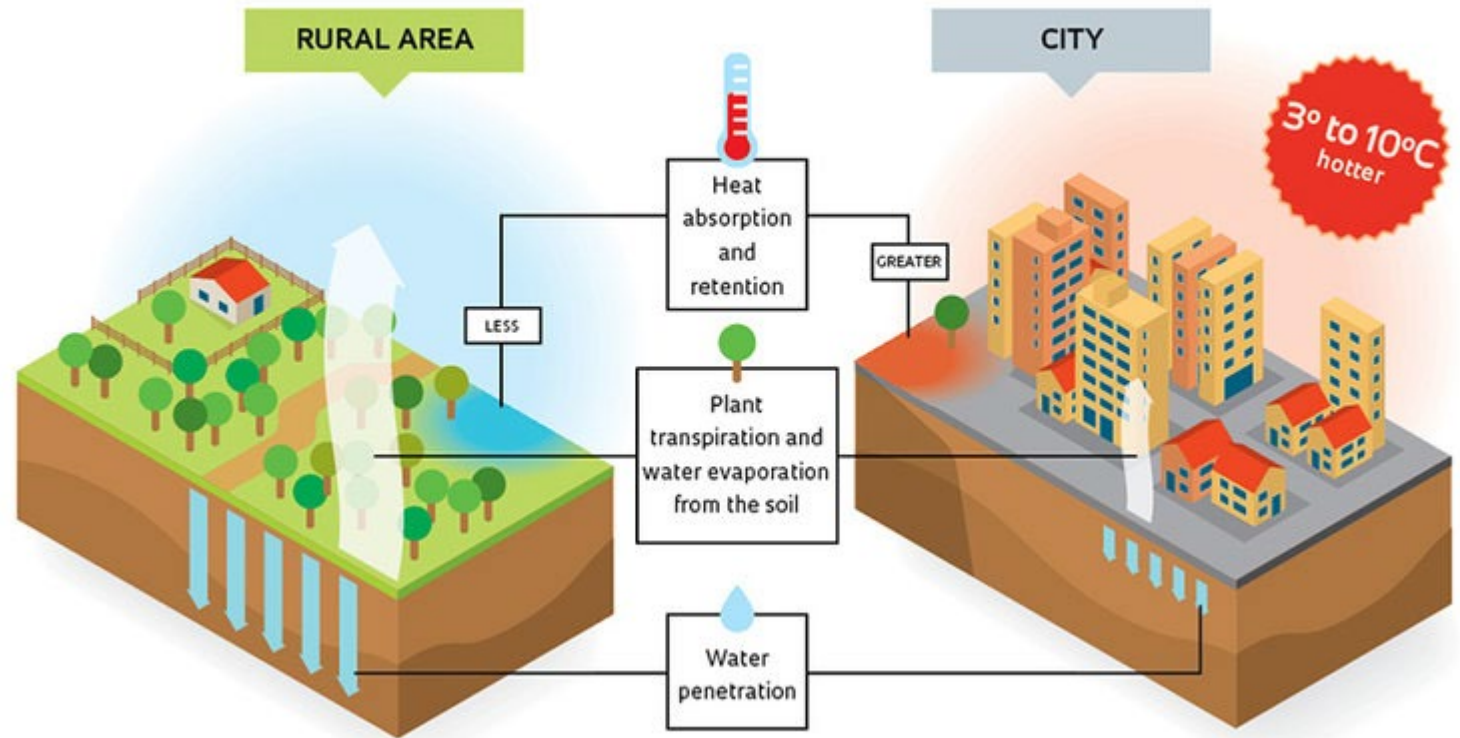
- Store water
- Slow down water
- Reduce volume of peak runoff
- Reduce soil and river erosion



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>

The Natural Shift

10 REASONS FOR OPTIMISM



1) Indigenous-led Opportunities



Stories of Ethical Space
 From Pathway to Canada Target 1

June 2021

Live Graphic Recording by:

Kelly Foxcroft-PAIRIE



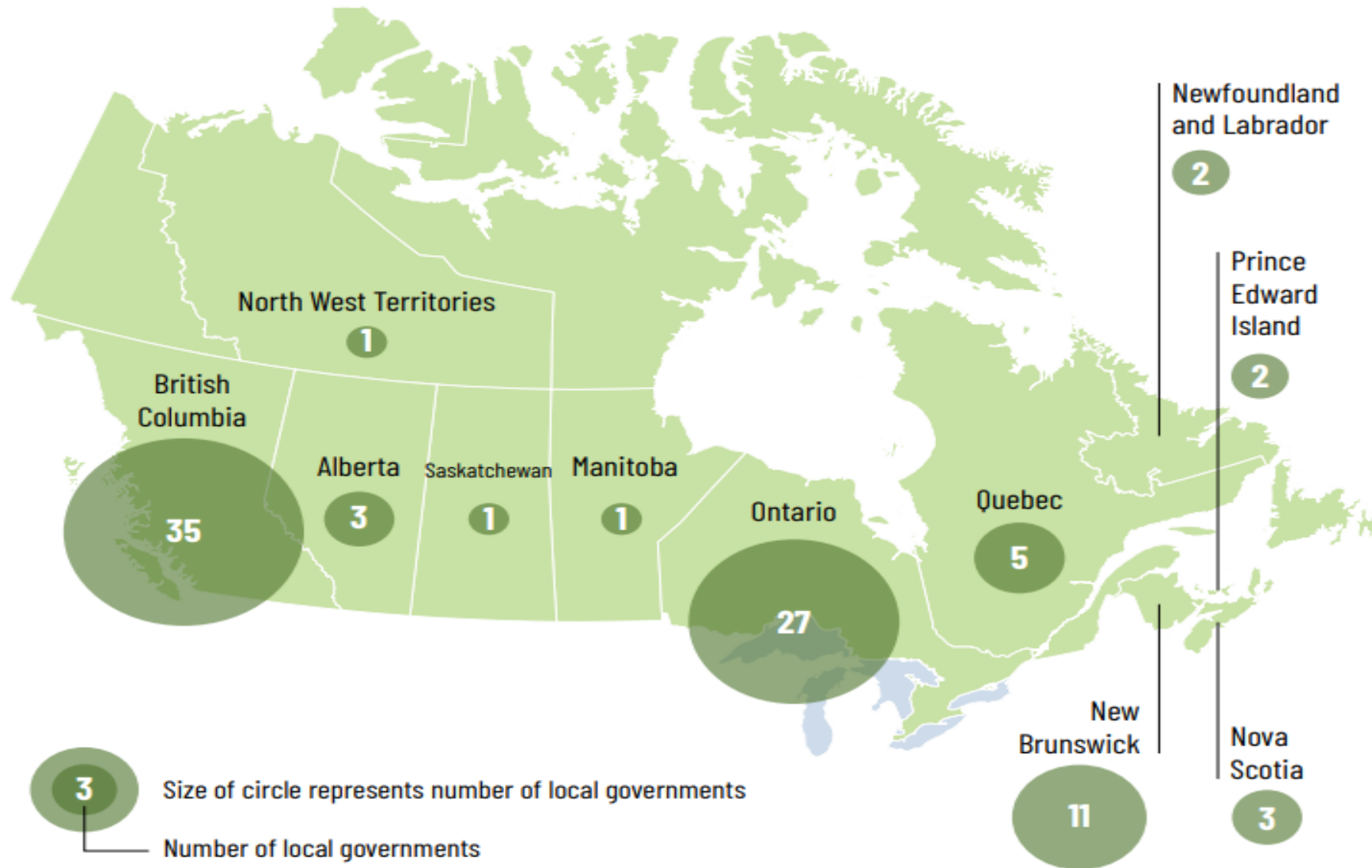
2) Federal Government (inc INFC) has Taken Notice of Natural Infrastructure



3) Case Studies of NbS for Resilience are Multiplying



4) Local Governments are Managing Natural Assets



5) Accountants are Informing Their Own Members



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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



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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.

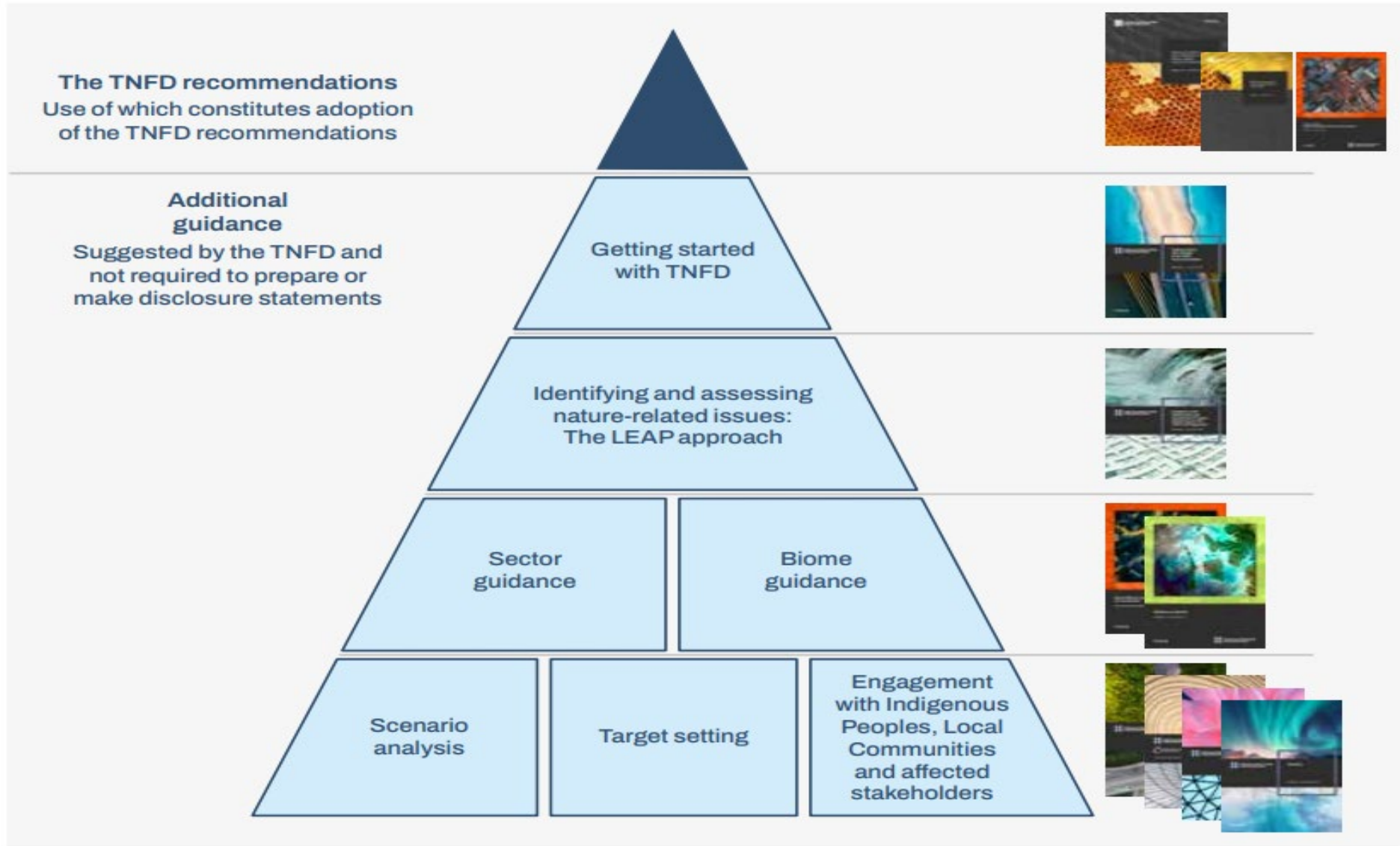
Canada



7) ESG, Sustainability, Climate Community are Integrating Nature



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

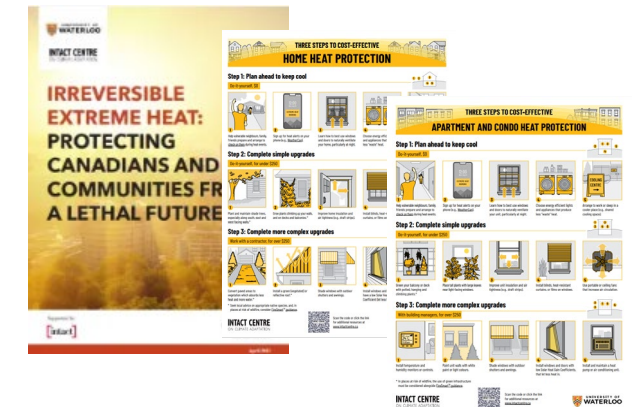


- 1) Home, 2) Existing Communities, 3) New Community Design, 4) Commercial Real Estate, 5) Coastal Communities, 6) Integrated Solutions, 7) Cities, Provinces, Territories, 8) Home Protection Infographic

WILDFIRE



EXTREME HEAT



NATURAL INFRASTRUCTURE



HEALTH



CAPITAL MARKETS



Actions – Your To Do List

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