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2023 Virtual Symposium

April 18, 20, 25 & 27, 2023

2023 Symposium Planning Committee

PGO gratefully acknowledges the work of the Symposium Planning Committee in putting together this virtual learning event.

Craig Waldie, P.Geo., FGC (Chair)

Sheila Ballantyne, P.Geo. (Vice Chair)

Kristina Anderson, P.Geo.

Hannah Chessell, P.Geo.

Joanna Eyquem, P.Geo.

Kristin Hanson, P.Geo. (Non-practising), FGC

Robert Hearst, P.Geo.

Alicia Kimberley, P.Geo.

Neera Sundaralingam, GIT

Andrea Waldie, P.Geo., FGC

James Whyte, P.Geo.

Tony Andrews, PhD

Marilen Miguel

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Panel Session B

Achieving Canada's New Climate Adaptation and Biodiversity Goals

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Panel Session B Co-Chairs

Joanna Eyquem, P.Geo.
Intact Centre on Climate Adaptation
University of Waterloo

Kristina Anderson, P.Geo.
Toronto Region Conservation Authority

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Land Acknowledgement

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Panel Session B

Presentations and Speakers

1) *Canada's National Adaptation Strategy: A blueprint for a more climate-resilient Canada*
Caroline Metz, Managing Director of Economics and Resiliency, Intact Centre on Climate Adaptation

2) *Progress, obligations and opportunities for training in climate adaptation*
Paul Cobb, Manager, Training Services, Climate Risk Institute

3) *Integrated Watershed Planning and Management for Biodiversity and Ecosystem Services Conservation*
Namrata Shrestha, Senior Manager, Toronto and Region Conservation Authority

4) *Mainstreaming natural asset management in geoscience knowledge and practice*
Liese Coulter, Research Fellow, Municipal Natural Assets Initiative, Resilience by Design Lab

----------5-MINUTE BREAK----------

5) Panel Discussion
Co-chairs and **Speakers**

6) *Q & A Session*

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Presentation 1

Canada's National Adaptation Strategy: A blueprint for a more climate-resilient Canada

Caroline Metz

Managing Director of Economics and Resiliency
Intact Centre on Climate Adaptation

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Canada's National Adaptation Strategy:
A blueprint for a more climate-resilient Canada

Caroline Metz

Managing Director, Intact Centre on Climate Adaptation

April 20, 2023

Outline

- Intact Centre on Climate Adaptation
- Climate change and the need for adaptation
- Canada's National Adaptation Strategy (NAS)
  - Climate change impacts
  - Goals and objectives
  - Targets
  - Cross-societal roles and responsibilities
- How can geoscientists lead
- Next steps

INTACT CENTRE ON CLIMATE ADAPTATION

INTACT CENTRE
ON CLIMATE ADAPTATION

- Applied research centre, national focus
- University of Waterloo
- Address adaptation from all perspectives
- Develop guidance and resources

Intact Centre on Climate Adaptation,
Faculty of Environment, University of Waterloo

Mission:

- Build a more climate-resilient future
- Help **homeowners, communities, governments, businesses** reduce risks associated with climate change and extreme weather events

Climate change – Canadian context

- Canada's climate **has warmed, and will continue to warm;** cause is human influence
- Warming has been at **2x the global rate**, and ~ 3x in the north
- Warming is **effectively irreversible**

Source: Bush, E., & Lemmen, D.S. (Eds). (2019). *Canada's Changing Climate Report* Government of Canada, Ottawa, ON

Building Climate Resilience

Reduce GHG Emissions

Sequester/ store CO2

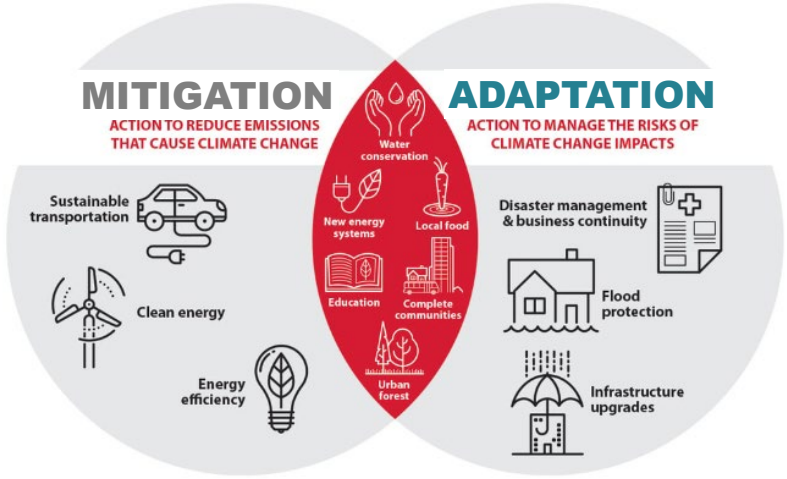

image from https://www.calgary.ca/UEP/ESM/Pages/Energy-Savings/Climate-Change.aspx?redirect=/climateprogram

Manage Risks and Cope

In Canada:

- **Extreme weather** - more frequent, intense:
  - **Precipitation/ Flooding**
  - **Extreme Heat** – heat waves
- **Wildfire**
- Drought
- Melting glaciers and permafrost
- Sea level rise

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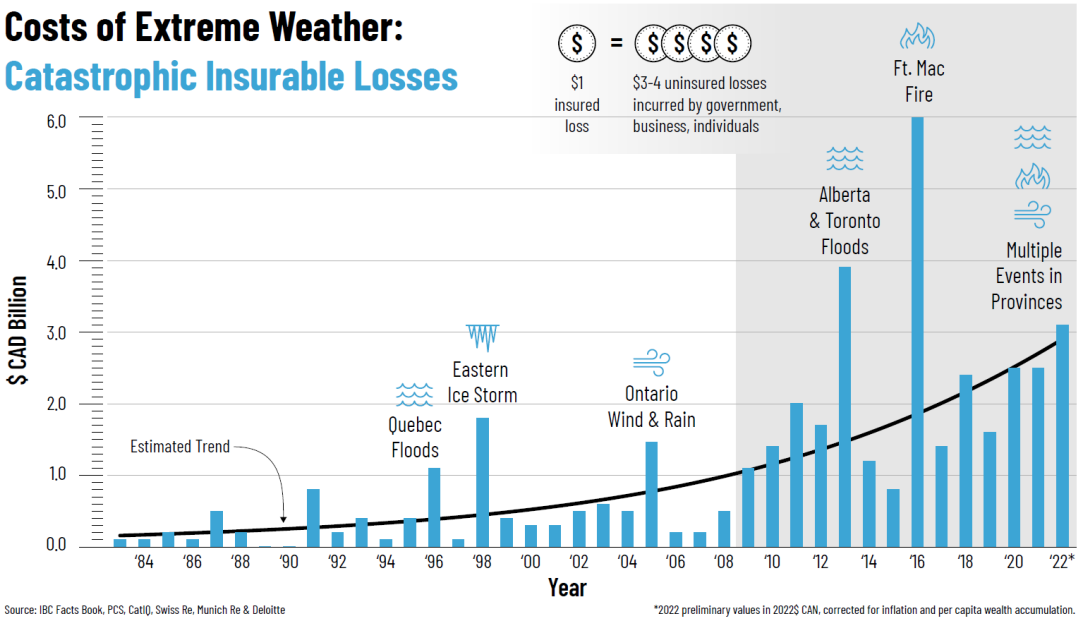
Need for Adaptation



- $2B in insured losses (2022); Third most costly year on record
- Most losses are not insured:
  - $1 of insured loss = $3-4 of uninsured loss borne by individuals, business, governments
- Proactive adaptation, strong ROI:
  - $1 invested today yields $5-$15 in avoided losses

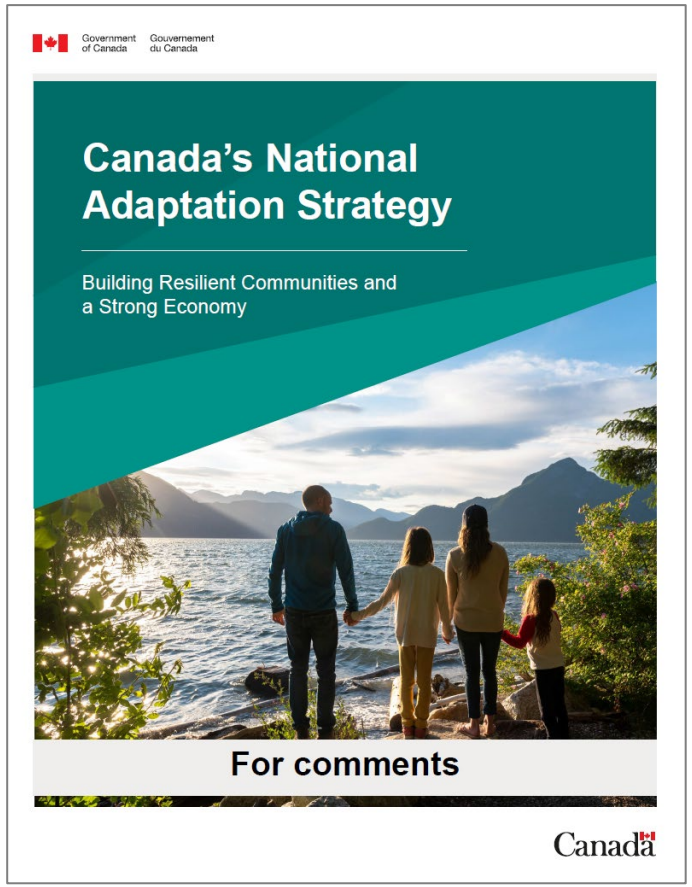
Social / Health Costs:

Loss of life, injury, suffering, displacement, etc. from climate change and extreme weather

Heat Event	Year	Heat-related deaths* reported
BC Heat dome	2021	619
QC	2018	86
QC	2010	280
BC	2009	156

* Includes possible heat-related deaths

Canada's National Adaptation Strategy (NAS)

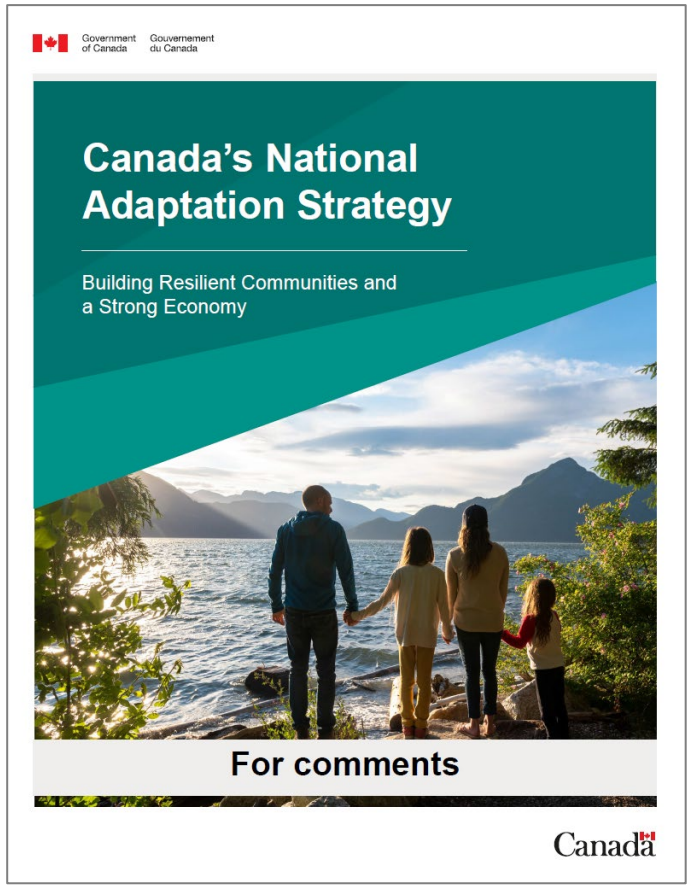


- Released Nov 2022 - Environment and Climate Change Canada
- First, comprehensive strategy – **shared path** for building a climate-resilient Canada, across five **key systems**:
  1. Disaster Resilience*
  2. Health and Wellbeing
  3. Nature and Biodiversity*
  4. Infrastructure*
  5. Economy and Workers

Note: * - The Intact Centre provided input/ advice on these tables, in addition to supporting Climate Proof Canada Coalition

- Calls on a "**whole of society approach**" for adaptation
- Defines **targets and indicators**
  - Measure progress on climate adaptation in short-term (2023-2030) and intermediate-term (to 2050)
- Complimented by *Government of Canada Adaptation Action Plan*

Canada's NAS (Cont'd)



- Commits **funding** for programs:

$1.6B announced in Nov 2022

- Disaster Mitigation and Adaptation Fund (DFAA) (top up)
- Green Municipal Fund (expansion)
- Flood hazard mapping (extension)
- Climate Resilient Coastal and Northern Communities Program (new)
- Protecting Canadians from Extreme Heat Program (expansion)
- HealthAdapt Program, support climate-resilient health systems (expansion)
- Accelerating use of climate-informed codes, standards, and guidelines for resilient infrastructure (new)

~$875M+ announced in Federal Budget 2023

- Monitoring & restoration of Great Lakes (+other lakes, rivers) + freshwater protection
- Creation of Canada Water Agency (new)
- Development of low-cost national flood insurance program - high-risk properties (new)
- Creation of on-line flood risk portal (new)
- ID high-risk flood areas and modernize DFAA program

Climate Change Impacts

Pages 7-14 (NAS) describe how life in Canada is disrupted:

- Harming our health and wellbeing
- Natural environment is affected
- Homes damaged, infrastructure affected
- Livelihoods and ability to secure necessities of life, affected
- Some people and communities more affected
- Indigenous Peoples experience climate impacts in unique and serious ways
- Coastal communities more vulnerable
- Climate change is daily, lived reality in the North
- Circumstances in the North → unique challenges

Figure 1. A wildfire frontline with emergency services nearby, Okanagan Valley, British Columbia

Figure 2. Agricultural worker in the fields near Harrow, Ontario

Figure 3. City of Iqaluit, Nunavut

Time to act is now

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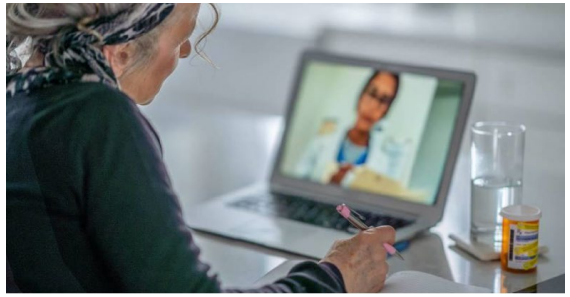
Goals and Objectives

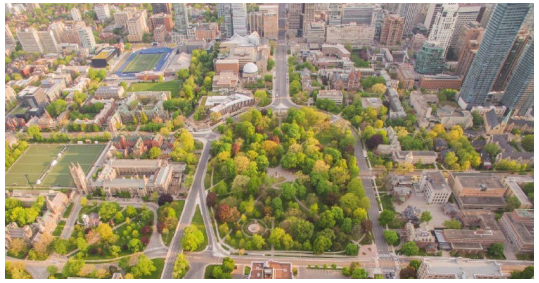
Defined for the five systems (p. 19-28 of NAS):

Disaster Resilience



Health and Wellbeing

Nature and Biodiversity



Infrastructure

Economy and Workers

Targets

Disaster Resilience	
Objectives	**Targets**
Whole-of-society collaboration and governance	By 2025, federal, provincial, and territorial governments have engaged regularly, including with whole of society partners and Indigenous communities, to align emergency management adaptation activities to promote disaster resilience
Understanding disaster risks	By 2025, 60% of Canadians are aware of the disaster risks facing their household as a result of climate change
	By 2028, at least 200 out of 250 targeted high-risk areas identified as priorities in collaboration with PTs are covered by new flood hazard maps, produced in accordance with scientific guidance and made available to Canadians
Prevention and disaster risk reduction activities	By 2025, 50% of Canadians have taken measures to respond to climate change risks facing their household
Enhancing capacity and coordination	All communities in zones of high risk develop and implement a wildfire community protection plan by 2050, with 15% by 2028
Strengthening recovery efforts; building back better	By 2028, a national recovery strategy is developed which sets out shorter timeframes for displaced individuals to be able to return to their homes or resettle after climate change disaster events
	By 2025, in 65% of disaster events where provinces and territories seek support through the Disaster Financial Assistance Arrangements, they seek additional funding for measures to prepare for, respond to, and recover from future natural disasters

Source: NAS, pg. 47-52

Health and Wellbeing	
Objectives	**Targets**
Health system capacity	By 2026, 80% of health regions will have implemented evidence-based adaptation measures to protect health from extreme heat
Tracking health impacts and evaluating progress	By 2030, health systems have identified risks, developed adaptation plans, and are measuring progress towards climate-resilience
Protecting people from health risks	By 2040, deaths due to extreme heatwaves have been eliminated
Mainstreaming health benefits	By 2030, consideration of health impacts and benefits are integrated into key climate change tools, guidelines and standards

Nature and Biodiversity	
Objectives	**Targets**
Halting and reversing biodiversity loss	Conserve 25% of our lands and waters by 2025 and 30% of each by 2030, working to halt and reverse nature loss by 2030 in Canada
	Identify and support at least 3 ecological corridors by 2026, to improve ecological connectivity between protected and conserved areas
Self-determined ecosystem stewardship	By 2026, support new and existing Guardians initiatives, establish new Indigenous Guardians Networks, and support Indigenous communities to build capacity to establish more Indigenous Protected and Conserved Areas
Nature-based solutions	Establish 15 new national urban parks by 2030

Targets

Infrastructure	
Objectives	**Targets**
Codes and standards	By 2030, robust guidance, codes and standards covering the top climate change risks for key public infrastructure systems are available to be adopted by all infrastructure decision-makers
Infrastructure decision-making	By 2030, 80% of public and municipal organizations have factored climate change adaptation into their decision-making processes
Resilient infrastructure funding	Starting in 2024, resilience to climate change impacts is factored into all new federal infrastructure funding programs

Economy and Workers	
Objectives	**Targets**
Skilled workforce	By 2027, 75% of the members of professional associations (i.e., civil engineers, planners, landscape architects, and accountants) have the capacity to apply climate change adaptation tools and information and communicate the business case for adaptation measures to their clients
Climate-exposed sectors	By 2027, 80% of highly exposed businesses include adaptation to climate change in plans and strategies in order to strengthen their competitiveness
Coastal communities	By 2030, coastal communities and businesses reduce the incremental costs of adaptation by 40%

Source: NAS, pg. 47-52

We are all part of the solution

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How can geoscientists lead?

- Within own organizations:
  - Assess, address, and report on physical climate vulnerabilities in operations, supply chains, workforce
  - Proactively plan (preparation, response, recovery) for natural disaster emergencies
  - Integrate climate change considerations into practices, codes of conduct
- Educate and train members on physical climate risks and adaptation solutions; integrate into professional development requirements
- Support climate-resilient land use planning, natural resources management, grey and green infrastructure policies, regulations
  - Encourage uptake of new practices, designs, technologies

Next Steps

NAS finalization

- Comments gathered and integrated (Nov – present)
- Federal government engaging with provinces and territories on bi-lateral agreements supporting the NAS
- NAS finalization expected in Summer 2023

Considerations

- The challenge with the NAS is one of implementation

> *"As a country, we excel at producing good policy and ideas". "We punch well below our weight, however, in implementing policy, in turning ideas into action"*
>
> – Thomas D'Aquino,
>
> Canadian entrepreneur, global business ambassador, policy innovator, author, educator, and philanthropist

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Thank you

Presentation 2

Progress, obligations and opportunities for training in climate adaptation

Paul Cobb
Manager, Training Services
Climate Risk Institute

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Progress, Obligations and Opportunities for Training in Climate Adaptation

Paul Cobb

April 20, 2023

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Progress, Obligations and Opportunities for Training in Climate Adaptation

Adaptation measures reduce risks from climate impacts but efforts will be **overwhelmed** by increasingly extreme weather events unless combined with **aggressive mitigation efforts** to curb global warming.

We need the tools and skills to act urgently.

IPCC 2022 WGII SPM

Climate Impacts and Risks

WHAT GEOSCIENTISTS DO

Geoscience is the acquisition and application of knowledge about the earth, its properties and processes. Professional geoscientists provide advice and make decisions in the interests of the public in the areas of:

Mineral Resources
Exploration, valuation, development and extraction of mineral resources;

Geo-hazards
Understanding and predicting geo-hazards, including earthquakes and landslides;

Infrastructure Projects
The general behavior of rocks and soils, with application to the location and construction of bridges, dams and large buildings;

Water, the Environment and Ecosystems
Understanding and predicting the interaction of water, soils and rocks including natural and man-induced contamination; water quality and the movement of water on the surface and the subsurface, through soils and rock formations;

Public Health
Understanding the occurrence and movement of naturally occurring elements in soil, water and rocks and the risks and benefits for people and the biosphere.

Climate Science

Climate Risk

Climate Impacts

Climate Risks

Climate Science

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National Adaptation Strategy

National Adaptation Strategy key points:

- **By 2024** → Resilience to climate impacts is factored into all new federal infrastructure funding programs.
- **By 2027** → 75% of the members of professional associations (i.e., civil engineers, planners, landscape architects, and accountants) have the capacity to apply climate change adaptation tools and information and communicate the business case for adaptation measures to their clients
- **By 2030** → 80% of public and municipal organizations have factored climate change adaptation into their decision-making processes
- **By 2030** → robust guidance, codes and standards covering the top climate change risks for key public infrastructure systems are available to be adopted by all infrastructure decision-makers

Where Are We Currently?

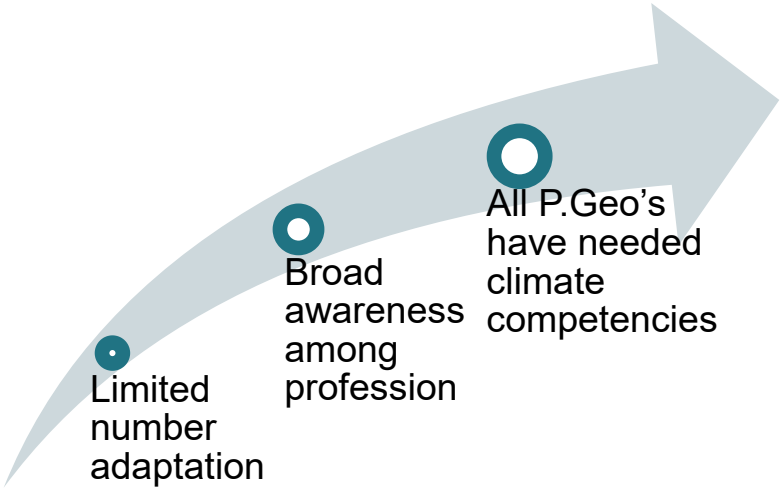
State of Play:

"Progress is being made in building capacity… However, the consensus is that much more needs to done when we consider what needs to happen in Canada to successfully adapt to climate change."

Resources to build from:

Natural Resources Canada Building Regional Adaptation Capacity and Expertise Program (2017-2022) invested in training, knowledge-exchange activities.

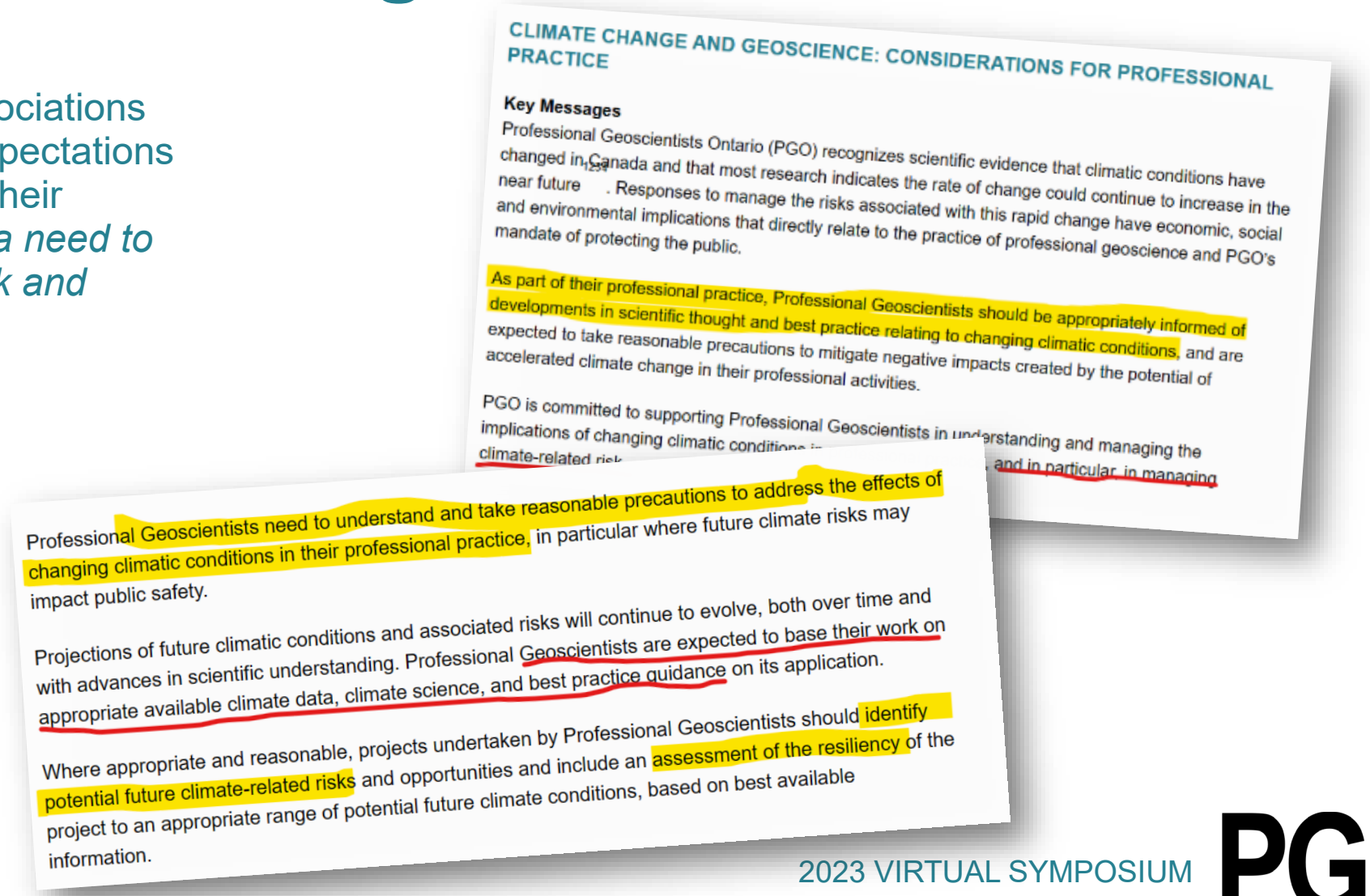
Targeted themes: infrastructure, forest and water management, and nature-based solutions. Resources available online.



https://ftp.maps.canada.ca/pub/nrcan_rncan/publications/STPublications_PublicationsST/331/331406/gid_331406.pdf
https://natural-resources.canada.ca/climate-change/building-regional-adaptation-capacity-and-expertise-program/21324

Professional Obligations

Regulators and associations are making clear expectations and obligations for their members – *there's a need to consider climate risk and climate resilience*.



CLIMATE CHANGE AND GEOSCIENCE: CONSIDERATIONS FOR PROFESSIONAL PRACTICE

Key Messages

Professional Geoscientists Ontario (PGO) recognizes scientific evidence that climatic conditions have changed in Canada and that most research indicates the rate of change could continue to increase in the near future . Responses to manage the risks associated with this rapid change have economic, social and environmental implications that directly relate to the practice of professional geoscience and PGO's mandate of protecting the public.

As part of their professional practice, Professional Geoscientists should be appropriately informed of developments in scientific thought and best practice relating to changing climatic conditions, and are expected to take reasonable precautions to mitigate negative impacts created by the potential of accelerated climate change in their professional activities.

PGO is committed to supporting Professional Geoscientists in understanding and managing the implications of changing climatic conditions in climate-related risk and in particular, in managing

Professional Geoscientists need to understand and take reasonable precautions to address the effects of changing climatic conditions in their professional practice, in particular where future climate risks may impact public safety.

Projections of future climatic conditions and associated risks will continue to evolve, both over time and with advances in scientific understanding. Professional Geoscientists are expected to base their work on appropriate available climate data, climate science, and best practice guidance on its application.

Where appropriate and reasonable, projects undertaken by Professional Geoscientists should identify potential future climate-related risks and opportunities and include an assessment of the resiliency of the project to an appropriate range of potential future climate conditions, based on best available information.

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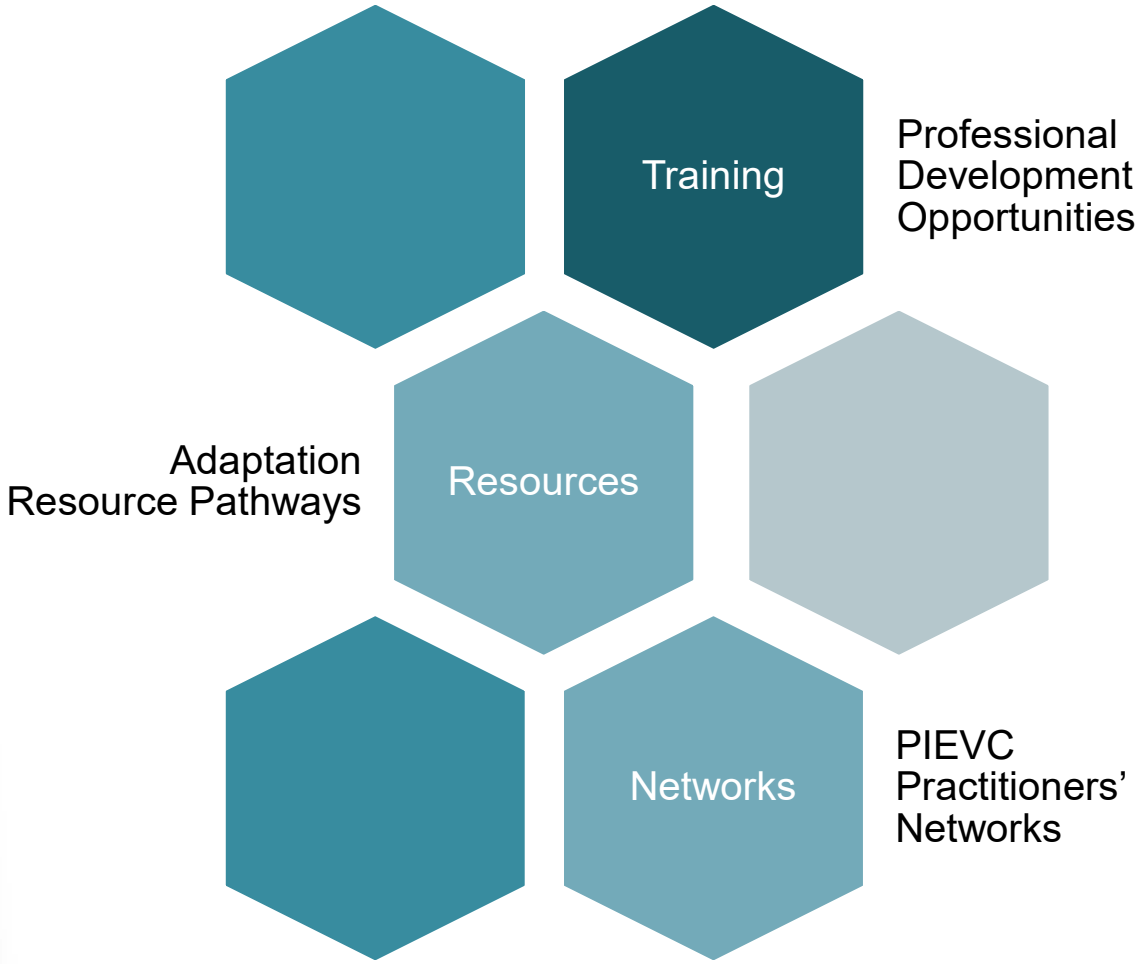
Resources

Expanding list of training, tools, guides resources and networks to connect with.



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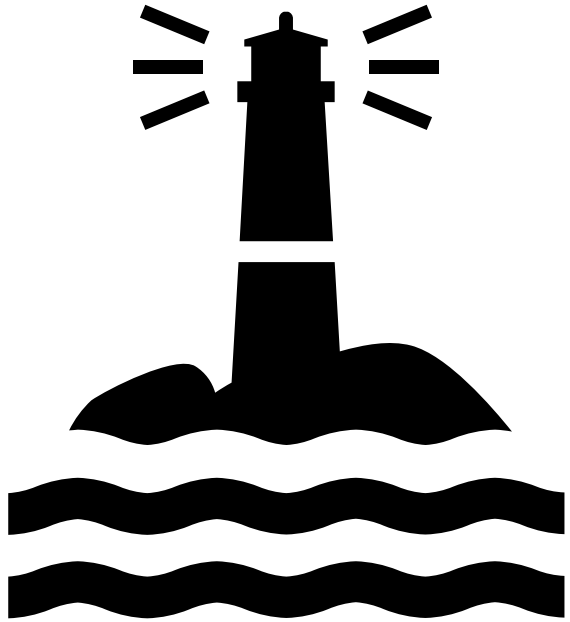
CRI's Training and Professional Development Approach

- Training designed collaboratively based on understanding of needs.
- Promote engagement with the content, and with peers and colleagues.
- Focus on ability to apply knowledge in practice.



CRI's Series of Professional Development Courses

Infrastructure Risk and PIEVC	Risk Principles Protocol Steps
Asset Management	Resilience strategies Natural Infrastructure
Management of Risk	Analytical risk tools Risk Communication
Applied Climate Science	Data in design Team-building
Policy and Procurement	Policy fundamentals Resilience through procurement
Climate Law	Legal implications Professional obligations
Professional Planning	Impacts, vulnerability and risk Adaptation Approaches and Planning Tools
Forestry	Vulnerability Assessment Adaptation and Forest Management Planning
Public Health*	Health impacts climate change Public health approaches to adaptation

- Infrastructure and Engineering
- Planning
- Forestry
- Public Health

*Not shown: Custom and tailored courses, including international variations.

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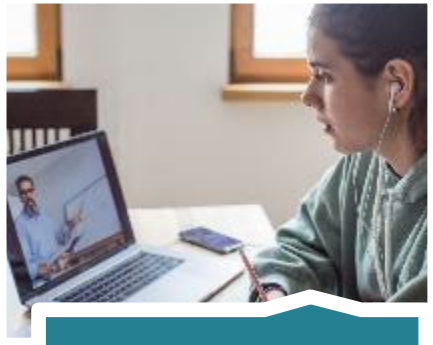
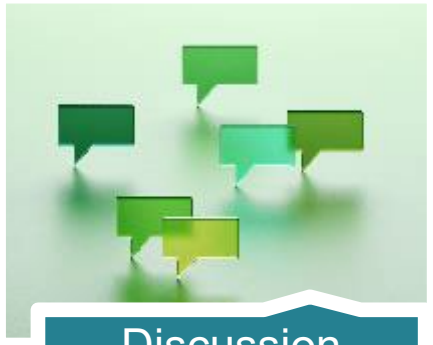
Learner Experience – Hybrid Course

Readings



Videos



Discussion Boards

Quizzes

Learner progress each week, from self-paced content review, discussions with peers, to live sessions.

Assignments

Live Sessions

Our Instructors

Expertise, experience and passion for resilience and adaptation.











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Pathway

- Reflect on PGO Statement, Professional Obligations… and liability.
- Review competencies, skills and tools you need.
- Chart your own learning pathway.

Photo: Craig Paisley, CBC Nova Scotia

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Thank you

pcobb@climateriskinstitute.ca

www.climateriskinstitute.ca/irp-page

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Presentation 3

Integrated Watershed Planning and Management for Biodiversity and Ecosystem Services Conservation

Namrata Shrestha
Senior Manager
Toronto and Region Conservation Authority (TRCA)

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Integrated Watershed Planning & Management for Biodiversity & Ecosystem Services

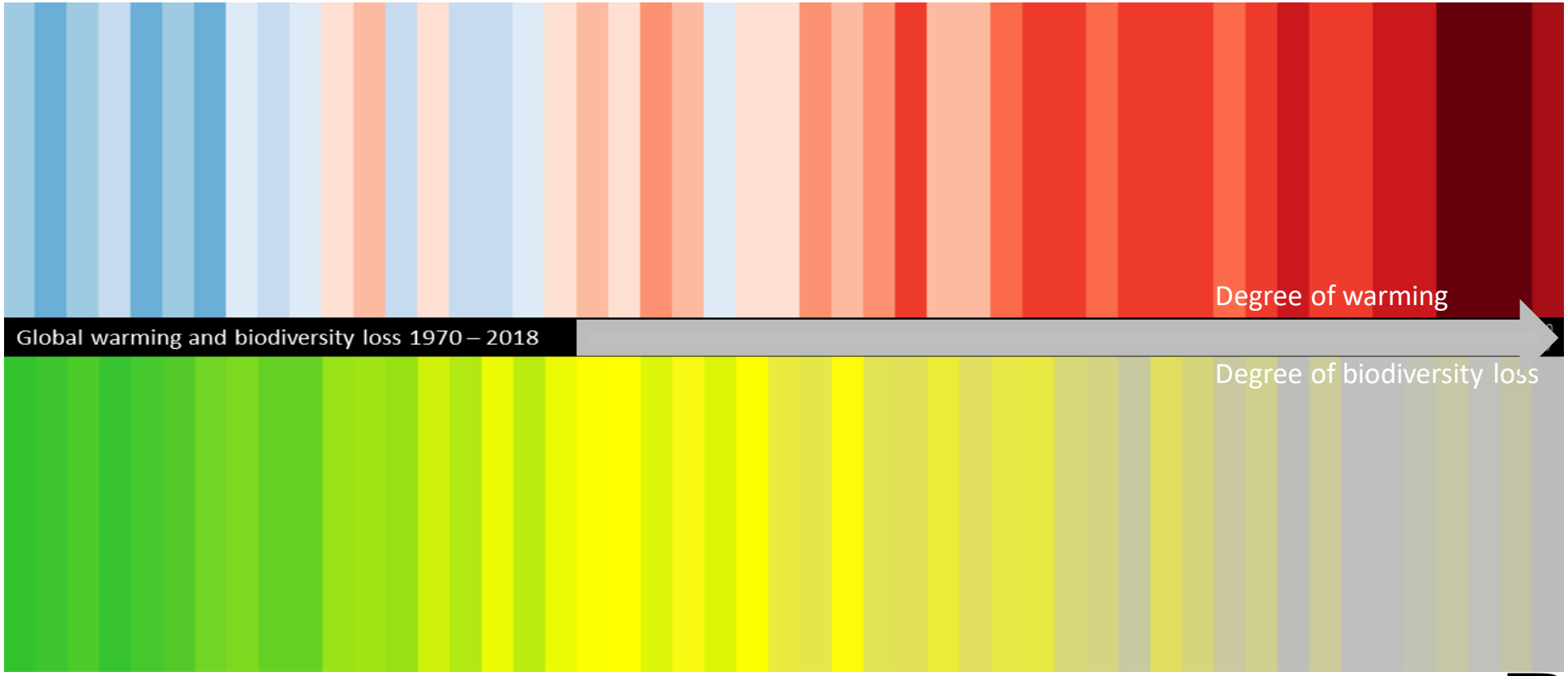
Namrata Shrestha, Ph.D.
Senior Manager, Watershed Planning and Reporting
Toronto and Region Conservation Authority
April 20, 2023

Outline

- Context
- Approach
- Local Examples from Toronto and Region
- Role of Geoscientists

Context

Context:
The Twin Crises

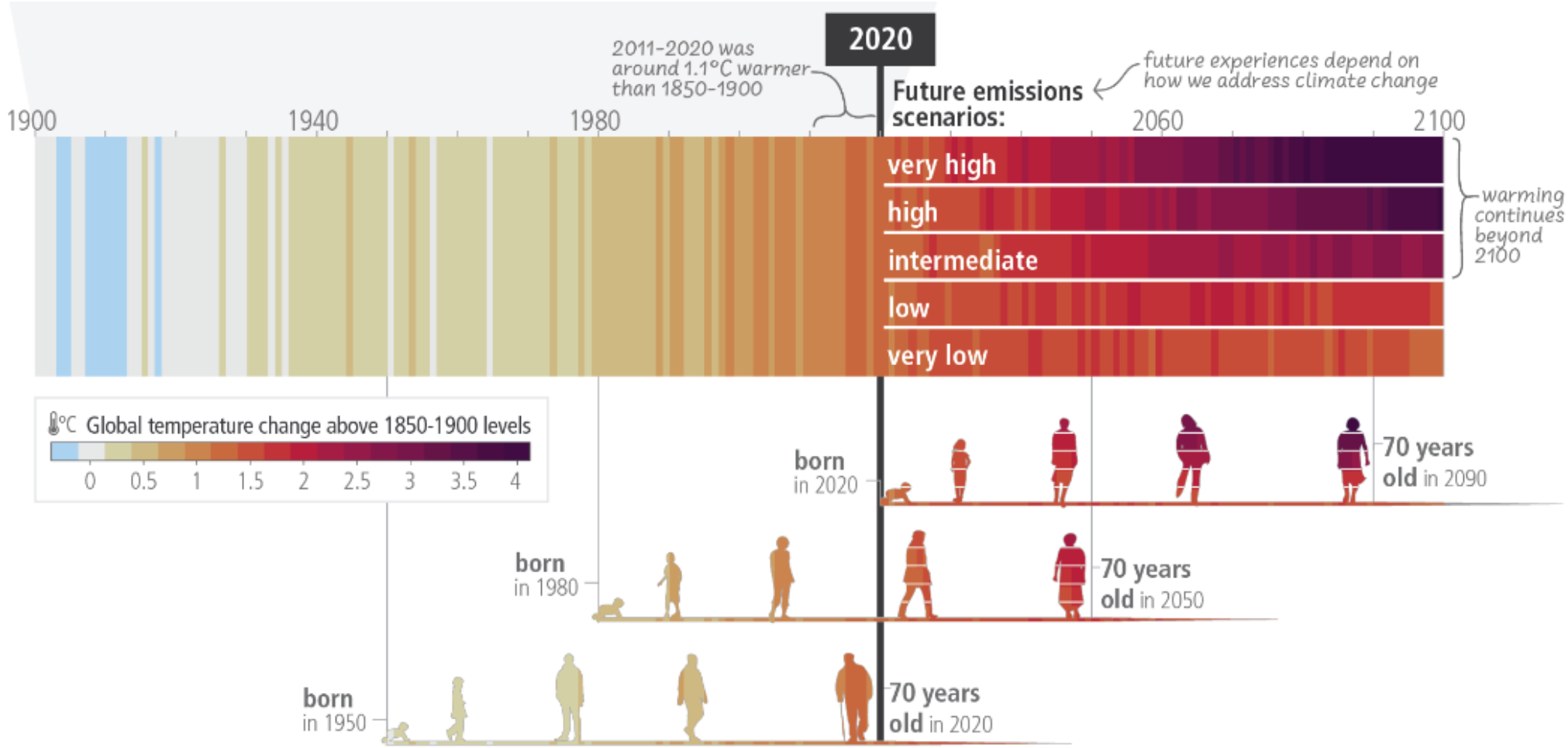


(Source: biodiversitystripes.info; IPBES 2019; IPCC 2021)

- Climate and Biodiversity Stripes Showing Increased Global Warming and Biodiversity Loss Between 1970 and 2018
- Each stripe represents average change in temperature (top) and biodiversity (bottom) in a year.

Climate Change

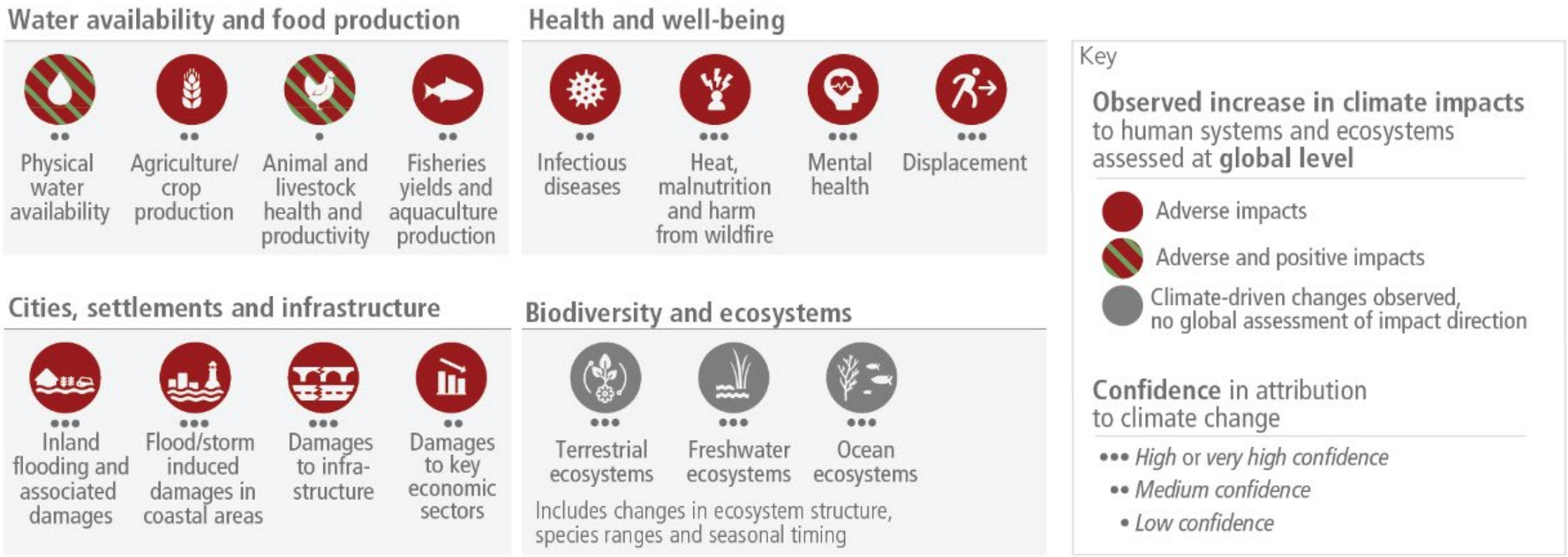
Extent of Change for current & future generations



https://www.ipcc.ch/report/ar6/syr/figures/

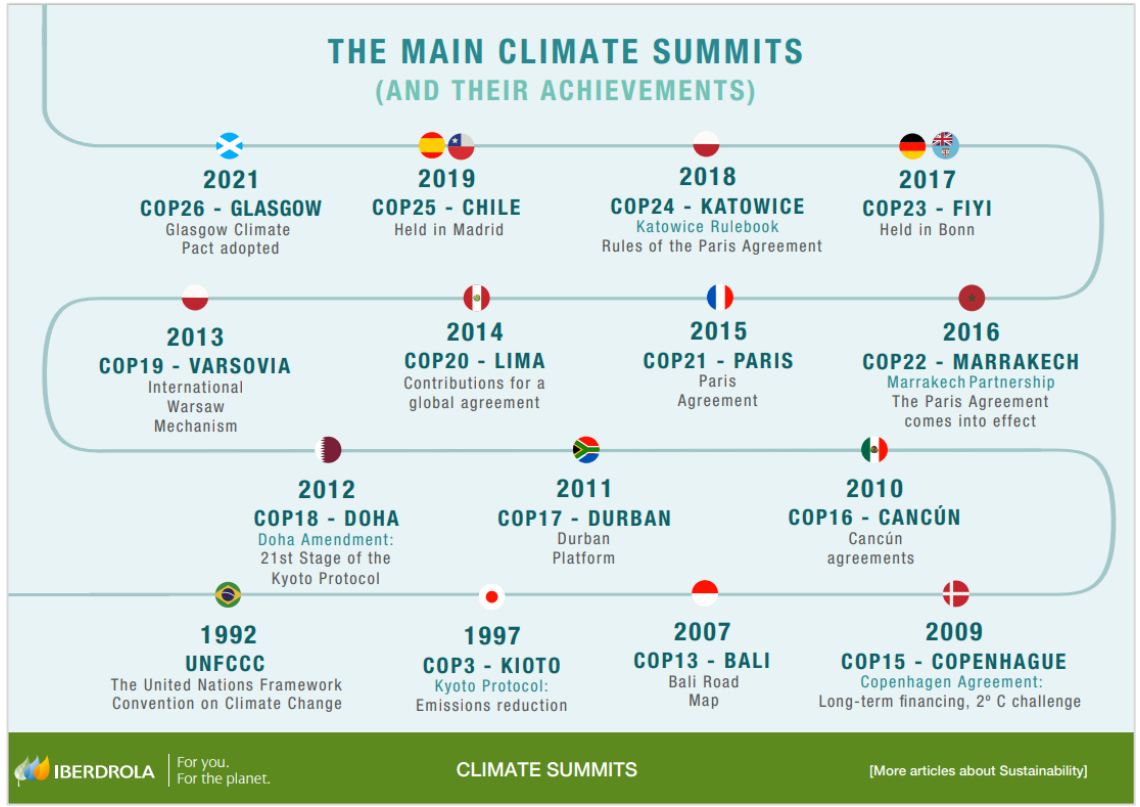
Climate Change

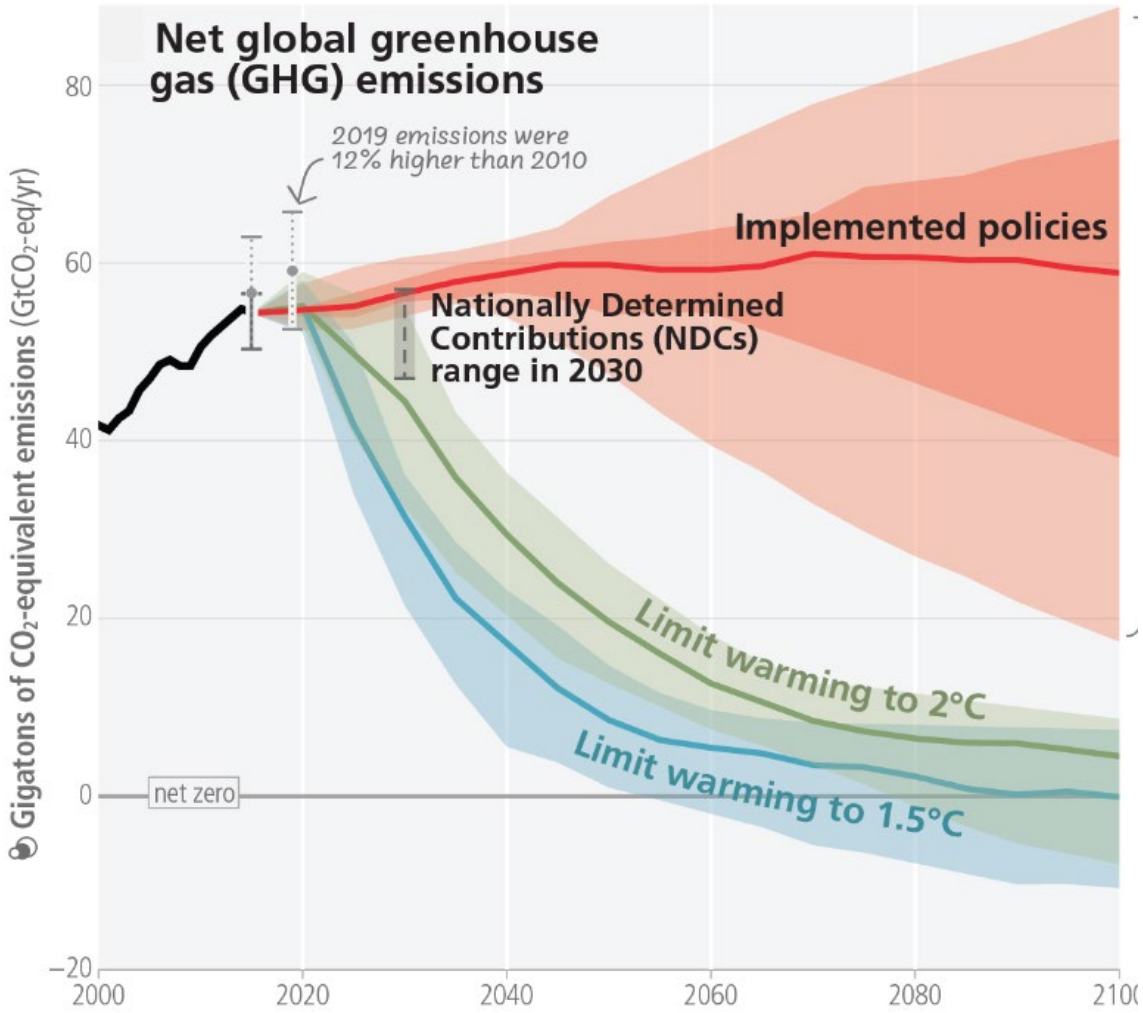
Observed impacts of climate change



https://www.ipcc.ch/report/ar6/syr/figures/

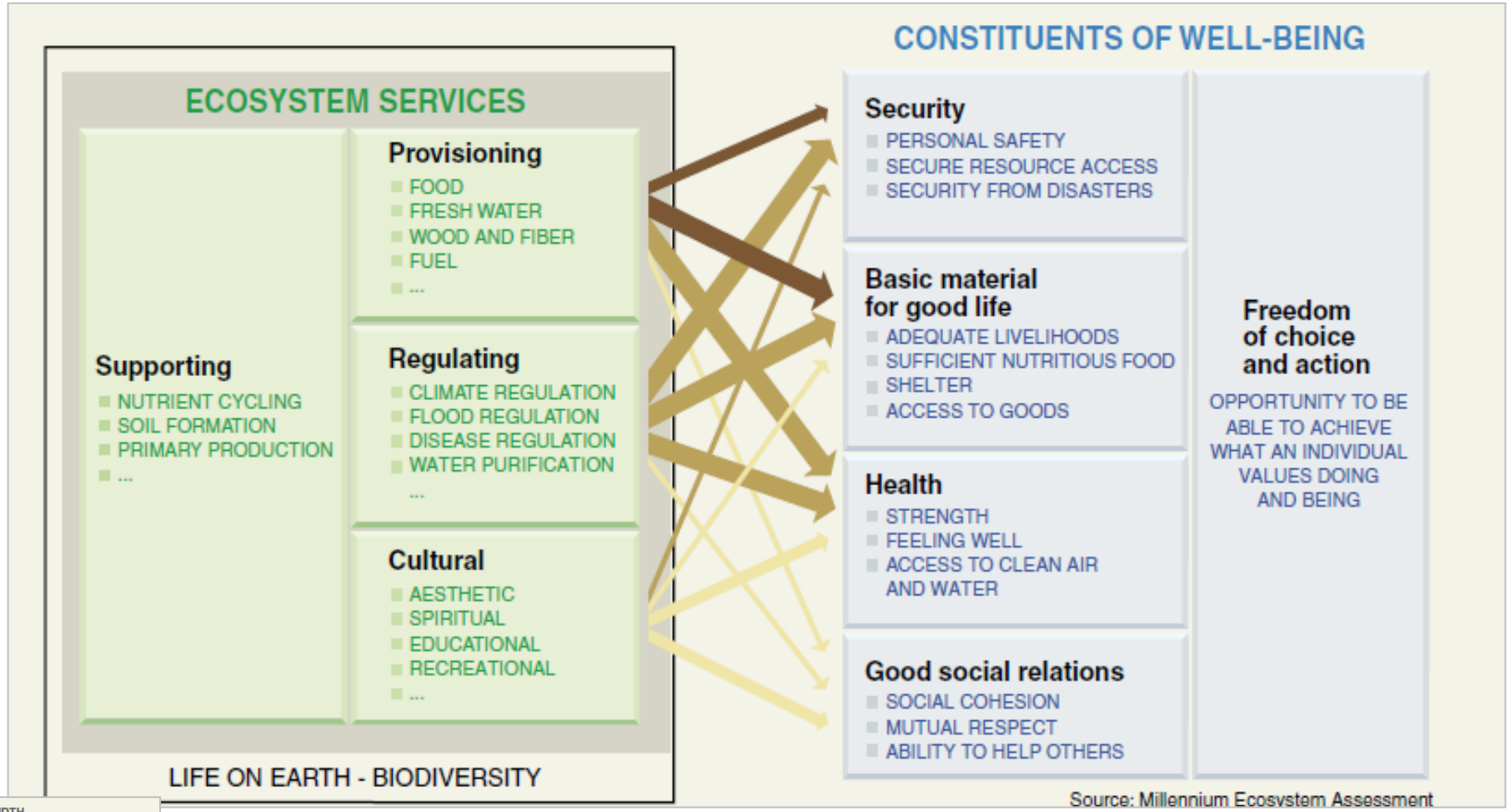
Climate Change



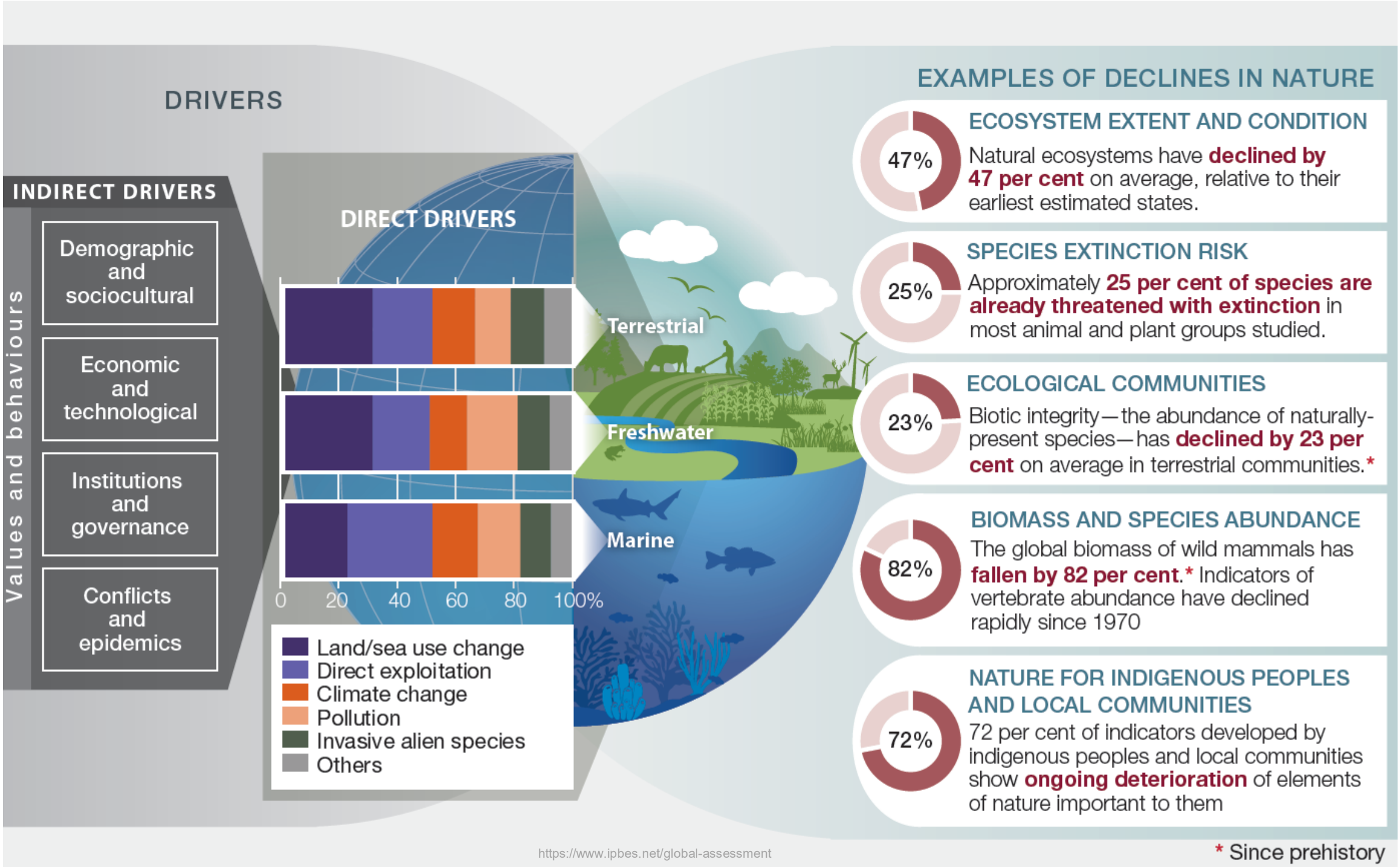


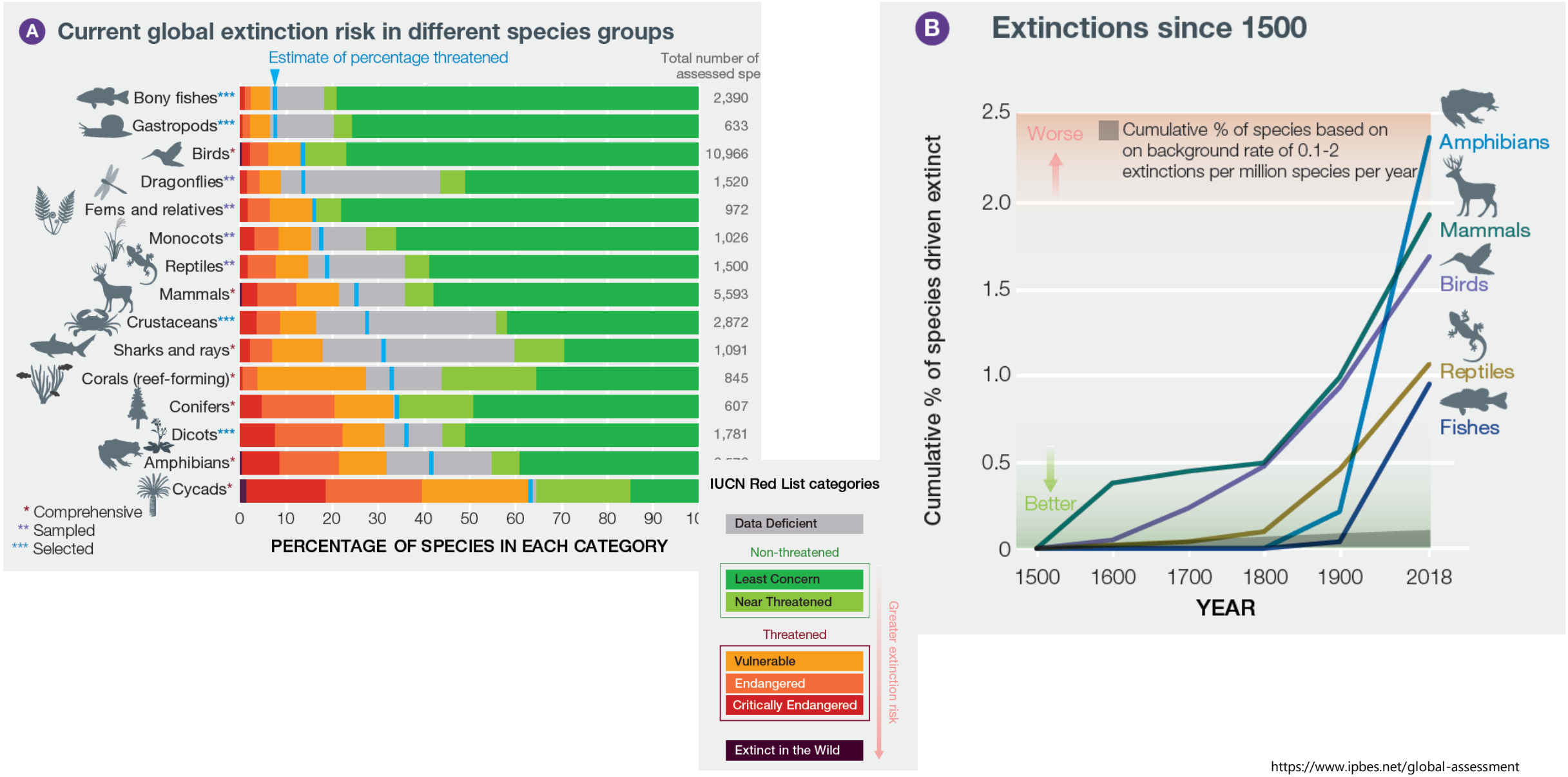
https://www.ipcc.ch/report/ar6/syr/figures/

Biodiversity



https://www.millenniumassessment.org/en/Global.html


DRIVERS
INDIRECT DRIVERS
Values and behaviours
Demographic and sociocultural
Economic and technological
Institutions and governance
Conflicts and epidemics
DIRECT DRIVERS
0
20
40
60
80
100%
Land/sea use change
Direct exploitation
Climate change
Pollution
Invasive alien species
Others
Terrestrial
Freshwater
Marine
EXAMPLES OF DECLINES IN NATURE
47%
ECOSYSTEM EXTENT AND CONDITION
Natural ecosystems have declined by 47 per cent on average, relative to their earliest estimated states.
25%
SPECIES EXTINCTION RISK
Approximately 25 per cent of species are already threatened with extinction in most animal and plant groups studied.
23%
ECOLOGICAL COMMUNITIES
Biotic integrity—the abundance of naturally-present species—has declined by 23 per cent on average in terrestrial communities.*
82%
BIOMASS AND SPECIES ABUNDANCE
The global biomass of wild mammals has fallen by 82 per cent.* Indicators of vertebrate abundance have declined rapidly since 1970
72%
NATURE FOR INDIGENOUS PEOPLES AND LOCAL COMMUNITIES
72 per cent of indicators developed by indigenous peoples and local communities show ongoing deterioration of elements of nature important to them
https://www.ipbes.net/global-assessment
* Since prehistory



https://www.ipbes.net/global-assessment

CBD UNEP

Secretariat of the Convention on Biological Diversity
World Trade Centre, 413 St. Jacques Street, Suite 800
Montreal, Quebec, Canada H2Y 1N9
Phone: 1(514) 288 2220 Fax: 1 (514) 288 6588
E-mail: secretariat@cbd.int Website: www.cbd.int

Aichi Biodiversity Targets

- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society
- Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use
- Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
- Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services
- Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

Goal	Target	Target element (abbreviated)	Progress towards the Aichi Targets		
			Poor	Moderate	Good
A. Address the underlying drivers	1	1.1 Awareness of biodiversity			
		1.2 Awareness of steps to conserve			
	2	2.1 Biodiversity integrated into poverty reduction			
		2.2 Biodiversity integrated into planning			
		2.3 Biodiversity integrated into accounting			
		2.4 Biodiversity integrated into reporting			
	3	3.1 Harmful subsidies eliminated and reformed			
		3.2 Positive incentives developed and implemented			
	4	4.1 Sustainable production and consumption			
		4.2 Use within safe ecological limits			
B. Reduce direct pressures	5	5.1 Habitat loss at least halved			
		5.2 Degradation and fragmentation reduced			
	6	6.1 Fish stocks harvested sustainably			
		6.2 Recovery plans for depleted species			
		6.3 Fisheries have no adverse impact			
	7	7.1 Agriculture is sustainable			
		7.2 Aquaculture is sustainable			
		7.3 Forestry is sustainable			
	8	8.1 Pollution not detrimental			
		8.2 Excess nutrients not detrimental			
	9	9.1 Invasive alien species prioritized			
		9.2 Invasive alien pathways prioritized			
		9.3 Invasive species controlled or eradicated			
		9.4 Invasive introduction pathways managed			
	10	10.1 Pressures on coral reefs minimized			
		10.2 Pressures on vulnerable ecosystems minimized			
C. Improve biodiversity status	11	11.1 10 per cent of marine areas conserved			
		11.2 17 per cent of terrestrial areas conserved			
		11.3 Areas of importance conserved			
		11.4 Protected areas, ecologically representative			
		11.5 Protected areas, effectively and equitably managed			
		11.6 Protected areas, well-connected and integrated			
	12	12.1 Extinctions prevented			
		12.2 Conservation status of threatened species improved			
	13	13.1 Genetic diversity of cultivated plants maintained			
		13.2 Genetic diversity of farmed animals maintained			
		13.3 Genetic diversity of wild relatives maintained			
		13.4 Genetic diversity of valuable species maintained	Unknown		
		13.5 Genetic erosion minimized			
D. Enhance benefits to all	14	14.1 Ecosystems providing services restored and safeguarded			
		14.2 Taking account of women, IPLCs, and other groups	Unknown		
	15	15.1 Ecosystem resilience enhanced	Unknown		
		15.2 15 per cent of degraded ecosystems restored	Unknown		
	16	16.1 Nagoya Protocol in force			
		16.2 Nagoya Protocol operational			
E. Enhance implementation	17	17.1 NBSAPs developed and updated			
		17.2 NBSAPs adopted as policy instruments			
		17.3 NBSAPs implemented			
	18	18.1 ILK and customary use respected			
		18.2 ILK and customary use integrated	Unknown		
		18.3 IPLCs participate effectively	Unknown		
	19	19.1 Biodiversity science improved and shared			
		19.2 Biodiversity science applied	Unknown		
	20	20.1 Financial resources for Strategic Plan[a] increased			

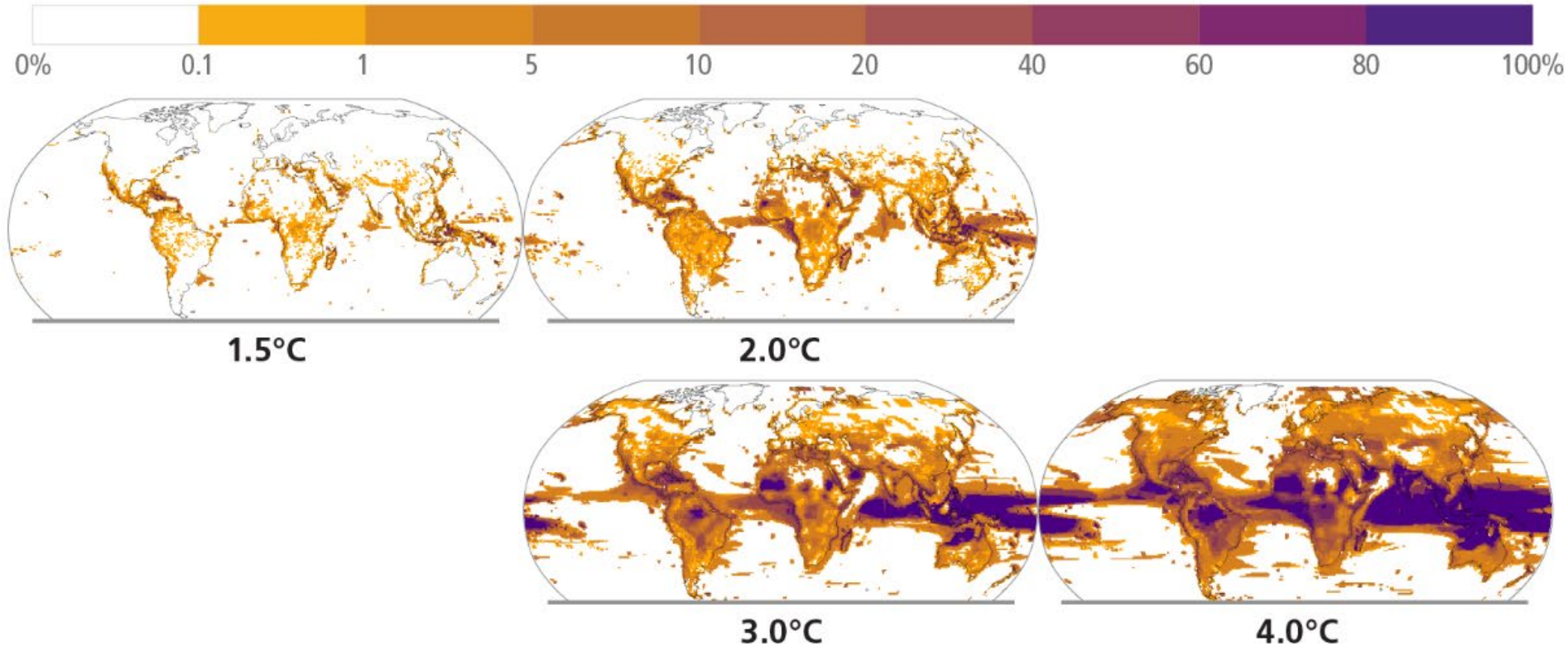
https://www.ipbes.net/global-assessment

Future climate change is projected to increase the severity of impacts

Examples of impacts without additional adaptation

a) **Risk of species losses**

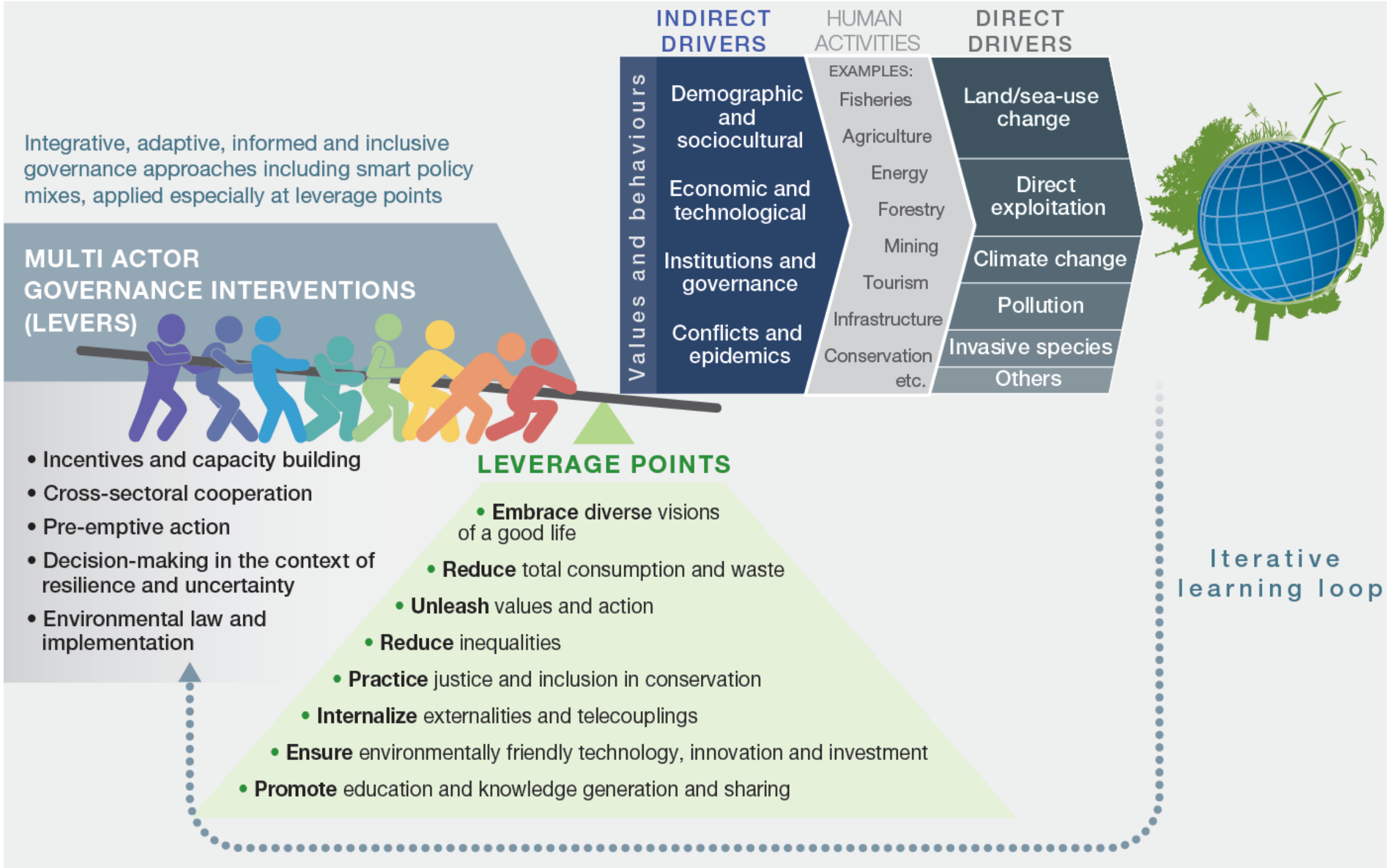
Percentage of animal species and seagrasses exposed to potentially dangerous temperature conditions[1, 2]



https://www.ipcc.ch/report/ar6/syr/figures/

So… What do we do?

Approach


INDIRECT DRIVERS
HUMAN ACTIVITIES
DIRECT DRIVERS
Values and behaviours
Demographic and sociocultural
Economic and technological
Institutions and governance
Conflicts and epidemics
EXAMPLES:
Fisheries
Agriculture
Energy
Forestry
Mining
Tourism
Infrastructure
Conservation etc.
Land/sea-use change
Direct exploitation
Climate change
Pollution
Invasive species
Others
Integrative, adaptive, informed and inclusive governance approaches including smart policy mixes, applied especially at leverage points
MULTI ACTOR GOVERNANCE INTERVENTIONS (LEVERS)
• Incentives and capacity building
• Cross-sectoral cooperation
• Pre-emptive action
• Decision-making in the context of resilience and uncertainty
• Environmental law and implementation
LEVERAGE POINTS
• Embrace diverse visions of a good life
• Reduce total consumption and waste
• Unleash values and action
• Reduce inequalities
• Practice justice and inclusion in conservation
• Internalize externalities and telecouplings
• Ensure environmentally friendly technology, innovation and investment
• Promote education and knowledge generation and sharing
Iterative learning loop

KUNMING MONTREAL GLOBAL BIODIVERSITY FRAMEWORK

CONSERVE

1. Biodiversity-inclusive **spatial** planning, «**near-0 loss**»
2. Effectively **restore 30%** of degraded nature
3. Effectively **conserve 30%** of lands and seas
4. Halt human-induced **extinctions**

AVOID

5. Stop unsustainable **use, harvest, trade** of species
6. Reduce **alien species** spread by at least 50%
7. Reduce **pollution** risks, impacts by at least 50%
8. Reduce **climate change** impacts

SAFE-GUARD

9. Sustainably **manage and use** wild species
10. Sustainable **agri/aquaculture, fisheries, forestry**
11. Restore and enhance **nature's goods**, services
12. Increase area, quality of **urban** green/blue spaces
13. Fair sharing of benefits from **genetic resources**

ACT

14. **Mainstream** biodiversity into all policy, practice
15. **Businesses** to monitor, disclose nature impacts
16. Sustainable **consumption**, half food waste
18. Phase out 'perverse' **subsidies**, increase **finance**
17 23. Strengthen **capacity, participation, IPLC, women**

2030-goals

Not time specific

Four overarching goals

A. Halt loss, restore nature
B. Use lands & seas sustainably
C. Share benefits and services
D. Mobilize necessary resources

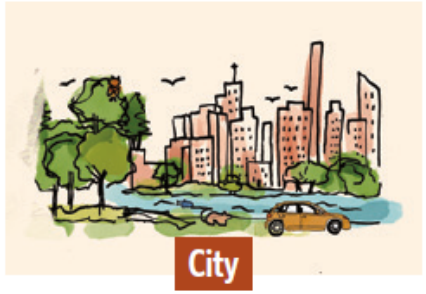
to be met by 2050

https://www.cbd.int/doc/c/e6d3/cd1d/daf663719a03902a9b116c34/cop-15-l-25-en.pdf

SCALE

Global

Regional



City

Neighborhood

CHALLENGES

SPREAD OF INVASIVES

BIODIVERSITY CHANGE

LOCAL EXTIRPATION

HABITAT LOSS

CARBON

COASTAL RESILIENCE

ECOSYSTEM SERVICES CHANGE

URBAN HEAT

CLIMATE CHANGE

POLLUTION

OPPORTUNITIES

POSITIVE IMPACTS OF SMALL SCALE HABITATS

MORE LOCAL PARTICIPATION IN BIODIVERSITY PLANNING

DIVERSE KNOWLEDGE-BASED TOOL DEVELOPMENT

INTEGRATED & PARTICIPATORY URBAN PLANNING

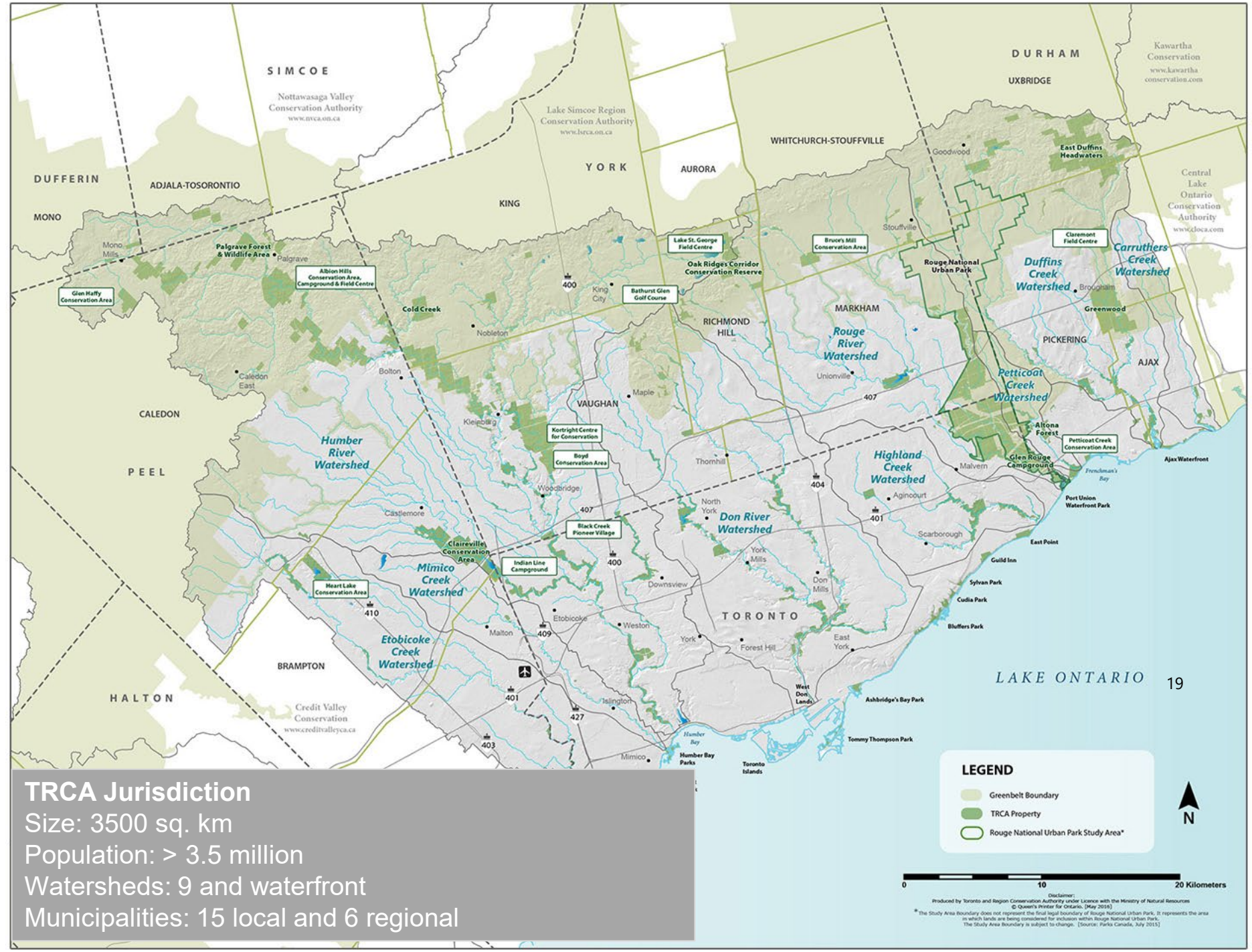
GLOBAL & NATIONAL SCALE COMMITMENT TO SUPPORT SUSTAINABLE & BIODIVERSE CITIES

LIVEABILITY IMPROVED BY BIODIVERSITY

How do we do it?

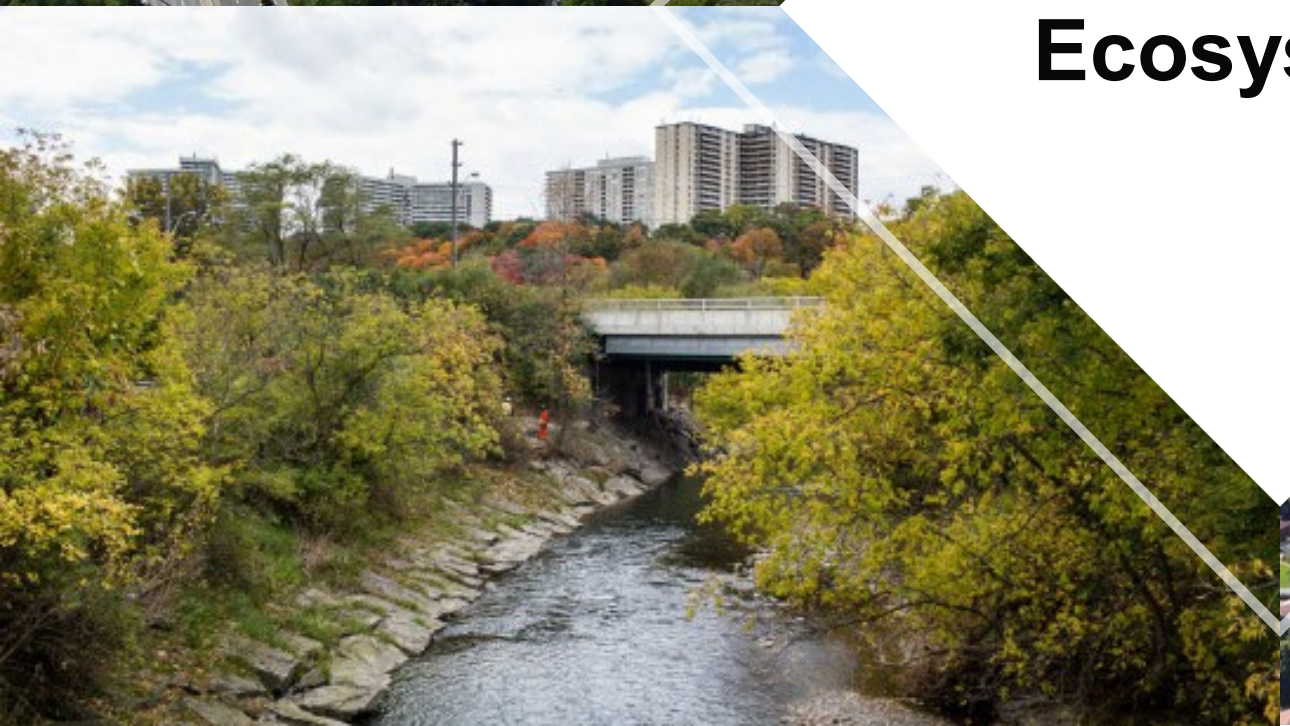
Examples

from Toronto & Region



TRCA Jurisdiction
Size: 3500 sq. km
Population: > 3.5 million
Watersheds: 9 and waterfront
Municipalities: 15 local and 6 regional

Urban Ecosystems













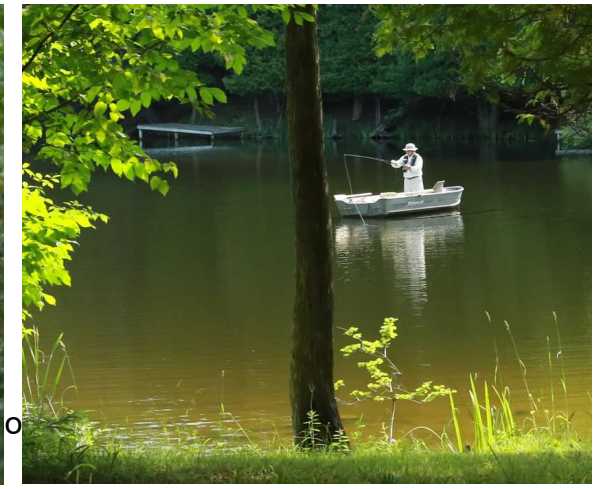
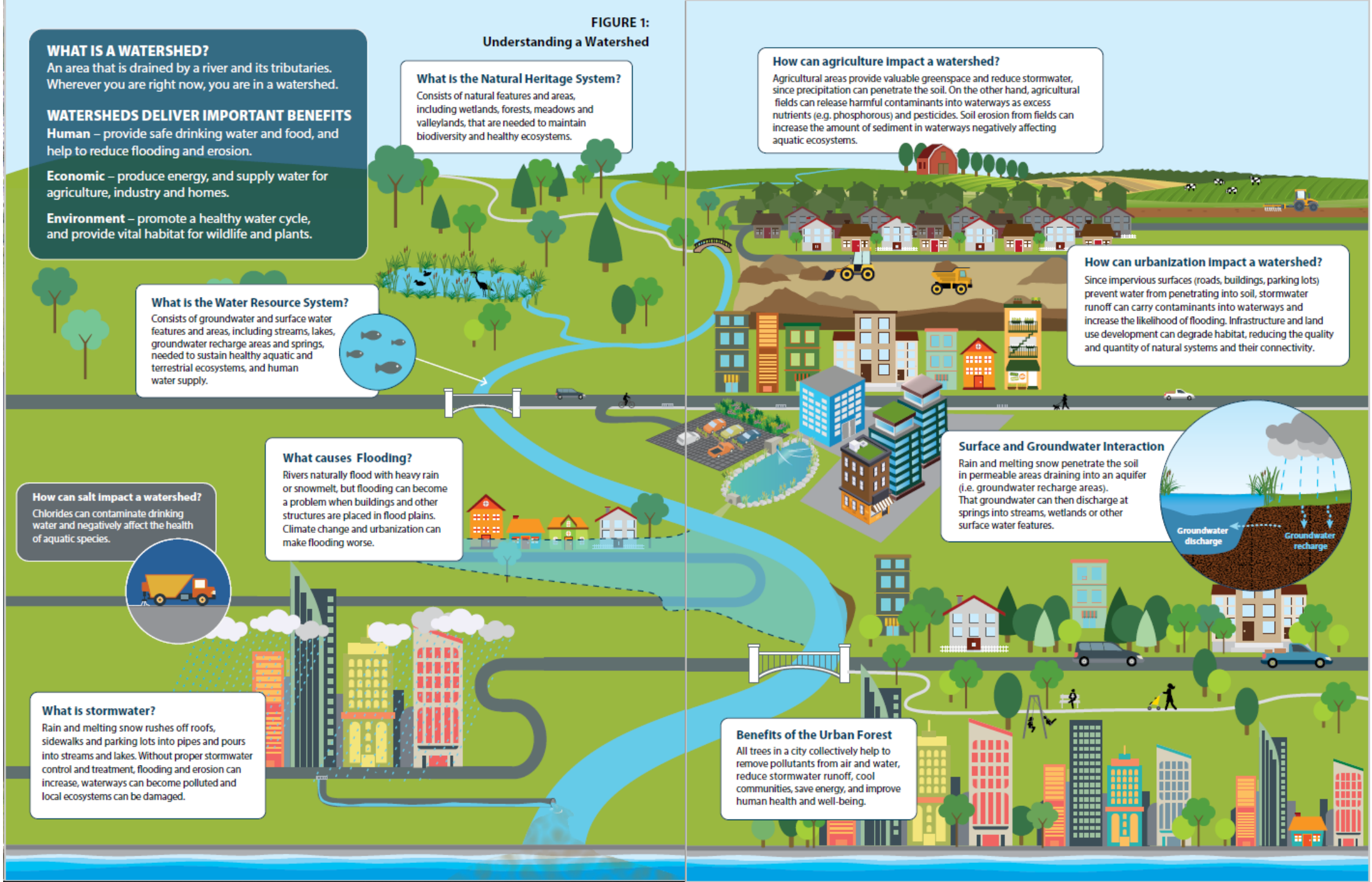



FIGURE 1:
Understanding a Watershed



TRCA Integrated Watershed Planning

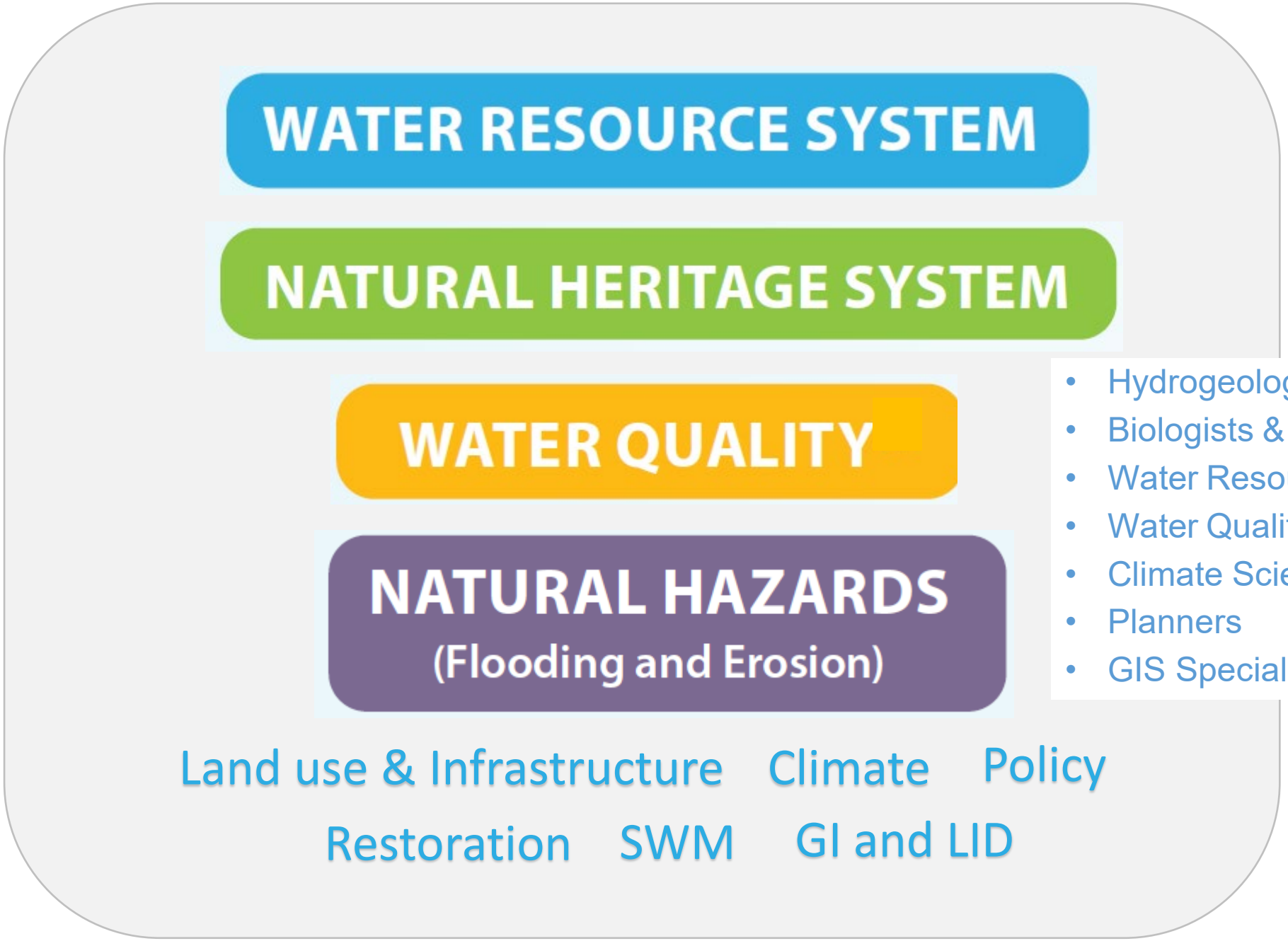
- Integrated Watershed Planning provides a systematic framework
  - Assesses the overall current and potential future conditions of the watershed
  - Identifies measures to protect, restore and enhance the health of the watershed
- Focus on collaboratively halting loss, restoring nature, using land sustainably, sharing benefits, and allocating resources
- Helps inform various long-term planning and management
- Provincial plans and policies encourage municipalities to complete watershed plans, in partnership with Conservation Authorities

TRCA Integrated Watershed Planning

Engagement

1. Preparation and scoping
2. Watershed characterization
   - Understand historical and current conditions, or the current state of the watershed
3. Future management scenarios
   - Assess how the watershed would respond to potential future changes
4. Implementation planning
   - Identify goals, objectives, indicators, and management recommendations
5. Monitoring and evaluation

Engagement
Partnership building

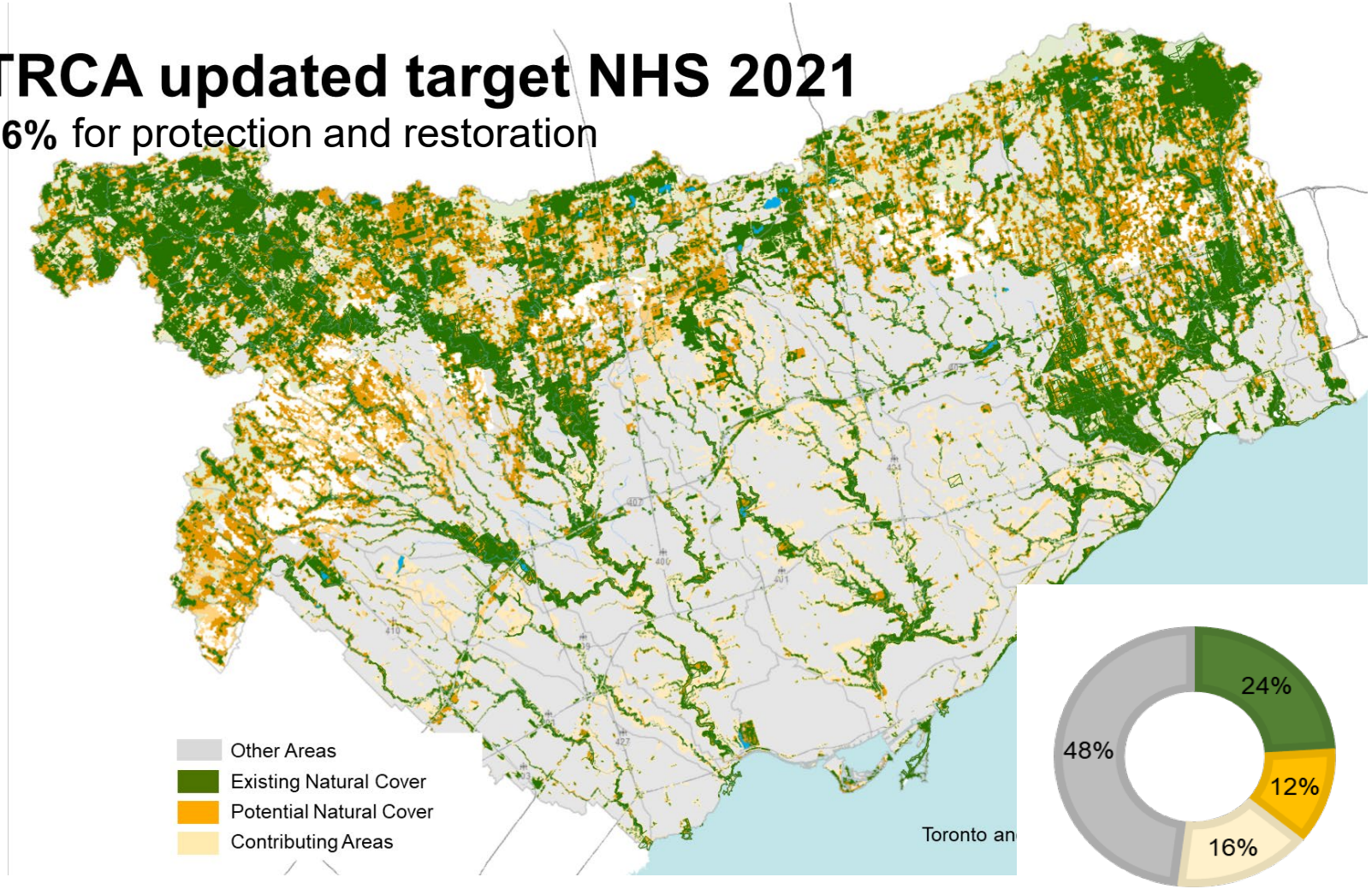


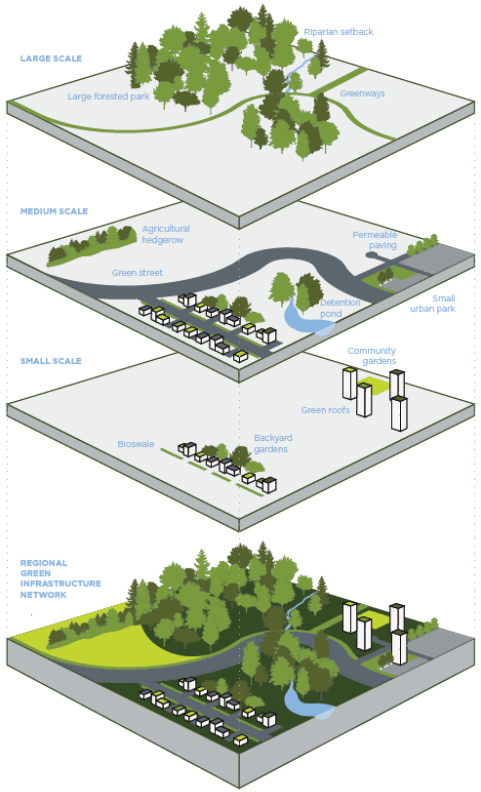
- Hydrogeologists
- Biologists & Ecologists
- Water Resource Engineers
- Water Quality Specialists
- Climate Scientists
- Planners
- GIS Specialists

Natural Heritage System

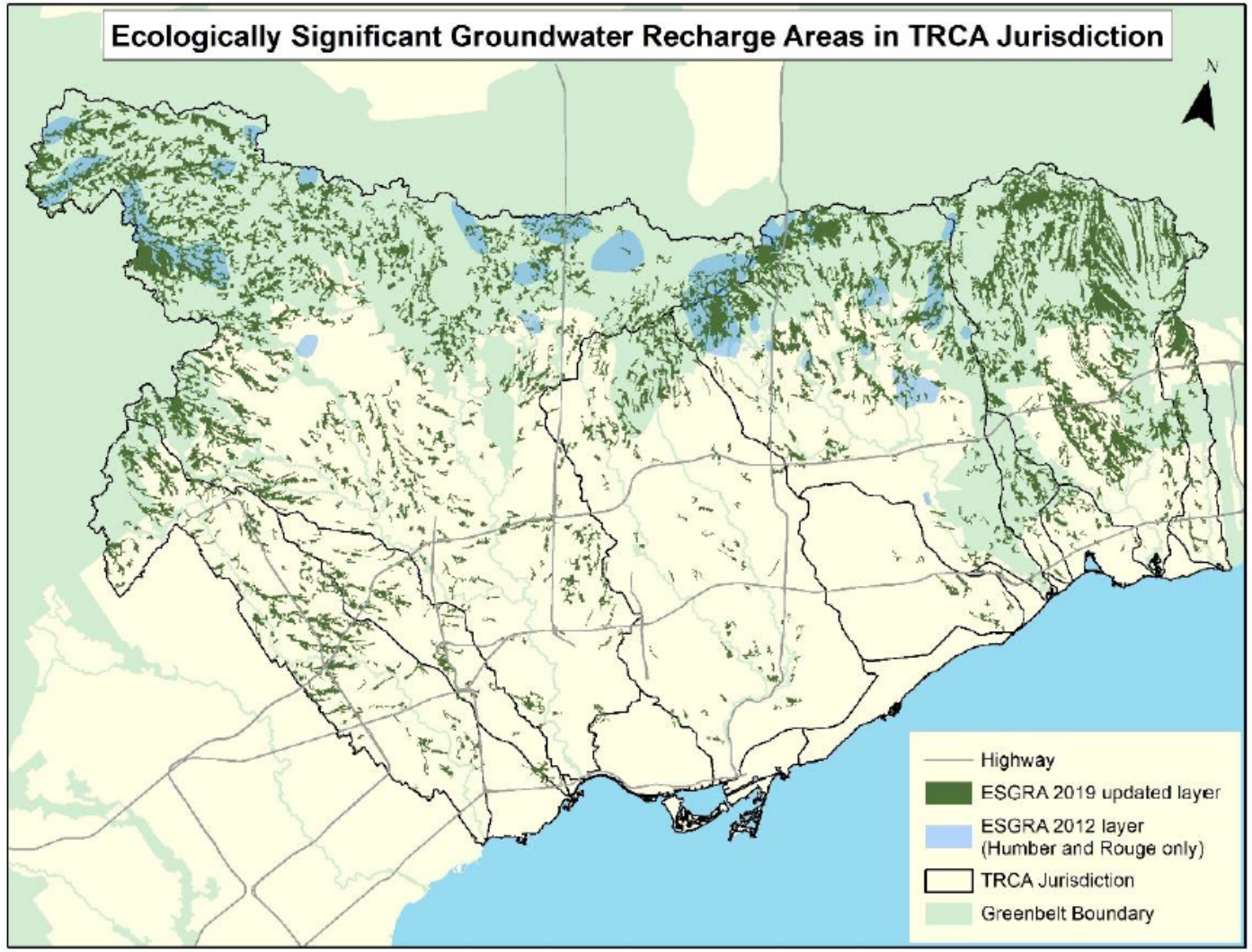
TRCA updated target NHS 2021

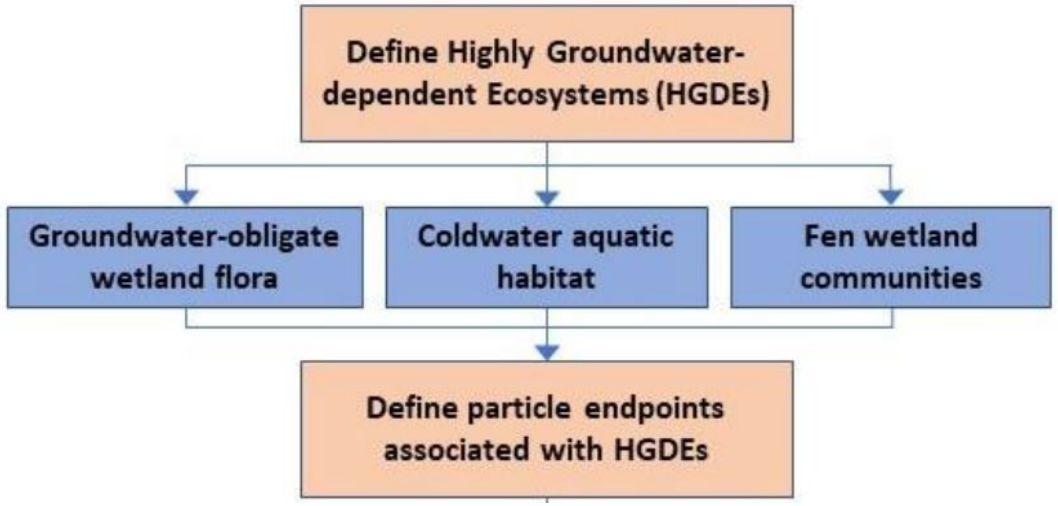
36% for protection and restoration



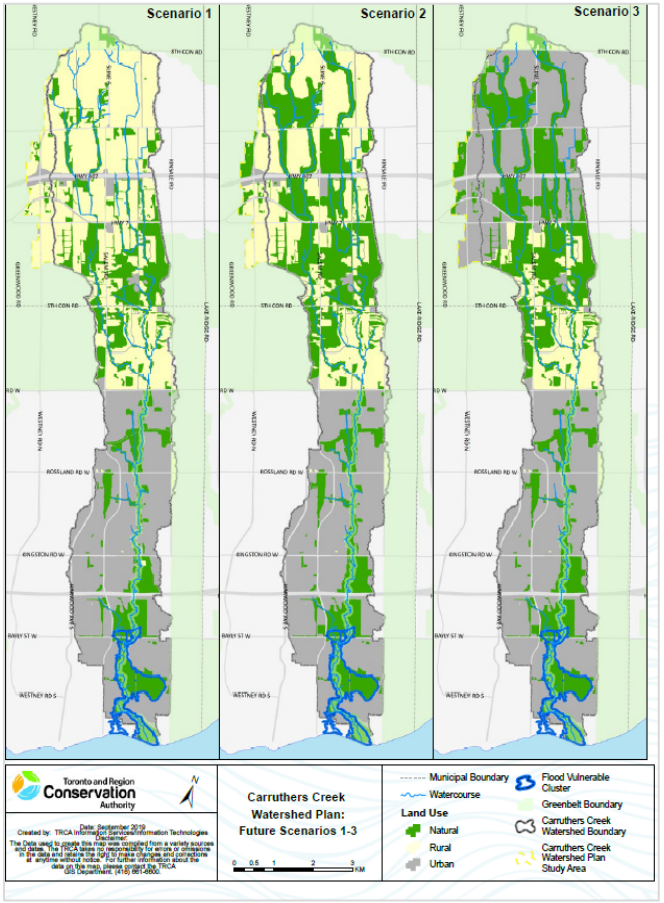


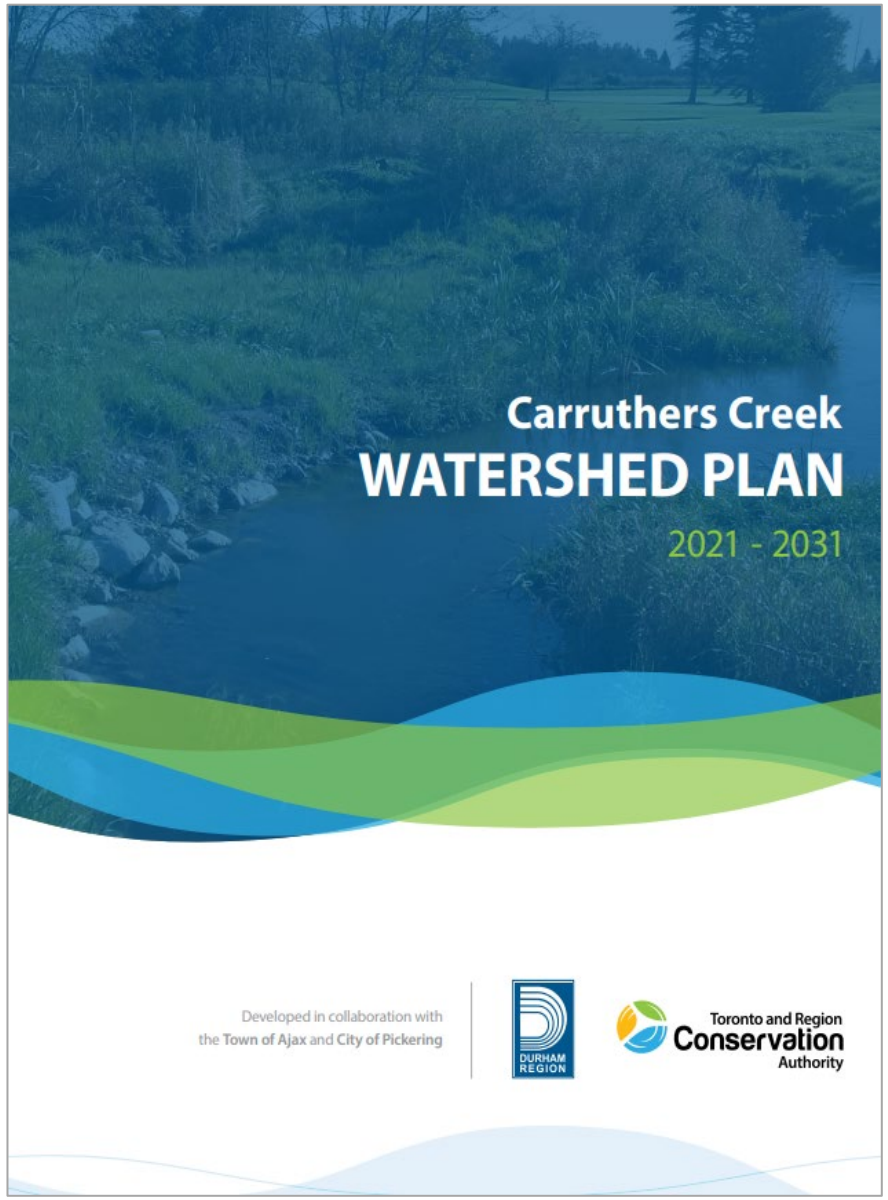
Role of Geosciences ... critical in understanding / identifying!!



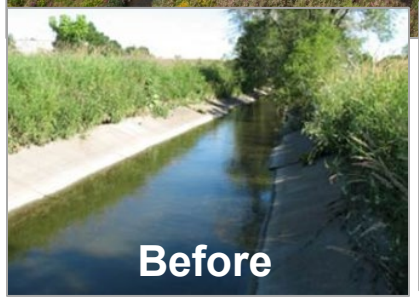


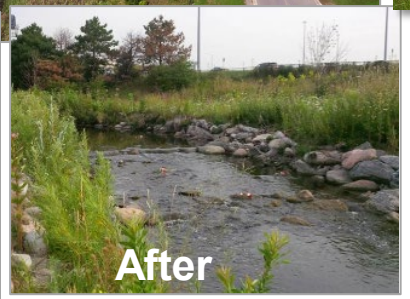
Role of Geosciences ... critical in management planning / policy!!





Role of Geosciences ... critical in implementing & partnerships!!





... through collaborations and partnerships !

In Summary…

- Challenges are many
- Attempts have been made – mostly unsuccessful
- Geoscientists have been instrumental in improving understanding
- Need active involvement in
  - *Advancing science and improving understanding*
  - *Informing Governance & planning decision making*
  - *Education & awareness*
  - *Advocacy*

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Thank you

Presentation 4

Mainstreaming natural asset management in geoscience knowledge and practice

Liese Coulter
Research Fellow
Municipal Natural Assets Initiative
Resilience by Design Lab

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Mainstreaming Natural Asset Management in Geoscience Knowledge and Practice

Liese Coulter, PhD

20 April 2023

NAI.CA Making Nature Count

Resilience by DesignLab INSPIRING CLIMATE ACTION

Mitacs

Natural Asset Management Knowledge Mobilization: A Competency Framework and Professional Norms

Partners

Municipal Natural Assets Initiative (MNAI) & Resilience by Design Lab (Royal Roads University) in Mitacs Accelerate Fellowship.

Project

Researching how to incorporate natural assets in infrastructure management; focus on required capacity and learning

Today

Explore the vital role of Geoscience Professionals

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Resilience by Design Lab INSPIRING CLIMATE ACTION

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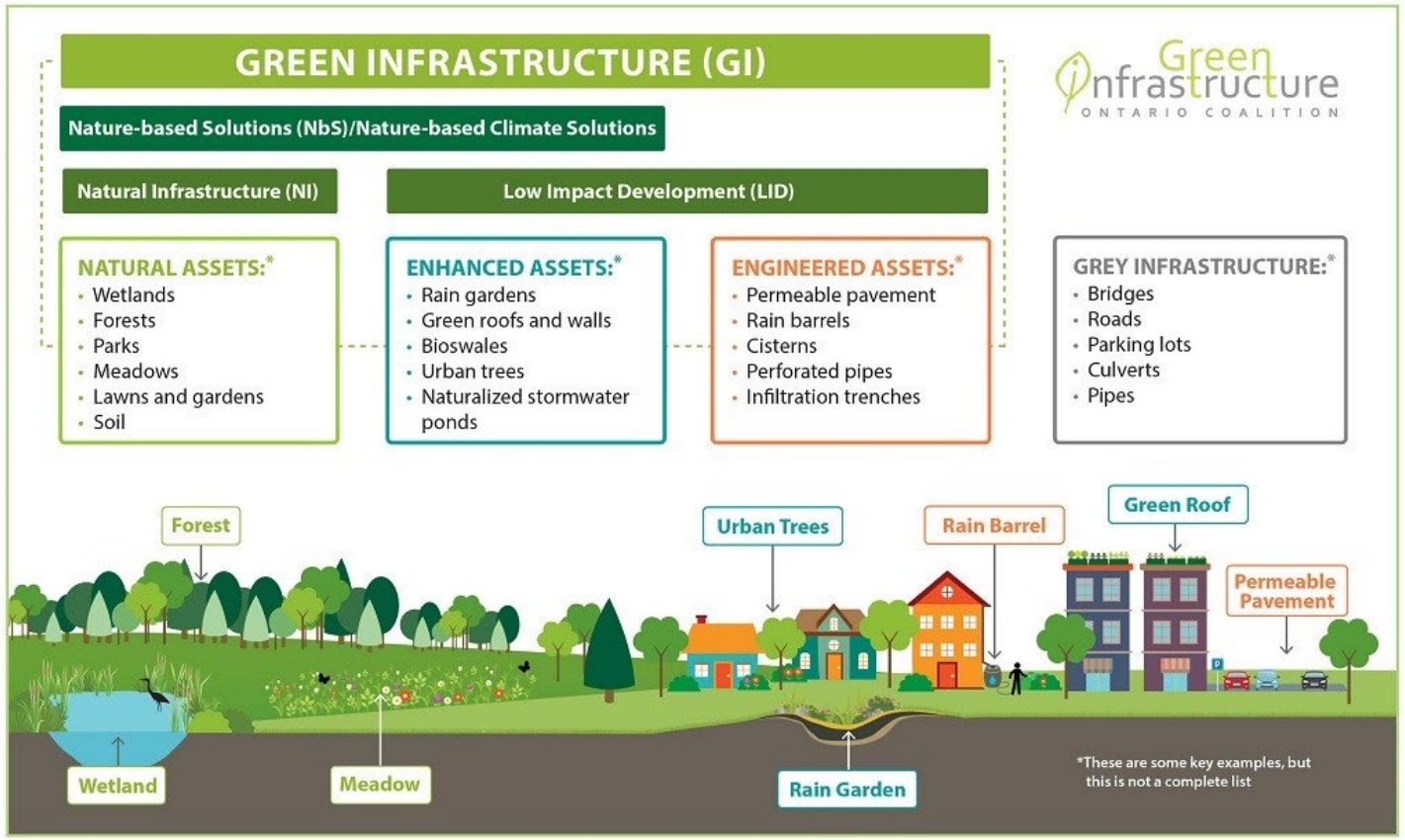
Natural Asset Management (NAM)



Natural assets

- Make up *NI*, which is a tangible subset of *GI and NbS*
- Are managed through ecosystem approaches that can be applied by local governments (LGs).

Geoscience and NAM

Geoscience Professionals offer natural asset management (NAM) knowledge and skills:

- Professional technical knowledge;
- Practical approaches to cost estimation and economic appraisal;
- Technical communication and data visualization techniques;
- Skills in stakeholder engagement, systems thinking and problem-solving.

Geoscience Roles

Geoscience Professionals are

- key stewards of urban built environments
- core members of asset management teams
- critical in assessing and managing natural assets

Professional opportunities to

- Support an open-minded environment to collaborate in managing complex challenges.
- Offer systems thinking and problem-solving skills, in addition to technical knowledge.
- Support the team to welcome Indigenous knowledge perspectives into decision-making

NAM: Managing climate risk

Natural assets can adapt to changing climate conditions, providing services well into the future, strengthening resilience and adaptive capacity, up to a point (SDG Target 13.1).

NAM planning helps develop knowledge and data reflecting future climate scenarios (SDG Target 13.2 and 13.3).

By displacing an engineered asset, NAM can result in lower embodied carbon, more sequestered carbon and lower emissions (SDG Target 13a)

Local Government AM & NAM

Asset management (AM) helps LGs deliver financially and environmentally sustainable core services …
including through natural assets.

NAM co-benefits can improve overall community health and well-being …
recreation, climate regulation, clean air, natural habitat, and biodiversity.

NAM can provide equivalent or better services compared to many engineered assets …
often with no capital costs and lower operating costs.


Natural Asset Inventories
Natural Asset Management Projects
Gibsons, BC
Prince George, BC
Kent District, BC
Okotoks, AB
Okotoks, AB
Langley, BC
Courtenay, BC
Abbotsford, BC
Surrey, BC
West Vancouver, BC
Nanaimo, BC
Kelowna, BC
West Kelowna, BC
Sparwood, BC
Grand Forks, BC
Selkirk, MB
Winnipeg, MB
Logy Bay, NFLD-Labrador
Drummond, NB
Charlottetown, PEI
Riverview, NB
St. André, NB
Stratford, PEI
Drummond, NB
Riverside-Albert, NB
Moncton, NB
Halifax, NS
Lunenberg, NS
Orillia, ON
Northumberland County, ON
Markham, ON
Peterborough, ON
Region of Peel, ON
Mississauga, ON
Oshawa, ON
Oakville, ON
Dufferin, ON
Niagara Region, ON
Making Nature Count

Accurate as of March 2023

Geoscience Opportunities to …

… LEAD asset management work to help teams maintain a focus on outcomes for service delivery across phases of assess, plan, and implement.

Figure: Asset Management BC. (2019). *Climate Change and Asset Management*. www.assetmanagementbc.ca

Geoscience Opportunities to …

… LEAD asset management work to help teams maintain a focus on outcomes for service delivery across phases of assess, plan, and implement.

… help asset management teams identify where additional skill sets may be needed.

Skill sets involved in NAM

- Integrated stormwater management planning
- Water quality
- Design
- Sediment dynamics
- Ecosystem service valuation
- Natural asset condition assessment

Geoscience Opportunities to …

… help LGs to understand and characterize the natural assets on which they rely, not just those they own.

Natural assets follow watershed or ecological boundaries, not ownership and jurisdiction boundaries.

Tay River in the Perth catchment

Practice Guidelines

Updating practice guidelines can help Geoscience Professionals to:

- Integrate natural asset considerations into the asset management process
- Access tools and resources relevant to natural asset management

Geoscience students in S-IMEW workshop, Sudbury 2019

Looking for resources?

EGBC and MNAI informed this presentation

The Engineering and Geoscientists BC Professional Practice Guidelines (EGBC, 2021) include natural assets in their definition of asset management.

- EGBC. (2021). *Professional Practice Guidelines – Local Government Asset Management*. https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories/Document/01525AMWZVWX2LETUSHVF3LMTH6M24ZLTN/Local%20Government%20Asset%20Management

The MNAI Companion Guide for EGBC (MNAI, 2021) provides specific opportunities and details.

- MNAI. (2021). *Companion Guide to the Engineering and Geoscientists BC Professional Practice Guidelines – Local Government Assets Management*. https://mnai.ca/media/2021/09/MNAI-EGBC-companion-guide-mar2021-104.pdf

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Thank you

LieseC@MNAI.ca

MNAI.ca Making Nature Count

Resilience by DesignLab INSPIRING CLIMATE ACTION

Mitacs

Panel Discussion

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Q & A Session

Use the dialogue box to submit your questions.

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We need your feedback.

Please complete the online survey.

Click on the SURVEY tab on your screen.

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Symposium contact information

Marilen Miguel
mmiguel@pgo.ca

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Panel Session C

Equity, Diversity and Inclusion: Practice Guidance for Professionals and Organizations

April 25, 2023
10:00 a.m. to 12:00 p.m. ET

Co-Chairs

Neera Sundaralingam, GIT
EcoMetrix Incorporated

Kristina Anderson, P.Geo.
Toronto Region Conservation Authority

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