

WATER ADAPTATION COMMUNITY WEBINAR



GLOBAL
CENTER ON
ADAPTATION

SCALING UP NATURE-BASED SOLUTIONS FOR ADAPTATION IN COASTAL AREAS

Thursday, 23rd June 2022, 12:30–14:00 CEST



About the Global Center on Adaptation



- The Global Center on Adaptation is an international organization based in Rotterdam with a research hub based in Groningen and regional offices in Africa, South Asia, and Asia Pacific.
- GCA works as a solutions broker to accelerate action for climate adaptation, in partnership with the public and private sector.
- We facilitate investments that prepare the world for the disruptive effects of climate change, equipping individuals and communities to deal with climate-related challenges and enhancing global resilience.



The Akkoord van Groningen



- This event, which convenes local private sector partners and stakeholders, is organized by the knowledge and innovation broker of the Akkoord van Groningen
- A strategic partnership between the university, vocational training schools, the municipality and the province aiming to develop the city and province into a prime knowledge and innovation hub on global issues
- GCA is a partner of the Akkoord on climate change adaptation.
- [Groningen.nl](https://groningen.nl) | [Het Akkoord van Groningen](#); [De 'Bond van Doorpakkers'](#) zet de volgende stap :: [Klimaatadaptatie Groningen](#)

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Making Climate Adaptation Happen: Governing Transformation Strategies for Climate Change

★★★★★ 4.7 (8 reviews)

Explore how adaptive governance could help policymakers plan for and manage sudden environmental changes.

[Join course for free](#)

3,72K enrolled on this course



STAKE and the Water Adaptation Community



- Contributing to the acceleration of adaptation worldwide.
- Repository of climate adaptation knowledge and data.
- Showcasing relevant and recent third party data and original GCA data sets
- Tool for practitioners at spatial & governance scales, offering dashboards for risk assessment and identification of project examples
- A place for people to engage on adaptation related issues.
- Fosters communities (such as the WAC), provides education, awareness and provides relevant content to help bring people together
- The Water Adaptation Community is a multi-stakeholder platform for knowledge and action to support the scaling up and acceleration of water adaptation.

The screenshot displays the homepage of the GCA Knowledge Exchange. The header includes the logo and the text "STATE 6 TRENDS IN ADAPTATION KNOWLEDGE EXCHANGE". A navigation bar at the top right states "The Knowledge Exchange includes data from a.o. AIDB, IMF, IPCC, OECD, World Bank". The main content area is divided into three columns: "Impacts & Vulnerability", "Innovation & Action", and "Engage & Learn". Each column contains a list of items with a plus sign icon, such as "Impacts", "Vulnerabilities", "Regional Challenges", "Africa Adaptation Acceleration Program", "Projects & Practice", "Non-State Action", "Water Adaptation Community", "eLearning", and "Resources". A navigation menu at the bottom includes "Home", "Communities of Practice", "The Adaptation Journey", "Hotspots", "Case Studies", "Webinars and Events", "My account", "Log in", and "Register". A large banner at the bottom features an aerial view of a tropical coastline and the text "Water Adaptation Community". Below the banner, a paragraph describes the WAC's mission: "The Water Adaptation Community (WAC) aims to connect all who work on water issues and nature based solutions across sectors and professions to share experience and knowledge. It goes beyond the 'water sector' to bridge the..."

<https://communities.adaptationexchange.org/>

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Combining Natural and Grey Infrastructure – with examples from Canada’s Eastern and Western Coastal Communities

For: Global Center on Adaptation - Water Adaptation Community Webinar:
Scaling up nature-based solutions for adaptation in coastal areas: What are the elements of success ?

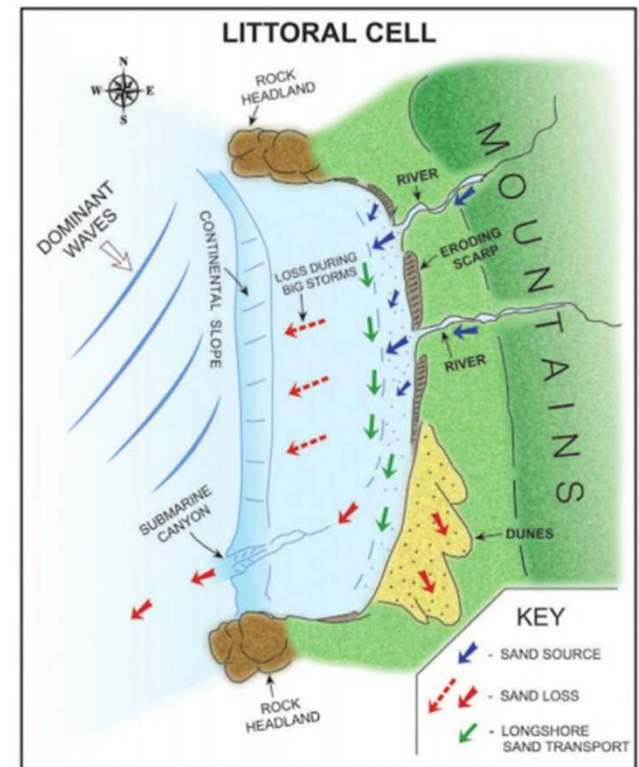
Joanna Eyquem PGeo. ENV SP. CWEM. CEnv.
Managing Director, Climate Resilient Infrastructure
Intact Centre on Climate Adaptation
joanna.eyquem@uwaterloo.ca



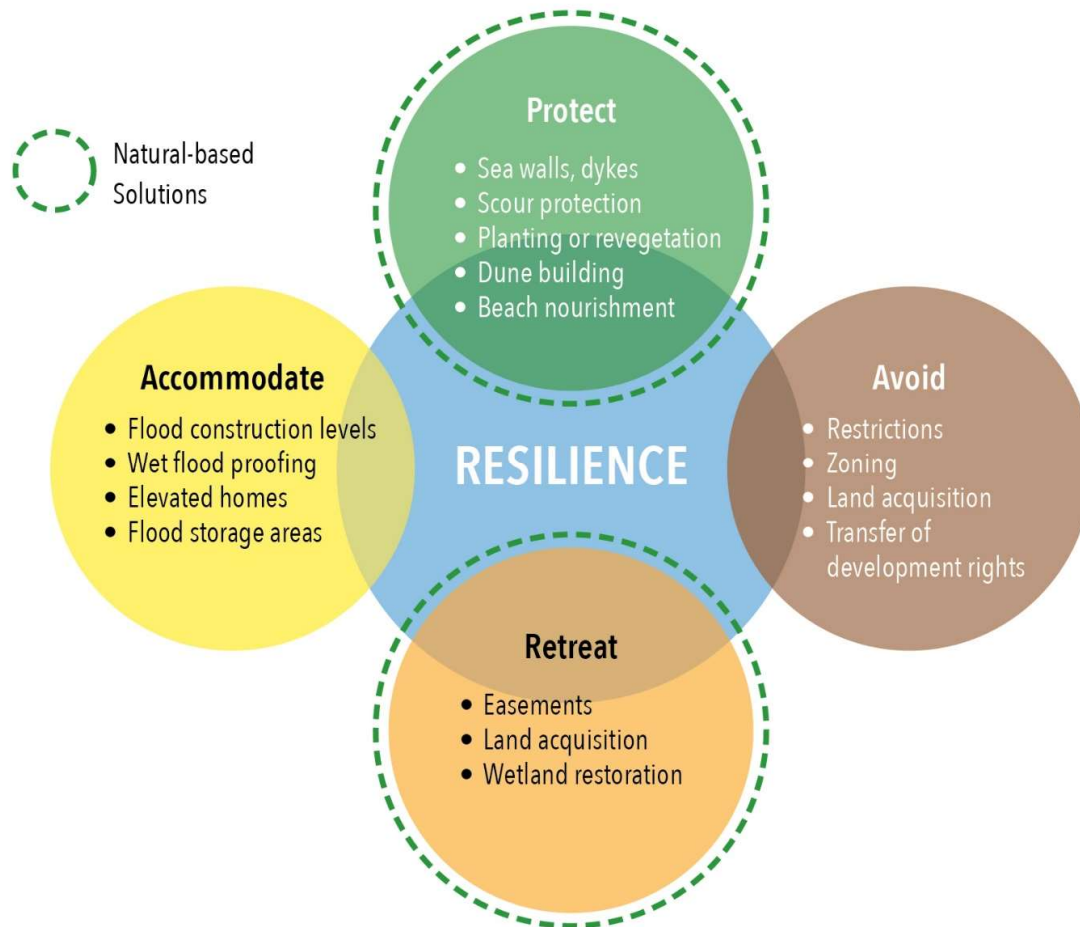
June 23, 2022, Groningen and Virtual

Working with Nature and Natural Processes

- Coastal adaptation considers flooding and erosion risk in tandem with people and nature.
- International movement towards solutions that:
 - are strategic and long-term (100yrs)
 - work with natural processes, at the functional scale (littoral cell), rather than fighting them
 - combine structural and non-structural measures (e.g. planning)
 - combine grey and natural infrastructure
- Nature-based solutions are currently underused and undervalued.



The PARA Framework



Alternatives?

Protect – *Protect each other*

Accommodate – *Host*

Retreat – *Move Together*

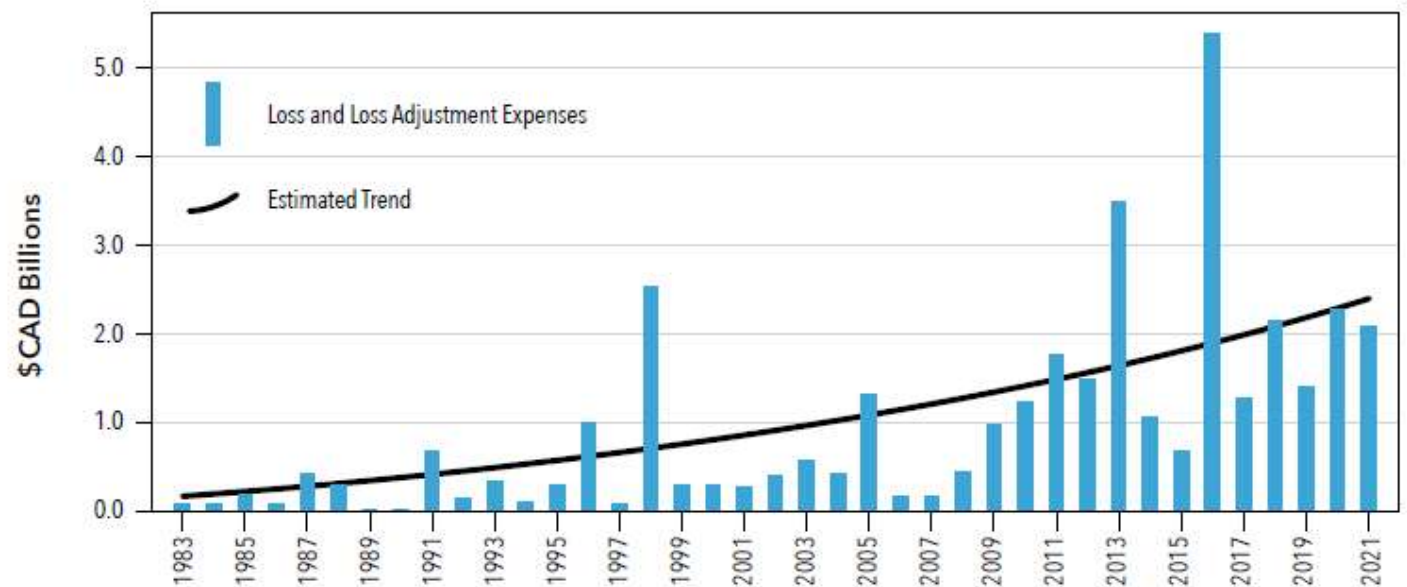
Avoid - *Respect*

Source: Eyquem (2021). Rising Seas and Shifting Sands: Combining Natural and Grey Infrastructure to Protect Canada's Eastern and Western Coastal Communities
<https://www.intactcentreclimateadaptation.ca/rising-seas-and-shifting-sands-combining-natural-and-grey-infrastructure-to-protect-canadas-eastern-and-western-coastal-communities/>

NbS are not « just » to tackle an environmental issue....

- Per \$1 of insured loss, there are \$3-4 of uninsured losses incurred by government, businesses and individuals
- Degradation of natural infrastructure is a contributing factor reducing resilience to flooding.

Figure 1: Catastrophic Insurable Claims (\$ Can/billions) in Canada, 1983-2021. Blue bars represent loss + loss adjusted expenses. \$1 in insured loss reflects an "insurance gap" of \$3-4.



Source: IBC (2022) & CatIQ (2022)

Note: claims have been normalized for inflation (\$2021) and per capita wealth accumulation.

NbS Co-Benefits

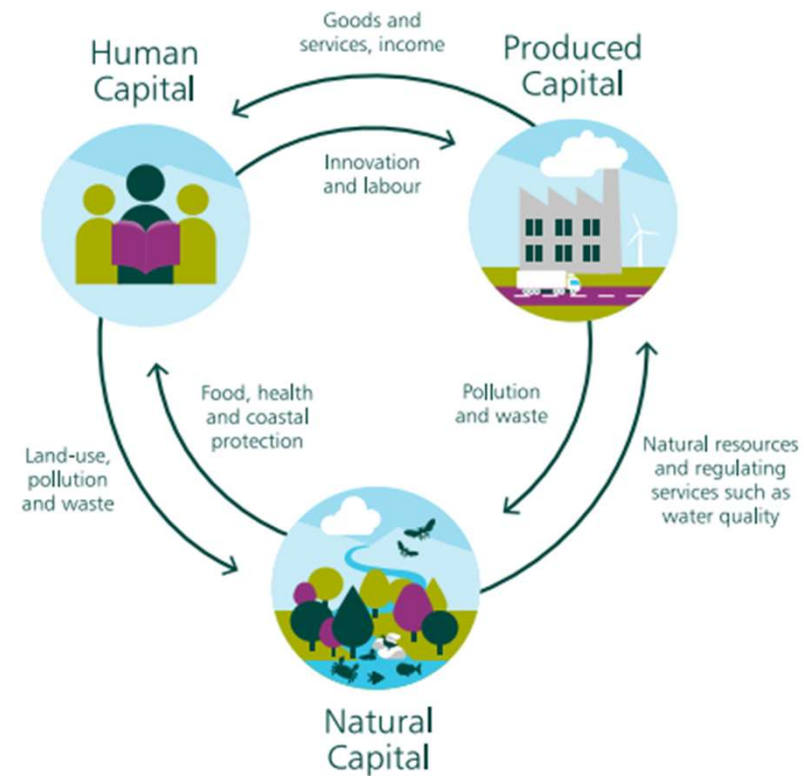
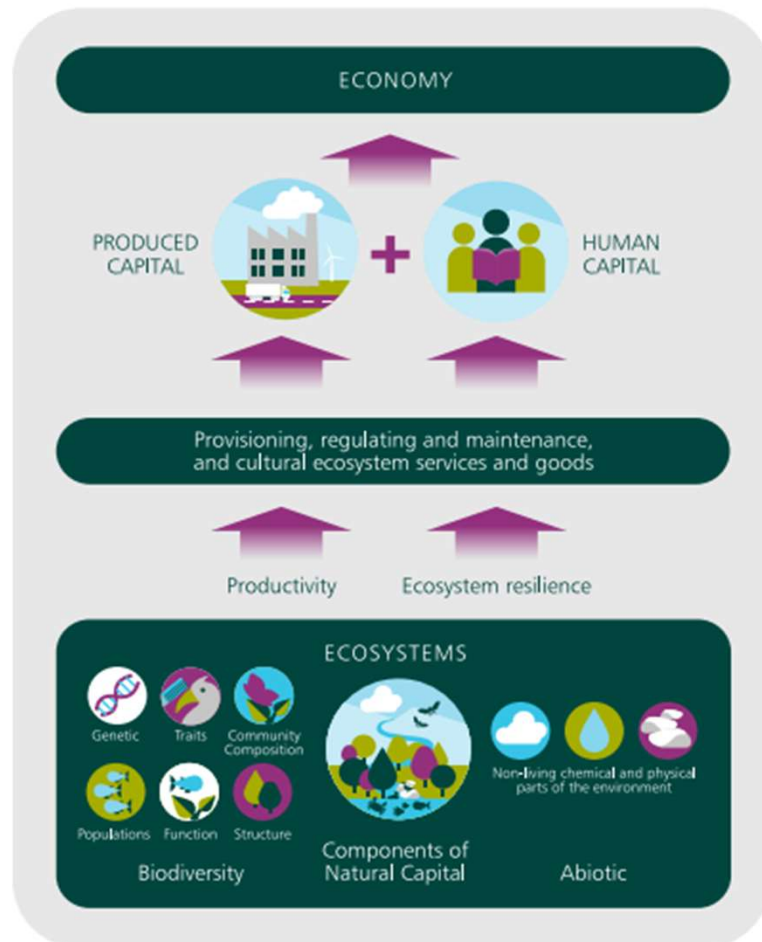
Nature-based Solutions provide
« ecosystem goods and services »

- **Provisioning**
 - 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
 - Spiritual, ed

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



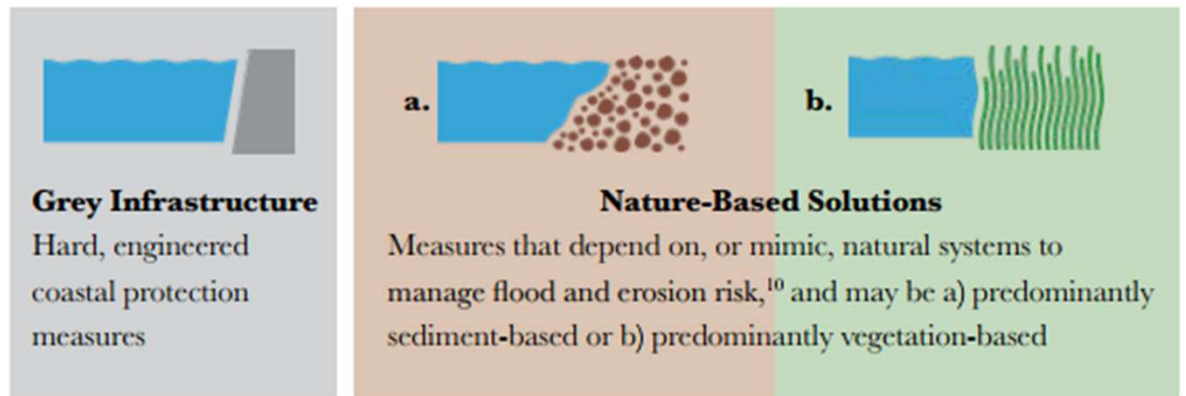
NbS Co-Benefits Support the Economy



Source: HM Treasury (2021) The Economics of Biodiversity: The Dasgupta Review <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>

It is not a Choice Between Grey and Natural

- Not an « either - or » decision



- Achieve multiple benefits
- Grey infrastructure may actually enable NbS, particularly where processes are modified.
- Natural infrastructure can enhance grey infrastructure.

Broadening View of « Infrastructure » in Canada

National Adaptation Strategy



1. Health and Wellbeing;
- 2. Resilient Natural and Built Infrastructure;**
3. Thriving Natural Environment;
4. Strong and Resilient Economy; and,
5. Disaster Resilience and Security.

National Infrastructure Assessment



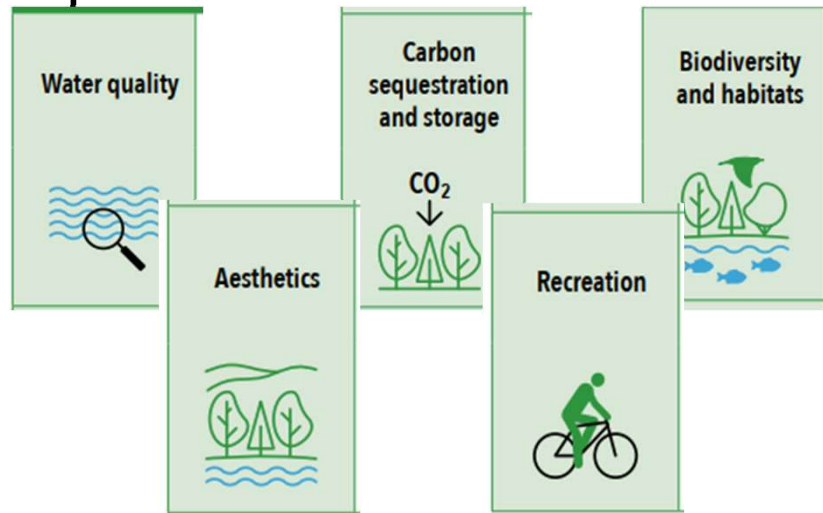
*....covering all sectors of economic, social, sustainable **and natural infrastructure.***

Budget 2021: Natural Infrastructure Fund

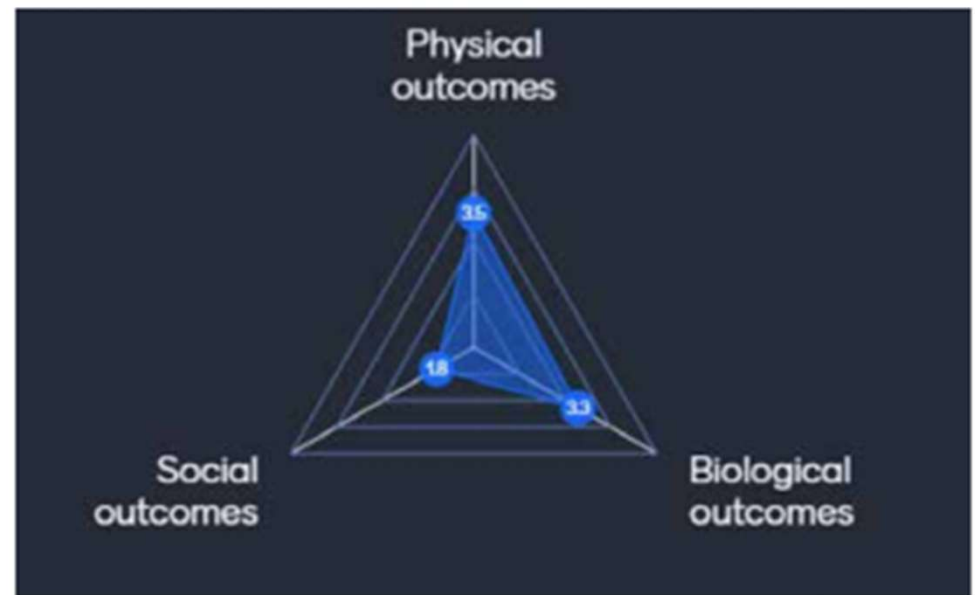


*....\$200 million over three years, starting in 2021-22, to **Infrastructure Canada to establish a Natural Infrastructure Fund.***

Making a Case for NbS and their co-benefits up front



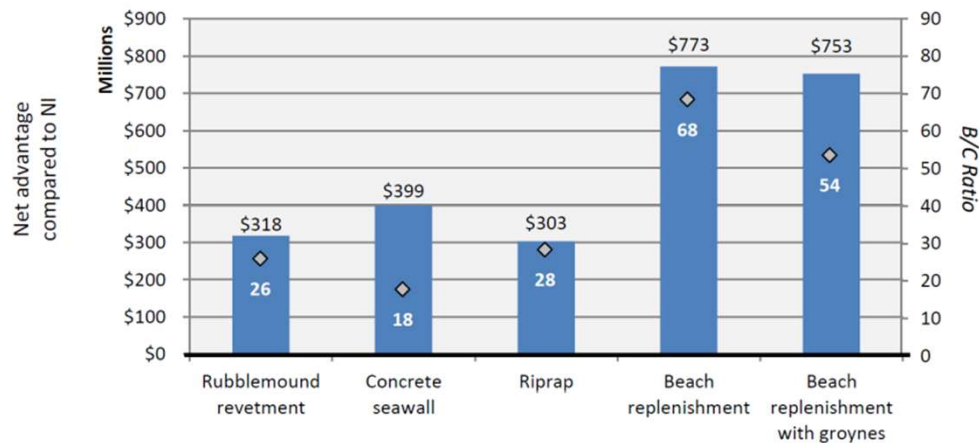
How strong do you think we are at measuring physical, biological and social outcomes?



- Modeling \$ e.g. InVEST
- Predicted changes in indicators
- Social value of carbon
- Avoided costs..

Example: Percé, Quebec (Ouranos, 2016)

Five alternatives assessed for Anse du Sud



CBA compared to non-intervention
 Beach nourishment most beneficial option over 50-year period considered.

Benefit-cost ratio: 68:1
 Large benefits from tourism industry

Source: Circé, M., et al. 2016, Ouranos
<https://www.ouranos.ca/wp-content/uploads/Synthesis-report-ACA-Quebec-final.pdf>

Economic	<ul style="list-style-type: none"> Gain in tourism revenues
Environmental	<ul style="list-style-type: none"> Improvement in fish spawning grounds
Social	<ul style="list-style-type: none"> Improvement in the coast's recreational use Improvement in quality of life (security) Improvement in the landscape



Natural Asset Management by Canadian Municipalities

- Several municipal-scale initiatives to **inventory and value** natural infrastructure (including coastal communities)
- **Valuation** focused on municipal service provision
- **National Standard of Canada** in development for natural asset inventory.
- Interest among CFOs in ability to reflect values in **financial statements**



- Town of Logy Bay-Middle Cove-Outer-Cove, NL*
- Town of Riverview, NB*
- Town of Florenceville-Bristol, NB*
- Village of Riverside-Albert, NB*
- Greater Montreal, QC*
- Greater Quebec City, QC*
- Rivière Chaudière, QC*
- Compton, QC*
- National Capital Region, ON/QC*
- City of Oshawa, ON*
- Region of Peel, ON*
- Town of Oakville, ON*
- City of London, ON*
- York Region, ON*
- City of Richmond Hill, ON*
- City of Calgary, AB*
- Town of Gibsons, BC*
- District of Sparwood, BC*
- City of Courtenay, BC*
- District of West Vancouver, BC*
- City of Grand Forks, BC*
- City of Nanaimo, BC*
- Regional District of Central Kootenay, BC*
- Regional District of East Kootenay, BC*
- Regional District of Kootenay Boundary, BC*
- City of Cranbrook, BC*
- Town of Golden, BC*
- City of Rossland, BC*

Thoughts to build on.....

- Use and valuing of NbS is maturing, but not yet a mainstream solution (how can we change this?).
- Strategic, long-term approaches are key.
- Local governments and communities are important in managing and valuing natural assets.
- Absence of « perfect » approaches should not get in the way of incorporating « good » practice to accelerate NbS implementation.

<https://www.intactcentreclimateadaptation.ca>



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Fourteen projects

All projects focus on the **main goals**:

1. Reduction of turbidity / restoration of natural dynamics
2. Beneficial use of sediment: clay, leveling low area's or building materials
3. Habitat development in the coastal zone

Combination with local livability / quality of the area wherever possible!



Situation Coastal zone Groningen

- Soil subsidence causes:

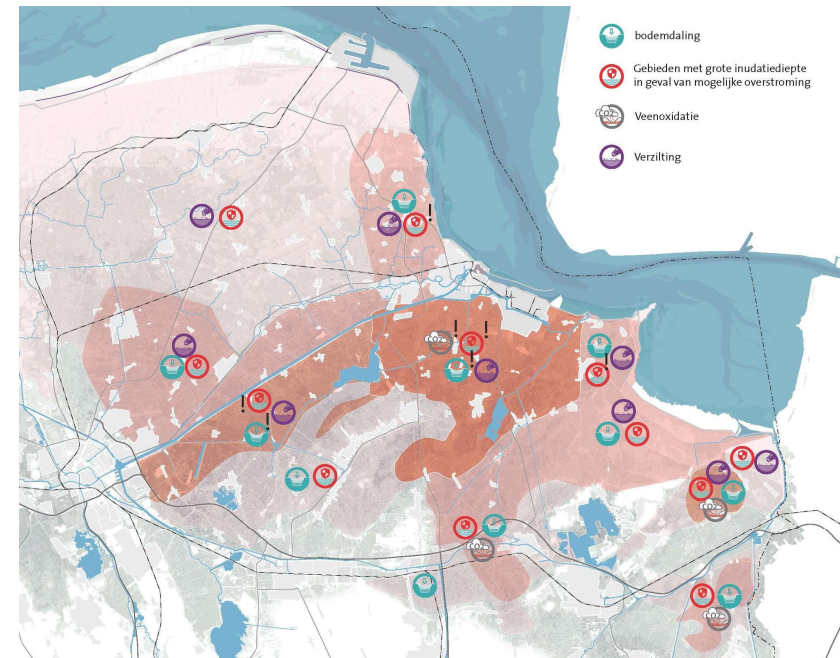
- Gas extraction
- Peat oxidation
- Salt extraction



- Effects of climate change:

- Sea level rise
- Extreme weather

- Bottlenecks for the agriculture
 - High groundwater level
 - Salinization
- Bottlenecks for the water management
 - Water safety
 - Water nuisance
 - Potential lack of fresh water



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Coastal protection examples from Denmark

Implementing the NbS agenda
to protect, accommodate,
retreat, or avoid

Ole Fryd

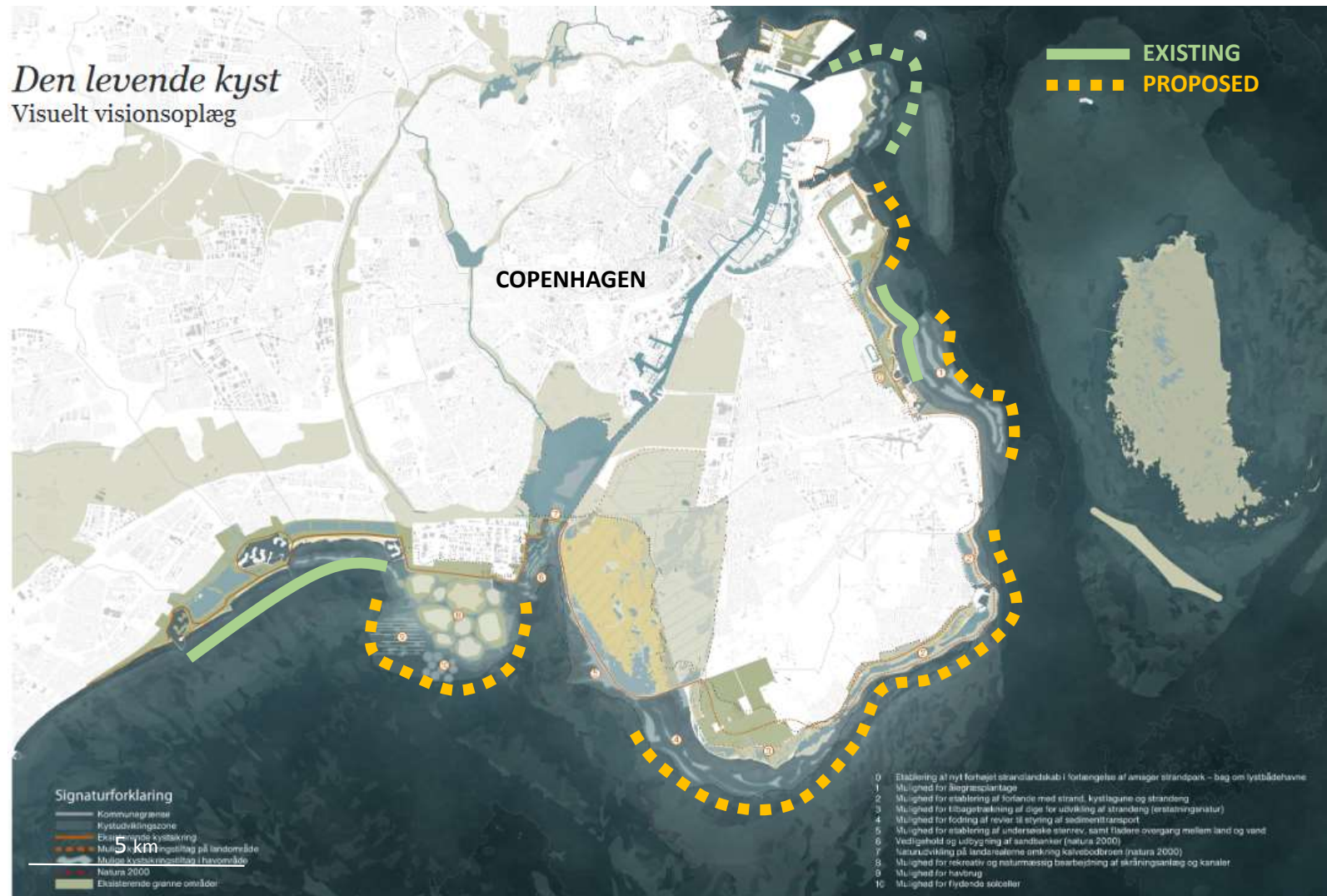
Associate Professor

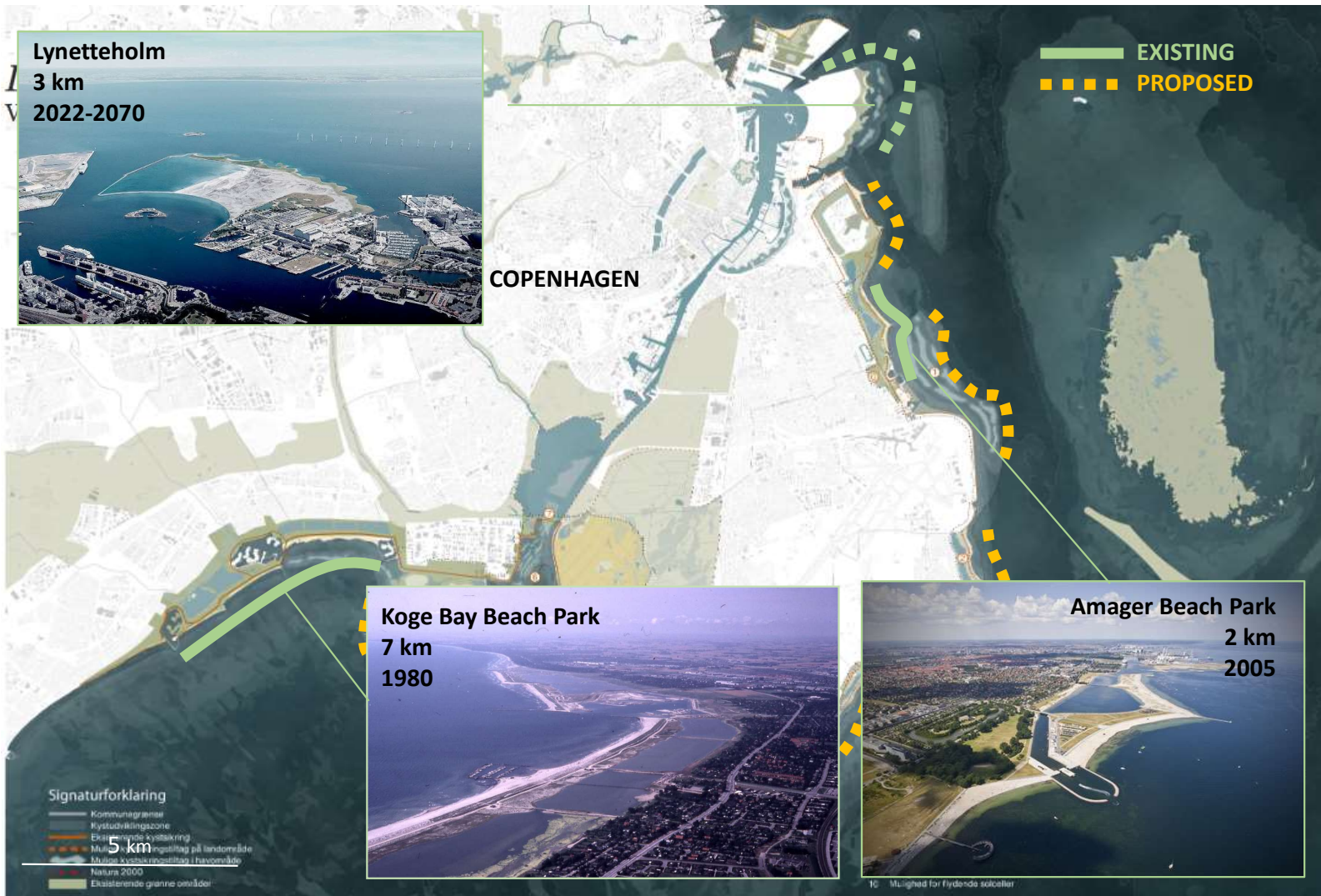
Landscape Architecture and Planning

GCA, Groningen
23 June 2022

UNIVERSITY OF COPENHAGEN



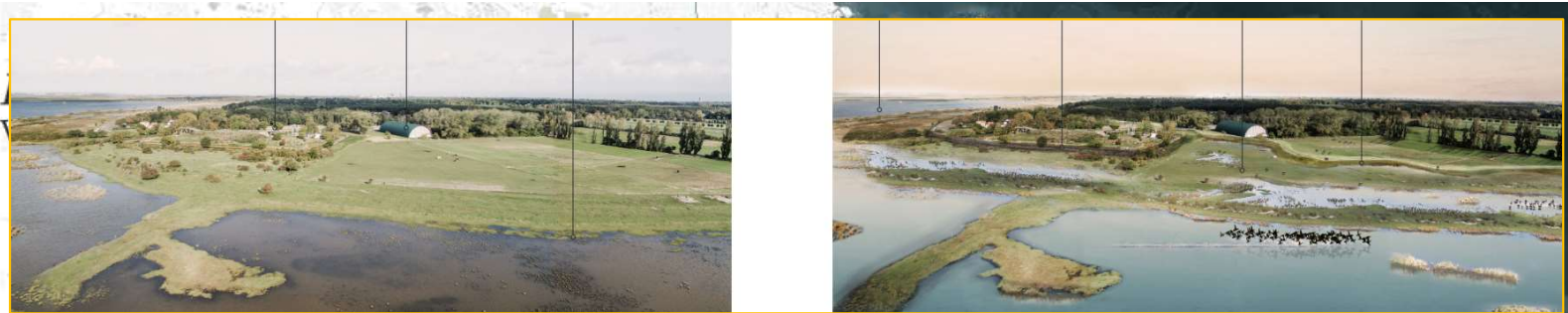




Koge Bay Beach Park

- Nordic welfare state flagship project
- National spatially explicit urban development law
- Legal partnership regional gov'ts & municipalities
- Board of Directors are mayors from municipalities
- Independent budget, secretariat and technical staff

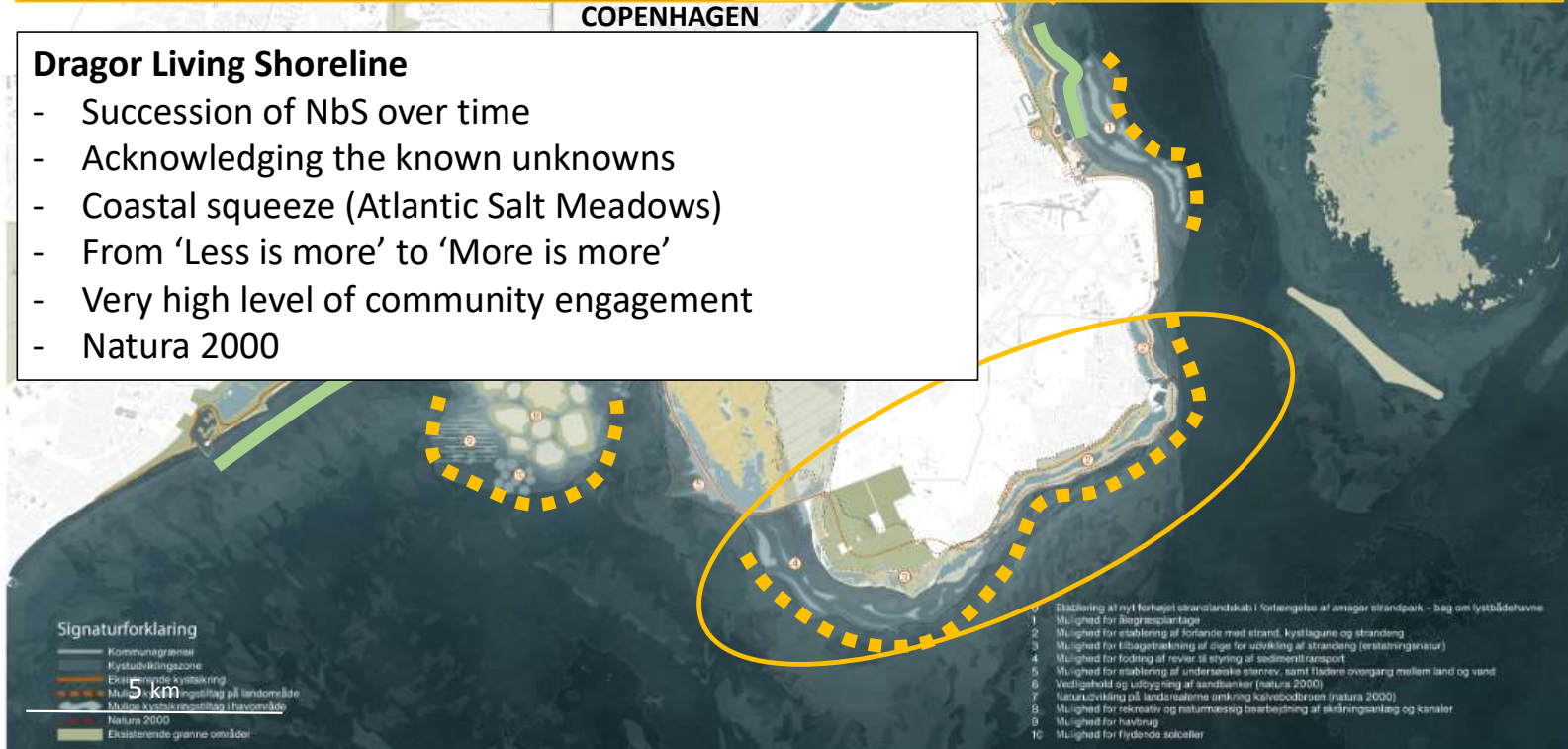




COPENHAGEN

Dragor Living Shoreline

- Succession of NbS over time
- Acknowledging the known unknowns
- Coastal squeeze (Atlantic Salt Meadows)
- From 'Less is more' to 'More is more'
- Very high level of community engagement
- Natura 2000



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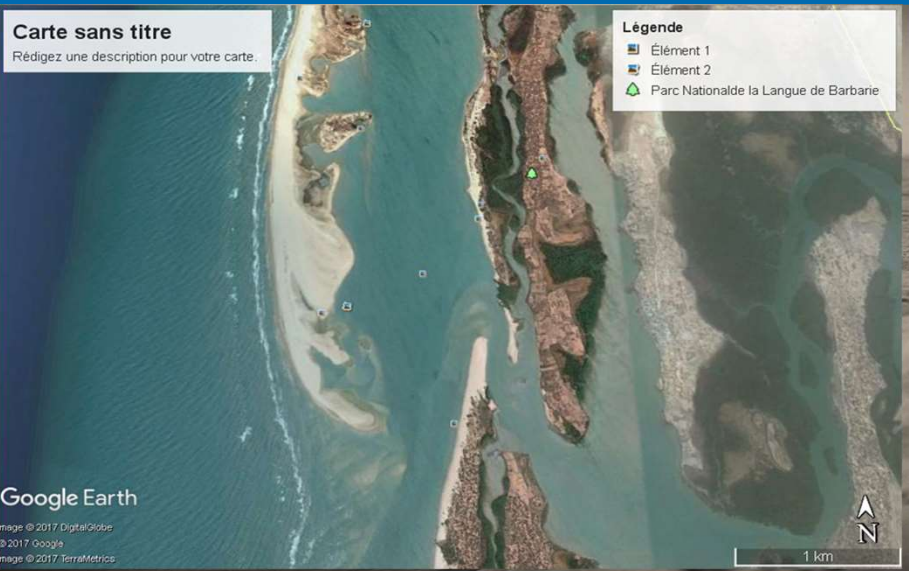
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Rédigez une description pour votre carte.

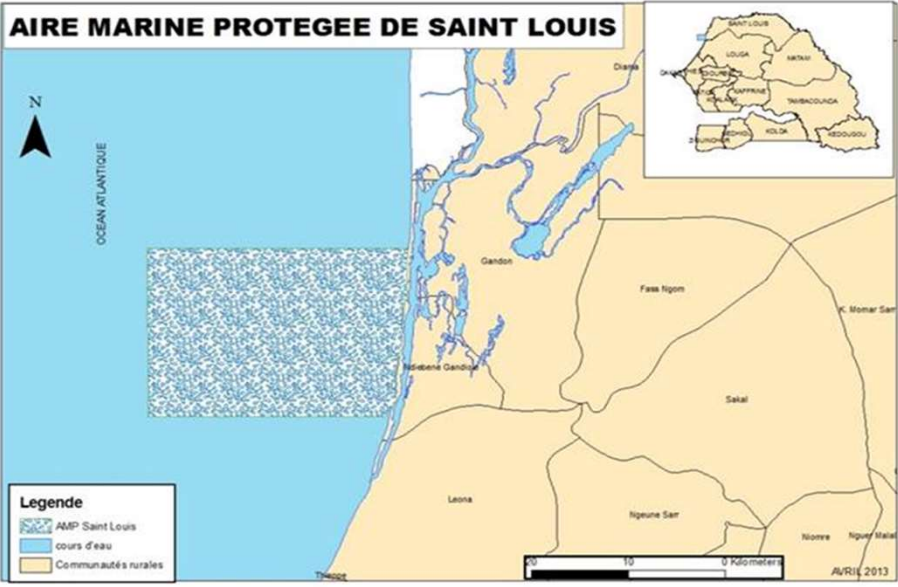


« RECONSTRUCTION DES DUNES À SAINT-LOUIS, SÉNÉGAL »

SOLUTIONS DOUCES D'ADAPTATION OU DE LUTTE CONTRE LES RISQUES CÔTIERS

FEEDBACK FROM EXPERIENCES ON THE INSTALLATION OF TYPHAVELLES Marine Protected Area of Saint-Louis, SENEGAL

Présentation:
Didier K KABO, AMP de Saint-Louis
Dr Moussa SAI I CSE



« RECONSTRUCTION DES DUNES À SAINT-LOUIS, SÉNÉGAL »

SOLUTIONS DOUCES D'ADAPTATION OU DE LUTTE CONTRE LES RISQUES CÔTIERS



SOLUTION OVERVIEW

2 row grid

Typhavelles 2m long by 1m high;

Typhavelles fixed together by filao stakes 1.8m high;

Over a distance of more than 1.5 km;

Following a NW direction.

RESULTS

The reloading of the traps is noted with variable heights (70cm-90cm);

The formation of a dune cord;

The formation of embryonic dunes;

The increase in the length of the beach;

The appearance of vegetation (RN Mangrove) and “colonization by ground covers (Sesuvium portulacastrum, Ipomea and Cyperus maritimus in front and behind typhavelles;

Fixing the area with the reforestation of 10 ha behind the typhavelles.

« RECONSTRUCTION DES DUNES À SAINT-LOUIS, SÉNÉGAL »

SOLUTIONS DOUCES D'ADAPTATION OU DE LUTTE CONTRE LES RISQUES CÔTIERS

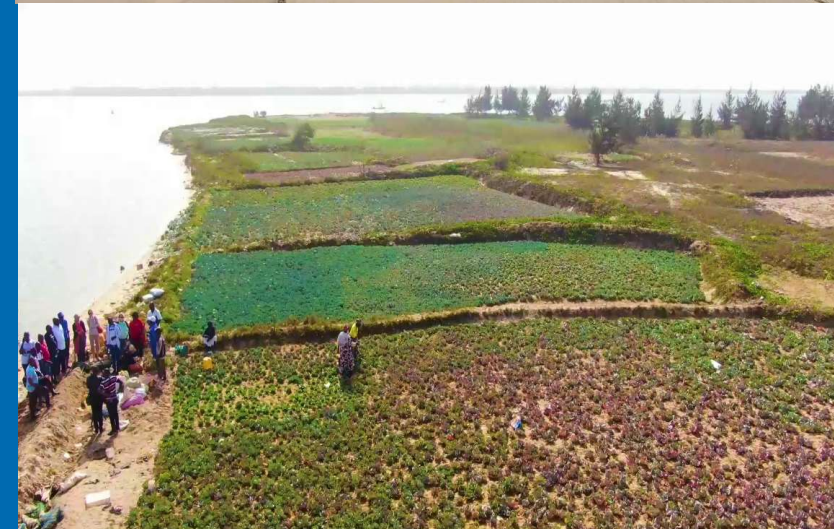
LESSONS LEARNED

NEGATIVE POINTS :

Periodic maintenance of structures

GOOD POINTS)

- The Saint-Louis MPA experience is an NBS
- Return of the avifauna and natural regeneration of the mangrove on the site linked to the positive modification of the environmental conditions;
- Capacity building of the MPA on soft protection/restoration solutions and ecological monitoring;
- Better control of the site environment with its division into management units and their periodic monitoring with the constitution of a database;
- The use of *Typha australis*, an aquatic plant that invades the Senegal River and freshwater bodies;
- The involvement of local micro-enterprises such as the GIE Suxaali Aalam of Bango in the production of *Typha australis* palisades (eco-materials) and the promotion of women's initiatives;
- Development of market gardening downstream of typhavelles



RECONSTRUCTION DES DUNES À SAINT-LOUIS, SÉNÉGAL »

SESSION « RETOURS D'EXPERIENCES SUR L'INSTALLATION DES TYPHAVELLES »

MERCI DE VOTRE ATTENTION



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Strategy takes time

Time for a transformational change at the coast?

June 2022

Paul Sayers

Contributions

Drawing on EU Interreg C5a and CCC and ECF

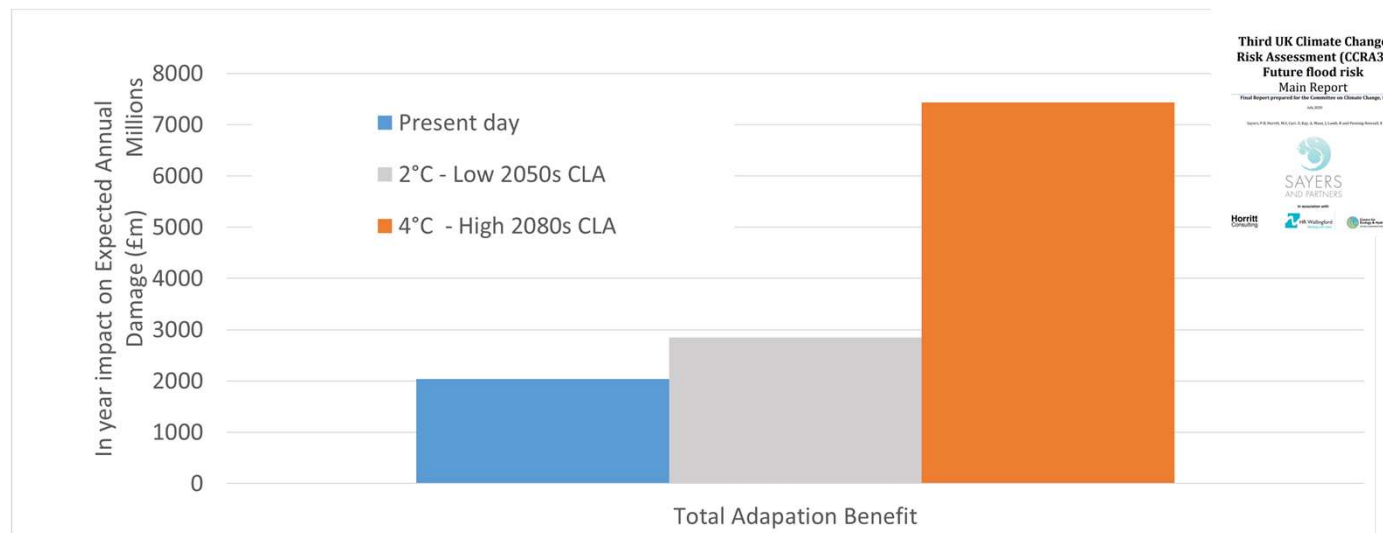


Paul.sayers@sayersandpartners.co.uk

The opportunity is now Adaptation

Flood related adaptation will be a significant cost - if simply focused on **conventional risk reduction approaches this would be a wasted opportunity...proactively** seek multiple benefits

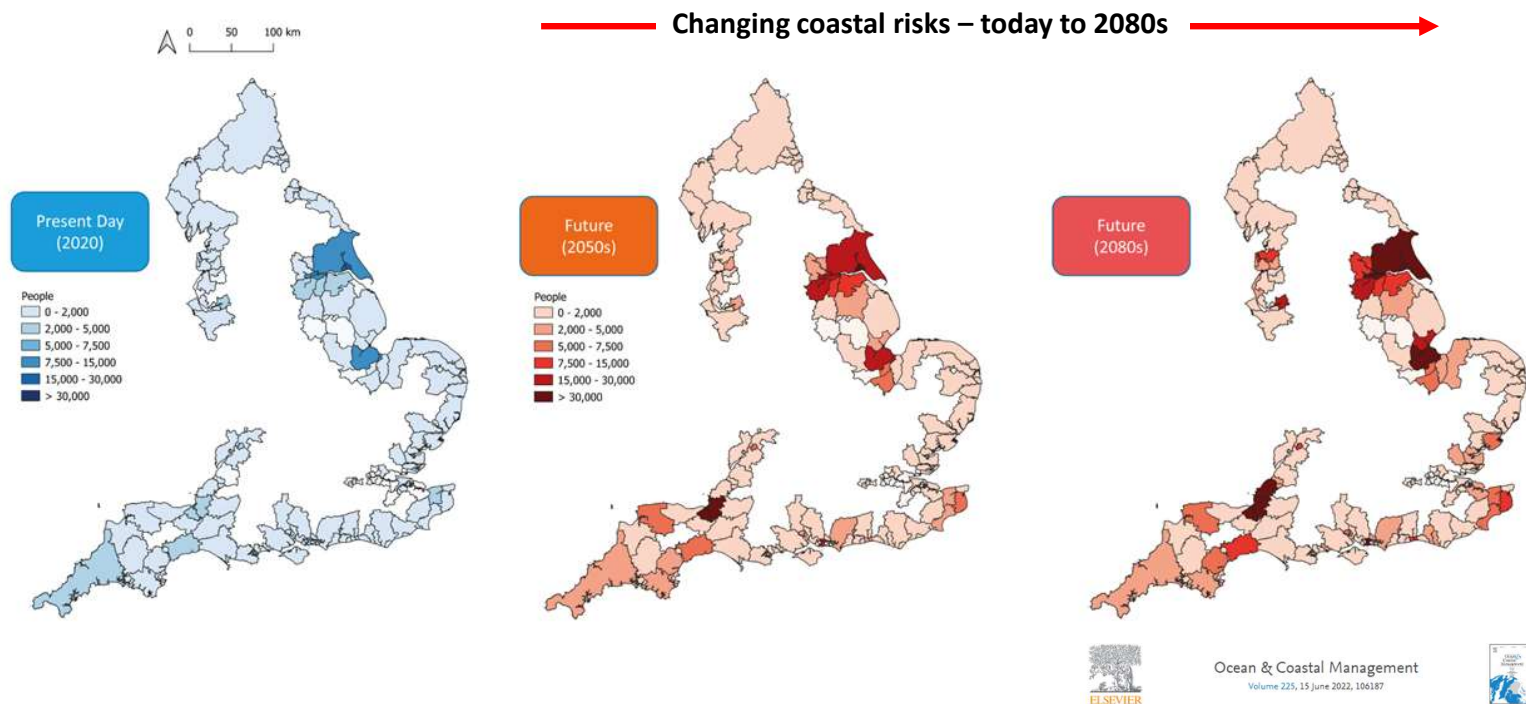
Growth in the 'managed flood risk' by 2080s in the UK



from Sayers et al, 2020– UK Climate Change Risk Assessment – Flood projections

Different places face different challenges..

Sometimes this will mean implementing **radical change** including relocation – but this takes time to plan and communities supported.



Source Sayers et al, 2022

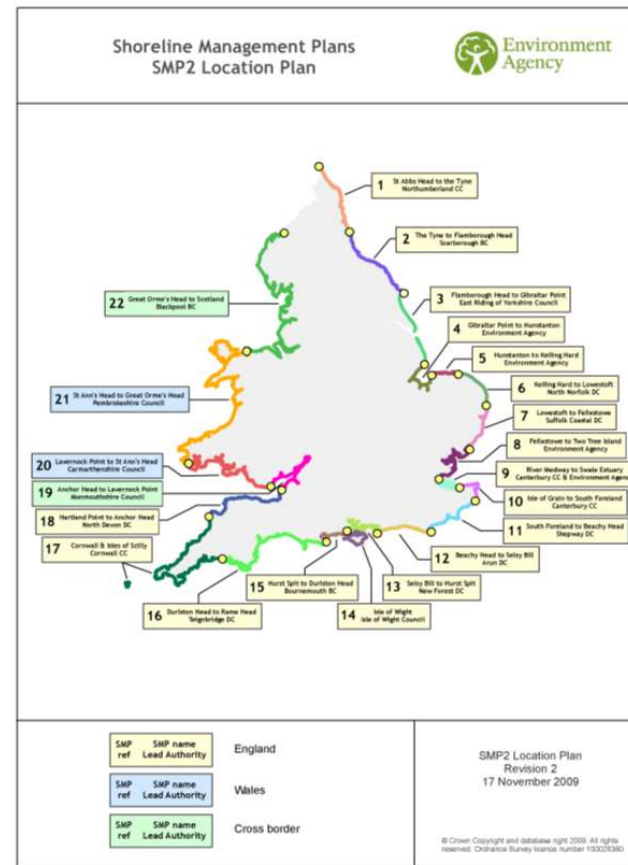
Innovations will be needed...in planning

UK Shoreline Management Planning process..

Hold-the-Line – Managed Realignment – Advance the Line or No Active Intervention

Other countries, such as Belize and New Zealand, are using the UK's SMP approach as a starting point.

They find they are able to go further than in the UK: integrate more fully with Planning, and introduce an actual decision pathway approach, in close collaboration with communities.



Communication with Jaap Flikweert - RHDHV

Innovations will be needed...in thinking

Supporting a Cloud-to-Coast Approach

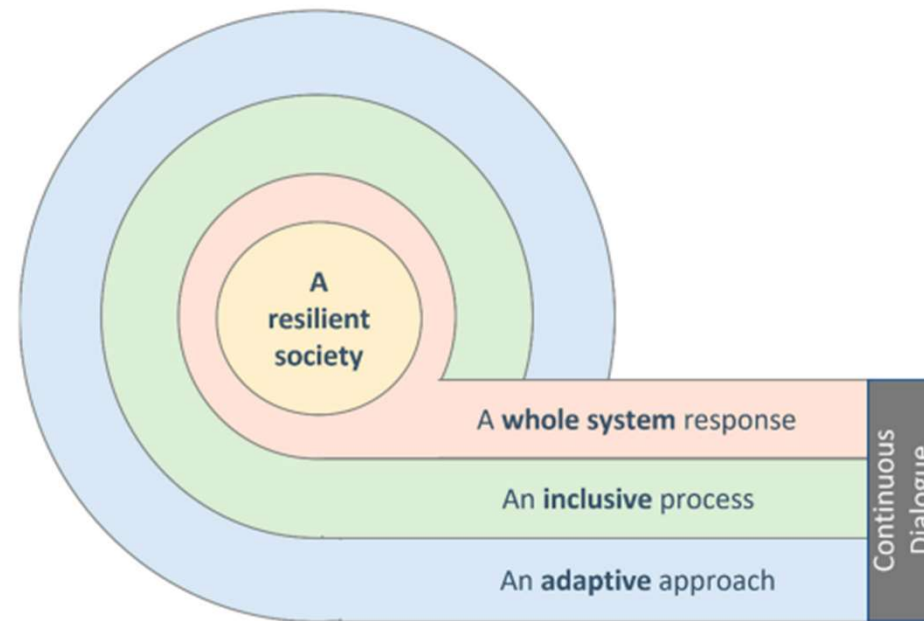


Figure 1. The four pillars of the Cloud to Coast framework to support the transition to a resilient society.

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REST-COAST

EEMS²⁰ DOLLARD⁵⁰



Towards an climate adaptive coastal zone by implementing restoration projects
***Upscaling and replicability to other areas:
projects***

Floris Boogaard

23 June 2022

Deltares  Living Lab
Grensmaas



This project receives funding from the European Union's Horizon 2020 Research and Innovation action under grant agreement No: 101037097.

Fourteen projects

All projects focus on the main goals:

1. Reduction of turbidity / restoration of natural dynamics
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Combination with local livability / quality of the area wherever possible



REST-COAST CORE-PLAT: Enhance cross border collaboration

Follow process strategy of Ems-Dollard (ED2050)

Plus

Joint effort Wadden Coast and Estuaries

1. Develop **joint network and joint activities**
2. Develop **shared understanding of approaches** to adaptation management by restoration in both countries
3. (Develop) **joint tools**



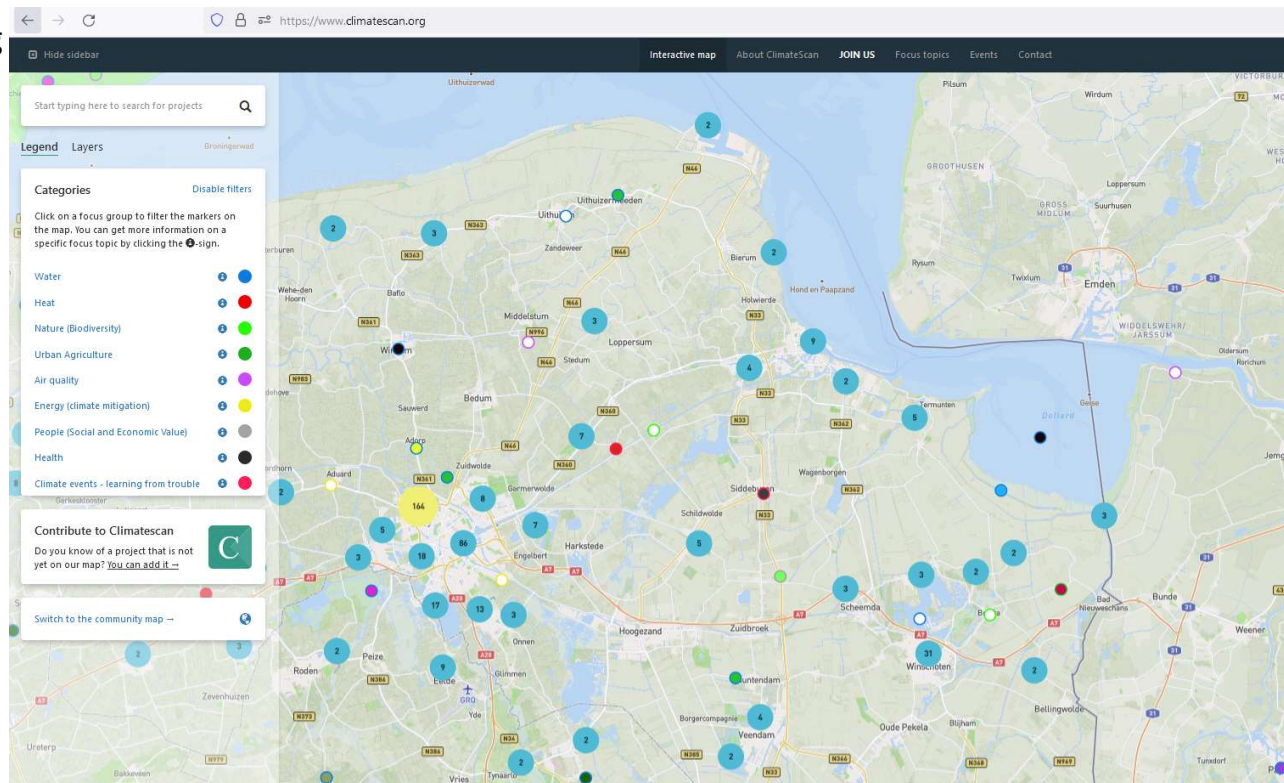
Shared understanding of approaches to adaptation management

- a) What pilots/projects/products and participation of partners?

- **Climate cafes** would be nice to organise with German universities

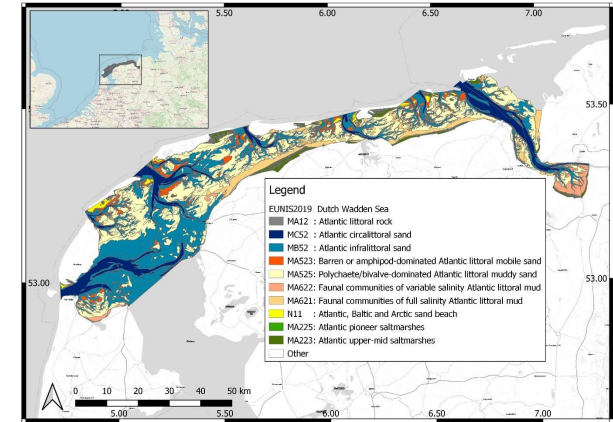
- Workshops (eg Eems-Dollard for hands-on restoration)

- sharing



Joint tools

- a) What is the approach to build joint tools to increase understanding?
 - risk analysis system for habitat and ecosystems
 - Investigate hard measures
 - Build a downstream risk assessment
 - Currently, the German Bight model (incl. Eems-Dollard)
 - Modelling of seagrass, current effect of seagrass vs no seagrass vs extension of seagrass
 - Exchange of information on parameterisation/harmonisation
- b) Interactive participation tools



Source: Baptist (2022) –concept!-

- c) How can partners contribute?
 - modelling support and lessons learnt

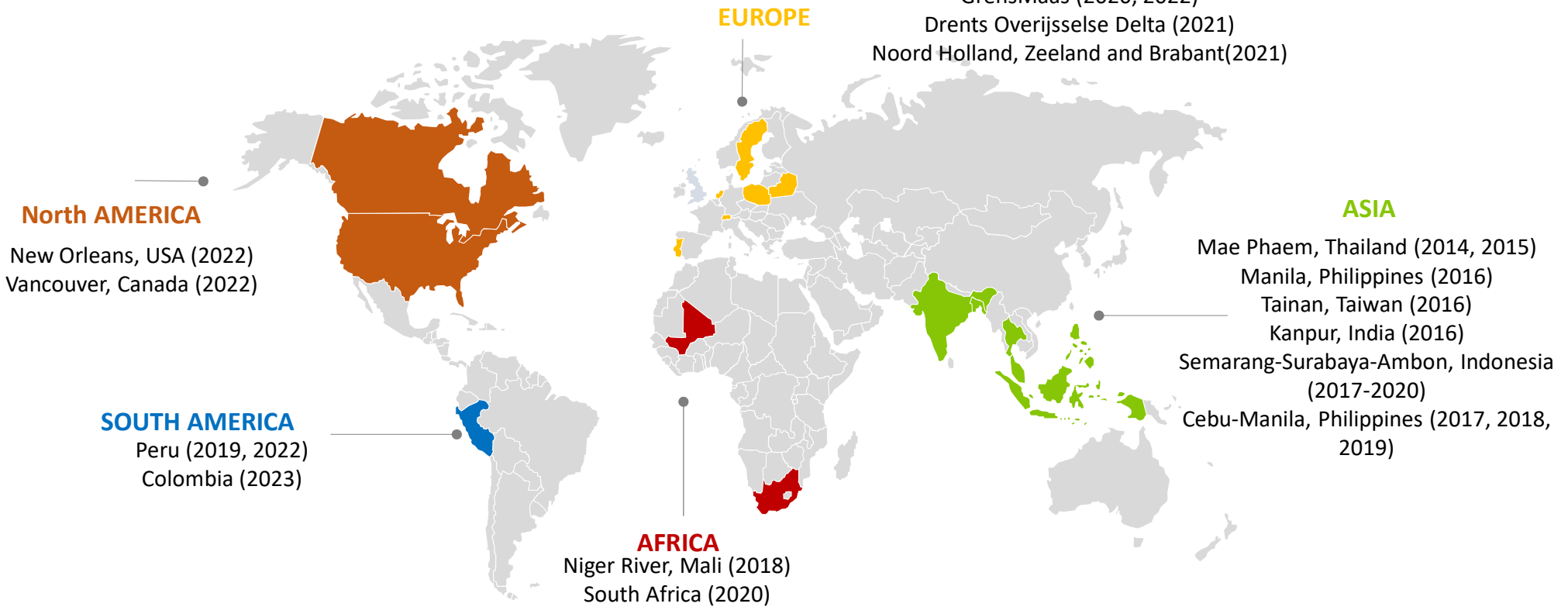




www.climatecafe.nl

Riga, Latvia (2019,2022)
Oldenburg, Germany (2020)
Malmo, Sweden (2019)
Chur, Switzerland (2019)
Gdansk, Poland (2021)
Coimbra, Portugal (2022)

The Netherlands
Cities:
Groningen (2014,2017-2022)
Rotterdam (2017-2019,2022)
Leeuwarden, Hoogeveen, Kampen, Apeldoorn,
Arnhem, Tilburg, Nijmegen, Eindhoven (2015-2022)
Regions:
GrensMaas (2020, 2022)
Drents Overijsselse Delta (2021)
Noord Holland, Zeeland and Brabant(2021)



ClimateCafé: sustainable climate adaptation and lessons learnt: <https://www.mdpi.com/2071-1050/12/9/3694>

RECONNECT V



WA1. Innovation - technical /design& social innovation, action research practices, frameworks for NBS

WA2. Demonstration
EU Demonstrators

Co-design Co-implement Monitor Evaluate

Demonstrator Type A:
Elbe Estuary, Portofino Natural Park, Odense Coastal
Tordera River Basin, Greater Copenhagen

Demonstrator Type B:
Ijssel River Basin,
Inn River Basin,
Var River Basin,
Aarhus Coastal
Les Boucholeurs Coastal

WA4. Overcoming barriers, upscaling and synergies with other projects

EU Collaborators:
development of land management plans
Poland, Croatia, Serbia, Bulgaria

International Collaborators:
knowledge sharing
Brazil, Thailand, Taiwan, Australia
External expert advisory board
Global NBS network

WA3. Validation - Monitoring and Evaluating NBS (monitoring platform, data collection, flood risk assessment, EIA, SIA, multi-benefits, etc)

WA5. Consolidation of evidence-base and standardisation
- design and performance, cost-effectiveness, O&M, etc.

WA6. Dissemination and business models
- enhancement of market demand

Figure 3: RECONNECT schematic diagram of Work Areas which will be structured into Work Packages and Tasks in Stage 2;

CASE STUDY: Ijssel River basin, The Netherlands
DEMONSTRATOR B
Responsible partners: **Tauw** (Floris Boogaard)

NBS Description
The Ijssel River basin project ("Stroomlijn") is implemented under the banner of the "Room for the River" Programme.
In the Ijssel project area (blue square in figure) it rains more often and with higher intensity. As a result, rivers are often confronted with high-water levels. If the water flows into the floodplains, vegetation can impede the water flow, leading to a rise in water levels and an increase of the flood risk.
We focus on innovative tools for the river by means of vegetation management of 300 hectares dealing with >10 disciplines and multiple stakeholders from public and private sector. The project focuses on the removal of vegetation within the floodplains in places where the river flows fastest at high water levels.

'Room for the River' Programme
The Ijssel delta experiences annual flooding in 1950 and 1995, floods threatened to devastate regions surrounding the delta.
Climate change is ongoing, and as the river floods each year the water distributes sediments throughout the floodplain, reducing the space that was initially allowed for annual floods.
The goal of the Dutch Room for the River Programme is to give the river more room to manage higher water levels. As more than 30 locations, measures are taken to give the river space to find safety water at the same time improve the quality of the immediate surroundings.
Measures include planting and mowing dunes, depolluting, creating/increasing the depth of flood channels, reducing height of dykes, removing obstacles, and the construction of a "dike-in river" (flood bypass). This will result in lower flood levels.

Benefits and co-benefits
• Flood reduction
• Nature based maintenance
• Water quality improvement

and upscaling
of the Dutch Government
offering technology and methods.
NBS implementation, with high
level.

www.reconnect.eu

¹ Interessen Im Fluss, D 30449 Hannover, Germany

² Department of Agroecology, Aarhus University, Blichers Alle 20, 8830-DK Tjele, Denmark

³ Applied Systems Thinking in Practice Group, School of Engineering and Innovation, Faculty of Science Technology Engineering and Mathematics, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK

⁴ Swedish Agency for Marine and Water Management, 404 39 Gothenbur, Sweden

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Upscaling and replicability to other areas: projects

Social learning as a shared understanding of complex ecosystem and water-management issues can be supported with active stakeholder involvement and citizen science. As such, in co-governance processes, stakeholders need technical access to data and knowledge and a shared process memory. This enables them to develop a shared understanding and facilitates bringing together competing interests and finding new solutions. Participatory tools became part of successful processes by building trust and knowledge based on commitment. However, proficient

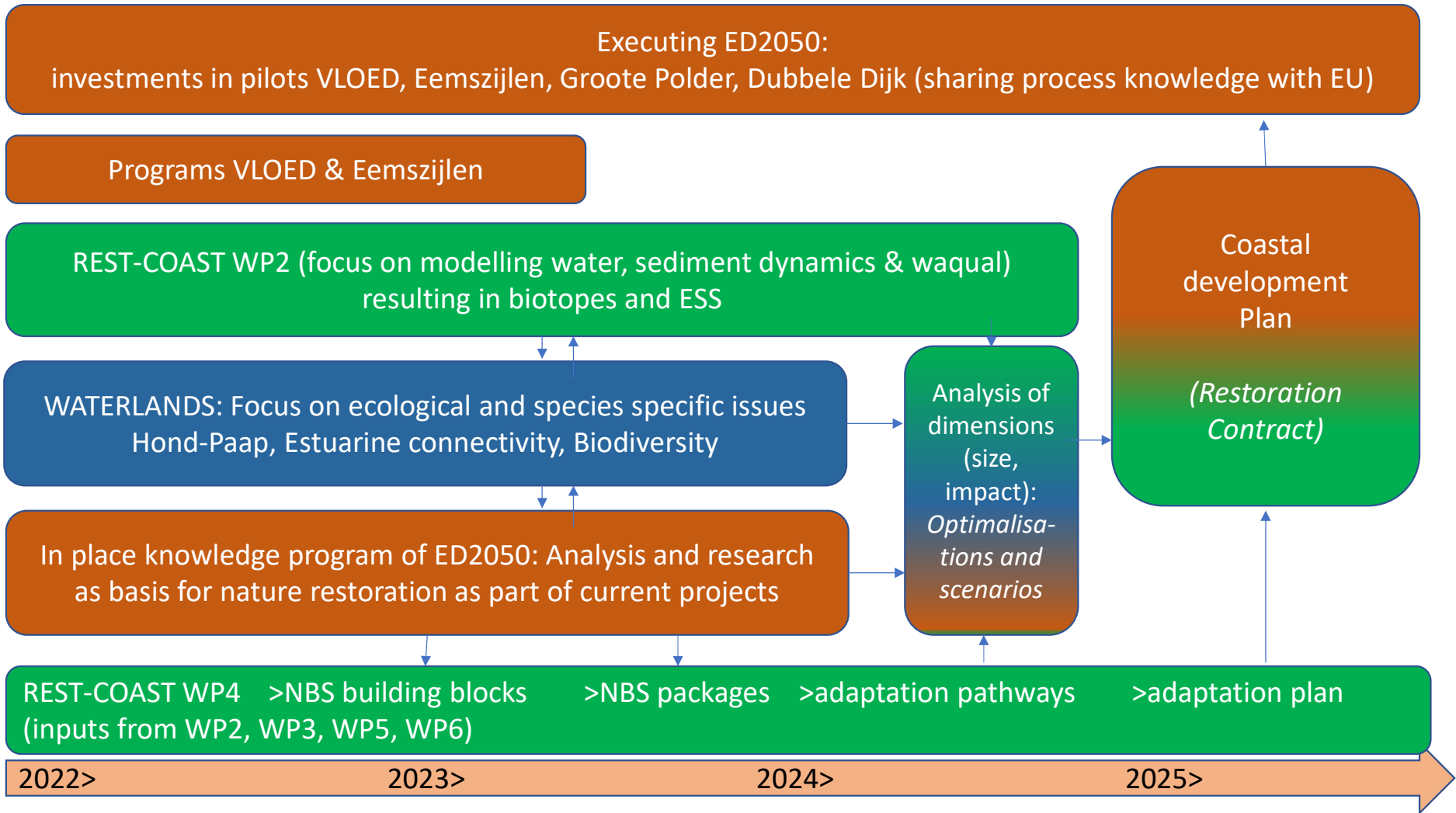
Process design and facilitation make these tools more effective ***Key success Internationale knowledge exchange NBS***

- ***Speaking the same language***
- ***Select the right tools (new tool needed?)***
- ***Make friendships***
- ***Twinning/Demonstrators***
- ***Mapping and Monitoring***
- ***Participation***



Thank you!

Integration REST-COAST & WATERLANDS within ED2050 program



WATER ADAPTATION COMMUNITY WEBINAR

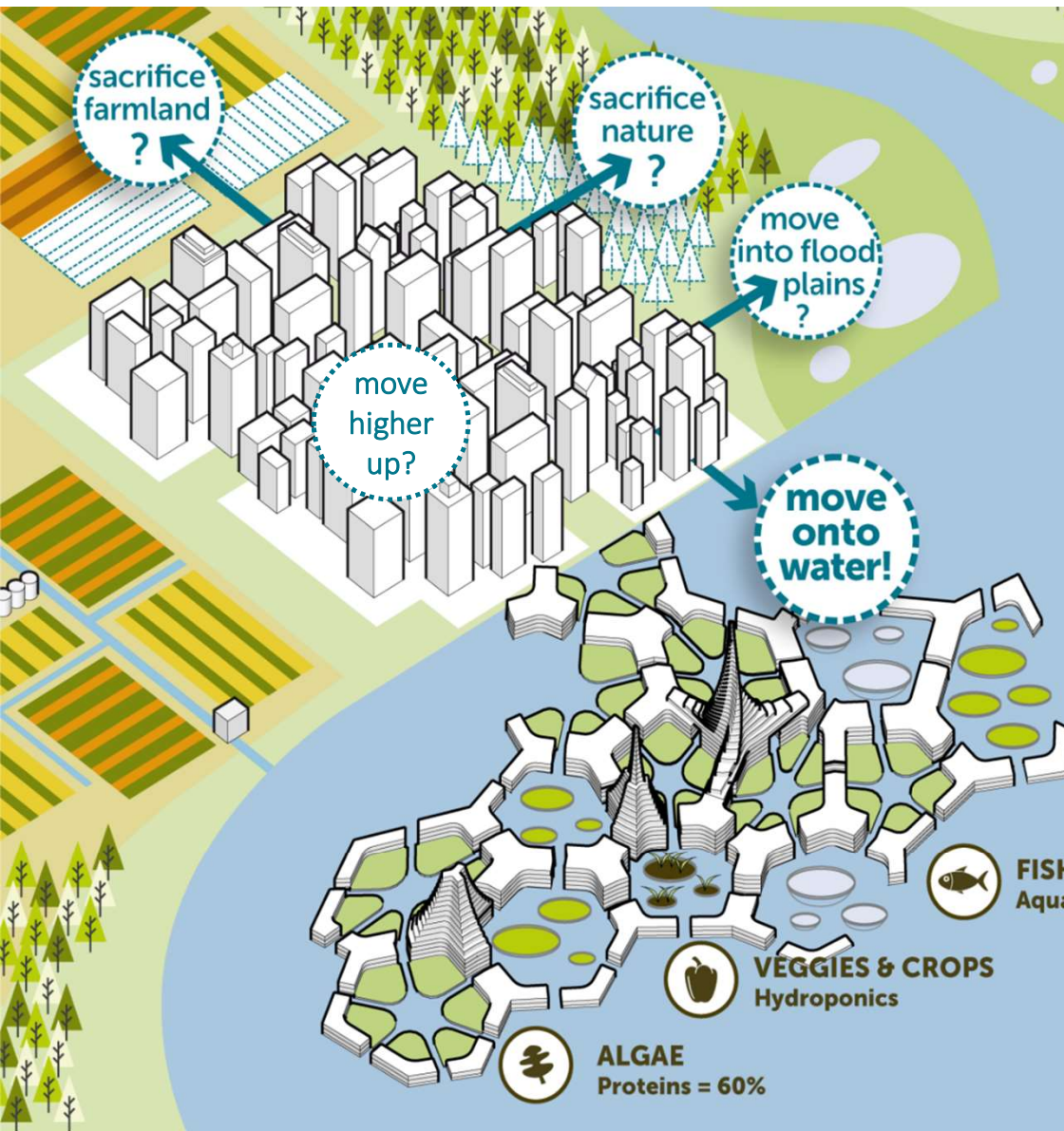


GLOBAL
CENTER ON
ADAPTATION

SCALING UP NATURE-BASED SOLUTIONS FOR ADAPTATION IN COASTAL AREAS

Thursday, 23rd June 2022, 12:30–14:00 CEST





OUR SOLUTION:

CREATING NEW SPACE ON THE WATER

Building floating structures on water it is possible to gain space for food production and urbanization without competing for scarce land.

Floating v.s. Land reclamation



Image Source: blue21



Image Source: : www.portcalls.com/nii-builders-takes-p74b-reclamation-project-expand-manila-harbour-centre/

Floating developments	Land reclamation
Ecological habitat created, less disruptive	Detrimental impacts on corals and marine life
Scalable and no time needed for soil stabilization	Large capital investment needed to start with
Adaptive to sea level rise	Not adaptive, dikes
Resistant to earthquakes and tsunamis	Vulnerable for natural events
Possible prefabrication elsewhere with fast deployment	Long construction period

INDYMO – Impacts of floating structures

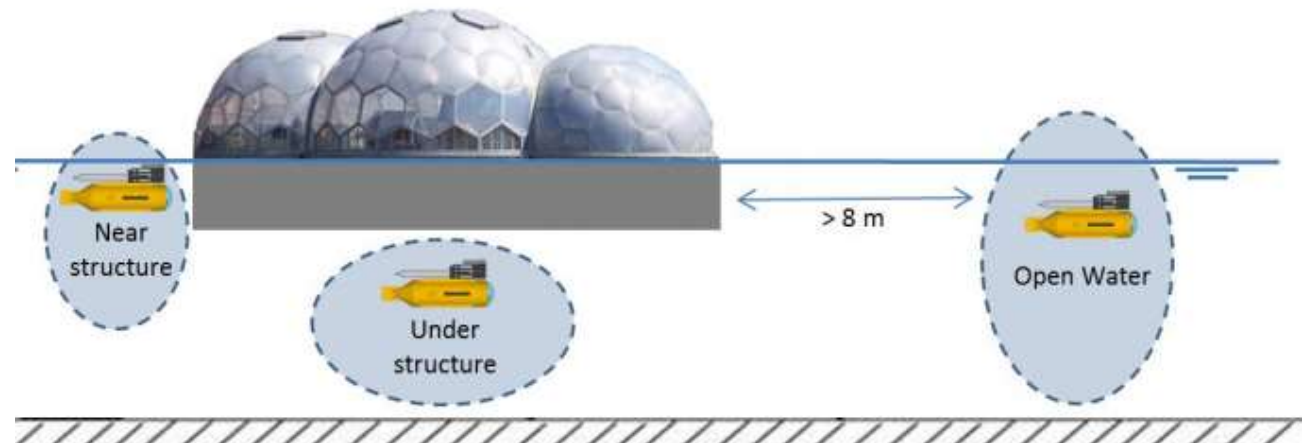


INNOVATIVE
DYNAMIC
MONITORING

Water quality and ecology

Several case study locations
(15+) with floating structures
around the Netherlands

Measurement campaign from
2014-2020



Rui L. Pedroso de Lima, Rutger E. de Graaf-van Dinther, Floris C. Boogaard (2022); Impacts of floating urbanization on water quality and aquatic ecosystems: a study based on in situ data and observations. *Journal of Water and Climate Change* 2022; jwc2022325.