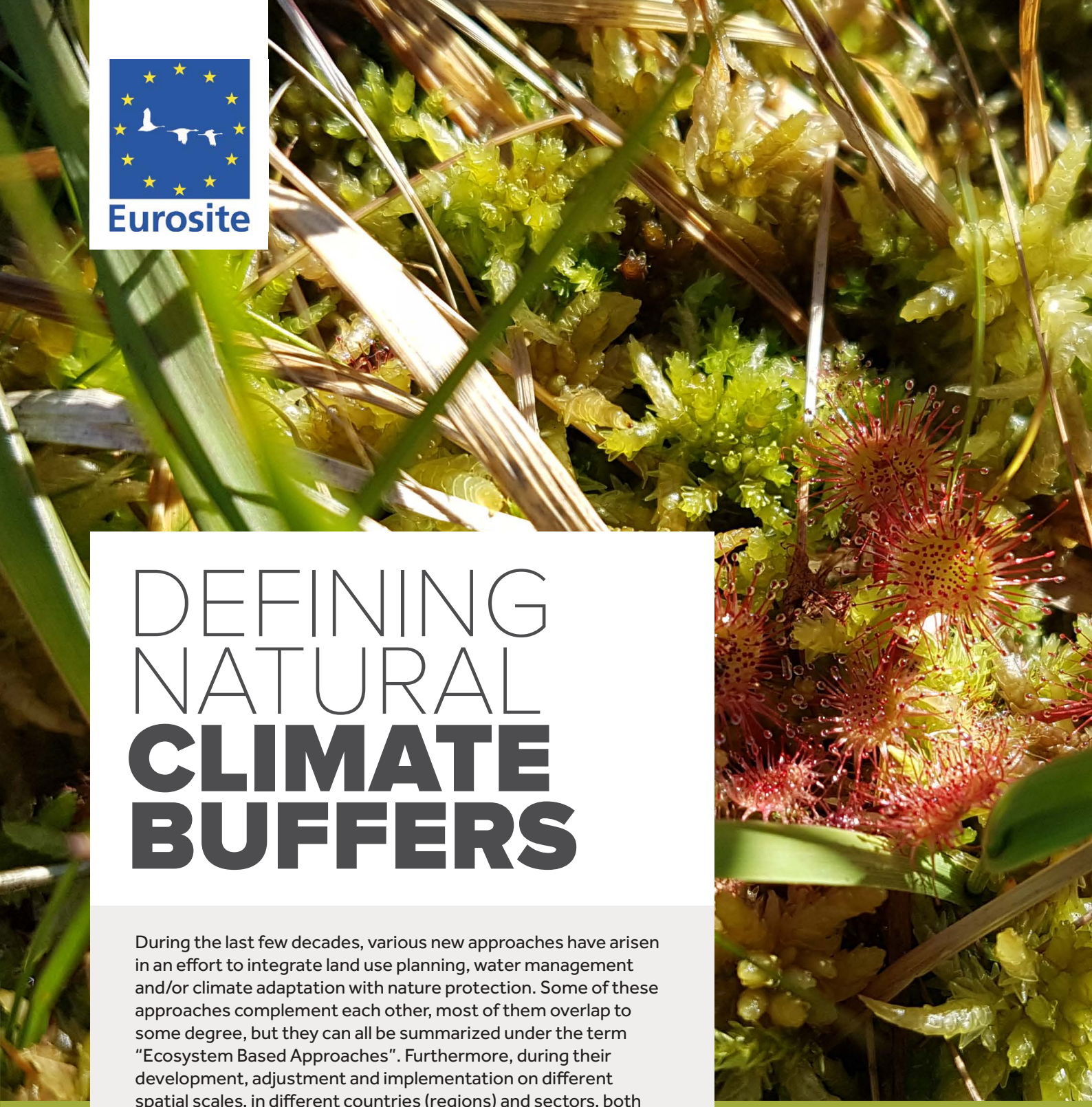


Eurosite

DEFINING NATURAL **CLIMATE BUFFERS**

During the last few decades, various new approaches have arisen in an effort to integrate land use planning, water management and/or climate adaptation with nature protection. Some of these approaches complement each other, most of them overlap to some degree, but they can all be summarized under the term "Ecosystem Based Approaches". Furthermore, during their development, adjustment and implementation on different spatial scales, in different countries (regions) and sectors, both their definitions and terminology were often mixed up and confounded. This may present an obstacle to their credibility, applicability and acceptance in relevant fields, but it also impedes their mainstreaming.

One of these new approaches is the concept of "Natural Climate Buffers" (NCB). In the following sections we will clarify the concept and show how it fits within the overall concept of Ecosystem Based Approaches.

NATURA 2000

Life

SHORT **HISTORY**

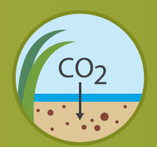
Natural Climate Buffers were first defined in 2007, in the study commissioned by Vereniging Natuurmonumenten, Waddenvereniging, Birdlife Netherlands and Ark Nature - "Natuurlijke klimaatbuffers voor een klimaatbestendiger Nederland" (lit. *Natural climate buffers for a more climate-proof Netherlands*).

Definition and typology developed in this Study formed a basis for today's definition, as presented by the Dutch Coalition for Natural Climate Buffers.

TYPES OF **NATURAL CLIMATE BUFFERS (NCB)**

BIO-BUILDERS
use vegetation and other nature-based structures to capture sediment in coastal areas. Moreover, they reduce the impact of waves and the sea level rise.

They consist of "living breakwaters" and can literally grow with the sea! So during (and due to) sea level rise, the altitude of the climate buffer area is also increasing. This contributes to coastal and shore defence.



CARBON-SINKS
are areas where more carbon is stored than released. Forests and "mature" wetlands (including mires and bogs) are the best examples of such carbon sinks.

These are NCB squared! They contribute both to climate adaptation (water retention or coastal protection) and to climate mitigation (by reducing CO_2-emissions and by carbon sequestration). Examples are peatland areas, salt marshes, shellfish banks and seagrass vegetation. Restoration and extension of such areas delivers multiple benefits.

GREEN AIRCOS
reduce air temperature by restoring and/or preserving green and blue areas in and around cities.

These are blue and green (natural) areas which offer coolness close to or in residential areas. These areas absorb solar radiation and are an important tool for limiting temperature rise in build-up areas. They can be combined with other NCB types (e.g. natural sponge or carbon-sinks), but also with retention and/or recreational areas and thus deliver society even more ecosystem services.

NATURAL SPONGES
are areas which temporarily store water that is slowly being discharged into streams and rivers or used to recharge the groundwater system. Natural sponges are often, but not always, carbon sinks.

This climate buffer type retains water in upstream nature areas. This can be done in 'capillaries' of the surface water system (brooks, ditches, natural depressions), in peatland areas, forests, meadows and wet heathlands/ marshlands.

LIVING COASTS include natural dunes with moving sands, sandbanks or salt marshes that prevent or reduce coastal erosion and provide flood protection from coastal waters.

They strengthen the coastal flood defence structures by fostering natural processes - e.g. formation of sand dunes (by free drifting sand) and salt marshes which decrease the power of the waves. They increase the biodiversity of an area by providing an attractive habitat for aquatic organisms, coastal plants and birds.

BLUE-GREEN SPACE
is an area that temporarily stores water during heavy precipitation and peak discharges.

Due to an increase in the occurrence of torrential rains and heavy rainstorms the water being discharged through rivers increasingly exceeds their maximum capacity and flooding of areas along the rivers becomes a potential threat. Widening of the river beds by restoring floodplains is an important approach to increase their discharge capacity. The 'Space for rivers' programme in the Netherlands is built on this principle. This NCB combines climate adaptation with restoring landscape and biological diversity and creating recreational opportunities, sometimes combined with low input agriculture.

DEFINITION **AND PRINCIPLES**

Natural Climate Buffers are areas where natural processes are given space. As a result, they evolve with climate change, adapt to it and can play a vital role in retaining and collecting water (thus preventing the floods or water shortages), tempering heat and reducing carbon dioxide in the atmosphere. Natural Climate Buffers can improve the quality of human life, while restoring and/or preserving the biodiversity at the same time, as well as providing a wide range of other ecosystem services.

[The Dutch Coalition for Natural Climate Buffers]

NCB are areas where natural processes are given space in order to increase social and ecosystem resilience against the impacts of climate change. As a result, NCB are areas which have been designated to "buffer" the impact of climate change by:

- retaining water,
- temporarily storing flood waves,
- reducing CO_2 in the atmosphere,
- regulating air temperature,
- adapting to sea level rise and absorbing wave energy.

Retaining water is essential in the upstream parts of watersheds to slow down discharge and prevent peaks in discharge patterns and to conserve water for dryer periods, while temporarily storing water is essential in downstream parts of watersheds like floodplains to level out peaks in water discharge of rivers and streams. Green and blue areas like wetlands and parks in urban areas have a buffering effect on high temperatures, while green areas sequester CO_2. NCB thus contribute to local communities' well-being and, at the same time, restore and/or preserve biodiversity, as well as provide a wide range of other ecosystem services.

In a nutshell, Natural Climate Buffers:

- use natural processes as spatial solutions to create climate resilient urban and rural landscapes;
- prioritise climate adaptation as the main ecosystem function while safeguarding other existing ecosystem functions;
- increase biodiversity and ecosystem connectivity.

RELATED **APPROACHES**

Nature-based Solutions (NbS) are still considered to be a relatively 'young' concept, in the process of being framed. Therefore, in 2016 IUCN prepared a publication aiming to deepen the understanding of the concept and confirm the principles upon which NbS are based, all in order to move towards an operational framework. In that context, NbS are considered an umbrella concept that covers a range of different approaches. Those approaches have emerged from a variety of spheres (scientific research, practice or policy), but they all share the same focus on ecosystem services.

The European Commission recognizes Nature-based Solutions (even though their definition is slightly different from one adopted by IUCN) as an important approach of adapting to climate change and it actively promotes implementation of **Natural Water Retention Measures (NWRM)** - multi-functional measures that aim to protect and manage water resources using natural means and processes, while building up Green Infrastructure. NWRM have the potential to provide multiple benefits, including flood risk reduction, water quality improvement, groundwater recharge and habitat improvement, thus helping to achieve the goals of key EU policies.

The relationship between the NCB concept, Nature Based Solutions and Natural Water Retention Measures is presented on the next page.

Nature-based Solutions (IUCN 2016)	**Natural Water Retention Measures (EC 2014)**
Definition:	***Definition:***
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.	*Natural Water Retention Measures are multi-functional measures that aim to protect water resources and address water-related challenges by restoring or maintaining ecosystems as well as natural features and characteristics of water bodies using natural means and processes. [...]* *NWRM have the potential to provide multiple benefits, while the preserved or restored ecosystems can contribute both to climate change adaptation and mitigation.*

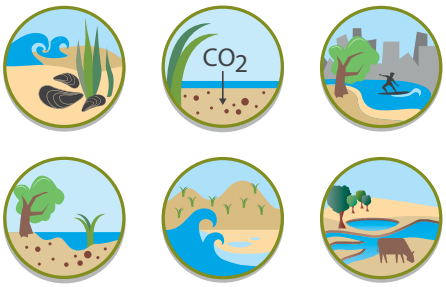
Some NWRM can be linked to certain NCB types...

Natural Water Retention Measures (NWRM)

I. Direct modification in ecosystems:
- Rivers and connected wetlands,
- Lakes and connected wetlands,
- Aquifers

II. Change & adaption in land-use & water management practices:
- Agriculture
- Forestry and pastures
- Urban development

Natural Climate Buffer (NCB) concept



... while NCB can be seen as an informative way to illustrate the NbS concept by highlighting the societal aspect of climate change.

Nature-based Solution (NbS) concept

ER	Ecological Restoration
EE	Ecological Engineering
FLR	Forest Landscape Restoration
GI	Green Infrastructure
NI	Natural Infrastructure
EbMgt	Ecosystem-based Management
EbA	Ecosystem-based Adaptation
EbM	Ecosystem-based Mitigation
Eco-DRR	Ecosystem-based Disaster Risk Reduction
CAS	Climate Adaptation Services
AbC	Area-based Conservation

FURTHER READING

- Andriesse L.A., Akkerman G.J., van den Broek T., Vos P., Martens D.C.A.M., Stroeken P.F.A., Speets R. (2007): Natuurlijke klimaatbuffers voor een klimaatbestendiger Nederland. Royal Haskoning Netherlands.
- Cohen-Shacham E., Walters G., Janzen C. and Maginnis S. (eds.) (2016): Nature-based Solutions to address global societal challenges. Gland,Switzerland: IUCN. xiii + 97pp.
- Dutch Coalition for Natural Climate Buffers webpage (2018): https://www.klimaatbuffers.nl/
- European Commission - Environment (2014): EU policy document on Natural Water Retention Measures (Technical Report 2014-082). Office for Official Publications of the European Communities, Luxembourg ii + 12pp.
- NWRM Platform (2018): http://nwrm.eu/

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The Eurosite Wetlands and Climate Change Working Group

Eurosite

Climate-adapted wetlands can play an instrumental role in mitigating the adverse impacts of climate change and function as *natural climate buffers* – also for other land use and economics. Developing robust, connected and resilient wetlands is an objective of this working group.

Eurosite's Wetlands and Climate Change Working Group was set up following the request by a number of Eurosite members to exchange ideas on dealing with the new challenges presented by global climate change.

The main goals of the Eurosite's Wetlands and Climate Change Working Group are to:
- increase exchange of knowledge about ecosystem-based approaches to adapt wetlands to climate change and mitigate its impacts;
- follow, react to and influence the developments of policy and practice in relation to wetlands and climate change and their effects on the Natura 2000 network, and advocate best possible approaches;
- cooperate on the development of joint projects and identify funding sources.

The Wetlands and Climate Change Working Group meets regularly throughout the year and organises annual demand-driven knowledge exchange events on relevant topics.

Visit www.eurosite.org for more information.

This publication is financially supported by the European Union. The sole responsibility lies with the author – the Agency is not responsible for any use that may be made of the information contained herein.