Nature Based Solutions: Reporting and analyzing insights from Europe

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ITS4.4/ERE1.10 – Nature-Based Solutions and Climate Engineering in Climate Governance

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1. Background: The ARTISAN project

Achieving Resiliency by Triggering Implementation of nature-based Solutions for climate Adaptation at a National scale (2020-2028)

Coordinator

- French Office of Biodiversity.

Number of partners and pilot sites

- 28 partners.
- 40 actions and 10 NBS projects in Metropolitan-Overseas France.

Le climat change, adaptons-nous avec la nature

Objectives

- Demonstrating and valorizing the potential of NBS.

- Raising awareness and training stakeholders on NBS.

-Supporting and amplifying NBS projects in Metropolitan and overseas France.

Foreseen plans

- A wide scale Demonstrator program.

-Conception, adaptation and dissemination of decision support tools.

- Creation and animation of actor networks.

2. Objectives of the presented work

Action A2: Status report on knowledge building needs in order to mainstream Nature-Based adaptation Solutions (NBaS)

- **Outcome 1:** A multi-scale state of the art on NBaS

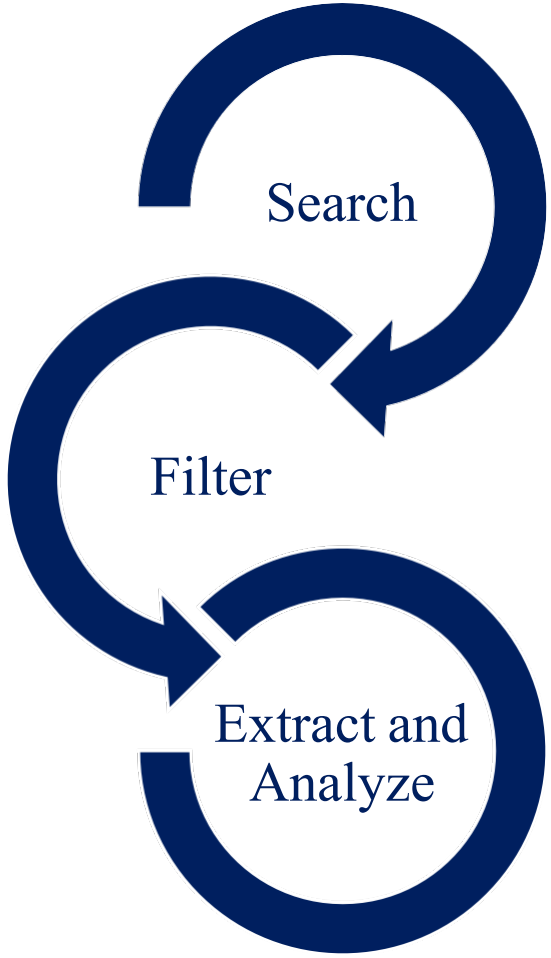
Target scales: France (National), **Europe (Regional)** and International

Research problematic: Revealing the dynamic, progressive and ongoing to climate change related notions, and ultimately to NBaS.

- **Outcome 2:** An inventory of research needs for NBaS in France

Target scale: France (National)

Research problematic: Prioritizing research needs for mainstreaming NBaS and for accurately mapping actors.



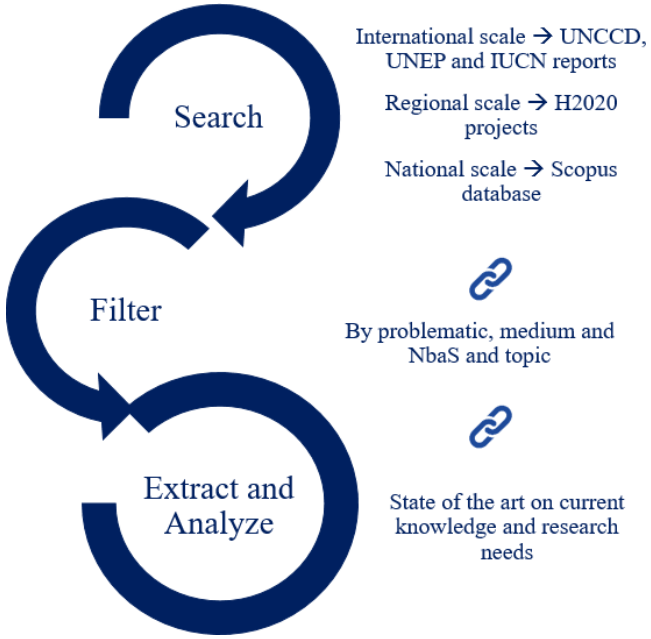
Why a multi-scale approach?

i. A knowledge gradient over a macro to micro spectrum (similarities, differences and positioning)

ii. A multiscalar investigation of the transition from NbS to NbaS.

iii. A study of present and future trends/orientations.

iv. Highlighting research needs and priorities across different levels

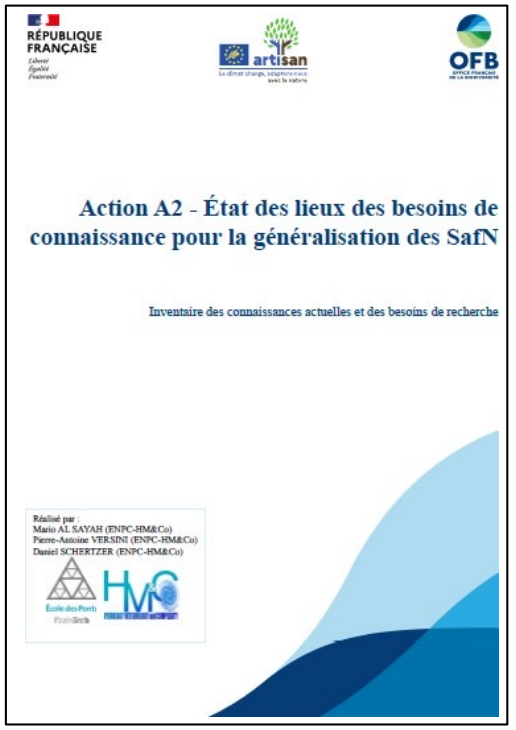


International scale: Conceptual (to a lesser extent scientific)

Regional scale: Scientific (to a lesser extent technical/political)

National scale: Scientific (to lesser extent practical)

A muti-background inventory of current knowledge and research needs



EGU General Assembly 2022

A systematic analysis of Horizon 2020 Nature-Based adaptation Solutions projects

3. The Regional scale: H2020 projects

Objectives

- Lessons learned from completed projects
- Ongoing efforts
- Target areas (statistics by European countries)
- Potential Success stories and opportunities
- Limitations, challenges

Methodology

Searching the CORDIS database for NBaS related H2020 projects

H2020 database search	Project acronym	Full name of the project Validation of projects against supporting evidence (Wild et al. 2020) and Oppla database
Status Beginning-Ending *Ongoing/Ended*	Project results from CORDIS database and each project's website	Sorting of outcomes per type
Filtering deliverables per problematic, thematic, target area and NBS studied	Extracting information of interest	**41 projects** (16/41) **~ 616 outcome** **~ 239 deliverables**

A two level classification:

- General → by medium
- Detailed → by pilot site, problematic and NBaS (projected or implemented)

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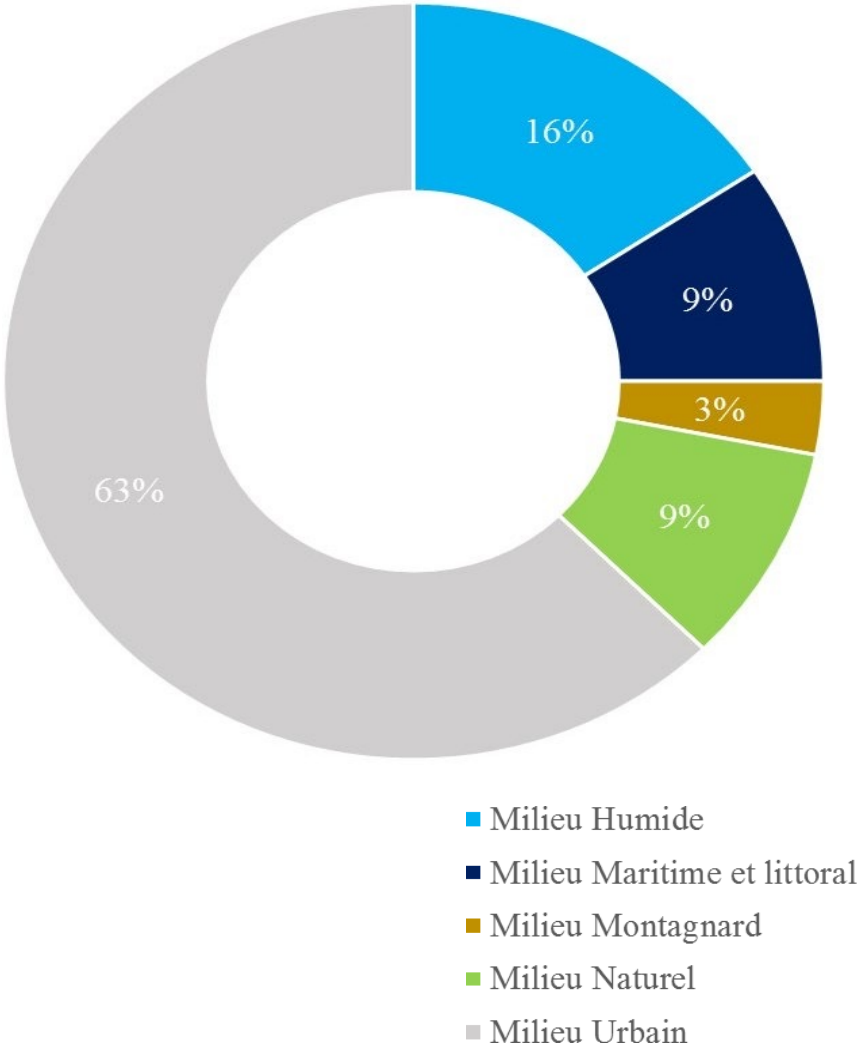

3. The Regional scale: H2020 projects

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Detailed classification

Table 8: The OPERANDUM project

Project	Study area	Specificities /Specific problematic	Open Air Lab's general problematic	Project's General Problematic	Milieu (ref A1)	NBAS	P\R
OPERANDUM	Three pilot areas in the Po valley Italy OAL Po valley Panaro river	Flooding	The delta of Po river represents a transition between the river and the sea, and has therefore different hydraulic, morphological and biological characteristics Flooding, droughts, coastal erosion, potential storm surge Economic engine for Italy (agriculture fisheries, food, manufacturing) Biodiversity is at risk (UNESCO protected areas)	Severe hydro-meteorological phenomena are having a high impact in European territories and are of global concern. The science behind these phenomena is complex and advancement in knowledge proceeds with progress in data acquisition and forecasting useful for real-scenario interventions. The employment of nature-based solutions (NBS) to mitigate the impact of hydro-meteorological phenomena is not adequately demonstrated, still uncoordinated at the European level, therefore not reaching full potential. Reduce hydro-meteorological risks in European territories through co-designed, co-developed, deployed, tested and demonstrated innovative green and blue/grey/hybrid NBS	Humid area (riverbank)	Installation of herbaceous perennial deep rooting plants as coverage of earth embankments, for preventing riverbank failures induced by erosion.	P
	Italy Bellocchio beach (UNESCO World Heritage site)	Coastal erosion			Mer et littoral (Sea and coastal areas)	Artificial dune consolidated with naturalistic engineering work that should protect a the dune and study area from erosion	P
	Italy Po di Goro	Flooding, drought and salt intrusion			Humid area (river delta)	NBS that mitigate salt intrusion and save the many activities related to agriculture along the Po river	P
	Finland Lake Puruvesi catchment	Forest harvesting and extreme weather events may increase suspended solid and nutrient load to Lake Puruvesi Subsequent Eutrophication	Known for its pure water and has uniquely excellent underwater visibility that reaches up to 12 meters. However, recent observations have		Humid area (Lake)	Peak flow control structures Sedimentation ponds Submerged dans	P

H2020 projects

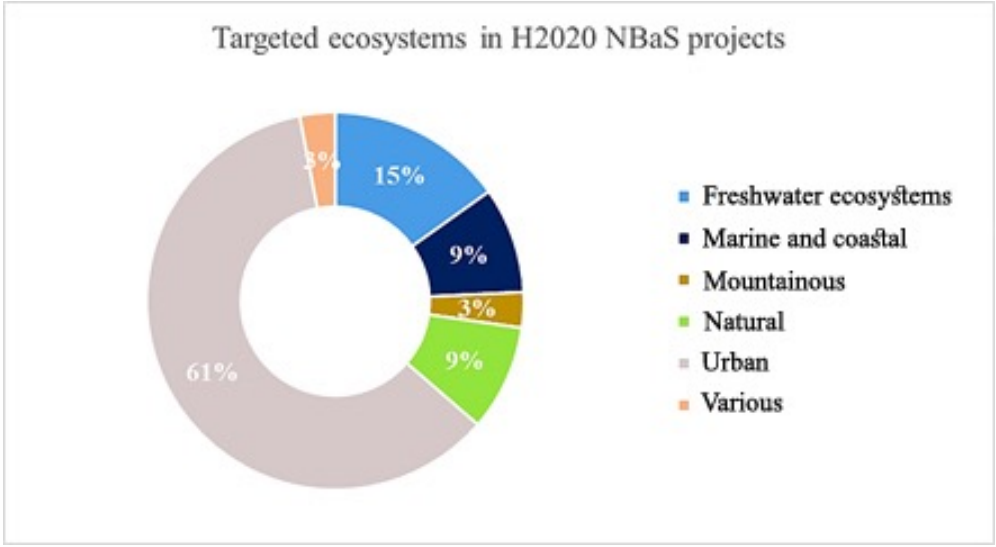
- A detailed classification of the retained projects was performed to filter them according their study areas, general and specific environmental challenges, medium of interest, type of NBaS and status (prospected or realized)

- The aim of this classification is to filter deliverables for curating information of interest.

3. The Regional scale: H2020 projects

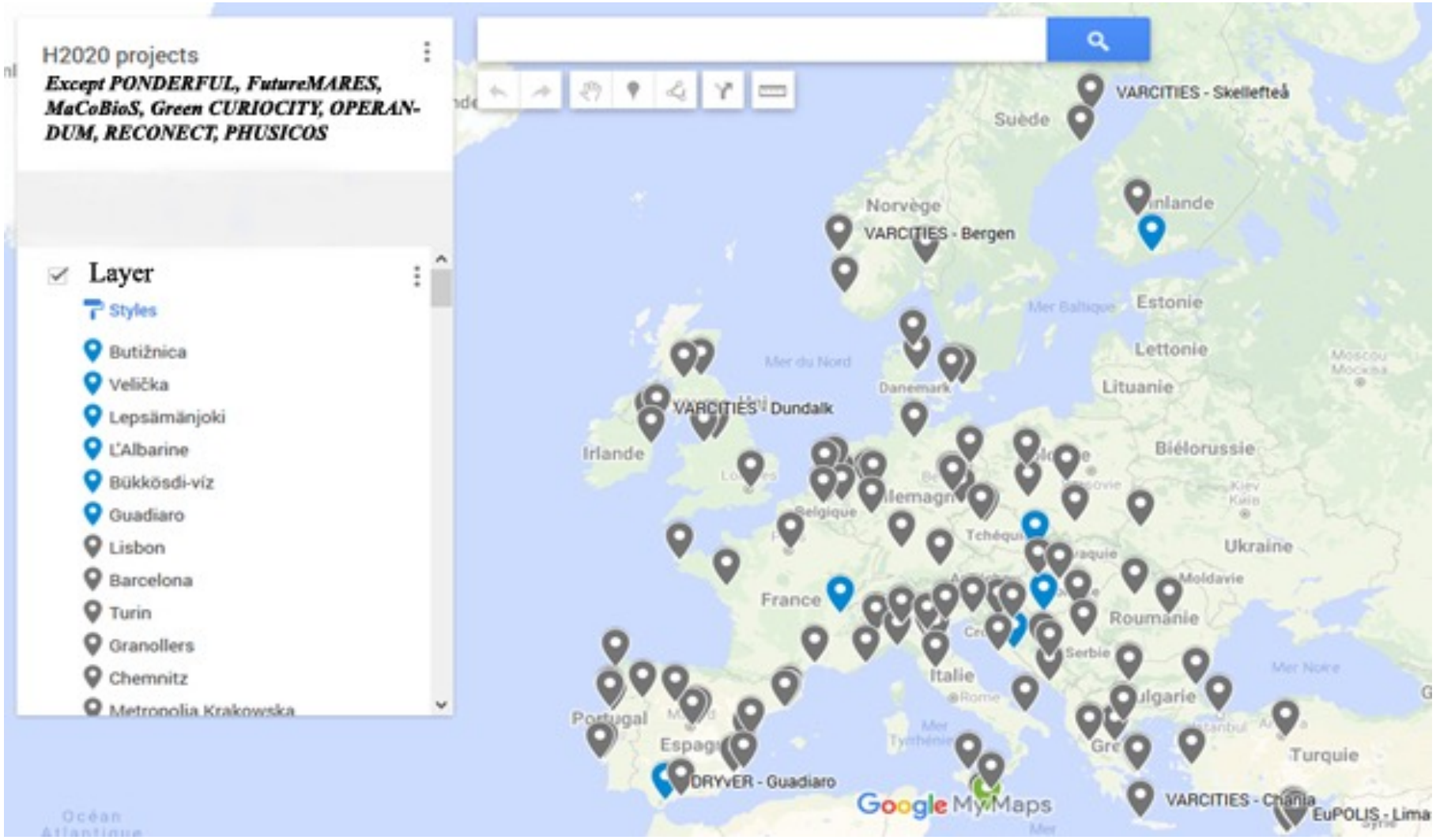
Detailed classification

H2020 NBaS projects		Ecosystem services			
Name	Ecosystem	Provision	Regulation	Support	Cultural
DRYvER	Freshwater	•		•	•
Future MARES	Marine and coastal	•	•	•	
PHUSICOS	Mountainous	•	•	•	
ReNature	All	•	•	•	
NAIAD	All	•	•	•	•
thinknature	All	•	•	•	•
OPERANDUM	All	•	•	•	•
UNaLab	Urban	•	•	•	•
CLEVER Cities	Urban	•	•	•	•
EdiCitNet	Urban	•		•	•
Connecting Nature	Urban	•	•	•	•
Grow Green	Urban	•	•	•	•
NATURVATION	Urban	•	•	•	•
URBAN GREEN UP	Urban	•	•	•	•
URBiNAT	Urban		•		•
proGIreg	Urban	•	•	•	•
euPOLIS	Urban	•	•	•	•
REGREEN	Urban		•	•	•
CLEARINGHOUSE	Urban		•	•	•
RECONECT	Urban	•	•	•	•
NATURE 4 CITIES	Urban		•	•	•



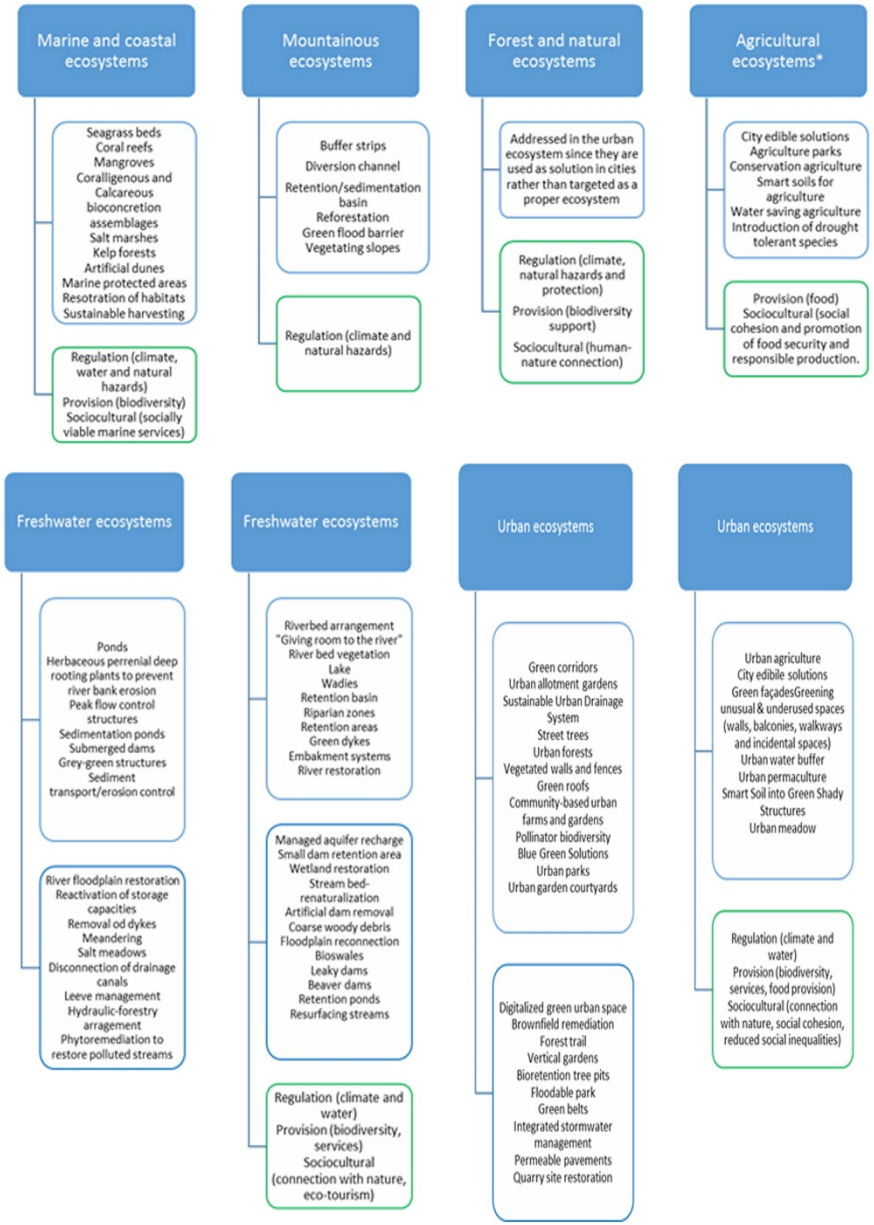
3. The Regional scale: H2020 projects

Geographical gradients



3. The Regional scale: H2020 projects

Type of utilized solutions (non exhaustive list)



- Clear preference of Type 2 and 3 NBS
- Much less use of NBS Type 1. This could be due to the prevalence of the urban environment as the most dominantly studied ecosystem. However, this makes most NBS and the related knowledge more or less limited to the urban environment, hence not necessarily applicable in others

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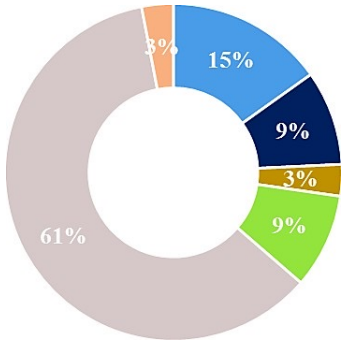
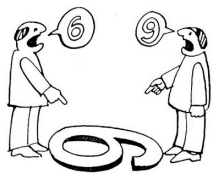
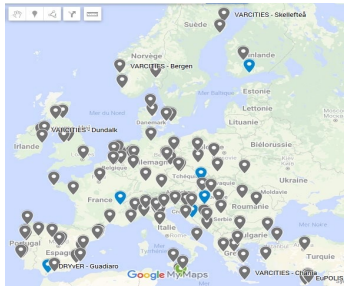


- Milieu Humide
- Milieu Maritime et littoral
- Milieu Montagnard
- Milieu Naturel
- Milieu Urbain
- Tous



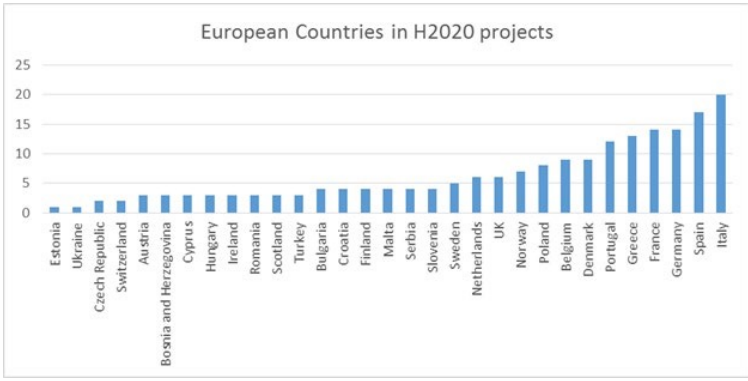


Specific findings

-Detailed inventory of current knowledge and limitations per ecosystem (urban, freshwater, marine-coastal, mountainous, forest-natural, and agricultural)

-Detailed inventory of current knowledge and limitations per main research topics:

- Climate change adaptation
- Risks of oversimplification
- System complexity
- Uncertainty
- The scale quandary
- Progress measuring-monitoring, and disservices.



Proposed research perspectives

- Interest in NbS-NbaS should extend beyond the urban ecosystem, while deeper knowledge on nature (the physical fundamentals of the N) in NbS-NbaS is needed.

- Understand if NbaS are intended to withstand weather change and/or climate change.

-For the implementation of wide-scale solutions, an extension beyond conservationism is needed, and a better accommodation of uncertainties is required → Understanding ecosystem tipping points, thresholds, and the resource efficiency of NbaS is primordial.

-Acknowledging that both ecosystem development and climate change will keep progressing throughout the existence of NbaS. Therefore, the interacting co-evolution of ecosystems, NbaS and climate change should be further studied where their interaction could be forgotten.

Contact and information

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https://www.ofb.gouv.fr/sites/default/files/2022-02/Livrable_A2-ENPC.pdf