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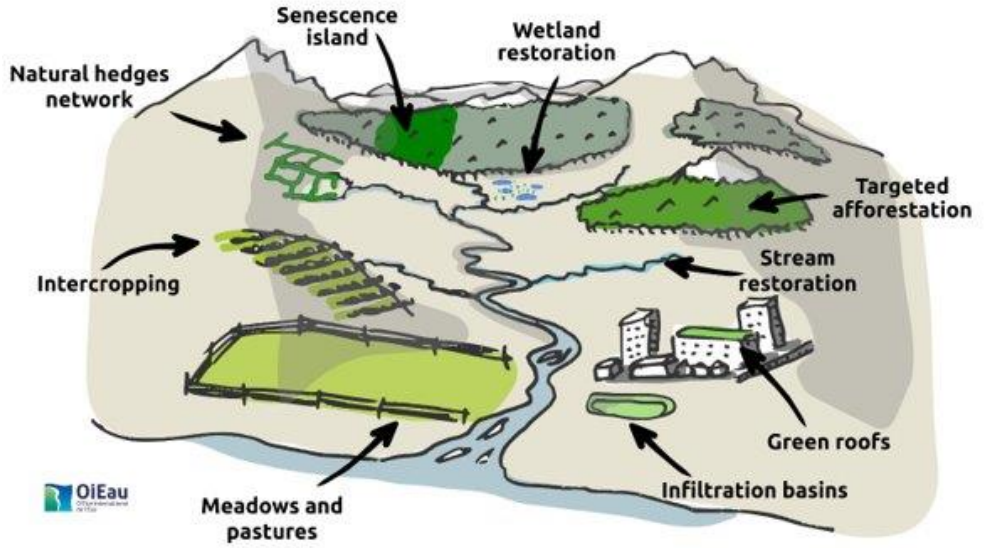
PRESENTATION OF THE NATURE-BASED SOLUTIONS CATALOGUE FOR RBMPS



30 october 2024

Yannick Pochon & Maxime Fouillet
International Office for Water (OiEau)

Implementing partners

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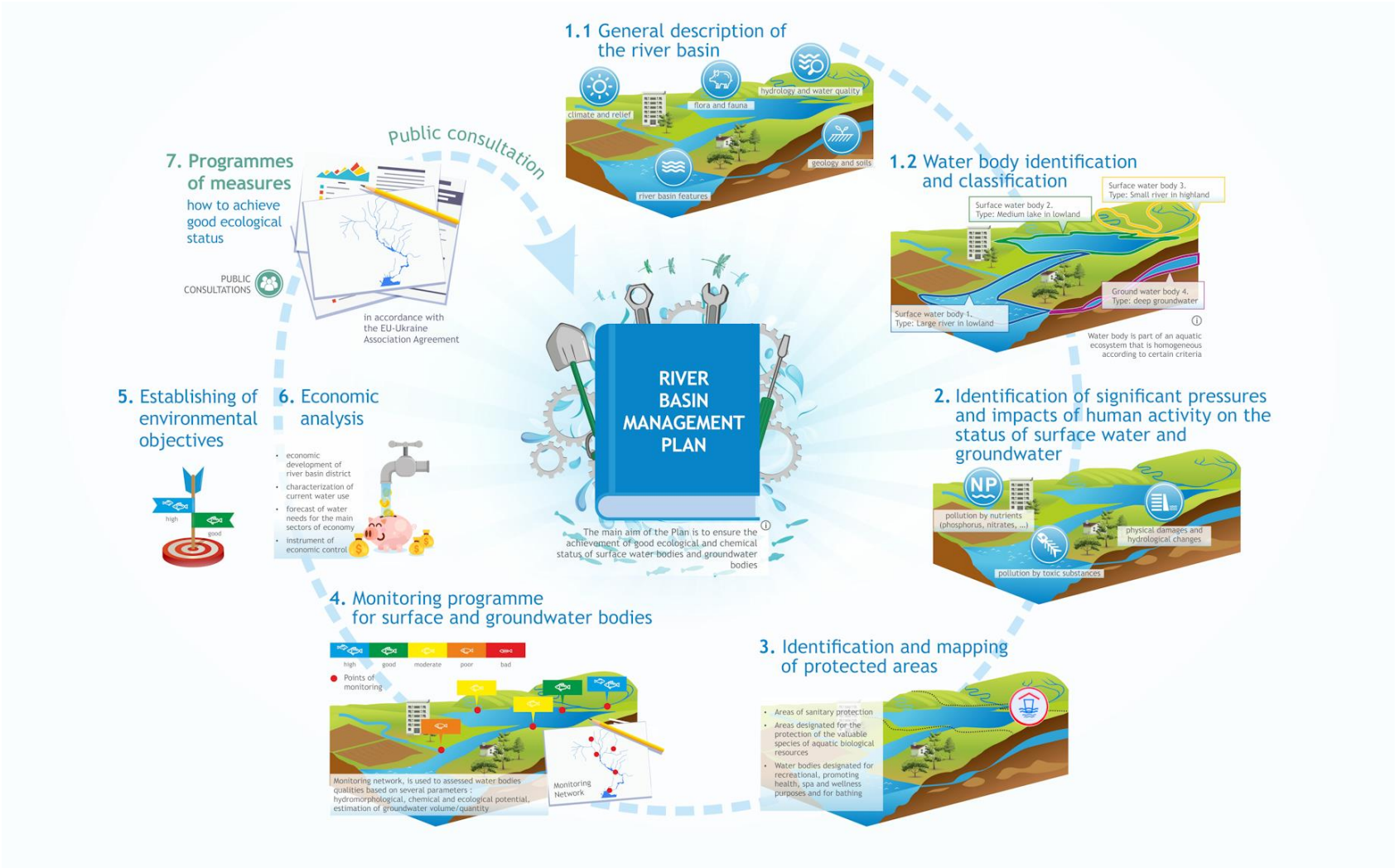
RIVER BASIN MANAGEMENT PLAN PROCESS



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IDENTIFICATION OF MEASURES

Water Bodies delineation

- Rivers
- Lakes
- Transitional water
- Coastal water
- Groundwater

Pressures analysis

- Point sources: urban waste water, industries;
- Diffuse sources: agriculture;
- Abstraction;
- Physical alteration;
- Etc.

Risk assessment

- To identify the water bodies which are at risk of failing to meet the Environmental Objectives of the Water Framework Directive, either because they will not achieve good status or because their status is at risk of deterioration

Programme of Measures

- To achieve the good status of water bodies
- Significant pressures mapped to Key Type of Measures
- **Including Nature Based Solutions**

ELABORATION OF THE NBS CATALOGUE

Reminder of the calendar

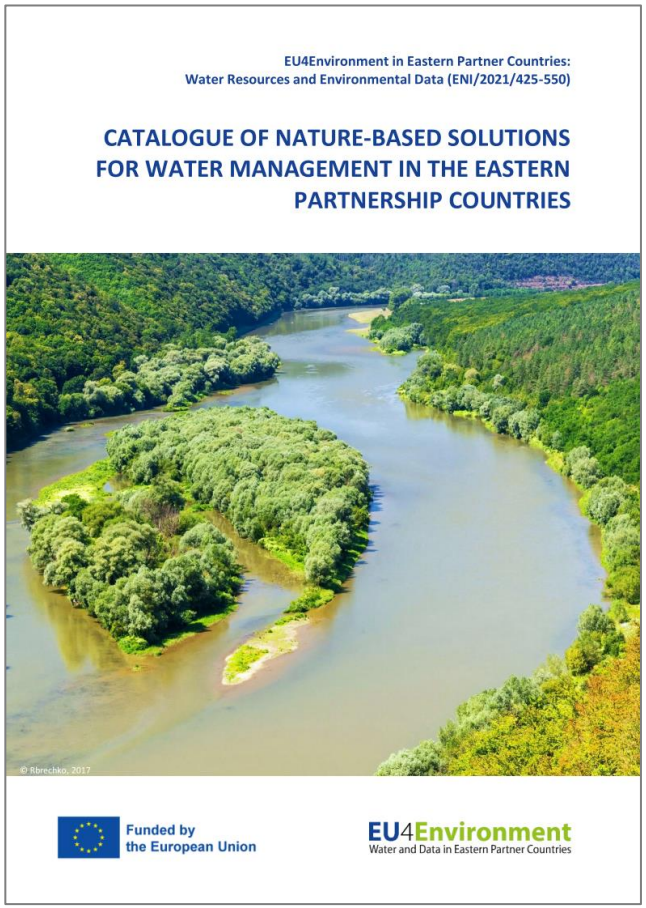
- 2022 - Launch of the EU4Environment programme
- 2022 to 2023 - Local NbS workshops in the frame of NPD
- July 2023 - NbS regional workshop 2023
- July 2023 to September 2024 - work on the NbS Catalogue
- 17.09.2024 - final publication :

https://eu4waterdata.eu/en/resource-library-hidden/56-eap-region-3/378-Catalogue-of-nature-based-solutions-for-water-management-in-the-eastern-partnership-countries.html

OBJECTIVES OF THE NBS CATALOGUE

- Ease the integration of Nature-based Solutions into Programmes of Measures (PoM)
- Decision support: what Nature-based Solutions are relevant?
- Description of measures to integrate them into Programmes of Measures (PoM)
- Access to further technical references for implementation

The Nbs Catalogue will be translated into the 5 languages of the Eastern Partner Countries to facilitate ownership and continuous update



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⇒A short reminder of how NbS are to be included in the Programme of Measures (PoM) of River basin management plans (RBMPs)

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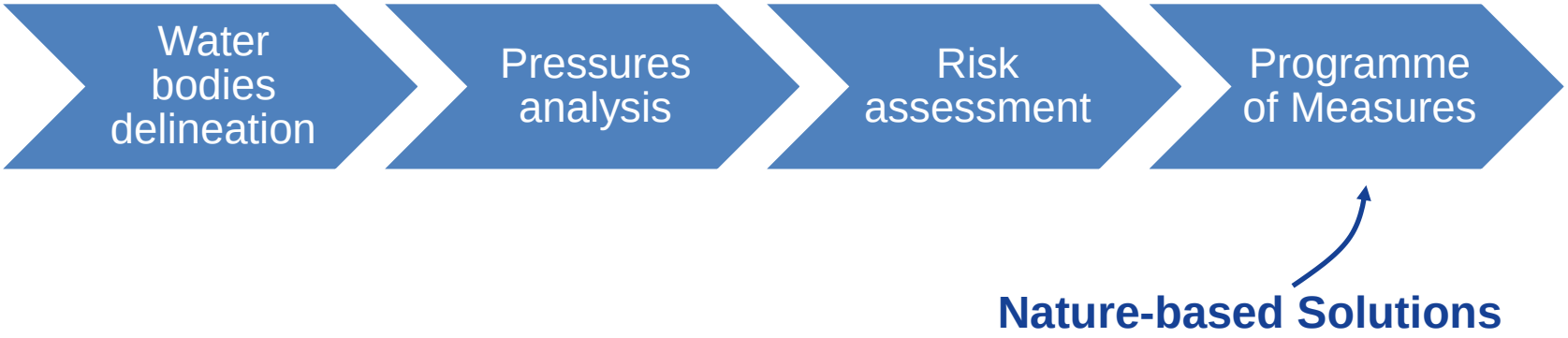
SELECTION OF NATURE-BASED SOLUTIONS



- For this matter, the NbS Catalogue is based on pressures according to the Water Framework Directive

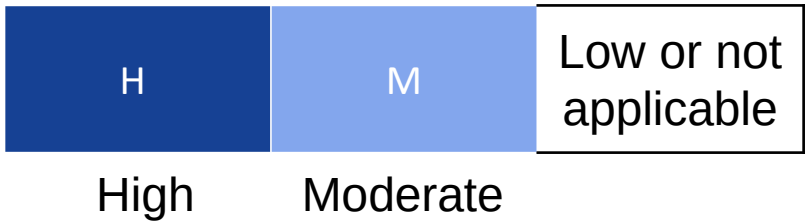
Relevant Nature-based Solutions for each pressure + **Their co-benefits**

SELECTION OF NATURE-BASED SOLUTIONS

- Pressures types to be taken into account (consistent with WFD & EUWI+):
  - **Point source pollution**: urban waste water, storm overflows, industrials plants, contaminated sites, etc.
  - **Diffuse source pollution**: urban run-off, agricultural, forestry, transport, etc.
  - **Abstraction and flow diversion**: agriculture, public water supply, industry, cooling water, etc.
  - **Hydromorphological pressures**:
    - Physical alterations of channels/bed/riparian are/shore
    - Dams, barriers and locks
    - Hydrological alterations

SELECTION OF NATURE-BASED SOLUTIONS

- The most relevant Nature-based Solutions for each pressure type
- Including following informations:
  - The level of effectiveness (high or moderate)
  - The name of the Nature-based Solution
  - The link to the detailed presentation of the Nature-based Solution
  - Co-benefits: focus on flood prevention, drought prevention and biodiversity preservation(high, moderate, low) + contribution to other EU policies (high, moderate, low)



It gives an indicative level of effectiveness. Real effectiveness varies according to multiple factors to be taken into account for the implementation.

SELECTION OF NATURE-BASED SOLUTIONS

H: high effectiveness; M: moderate effectiveness.

Technical sheet	Effectiveness	Relevant nature-based solutions	Co-benefits: Floods	Co-benefits: Drought	Co-benefits: Biodiversity	Co-benefits: EU policies synergy
1.1 Urban wastewater *May or may not be included in the UWWT Directive. Includes discharges from non-manufacturing commercial areas that can largely be assimilated to urban wastewater. Includes discharges of raw or partially treated urban wastewater that are identified as point sources.*						
23	H	Constructed wetlands for wastewater treatment			M	M
1.2 Storm overflows *Overflows from separated or combined sewers identified as point sources (for diffuse see 'Diffuse – Urban run-off' below).*						
15	H	Rainwater management public features	H	M	M	M
11	M	Greening of cities (green roofs, city gardens, etc.)	M		H	M
12	M	Raingardens	M	M		M
13	M	Forested parks	M	M	H	M
14	M	Permeable surfaces	M	M		M
18	M	Soil unsealing (removal of built structures)	M	M	M	M

Pressure & definition

Name of the nbs

Co-benefits

Factsheet nb

Best NbS

Other relevant NbS

SELECTION OF NATURE-BASED SOLUTIONS

H: high effectiveness; M: moderate effectiveness.

Technical sheet	Effectiveness	Relevant nature-based solutions	Co-benefits			EU policies synergy
			Floods	Drought	Biodiversity	
4.1 Physical alteration of channel/bed/riparian area/shore *Refers largely to longitudinal alterations to water bodies, including land drainage to enable agricultural activities, and other alterations for flood protection, agriculture, navigation, and other reasons.*						
8	H	Adapted forestry in floodplains and wet forests	M		H	H
25	H	Floodplain restoration and management	H	M	H	H
26	H	Stream and river restoration	M	M	H	H
27	H	Reconnection of oxbow lakes	H	M	H	H
28	H	Removal of transversal barriers	M		H	H
30	H	Removal of lateral barriers	H	M	H	H
31	H	Lake restoration		M	H	M
32	H	Re-naturalisation of polder areas	H		H	H
9	M	Controlled traffic forestry (water-sensitive driving, design, or road and stream crossings)	M			M
10	M	Coarse woody debris in rivers and streams	M		M	M
14	M	Permeable surfaces	M	M		M
15	M	Rainwater management public features	H	M	M	M
22	M	Sediment capture ponds and check dams	M			M
24	M	Wetland restoration and management	M	M	H	H
29	M	Natural bank stabilisation			M	M

SELECTION OF NATURE-BASED SOLUTIONS

- Also a more synthetic table (p. 18)

Table 1 - Most effective NbS per pressure affecting water bodies (© OiEau)

Type of pressure affecting water bodies		Type of nature-based solution	Scale of implementation	Typical grey infrastructure and technology
1. Point source pollution	Agglomeration and industry	Rainwater management public features	City, town, industrial plant	Stormwater infrastructures
		Constructed wetlands for wastewater treatment		Wastewater treatment plants
2. Diffuse source pollution	Agriculture	Improvement of cultivation practices	Agricultural plot	Modern farming equipment
		Conversion to lower impact land-use	Water body	None
		Drainage adaptation	Agricultural plot	
		Restoration of meadows and pastures	Water body	
	Urban run-off	Rainwater management public features	City, town, industrial plant	Stormwater infrastructures
	Forestry	Close-to-nature forestry	Water body and its sub-catchment	None
		Sediment capture ponds and check dams	Stretch of water	None
	Others	Rainwater management public features	Water body	Stormwater infrastructures
3. Abstraction or flow-diversion	Agriculture	Improvement of cultivation practices	Farm	Modern farming equipment
		Managed aquifer recharge	Water body to basin	Dams and groundwater pumps
	Others	Managed aquifer recharge	Basin-scale	
4. Hydro-morphology	Physical alterations	Adapted forestry in floodplains and wet forests	Stretch of water	None
		Restoration of aquatic ecosystems	Stretch of water	None
	Dams and barriers	Removal of barriers	Basin-scale	None
		Restoration of aquatic ecosystems	Stretch of water	
	Hydrological alteration	Drainage adaptation	Water body	Reservoirs
		Improvement of cultivation practices	Water body	None
		Managed aquifer recharge	Water body to basin	Reservoirs

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DETAILED PRESENTATION OF NBS

- 34 types of Nature-based Solutions have been selected:
  - Farming practices
  - Forestry practices
  - Rainwater management solutions
  - Conversion of land-use
  - River, lake, wetland and coastal ecosystems restoration
  - Other landscape measures
  - Managed aquifer recharge

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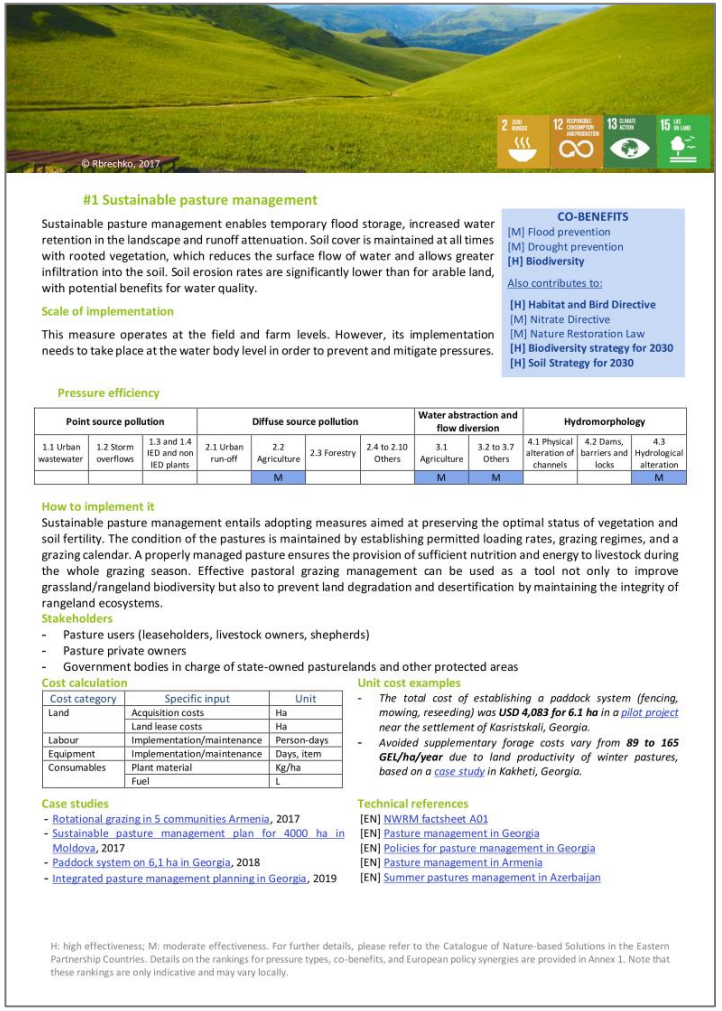
DETAILED PRESENTATION OF NBS

Detailed factsheets including on 1 page:

- Reference and name of the solution
- Short description
- Scale of implementation
- Co-benefits + EU policy contribution
- Pressures effectiveness
- How to implement?
- Stakeholders
- Cost-calculation elements
- Case-studies
- Technical references



#1 Sustainable pasture management

Sustainable pasture management enables temporary flood storage, increased water retention in the landscape and runoff attenuation. Soil cover is maintained at all times with rooted vegetation, which reduces the surface flow of water and allows greater infiltration into the soil. Soil erosion rates are significantly lower than for arable land, with potential benefits for water quality.

CO-BENEFITS
[M] Flood prevention
[M] Drought prevention
[H] Biodiversity

Also contributes to:
[H] Habitat and Bird Directive
[M] Nitrate Directive
[M] Nature Restoration Law
[H] Biodiversity strategy for 2030
[H] Soil Strategy for 2030

Scale of implementation

This measure operates at the field and farm levels. However, its implementation needs to take place at the water body level in order to prevent and mitigate pressures.

Pressure efficiency

Point source pollution			Diffuse source pollution				Water abstraction and flow diversion		Hydromorphology		
1.1 Urban wastewater	1.2 Storm overflows	1.3 and 1.4 IED and non IED plants	2.1 Urban run-off	2.2 Agriculture	2.3 Forestry	2.4 to 2.10 Others	3.1 Agriculture	3.2 to 3.7 Others	4.1 Physical alteration of channels	4.2 Dams, barriers and locks	4.3 Hydrological alteration
				M			M	M			M

How to implement it

Sustainable pasture management entails adopting measures aimed at preserving the optimal status of vegetation and soil fertility. The condition of the pastures is maintained by establishing permitted loading rates, grazing regimes, and a grazing calendar. A properly managed pasture ensures the provision of sufficient nutrition and energy to livestock during the whole grazing season. Effective pastoral grazing management can be used as a tool not only to improve grassland/rangeland biodiversity but also to prevent land degradation and desertification by maintaining the integrity of rangeland ecosystems.

Stakeholders

- Pasture users (leaseholders, livestock owners, shepherds)
- Pasture private owners
- Government bodies in charge of state-owned pasturelands and other protected areas

Cost calculation

Cost category	Specific input	Unit
Land	Acquisition costs	Ha
	Land lease costs	Ha
Labour	Implementation/maintenance	Person-days
Equipment	Implementation/maintenance	Days, item
Consumables	Plant material	Kg/ha
	Fuel	L

Unit cost examples

- *The total cost of establishing a paddock system (fencing, mowing, reseeding) was **USD 4,083 for 6.1 ha** in a pilot project near the settlement of Kasristskali, Georgia.*
- *Avoided supplementary forage costs vary from **89 to 165 GEL/ha/year** due to land productivity of winter pastures, based on a case study in Kakheti, Georgia.*

Case studies

- Rotational grazing in 5 communities Armenia, 2017
- Sustainable pasture management plan for 4000 ha in Moldova, 2017
- Paddock system on 6,1 ha in Georgia, 2018
- Integrated pasture management planning in Georgia, 2019

Technical references

[EN] NWRM factsheet A01
[EN] Pasture management in Georgia
[EN] Policies for pasture management in Georgia
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H: high effectiveness; M: moderate effectiveness. For further details, please refer to the Catalogue of Nature-based Solutions in the Eastern Partnership Countries. Details on the rankings for pressure types, co-benefits, and European policy synergies are provided in Annex 1. Note that these rankings are only indicative and may vary locally.

Implementing partners

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				M			M	M			M

DETAILED PRESENTATION OF NBS

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DETAILED PRESENTATION OF NBS

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⇒Methods and standards for the implementation

⇒Monitoring and evaluation

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⇒Technical and methodological guidance

⇒Short presentation of all case-studies

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⇒Methodology for the ranking of effectiveness

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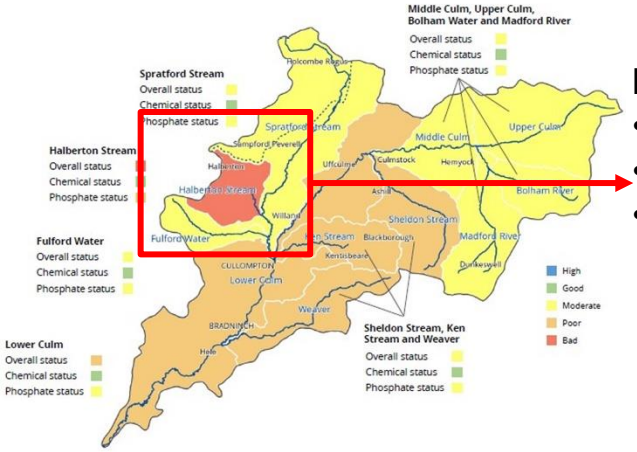
EXAMPLE USE OF THE NBS CATALOGUE



Identified pressures

- Diffuse pollution (agriculture)
- Physical alterations of channel
- Hydrological alteration

+ flood risks downstream
+ drought issues in summer

CONTENTS

H: high effectiveness; M: moderate effectiveness.

Technical sheet	Effectiveness	Relevant nature-based solutions	Co-benefits: Floods	Drought	Biodiversity	EU policies synergy
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25	H	Floodplain restoration and management	H	M	H	H
26	H	Stream and river restoration	M	M	H	H
27	H	Reconnection of oxbow lakes	H	M	H	H
28	H	Removal of transversal barriers	M		H	H
30	H	Removal of lateral barriers	H	M	H	H
31	H	Lake restoration		M	H	M
32	H	Re-naturalisation of polder areas	H		H	H
9	M	Controlled traffic forestry (water-sensitive driving, design, or road and stream crossings)	M			M
10	M	Coarse woody debris in rivers and streams	M		M	M
14	M	Permeable surfaces	M	M		M
15	M	Rainwater management public features	H	M	M	M
22	M	Sediment capture ponds and check dams	M			M
24	M	Wetland restoration and management	M	M	H	H
29	M	Natural bank stabilisation			M	M
4.2 Dams, barriers and locks *Refers to dams, barriers and locks related to flood protection, drinking water, irrigation, recreation (small dams are used in rivers to create recreational and angling areas), industry (dams are sometimes created to provide freshwater for large industry, typically for cooling purposes), navigation, and other dams, barriers and locks*						
25	H	Floodplain restoration and management	H	M	H	H
26	H	Stream and river restoration	M	M	H	H
27	H	Reconnection of oxbow lakes	H	M	H	H
28	H	Removal of transversal barriers	M		H	H
30	H	Removal of lateral barriers	H	M	H	H
32	H	Re-naturalisation of polder areas	H		H	H
24	M	Wetland restoration and management	M	M	H	H
29	M	Natural bank stabilisation			M	M
31	M	Lake restoration		M	H	M
33	M	Restoration of buffer strips, riparian forests and gallery forests	M	H	H	H

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EXAMPLE USE OF THE NBS CATALOGUE

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26	H	Stream and river restoration	M	M	H	H
27	H	Reconnection of oxbow lakes	H	M	H	H
28	H	Removal of transversal barriers	M		H	H
30	H	Removal of lateral barriers	H	M	H	H
31	H	Lake restoration		M	H	M
32	H	Re-naturalisation of polder areas	H		H	H
9	M	Controlled traffic forestry (water-sensitive driving, design, or road and stream crossings)	M			M
10	M	Coarse woody debris in rivers and streams	M		M	M
14	M	Permeable surfaces	M	M		M
15	M	Rainwater management public features	H	M	M	M
22	M	Sediment capture ponds and check dams	M			M
24	M	Wetland restoration and management	M	M	H	H
29	M	Natural bank stabilisation			M	M

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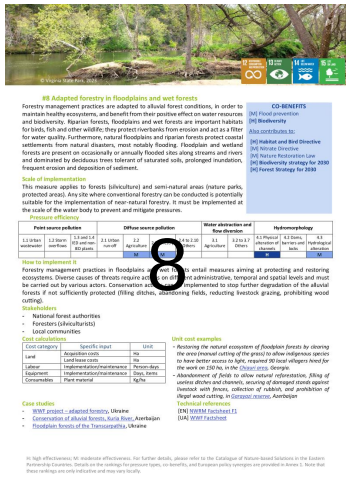

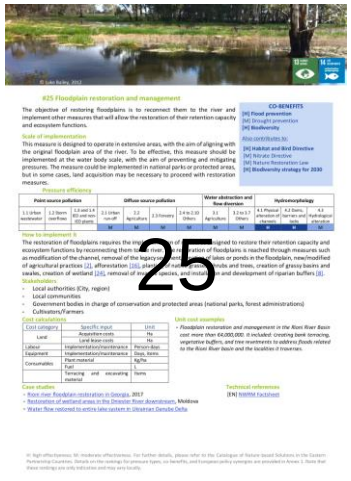

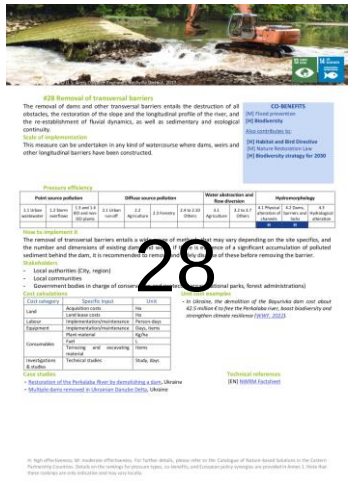

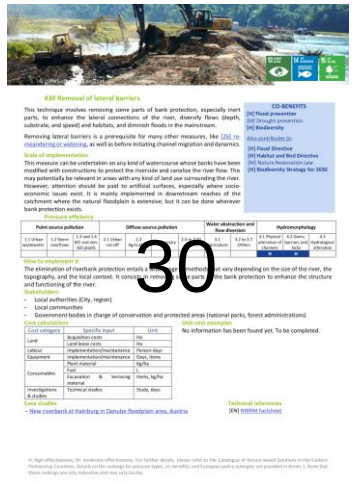

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EXAMPLE USE OF THE NBS CATALOGUE

#8 Adapted forestry in floodplains and wet forests

Forestry management practices are adapted to alluvial forest conditions, in order to maintain healthy ecosystems, and benefit from their positive effect on water resources and biodiversity. Riparian forests, floodplains and wet forests are important habitats for birds, fish and other wildlife; they protect riverbanks from erosion and act as a filter for water quality. Furthermore, natural floodplains and riparian forests protect coastal settlements from natural disasters, most notably flooding. Floodplain and wetland forests are present on occasionally or annually flooded sites along streams and rivers and dominated by deciduous trees tolerant of saturated soils, prolonged inundation, frequent erosion and deposition of sediment.

CO-BENEFITS
[M] Flood prevention
[H] Biodiversity

Also contributes to:
[H] Habitat and Bird Directive
[M] Nitrate Directive
[M] Nature Restoration Law
[H] Biodiversity strategy for 2030
[H] Forest Strategy for 2030

Scale of implementation
This measure applies to forests (silviculture) and semi-natural areas (nature parks, protected areas). Any site where conventional forestry can be conducted is potentially suitable for the implementation of near-natural forestry. It must be implemented at the scale of the water body to prevent and mitigate pressures.

Pressure efficiency

Point source pollution			Diffuse source pollution				Water abstraction and flow diversion		Hydromorphology		
1.1 Urban wastewater	1.2 Storm overflows	1.3 and 1.4 IED and non-IED plants	2.1 Urban run-off	2.2 Agriculture	2.3 Forestry	2.4 to 2.10 Others	3.1 Agriculture	3.2 to 3.7 Others	4.1 Physical alteration of channels	4.2 Dams, barriers and locks	4.3 Hydrological alteration
				M	M				H		M

How to implement it
Forestry management practices in floodplains and wet forests entail measures aiming at protecting and restoring ecosystems. Diverse causes of threats require actions on different administrative, temporal and spatial levels and must be carried out by various actors. Conservation actions can be implemented to stop further degradation of the alluvial forests if not sufficiently protected (filling ditches, abandoning fields, reducting livestock grazing, prohibiting wood cutting).

Stakeholders
- National forest authorities
- Foresters (silviculturists)
- Local communities

Cost calculations

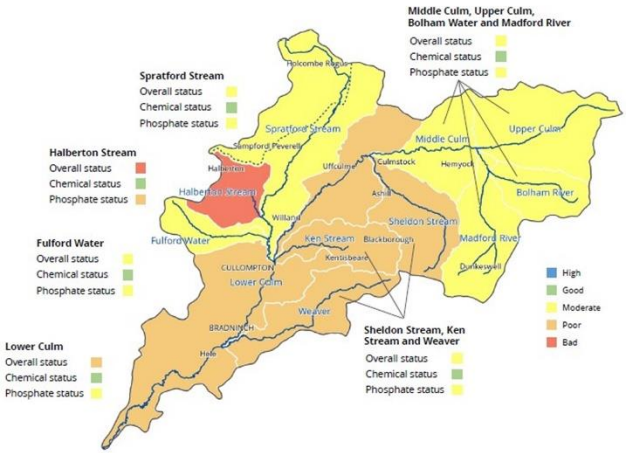
Cost category	Specific input	Unit
Land	Acquisition costs	Ha
	Land lease costs	Ha
Labour	Implementation/maintenance	Person-days
Equipment	Implementation/maintenance	Days, items
Consumables	Plant material	Kg/ha

Unit cost examples
- *Restoring the natural ecosystem of floodplain forests by clearing the area (manual cutting of the grass) to allow indigenous species to have better access to light, required 90 local villagers hired for the work on 150 ha, in the Chiauri area, Georgia.*
- *Abandonment of fields to allow natural reforestation, filling of useless ditches and channels, securing of damaged stands against livestock with fences, collection of rubbish, and prohibition of illegal wood cutting, in Garayazi reserve, Azerbaijan*

Case studies
- WWF project – adapted forestry, Ukraine
- Conservation of alluvial forests, Kuria River, Azerbaijan
- Floodplain forests of the Transcarpathia, Ukraine

Technical references
[EN] NWRM Factsheet F1
[UA] WWF Factsheet

H: high effectiveness; M: moderate effectiveness. For further details, please refer to the Catalogue of Nature-based Solutions in the Eastern Partnership Countries. Details on the rankings for pressure types, co-benefits, and European policy synergies are provided in Annex 1. Note that these rankings are only indicative and may vary locally.



Implementing partners

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EU4Environment
Water and Data in Eastern Partner Countries

FOR MORE INFORMATION: ACCESS TO THE CATALOGUE

https://www.eu4waterdata.eu/en/

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Upcoming: new EU4Green Recovery East is planned to address NbS in RBMPs