



Data availability and GAP analysis

Demonstrators A and B

D3.1

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Abstract (for dissemination, 100 words)	The objective of Deliverable 3.1 is to present the data and model gaps based on the monitoring and evaluation plans that Demonstrators have presented in D2.6. The overall comparison shows that data gaps concerning PEOPLE indicators are largest when compared to data gaps in WATER and NATURE areas. The results from this work aims to support data collection and monitoring activities for Demonstrators A and B. The document also serves as a reference for various WP2 and WP3 activities. In addition, it also provides a useful reference for RECONECT Collaborators in the development of their data collection and monitoring plans.
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Executive Summary

The data GAP analysis in RECONECT is conducted within the context of identifying which data are available (and fit-for-use) to assess relevant indicators in each demonstration A and B site.

The objective of Deliverable 3.1 is to present the data and model gaps based on the monitoring and evaluation plans that Demonstrators have presented in Deliverable 2.6. Therefore, this report is intended to mainly address the Demonstrators themselves by providing a clear and simplified view of those data/model gaps, which may facilitate the identification of the equipment, effort, and resources needed to further advance in their monitoring activities.

The first results of the data gap analysis show that overall, the area of NATURE contains the largest gap in the datasets. For both WATER and PEOPLE, this gap is about one third of the total datasets needed to assess the indicators.

In terms of the type of the demonstrators, Demonstrators B have more readily available data when compared to Demonstrators A.

In the area of WATER, the data gaps appear to be similar for both demonstrator types. In the area of NATURE, the gaps are also similar but overall larger when compared to the gaps in the area of WATER. In terms of PEOPLE indicators, the gaps are larger for Demonstrators A. The overall comparison shows that the data gaps concerning PEOPLE indicators are largest when compared to the data gaps in other areas.

This report aims to provide an overview of data availability in RECONECT Demonstrators which in turn serves as a basis for the development of the monitoring plans. This document should be read in conjunction with Deliverable 2.6. The document also serves as a reference for various WP2 and WP3 activities. In addition, the report also serves as a useful reference for RECONECT Collaborators in the process of developing their own data collection and monitoring plans.

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1 Introduction

A comprehensive data gap analysis is crucial for the planning of the monitoring activities in all demonstration sites. Once indicators have been selected to monitor the identified NBS impacts, the data/model that are required to assess those indicators need to be identified. Knowing the data/model already available is essential to avoid repeated work and to make efficient use of project resources.

Sometimes it is not sufficient to know whether data are available or not, but is also important to look in detail into the characteristics of these data and to determine whether the data fulfils the requirements to be used within a monitoring program. This includes judging, for example, whether the data is actual enough and whether the spatial and temporal data resolution fulfils the needs for indicators to monitor the impacts at the appropriate spatial and temporal scales. For example, for the Portofino demonstrator case, although there is a LiDAR dataset available, elevation data has been identified as a data gap, since the quality of these data is poor and outdated (> 10 years old). In this demonstration site, where precise height models are of high importance, it is therefore crucial to gather actual LiDAR data to be used in the monitoring and evaluation program.

Results from the data gap analysis are also used to make decisions on which equipment should be purchased for in-situ measurements within the demonstrator sites. Sometimes there is the need to prioritize the data gaps, since budgets to purchase new equipment and new survey activities may be limited. It is therefore important to closely link the outcomes of the data gap analysis to the local context and to the most relevant indicators.

Next to the in-situ data, geospatial datasets derived from remote sensing may be needed to assess indicators used in monitoring and evaluation programs. For small project sites, data from drones or unmanned aerial vehicles (UAVs) might be used. Instead, for larger project sites it may be required to obtain the data from fixed wing aircrafts or satellite imagery.

The data gap analysis in RECONECT is conducted within the context of identifying which data are available (and fit-for-use) to assess relevant indicators in each demonstration A and B site. The data gap analysis process consist on the following steps.

- At the beginning of the project, demonstrators were asked to present those indicators that had been identified as relevant to their NBS projects in consultation with stakeholders. Relevant indicators were identified using the RECONECT Selection Tool (which is being developed within WP3) based on the objectives or sub-goals that the NBS intends to achieve.
- 2) A first general overview was compiled of available datasets and models to assess the different indicators (for the baseline and after NBS implementation situations). Such overview has been presented in D2.5 "Report describing preparatory actions for Demonstrators A and B". This is included in Annex A.

For demonstrators A, a further analysis was carried out in terms of the availability of geospatial datasets. First, an overview of datasets already available at the European level, e.g. from the COPERNICUS program, was produced. Next, an overview was produced of those geodatasets available at the national, state or city level in the demonstration sites and the related metadata describing the characteristics of these

data was gathered. This turned to be a rather challenging, and time consuming, task because the datasets are most of the times not all available within one department or institution.

- 3) As part of D2.6 "Co-monitoring and evaluation plans for Demonstrators A and B", demonstrators have developed monitoring and evaluation plans to assess the performance of their NBS in achieving a selected number of sub-goals. In these plans, a focused set of indicators is presented together with the data/model that are required to assess those indicators. For each data/model required, characteristics such as the spatial coverage, temporal frequency, and the availability of the data/model to assess the indicator are described.
- 4) In addition to the more general characteristics in point three above, a further assessment is needed to determine whether the data is actual enough and/or of suitable quality to be used to assess the indicator. For example, a NBS site where landslide hazard is identified as the main indicator, requires a careful assessment of whether the available data is actual enough and has the required spatial resolution to be used as input to landslide hazard models.
- 5) Identification of the data gaps. In this step those missing, outdated, and/or of low quality are identified as a gap.
- 6) Finally, once a gap is identified, a strategy is sought to determine the technical requirements and specifications of the data to be acquired, hence bridging the gap.

The objective of this deliverable is to present the data and model gaps based on the monitoring and evaluation plans in step three above. Therefore, this report should be read in conjunction with D2.6.

The content herein provides a clear and simplified overview of the data gaps, which may facilitate the identification of the equipment, effort, and resources needed to further advance in the monitoring activities.

2 Dove/Gose Elbe Estuary, Germany - DA1

2.1 Summary data availability / data gaps

The following Table 1 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 1 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 1 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Flood risk	Flood hazard	Water level	yes	yes	yes	yes
ATER	reduction in urban areas and around rivers,	Delay time to peak	Water level	yes	yes	yes	yes
M	lakes and water courses	Flood peak reduction	Water level	yes	yes	yes	yes
NATURE	To maintain and enhance biodiversity	Species richness and composition	Number of species	no	NA	yes	yes
PEOPLE	Stimulate/increa se economic benefits	Vulnerability / Economic damage cost	Police / Fire department and insurance reports	no	NA	yes	yes

In Table 1, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature and People are not commonly measured and they represent the novel aspects of the project related to co-benefits.

3 Odense Coastal Area, Denmark-DA2

3.1 Summary data availability / data gaps

The following Table 2 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 2 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 2 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Coastal flood	Coastal flood	Terrain model	no	yes	yes	yes
VATER	risk reduction	hazard index (Changes in flood risk of areas behind NBS-dikes)	Sea water level (flooding)	yes		yes	
>	Improve water surface quality	The salinity of water in the	Coastal flood hazard	no	NA	yes	yes
		surface, near ground water	Salinity	no		yes	
	Increase habitat area (quantity)	Habitat area	Vegetation map of the targeted habitats in the area	no	NA	yes	no
			Terrain elevation	yes		yes	
			Sea water level	yes		yes	
			Sea flooding extent and frequency	no		yes	
			soil type	ves		ves	
			salinity	no		yes	
	Habitat	location of	habitat type	no	NA	yes	no
ш	provision and	habitat	Terrain elevation	yes		yes	
L R	distribution	boundaries	Sea water level	yes		yes	
NAT	(quality)		Sea flooding extent and frequency	no		yes	
			soil type	ves		ves	
			salinity	no		yes	
	Maintain and enhance	Species richness and composition	Number of species	no	NA	yes	no
	biodiversity		Terrain elevation	yes		yes	
			Sea water level	yes		yes	
			Sea flooding	no		yes	
			extent and				
			frequency				
			soil type	yes		yes	
			salinity	no		yes	

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Increase in recreational opportunities	Number of people that visit or spend free time in NBS area	Number of people visit the area	no	NA	yes	no
PLE		Enhancing attractiveness of places for living	Number of people visit the NBS area	no	NA	yes	no
PEO	and working and to visit	and working, and to visit	Value of the area	No		yes	
			Knowledge that the NBS is present in the region	No		yes	

In Table 2, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature and People are not commonly measured and they represent the novel aspects of the project related to co-benefits.

4 Tordera River Basin, Spain - DA3

4.1 Summary data availability / data gaps

The following Table 3 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 3 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 3 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Flood risk	Flood hazard		yes	yes	yes	yes
	Teduciion		Discharge time series	yes		yes	
			Digital elevation model	yes		yes	
ĸ			Control structure	yes		yes	
VATEI			Roughness coefficient	yes		yes	
>			Geometry of the channel	yes		yes	
			Flow Depth	yes	yes	yes	yes
		Economic damage cost	Land use/cover	yes		yes	
				yes		yes	
	Shifts in land use and land cover	Land use type	Land use cover map	no	NA	yes	yes
	(Structure of the riparian	riparian area)	Habitat cartography	no		yes	
	area)	Quality of the Riparian Forest	% of the riparian area covered with vegetation	no	NA	yes	yes
ATURE			Lateral connectivity of the riparian ecosystem	no	NA	yes	
Ń			Complexity of the riparian forest structure	no	NA	yes	
			Diversity of vegetal species in the riparian forest	no	NA	yes	
			Naturalness of the river channel	no	NA	yes	

	Increase habitat area (quantity)	Habitat area	Cartography of natural habitats of community interest	no	NA	yes	
	Stimulate/increas e economic		Flow Depth	yes	yes	yes	yes
OPLE	benefits	Economic damage cost	Land use/cover	yes		yes	yes
Ш				yes		yes	yes
			Property value data				

In Table 3, Column 3 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature are not commonly measured and they represent the novel aspects of the project related to co-benefits.

5 Portofino Regional Natural Park, Italy - DA4

5.1 Summary data availability / data gaps

The following Table 4 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 4 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 4 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baselin e situation
	Landslide risk reduction	Landslide hazard	Digital elevation model	no	no	Yes	yes
			Rainfall time series	no		yes	
		Floating transport in hydrographical network	Orthophotography and IR to evaluate vegetation conditions	no	NA	yes	yes
WATER			Direct survey to quantify the presence of dead trees along the hydrographical network	no		Yes	
		Vulnerability	Land use	yes	NA	yes	yes
			Roads	yes		yes	
			Building/ Cultural heritage	yes		Yes	
			Tourists presence	yes		yes	
	Increase habitat area (quantity)	Habitat area	Initial surfaces of the habitat patches that will be expanded	no	NA	yes	no
NATURE	Shifts in land use and land cover	Land cover area	Land Cover type and area	no	NA	Yes	no
	Maintain and enhance biodiversity	Species richness and composition	Species count data	no	NA	yes	no
PEOP	Increase in recreational opportunities.	Number of people that visit	Number of visitors (count data)	yes	NA	yes	yes

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baselin e situation
		or spend time in the NBS area.					
	Stimulate/incr ease economic benefits	Loss of cultural heritage due to hydro- metrological events	Number of visitors accessing the Abbey	no	NA	yes	no

In Table 4, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature and People are not commonly measured and they represent the novel aspects of the project related to co-benefits.

6 Ijssel River Basin, the Netherland - DB1

6.1 Summary data availability / data gaps

The following Table 5 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 5 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 5 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Flood risk	Flood	Rainfall time series	yes	no	yes	yes
	reduction	Hazard	River discharge time series	yes		yes	
			Water level time series	yes		yes	
			Vegetation data	yes		yes	
TER			Digital elevation model	yes		yes	
WA			Control structures	yes		yes	
			Channel cross section (flood plains)	yes		yes	
			Flow velocity	yes		yes	
			Roughness coefficient	yes		yes	
	Shifts in land use and land cover	Land cover area	land cover type and area	yes	NA	yes	yes
NATUR	Maintain and enhance biodiversity	Number and type of protected species (animal)	Animal species count data	yes	NA	yes	yes
PEOPLE	Stimulate/increase economic benefits	Maintenance and management cost of NBS	Cost of vegetation removal and cost of dredging	yes	NA	yes	yes
		Land and/or property values	Price of land before and after NBS implementation	yes	NA	yes	yes

In Table 5, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, in this case there is enough information to calculate the indicators, also the ones related to NATURE and PEOPLE which are not so commonly measured.

7 Inn River Basin, Austria - DB2

7.1 Summary data availability / data gaps

The following Table 6 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 6 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 6 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Flood risk reduction	Surface Run- off Reduction	Precipitation time series	no	no	yes	no
			Meteorological parameters	no		yes	
			Run-off time series	no		yes	
			Roughness	no		yes	
			Soil moisture	no		yes	
			Digital elevation model	no		yes	
		Slowing and Storing Run-	Precipitation time series	no	no	yes	no
	off	off	Meteorological parameters	no		yes	
~			Run-off time series	no		yes	
АТЕ			Roughness	no		yes	
×.			Soil moisture	no		yes	
			Digital elevation model	no		yes	
			Terrain slope	no		yes	
		Flood Hazard	Runoff at catchment outlet	no	no	yes	no
			Historical flood events	yes		yes	
			Land use	no		yes	
			climate scenarios	no		yes	
	Landslide risk	Landslide hazard	Land use	yes	NA	yes	yes
			Corresponding risk of landslides	yes		yes	
¥21	Increase habitat	Habitat area	Land use map		no	yes	no
	area (quantity)		Land cover map	no		yes	

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Habitat provision	Location of	Habitat sizes	no	NA	yes	yes
	and distribution	habitat	Land-use	no		yes	
	(quality)	boundaries	Land cover	no		yes	
	Shifts in land use and land cover	Land cover	Aerial pictures and satellite images for different periods	no	yes	yes	yes
			Old project reports that documented how much trees were bought, planted and labour hours	no		yes	
	To maintain and enhance biodiversity	Species richness and composition	Detect and determine typical species richness and composition	no	NA	yes	no
	Increase in recreational	Purpose of the visits to	Statistical data on climate	yes	NA	yes	yes
	opportunities	the NBS site	Water	yes		yes	
			Nature	yes		yes	
			Infrastructure	yes		yes	
Ē			socio- demographic data of people	yes		yes	
PEOP			number of overnight stays	yes		yes	
	Stimulate/increase economic benefits	Damage costs	Existing flooding zones	yes	NA	yes	yes
		Building prices	statistical parcel and building prices	yes	NA	yes	yes
			Existing flooding zones	yes		yes	

In Table 6, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature and People are not commonly measured and they represent the novel aspects of the project related to co-benefits.

8 Aarhus, Egå Engsø and Lystrup, Denmark -DB3

8.1 Summary data availability / data gaps

The following Table 7 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 7 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 7 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Flood risk reduction	Flood Peak Reduction	Rainfall time series	yes	yes	yes	yes
			Discharge time series	yes		yes	
			Water level time series	yes		yes	
			Digital elevation model	yes		yes	
		Delay time to peak	Rainfall time series	yes	yes	yes	yes
٣			Discharge time series	yes		yes	
			Water level time series	yes		yes	
VATE			Digital elevation model	yes		yes	
^	Improve Coastal water quality	Pollution in coastal waters	Nitrogen load to coastal waters	yes	NA	yes	yes
	Improve water quality in	Temperature and dissolved	Rainfall time series	no	NA	yes	no
	rivers/watercou rses,	oxygen concentration	Discharge time series	no		yes	
	lakes/ponds		Water level time series	no		yes	
			Digital elevation model	no		yes	
			Temperature and dissolved oxygen concentration	no		yes	
<u>د</u>	Habitat	Location of	Type of habitat	no	NA	yes	yes
NATU E	provision and distribution (quality)	habitat boundaries	Number and size of the habitat patches	no		yes	

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
			Max. depth limit of the aquatic vegetation Environmental variables: e.g. depth of the lake (average/min/max, 0,5 m intervals), size of the lake, water level at the inlet and outlet of the lake, Secchi depth, total phosphorus concentration (TP), total nitrogen concentration (TN), chlorophyll a, alkalinity, terrain elevation (Danish Hight Model), flooding extent and frequency, soil type.	no		yes yes	
	Shifts in land use and land cover	Land cover area	land cover type and area	no	NA	yes	yes
	Maintain and enhance biodiversity	Species richness and composition	Species count data Meteorological data: precipitation, wind speed	no no	NA	yes yes	yes
			Environmental variables: e.g. depth of the lake (average/min/max, 0,5 m intervals), size of the lake, Secchi depth, total phosphorus concentration (TP), total nitrogen concentration (TN), chlorophyll a, alkalinity, elevation (Danish Hight Model), flooding extent and frequency, soil type, etc.	no		yes	
		Number and type of protected	Species count data	no		yes	yes
		species	Environmental variables: e.g. depth of the lake (average/min/max, 0,5 m intervals),	no		yes	

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
			size of the lake, Secchi depth, total phosphorus concentration (TP), total nitrogen concentration (TN), chlorophyll a, alkalinity, elevation (Danish Hight Model), flooding extent and frequency, soil type, etc.				
		Restricted range species	Species count data	no	NA	yes	
			Environmental variables: e.g. depth of the lake (average/min/max, 0,5 m intervals), size of the lake, Secchi depth, total phosphorus concentration (TP), total nitrogen concentration (TN), chlorophyll a, alkalinity, elevation (Danish Hight Model), flooding extent and frequency, soil type, etc.	no		yes	
ш	Increase in recreational opportunities	Number of people that visit or spend time in the NBS area	Count data of number of people that visit or spend time in the NBS area	no	NA	yes	yes
PEOPL		Enhancing attractiveness of places for living and working, and to visit	User/visitor survey in combination with the count data (the number of visitors, qualitative for the purpose of the visit)	no		Yes	

In Table 7, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature and People are not commonly measured and they represent the novel aspects of the project related to co-benefits.

9 Thur River Basin, Switzerland - DB4

9.1 Summary data availability / data gaps

The following Table 8 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 8 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 8 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Flood risk	Flood Hazard	Rainfall time series	yes	yes	yes	yes
		Tidzard	Evapotranspiration	yes		yes	
			River discharge time series	yes		yes	
			Digital elevation model	yes		yes	
	Groundwater management	Groundwate r level	Digital elevation model	yes	NA	yes	yes
WATER			Groundwater level in piezometers	yes		yes	
	Improve water quality in rivers	Water pollution caused by wastewater	Chemical concentrations	yes	NA	yes	yes
	Improve groundwater quality	Pollution in groundwater	Contaminant in Groundwater	yes	NA	yes	yes
			electrical conductivity	yes		yes	
			Pressure head (water level)	yes		yes	
			Groundwater temperature	yes		yes	
NATURE	Increase habitat area (quantity)	Habitat area	Area if habitat	yes	NA	yes	yes
	To maintain and enhance biodiversity	Species richness and composition	Number of species	yes	NA	yes	yes

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Increase recreational opportunities	Number of people that visit or spend time in the NBS area	Number of people to visit the NBS	yes	NA	yes	yes
PEOPLE		Purpose of the number of visits to the NBS area	Number of activities during a visit at the NBS site	yes	NA	yes	yes
	Stimulate/incr ease economic benefits	Land and/or property values	Land and/or property values	yes	NA	yes	no

In Table 8, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, t in this case there is enough information to calculate the indicators, also the ones related to Nature and People which are not so commonly measured. Calculating indicator in the different challenge areas represent the novel aspects of the project related to co-benefits.

10 The Var Éco-Vallée, France - DB5

10.1 Summary data availability / data gaps

The following Table 9 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 9 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 9 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Flood risk reduction	Flood hazard	Discharge time series	yes	yes	yes	yes
			Meteorological parameters	yes		yes	
TER			Rainfall time series	yes		yes	
-MM			Roughness	yes		yes	
			Digital elevation model	yes		yes	
			River geometry	yes		yes	
	Increase habitat area	Habitat area	Satellite, habitat area images that	no	NA	yes	no
			will be used for comparison	no		yes	
NATURE	Habitat provision and distribution (quality)	Location of habitat boundaries (Changes in aquatic habitat, changes in flora and fauna in habitat)	Aerial pictures and satellite images for different periods of habitat	no	NA	yes	no
)PLE	Increase recreational opportunities	Number of people spending time in NBS	Statistic data of Number of people spending time in NBS	yes	NA	yes	yes
Ш	Stimulate/increase economic benefits	Building prices in NBS area	Statistical data and building prices	no	NA	yes	yes

In Table 9, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature and People are not commonly measured and they represent the novel aspects of the project related to co-benefits.

11 Les Boucholeurs, France - DB6

11.1 Summary data availability / data gaps

The following Table 10 provides a summary of the data available and gaps identified by applying the procedure described in Section 1. Most of the information was provided by responsible project partners which is to their current best knowledge. Table 10 presents a summary of information concerning indicators included in the monitoring plan described in indicators.

Table 10 Summary of data/model availability (dark green) and data/model gaps (red) to assess the selected indicators (NA: not applicable). Column 5 refers to the situation after NBS implementation and column 8 refers to the reference/baseline situation

1.Challenge	2.Sub-goals	3.Indicators	4.Data (variables)	5.Data available	6.Model available to assess the indicator	7. Planned for Monitoring during RECONECT	8.Indicator/data available for reference/baseline situation
	Coastal flood risk reduction	Coastal flood hazard	Discharge time series	yes	yes	yes	yes
	reduction		Meteorological parameters	yes		yes	
۲			Rainfall time series	yes		yes	
/ATEI			Roughness	yes		yes	
8			Digital elevation model	yes		yes	
			Sea water level	yes		yes	
			Geometry/ Bathymetry	yes		yes	
	Increase habitat area	Habitat area	Satellite, habitat area images that	no	NA	yes	no
			will be used for comparison	no		yes	
NATURE	Habitat provision and distribution (quality)	Location of habitat boundaries (Changes in aquatic habitat, changes in flora and fauna in habitat)	Aerial pictures and satellite images for different periods of habitat	no	NA	yes	no
PLE	Increase recreational opportunities	Number of people spending time in NBS	Statistic data of Number of people spending time in NBS	yes	NA	yes	yes
Эd	Stimulate/increase economic benefits	Building prices in NBS area	Statistical data and building prices	yes	NA	yes	no

In Table 10, Column 6 refers to the available model that will be used to assess the indicators, while Column 7 reflects the RECONECT monitoring plan outlined in Deliverable 2.6. In terms of the gaps, the indicators related to Nature and People are not commonly measured and they represent the novel aspects of the project related to co-benefits.

12 Summary

The first results of the data gap analysis show that the area of NATURE contains the largest gap in datasets. For both WATER and PEOPLE, this gap is about one third of the total datasets needed to assess the indicators.

In terms of the type of the demonstrators, Demonstrators B have more readily available data when compared to Demonstrators A.

In the area of WATER, the data gaps appear to be similar for both demonstrator types. In the area of NATURE, the gaps are also similar but overall larger when compared to the gaps in the area of WATER. In terms of PEOPLE indicators, the gaps are larger for Demonstrators A. The overall comparison shows that the data gaps concerning PEOPLE indicators are largest when compared to the data gaps in other areas.

This report aims to provide an overview of data availability in RECONECT Demonstrators which in turn serves as a basis for the development of the monitoring plans. This document should be read in conjunction with Deliverable 2.6. The document also serves as a reference for various WP2 and WP3 activities. In addition, the report also serves as a useful reference for RECONECT Collaborators in the process of developing their own data collection and monitoring plans.

Annex A. Data Inventory for Demonstrators

The information for the following tables are collected from questionnaires and information provided by project partners. More details can be found in Deliverable 2.3 and 2.5.

1. Demonstrator A1 – Dove/Gose Elbe Estuary, Germany

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstratio n area?	Good quality to use in indicator assessment?
	Surface Run-off Reduction	Precipitation	Precipitation data	YES	official reports of German Weather Service (DWD)		Automatic	daily basis	1950-2018	mm	XLS	On-site sensors			
		Soil type		?											
		Land use	Land use map	YES	Hamburg Transparenzportal						WMS	Derived map			
		Topography/DEM	Digital elevation model Hamburg	YES	Hamburg Transparenzportal						WMS	Remote sensors	1m		
		Radiation		?											
		Temperature		?											
		Evaporation		?											
		Wind speed		?											
		Roughness coefficient		?											
ter		Infiltration capacity		NO											
Wa	Slowing and Storing Run-off	Precipitation	Precipitation data	YES	official reports of German Weather Service (DWD)		Automatic	daily basis	1950-2018	mm	XLS	On-site sensors			
		Soil type		?											
		Land use	Land use map	YES	Hamburg Transparenzportal						WMS				
		Topography/DEM	Digital elevation model Hamburg	YES	Hamburg Transparenzportal						WMS	Remote sensors	1m		
		Radiation		?											
		Temperature		?											
		Evaporation		?											
		Wind speed		?											
		Roughness coefficient		?											
		Infiltration capacity		?											

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstratio n area?	Good quality to use in indicator assessment?
	Storage capacity		?											
Flood hazard	Discharge time series	River discharge	YES	Reinbek hydrology station			hourly basis	1970-2018	m³/s	XLS and DAT (ASCII)	On-site sensors			
	Water level time series	Water level	YES	Behörde für Umwelt und Energie Hamburg			hourly basis		m	XLS and DAT (ASCII)	On-site sensors			
	Flow velocity	flow velocity	NO						m/s					
	Topography/DEM	Digital elevation model Hamburg	YES	Hamburg Transparenzportal						WMS	Remote sensors	1m		
	Channel cross sections		?											
	Roughness coefficient		?											
	Water depth	Water depth	YES	Behörde für Umwelt und Energie Hamburg			hourly basis		cm	XLS and DAT (ASCII)	On-site sensors			
	Duration of inundation		?											
	Flood volume		?											
	Precipitation	Precipitation data	YES	official reports of German Weather Service (DWD)		Automatic	daily basis	1950-2018	mm	XLS	On-site sensors			
Vulnerability	Land use	Land use map	YES	Hamburg Transparenzportal						WMS	Derived map			
	Infrastructure	Infrastructure data	YES	Hamburg Transparenzportal						WMS				
	Population	Population	YES	Hamburg Transparenzportal						WMS				
	Building/Housing	3D data/cadastre	YES	Hamburg Transparenzportal						WMS				
Delay time to peak	Discharge hydrograph		?											
	Discharge time series	River discharge	YES	Reinbek hydrology station			hourly basis	1970-2018	m³/s	XLS and DAT (ASCII)	On-site sensors			
	Flood duration		?											
	Flood peak		?											
	Lag time		?											
	Water level	Water level	YES	Behörde für Umwelt und Energie Hamburg			hourly basis	1970-2018	cm NHN	XLS and DAT (ASCII)	On-site sensors			
	Topography/DEM	Digital elevation model Hamburg	YES	Hamburg Transparenzportal						WMS	Remote sensors	1m		
	Channel cross sections		?											

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstratio n area?	Good quality to use in indicator assessment
	Roughness coefficient		?											
Flood peak reduction	Discharge hydrograph		?											
reduction	Discharge time series	River discharge	YES	Reinbek hydrology station			hourly basis	1970-2018	m³/s	XLS and DAT (ASCII)	On-site sensors			
	Flood peak		?											
	Precipitation	Precipitation data	YES	official reports of German Weather Service (DWD)		Automatic	daily basis	1950-2018	mm	XLS	On-site sensors			
	Water level	Water level	YES	Behörde für Umwelt und Energie Hamburg			hourly basis	1970-2018	cm NHN	XLS and DAT (ASCII)	On-site sensors			
	Water depth	Water depth	YES	Behörde für Umwelt und Energie Hamburg			hourly basis		cm	XLS and DAT (ASCII)	On-site sensors			
	Topography/DEM	Digital elevation model Hamburg	YES	Hamburg Transparenzportal						WMS	Remote sensors	1m		
	Channel cross sections		?											
	Roughness coefficient		?											
Changes in pollution caused by waste water	Dissolved oxygen (DO)	collection of data and test in laboratory	existing measures											
	рН	collection of data and test in laboratory	existing measures											
	ORP	collection of data and test in laboratory	existing measures											
	Solids	collection of data and test in laboratory	existing measures											
	Nitrate as nitrate-nitrogen (NO3)	collection of data and test in laboratory	existing measures											
	Orthophosphate (mg P/I)	collection of data and test in laboratory	existing measures											
	Biological Oxygen Demand (BOD)	collection of data and test in laboratory	existing measures											
	Ammonium (NH4)	collection of data and test in laboratory	existing measures											

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstratio n area?	Good quality to use in indicator assessment?
	total phosphorus (mg P/I)	collection of data and test in laboratory	existing measures											
Reduced pollutants as relevant	рН	collection of data and test in laboratory	existing measures											
	Dissolved oxygen (DO)	collection of data and test in laboratory	existing measures											
	Conductivity	collection of data and test in laboratory	existing measures											
	Temperature	collection of data and test in laboratory	existing measures											
	Turbidity	collection of data and test in laboratory	existing measures											
	ORP	collection of data and test in laboratory	existing measures											
	Nutrients	collection of data and test in laboratory	existing measures											
	Phosporus	collection of data and test in laboratory	existing measures											
	Microorganisms	collection of data and test in laboratory	existing measures											
Attenuation of heavy metals and nutrients contamination in surface water	Phosphates	collection of data and test in laboratory	existing measures											
	Nutrient load, Nitrites, Nitrates	collection of data and test in laboratory	existing measures											
	Heavy metals	collection of data and test in laboratory	existing measures											
	% of mass removal	collection of data and test in laboratory	existing measures											
	Total dissolved solids in mg/l	collection of data and test in laboratory	existing measures											

							1								
	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstratio n area?	Good quality to use in indicator assessment?
	Sediment deposition	Suspended solid TSS	collection of data and test in laboratory	existing measures											
	Species richness and composition in respect to indigenous vegetation and local/national biodiversity targets	Number of species		?											
Vature		Water depth	Water depth	YES	Behörde für Umwelt und Energie Hamburg			hourly basis		cm	XLS and DAT (ASCII)	On-site sensors			
-	Distribution of public green spaces	Public green space	Statistical data	?											
		Surface of green space in the area	Aerial Images				5cm/ 10cm GSD	yearly orhos							
	Distribution of land use in the agricultural area	Land use	Land use map	YES	Hamburg Transparenzportal						WMS	Derived map			
	Land cover data	Land cover	Land cover data	YES											
	Increasing recreational opportunities of NBS area	Number of recreation activity in the area	Number of recreation activity in the area	?											
		Length of footpaths													
		Number of access points to NBS area								pedestr ian/cycl e					
e	Number of tourists	Number of tourists	Data collection, survey	?											
Peop	cultural events in NBS area	Number of cultural events	Data collection	?											
	Number and value of people spend time in the NBS areas	Number of people visit the area	Data collection	?											
		Number of people spend their free time in the area	Data collection	?								survey and questionnai re			
		Age of people visit the area	Survey	?											

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstratio n area?	Good quality to use in indicator assessment?
Number of green jobs in the area	Number of green jobs	employment records	?		<u>.</u>		-						-	
Reduced/avoide d damage cost from hydro- meteorological risk reduction	Flood depth	Flood depth	?						m					
	Flood velocity	Flood velocity	?						m/s					
	Land use map	Land use map	YES	Hamburg Transparenzportal						WMS	Derived map			
	Infrastructure	Infrastructure data	YES	Hamburg Transparenzportal						WMS				
	Damage data		?											
	Inundation map		?											
	Value maps													
Economic benefit from the reduction of stormwater that typically needs to be treated in a public sewerage system	cost of sewerage treatment	cost of sewerage treatment	?						euro/m ³					
,	Volume of water that need to be treated in sewerage system		?											
Change in land and/or property values	price of land and/or properties		?											
	willingness to pay		?								survey and questionnai re			
Number of people communicating in the area			?											

2. Demonstrator A2 – Odense Coastal Area, Denmark

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	Vulnerability	Land use	Land use map	YES						1		Derived			
		Infrastructure	Infrastructure data	?								Шар			
		Population	Population	?											
		Building/housing	3D data/cadastre	?											
	Storm surge	Topography	DEM data	YES	Kysterne.kyst.dk							Remote sensors			
		Tidal variation	Tidal variation	?	A hydro dynamic model					m					
		Barometric pressure		?	A hydro dynamic model										
		Wave height		?	A hydro dynamic model										
Vater		Spatial scale of storm		?	A hydro dynamic model										
>		Amplitude of surges		?	A hydro dynamic model										
		Duration of surges		?	A hydro dynamic model										
		Length of coastline affected by the surge		?	A hydro dynamic model										
	Coastal hazard index	Historical flood events and consequences		?											
		Frequency of floods		?											
		Flood inundation		?											
		Distance and topography influences the territory being affected		?											
		Flood depth	Flood depth	?						m					
		Tidal variation	Tidal variation	?						m					

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	Exposed value index (EVI)	Population density	Population density	?						inhab it/km ²					
		Built density	Built density	?						buildi ngs/k m²					
		Heritage		?											
		Potential damage		?											
		Land use	Land use map	YES								Derived map			
	Coastal vulnerability index (CVI)	Geomorphology		?											
		Coastal slope	DEM data	YES	Kysterne.kyst.dk					%					
		Shoreline rate	Shoreline rate	?						m/yr					
		Mean tide range	Mean tide range	?						m					
		Mean significant wave height	Mean significant wave height	?						m					
		Relative sea level rise rate	Relative sea	?						mm/y					
		Historical flood events and consequences	levernserate	?						ſ					
		Land use	Land use map	YES								Derived			
	Change in groundwater level/water table	Groundwater level	Dip wells	?								шар			
	Changes in riparian habitat	Riparian habitat	habitat cartography	?											
		Riparian habitat	GPS	?											
		Riparian habitat	Aerial Images	?											
Nature	Changes in aquatic/wetla nd habitat	Aquatic habitat	habitat cartography	?											
		Aquatic habitat	GPS	?											
		Aquatic habitat	Aerial Images	?											
		Wetland habitat	habitat cartography	?											
		Wetland habitat	GPS	?											

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
		Wetland habitat	Aerial Images	?											
	Change in location of habitat boundaries	habitat boundaries	variation of habitat boundaries	?											
	unanges in vegetation along watercourses	Vegetation along watercourses	remote sensing	?											
		Structure and function	remote sensing	?											
		Trends and status of the area	remote sensing	?											
		Trends and status of range	remote sensing	?											
	Conservation status of habitats Species	Cartography of habitats		?											
	richness and composition in respect to indigenous vegetation and local/national biodiversity targets	Number of species		?											
	Number and type of		Type of												
	protected species	Protected species	protected species	?											
		Protected species	Number of protected species	?											
	Diversity of	Number of species		?											
	species	Number of individuals for each species		?											
ole	Increasing recreational opportunities of NBS area	Number of recreation activity in the area	Number of recreation activity in the area												
reo		Length of footpaths													
		Number of access points to NBS area								pedes trian/ cycle					

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
Number and value of people spend time in the NBS areas	Number of people visit the area	Data collection	•											
	Number of people spend their free time in the area	Data collection												
Number of tourists	Number of tourists	Data collection												
	Personal characteristics													
Accessible NBS per capita	NBS free space area													
Average journey time for people by	Number of people that could access													
area or average distance from home/public transportation to NBS area	time from home/public trans area	portation to NBS												
Fabracian	Distance from home/public tr NBS area	ransportation to												
attractiveness of places for living and working	Number of people move close	er to the area												
Dark and (a. at	Number of people visit the NBS area													
keduced/avoi ded damage cost from hydro- meteorologica l risk reduction	Flood depth	Flood depth							m					
	Flood velocity	Flood velocity							m/s					
	Land use	Land use map	YES								Derived map			
	Infrastructure	Infrastructure data									4			
	Damage data													

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	Inundation map													
	Value maps													
Change in land and/or property values	Price of land and/or properties								Euro					
	Willingness to pay													
Mental well- being	Feeling happiness													
~~	Personal characteristics													

3. Demonstrator A3 – Tordera River Basin, Spain

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
Water		precipitation	precipitation data	YES	Catalan Meteorological Service		Automatic and non- automatic	historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	mm	ASCII and XLSX	On-site sensors			
		soil type map	Soil type map												
	Slowing and storing runoff	land use	Land use map	YES	Landsat		Remote sensing	1987/1992/ 1993/1997/ 2002/2006/ 2007/2009/ 2012/2017	every 5 years		GEOTIF F	Remote sensing			
		topography	DEM												
		Roughness coefficient		YES	Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m³/s	tabular data				

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	water discharge		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m³/s	1) XLSX 2) tabular data	On-site sensors			
	water level		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m	1) XLSX 2) tabular data	On-site sensors			
	water velocity		YES	Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5	m/s	tabular data				
Flood hazard	Flood peak		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5	m³/s	1) XLSX 2) Tabular data	On-site sensors			
	Flood duration		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5		1) XLSX 2) Tabular data	On-site sensors			
	Lag time		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes		1) XLSX 2) Tabular data	On-site sensors			
	precipitation	precipitation data	YES	Catalan Meteorological Service (SMC)		Automatic and non- automatic	historical 30 years; automatic from 1995	historical data: hourly and automatic	mm	ASCII and XLSX	On-site sensors			

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
								: 5 minutes						
	Roughness coefficient													
	Permeability													
	topography													
	channel networks													
						Pomoto	1987/1992/ 1993/1997/	ovoru E		CEOTIE	Pomoto			
	land use	Land use map	YES	Landsat		sensing	2002/2006/ 2007/2009/	years		F	sensing			
Vulnerability							2012/2017							
vullerability	Infrastructure	Infrastructure data												
	Population	Population												
	Building/housing	3D data/cadastre												
	Discharge hydrograph		YES	River gauging stations/Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m³/s	tabular data	On-site sensors			
Delay time to	Discharge time series		YES	Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m³/s	tabular data				
peak	Flood duration		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5		1) XLSX 2) Tabular data	On-site sensors			
	Flood peak		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	minutes historical data: hourly and automatic : 5 minutes	m³/s	1) XLSX 2) Tabular data	On-site sensors			

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	Lag time		YES	1) River gauging stations 2) Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5		1) XLSX 2) Tabular data	On-site sensors			
	Discharge hydrograph		YES	River gauging stations/Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m³/s	tabular data	On-site sensors			
	Discharge time series		YES	Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5	m³/s	tabular data				
Flood peak reduction	Flood peak		YES	River gauging stations/Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m³/s	1) XLSX 2) Tabular data	On-site sensors			
	Flood duration		YES	River gauging stations/Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5		1) XLSX 2) Tabular data	On-site sensors			
	Lag time		YES	River gauging stations/Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes		1) XLSX 2) Tabular data	On-site sensors			
Change in Groundwater level/water table	Groundwater level	Dip wells	YES	Monitoring program of the WFD			2005 to present	Monthly	m	PDF XLSX XML	other instrumen ts			

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	Attenuation of pollution in groundwater	Physicochemical quality and organic pollutants	•	YES	Monitoring program of the WFD			2005 to present	every 6 months		PDF XLSX XML	other instrumen ts			
	Seawater intrusion	Salinity		YES	Monitoring program of the WFD			2005 to present	Daily		PDF XLSX XML Raster	On-site sensors			
	Changes in	Riparian habitat	Habitat cartography	YES	Copernicus			2011-2013			dataset s				
	riparian habitat	Riparian habitat	GPS												
		Riparian habitat	Aerial Images									derived map			
	Changes in aquatic habitat	Mesohabitats (IHF)		YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e	other instrumen ts			
	Connectivity/f ragmentation of habitat structural	Connectivity (ICF)		YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e	other instrumen ts			
		Vegetation along watercourses	remote sensing	YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e				
ure	Change in	Structure and function	remote sensing	YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e				
Nat	vegetation along watercourses	Trends and status of the area	remote sensing	YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e				
		Trends and status of range	remote sensing	YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e				
		Riparian vegetation (QBR)		YES	Monitoring program of the WFD				once a year		XLSX Databas e	other instrumen ts			
	Conservation status of habitats	Cartography of habitats	Habitat cartography	YES	Copernicus			2011-2013			Raster dataset s				
	Change in land cover	Land Cover	Satelitte imagery	YES	Landsat		Remote sensing	1987/1992/ 1993/1997/ 2002/2006/ 2007/2009/ 2012/2017	every 5 years		GEOTIF F	Remote sensing			
	Number and type of	Number of protected species		YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e	other instrumen ts			

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
protected species	Type of protected species		YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e	other instrumen ts			
	Type of protected species		YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e	other instrumen ts			
	Weather data													
Diversity of species	Data that allow to understand observed species counts Temporal species population data Maps of external variables													
Number, area, location of invasive non- native animal	EXOACUA		YES	Monitoring program of the WFD Monitoring			2005 to present	once a year		XLSX Databas e XI SX				
and planted species that are	EXOCAT		YES	program of the WFD			2005 to present	once a year		Databas				
threatening to ecosystem, habitats or species	Type of protected species		YES	Monitoring program of the WFD			2005 to present	once a year		XLSX Databas e	other instrumen ts			
Increasing	Number of recreation activity in the area													
opportunities	Length of footpaths													
of NBS area	Number of access points to NBS area													
Provision of NBS sites for education and research	Number of student benefiting from education and research about NBS													
Reduced/avoi ded damage cost from	Flood depth	Water level	YES	Data from hydraulic models				historical data: hourly and automatic : 5	m	ASCII and XLSX				
hydro- meteorologica I risk reduction	Flood velocity	Water velocity	YES	Data from hydraulic models			4007 (4005 (minutes	m/s	ASCII				
	Land use	Land use map	YES	Landsat		Remote sensing	1987/1992/ 1993/1997/ 2002/2006/	every 5 years		GEOTIF F				

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
							2007/2009/ 2012/2017							
	Infrastructure	Infrastructure data					2012,2017							
	Damage	Damage data												
	Inundation	Inundation												
	Water level	iliaµ/uata	YES	River gauging stations/Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m	tabular data	On-site sensors			
	Water velocity		YES	River gauging stations/Data from hydraulic models			historical 30 years; automatic from 1995	historical data: hourly and automatic : 5 minutes	m/s	tabular data				
	value map													

4. Demonstrator A4 – Portofino Regional Natural Park, Italy

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
		Slope angle	Slope angle data	YES	Liguria Region GIS vector data				2017		vector data				
		Geology	Geology Map	YES	Liguria Regio data						pdf, other?				
Nater	Landslide hazard	Land use	Land use map	YES	Liguria region GIS vector data			3 years	2012/2015/ 2018		vector data	Remote sensing			
		Earthquakes		?											
		Precipitation	Precipitation data	YES	Taken from ARPAL		Automatic weather station	hour	2009-2019	mm	text (.txt)	On-site sensors			

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
		Maintenance level of man- made terraces					LIDAR data and aero photo acquisition through					Remote sensing			
		Dead trees in 20 m buffer areas along the hydrographical network					arones					Survey and questionnai re			
		Streams													
		Land use	Land use map	YES	Liguria region GIS vector data			3 years	2012/2015/ 2018		vector data	Remote sensing			
	Vulporability	Infrastructure	Infrastructure data	YES	Liguria region GIS vector data				2007		vector data				
	vullerability	Population	Population	YES	ISTAT census 2011		Survey	every 10 years	2011		.xls				
		Building/Housing	3D data/cadastre	YES	Liguria region GIS vector data				2007		vector data				
		Suspended Soldis (TSS)													
		Total dissolved solid (TDS)													
	Sediment Deposition	Turbidity (NTU)													
	Deposition	Sediment Composition													
		Sediment characteristics													
		Terrasses detection	LIDAR	NO											
		Precipitation	Precipitation data	YES	Taken from ARPAL		Automatic weather station	hour	2009-2019		text (.txt)				
	Possible source	Land use	Land use map	YES	Liguria region GIS vector data			3 years	2012/2015/ 2018		vector data				
		Slope angle	Slope angle data	YES	Liguria Region GIS vector data				2017		vector data				
		Geology	Geology Map	YES	Liguria Regio data						pdf				
		Terrasses detection	Aerial Images												
	Changes in	Riparian habitat	habitat cartography	YES	Portofino Natural Park Habitat cartography		Survey	every 2 years	2015		vector data	Survey and questionnai re			
Ð	riparian habitat	Riparian habitat	GPS	?											
Natur		Riparian habitat	Aerial Images	?								Remote sensing			

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	Terrestrial habitat	GPS	?											
Changes in terrestrial	Terrestrial habitat	Aerial Images	?								Remote sensing			
habitat	Terrestrial habitat	Terrestrial habitat map	YES	Portofino Natural Park Habitat cartography		Survey	every 2 years	2015		vector data	Survey and questionnai re			
Changes in vegetation along watercourses	Vegetation along watercourses	remote sensing	?			Survey					Survey and questionnai re			
	Structure and function	remote sensing	?			Survey								
Conservation	Trends and status of the area	remote sensing	?			Survey								
status of	Trends and status of range	remote sensing	?			Survey								
IIduitats	Cartography of habitats		?											
	Future prospects		?											
Change in land cover	Land Cover	satelitte imagery	YES	Liguria region GIS vector data		Aerial photo interpretation	every 3 years	2012/2015/ 2018		vector data	On-site sensors			
Change in land	Land Use	Land use map	YES	Liguria region GIS vector data			every 3 years	2012/2015/ 2018		vector data				
use	Compatible use of area		?											
Number and type of	Protected species	Type of protected species	YES	Portofino Natural Park species cartography		Survey	every 2 years	Historical data		bibliograp hic data	Survey and questionnai re			
protected species	Protected species	Number of protected species	YES	Portofino Natural Park species cartography		Survey	every 2 years	Historical data		bibliograp hic data	Survey and questionnai re			
	Number of recreation activity in the area	Number of recreation activity in the area	YES	Data taken from tourist information tourist			every year	2018		.xls	Survey and questionnai re			
Increasing recreational opportunities of	Length of improved path										Survey and questionnai re			
NBS area	water drainage improvemen								n°		Survey and questionnai			
	Number of access points to NBS area		?											
Number of tourists	Number of tourists	Data collection	YES	Portofino Park Authority			every year	2006		.xls	On-site sensors			
sites for education and research	Number of student	Data collection	?											

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
People	Loss of cultural heritage	Economic and properties loss	Budget of municipalities and Park	YES				every year	2000		.xls	Survey and questionnai re			
		Cultural heritage loss		?								Survey and questionnai re			
	Reduced need for management and maintenance	Maintenance and management	Budget of municipalities and Park	YES				every year	2000		.xls	Survey and questionnai re			
		reduced need	Budget of municipalities and Park	YES				every year	2000		.xls	Survey and questionnai re			
	Footpath network recover														

5. Demonstrator B1 – Ijssel River Basin, the Netherland

reduction

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
	Surface Run-off Reduction	Precipitation	Precipitation data	YES	KNMI / National Center of Meteorology & Hydrology, UK	the Nationa I Center	automatic	daily/hourly basis		mm	XLSX	On-site sensors		NO	
Water	Slowing and Storing Run-off	Precipitation	Precipitation data	YES	KNMI / National Center of Meteorology & Hydrology, UK	the Nationa I Center	automatic	daily/hourly basis		mm	XLSX	On-site sensors		NO	
		Roughness coefficient		?											
		Storage capacity		?											

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
Flood Hazard	Topography/DEM	Digital elevation model	YES					2011		GIS			YES	
	Flood depth	Flood depth	NO			Satellite data	daily basis		m		Remote sensors			
	River discharge	River discharge	YES	Rijkwaterstaat / RECONECT		hydrology station / ADCP	daily basis/ 2times (2 days)		m³/s	XLS and DAT (ASCII) / MAT	sensors / other instrumen ts		NO	
	Flow velocity	Flow velocity	YES			Aerial drone with Global Navigation Satellite System (GNSS) GPS device total station	2 times (2 days)			XLSX	Other instrumen ts			
	Cross sections		YES			and a high- end Global Navigation Satellite System (GNSS) GPS	2 times (2 days)			XLSX			NO	
	Vegetation growth	Vegetation growth	YES	Rijkwaterstaat		Satellite data					Remote sensors			
	Precipitation	Precipitation data	YES	KNMI	the Nationa I Center	automatic	daily/hourly basis	over 100 yrs	mm	XLSX	On-site sensors			
	Roughness coefficient													
Flood Peak Reduction	Precipitation	Precipitation data	YES	KNMI	the Nationa I Center	automatic	daily/hourly basis	over 100 yrs	mm	XLSX	On-site sensors			
	Topography/DEM	Digital elevation model	YES					2011		GIS			YES	
	Flood depth	Flood depth	NO			Satellite data	daily basis		m		Remote sensors On-site			
	River discharge	River discharge	YES	Rijkwaterstaat / RECONECT		hydrology station / ADCP	daily basis/ 2times (2 days)		m³/s	XLS and DAT (ASCII) / MAT	sensors / other instrumen ts		NO	

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator
															assessmen t?
		Flow velocity	Flow velocity	YES			Aerial drone with Global Navigation Satellite System (GNSS) GPS device	2 times (2 days)	1		XLSX	Other instrumen ts			
		Cross sections		YES			total station and a high- end Global Navigation Satellite System (GNSS) GPS device	2 times (2 days)			XLSX			NO	
		Vegetation growth	Vegetation growth	YES	Rijkwaterstaat		Satellite data					Remote sensors			
	Change in location of habitat boundaries	Vegetation cover	Vegetation cover	YES	the State			Continuous	2011		GIS				
		Vegetation growth	Vegetation growth	YES	Rijkwaterstaat		Satellite data					Remote sensors			
	Changes in vegetation	Vegetation cover	Vegetation	YES	the State			Continuous	2011		GIS				
		Vegetation growth	Vegetation growth	YES	Rijkwaterstaat		Satellite data					Remote sensors			
	Shoreline characteristics and erosion protection	Vegetation cover	Vegetation cover	YES	the State			Continuous	2011		GIS				
		Vegetation growth	Vegetation growth	YES	Rijkwaterstaat		Satellite data					Remote sensors			
ure	Change in land cover	Vegetation cover	Vegetation cover	YES	the State			Continuous	2011		GIS				
Nat		Vegetation growth	Vegetation growth	YES	Rijkwaterstaat		Satellite data					Remote sensors			
	Change in land use	Vegetation cover	Vegetation cover	YES	the State			Continuous	2011		GIS				
		Vegetation growth	Vegetation growth	YES	Rijkwaterstaat		Satellite data					Remote sensors			
	Changes in riparian habitat	Protected species and their habitat/feeding area	Location of protected species	YES	NDFF (national database flora and fauna)			Continuous	until 2018		GIS				
		Water quality and underwater ecoscan		YES	www.indymo.nl		underwater drone equipped with water	2 times (2 days)			XLSX				

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
						sensors								
Changes in aquatic habitat	Protected species and their habitat/feeding area	Location of protected species	YES	NDFF (national database flora and fauna)			Continuous	until 2018		GIS				
	Water quality and underwater ecoscan		YES	www.indymo.nl		underwater drone equipped with water quality sensors	2 times (2 days)			XLSX				
Changes in wetland habitat	Protected species and their habitat/feeding area	Location of protected species	YES	NDFF (national database flora and fauna)			Continuous	until 2018		GIS				
	Water quality and underwater ecoscan		YES	www.indymo.nl		underwater drone equipped with water quality sensors	2 times (2 days)			XLSX				
Changes in terrestrial habitat	Protected species and their habitat/feeding area	Location of protected species	YES	NDFF (national database flora and fauna)			Continuous	until 2018		GIS				
	Water quality and underwater ecoscan		YES	www.indymo.nl		underwater drone equipped with water quality sensors	2 times (2 days)			XLSX				
Conservation status of habitats	Protected species and their habitat/feeding area	Location of protected species	YES	NDFF (national database flora and fauna)			Continuous	until 2018		GIS				
	Water quality and underwater ecoscan		YES	www.indymo.nl		underwater drone equipped with water quality sensors	2 times (2 days)			XLSX				

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy	Frequency monitoring	Period of available data	Unit	Format	Type of data	Spatial resolution	Covering all demonstrati on area?	Good quality to use in indicator assessmen t?
Restr speci	ricted-range ies	Protected species and their habitat/feeding area	Location of protected species	YES	NDFF (national database flora and fauna)			Continuous	until 2018		GIS				
		Water quality and underwater ecoscan		YES	www.indymo.nl		underwater drone equipped with water quality sensors	2 times (2 days)			XLSX				
Num prote	ber and type of ected species	Protected species and their habitat/feeding area	Location of protected species	YES	NDFF (national database flora and fauna)			Continuous	until 2018		GIS				
		Water quality and underwater ecoscan		YES	www.indymo.nl		underwater drone equipped with water quality sensors	2 times (2 days)			XLSX				
Num locat nonn plant are t ecosy speci	ber, area, ion, of invasive native animal and ted species that hreatening to ystem, habitats or ies	Locations of invasive species					Field check by ecologist								
Loss herit metr due t	of cultural age due to hydro- ological events/ to land take	List and locations of cultu hedgerows and trees	urally valuable				field check, talks with landowners and historical analyses by historical								
Redu mana main	iced need for agement and tenance	Land use in m2 design pr focused on lower mainte	inciples, nance				geographer Field check with landowners								
		Wishes and permissions of landowners		NO			Talks with land owners	4 times				Survey and questionn aire			
Chan prop	ge in land and/or erty values	list of areas were subsidie received by land owners	es were				Talks with land owners								

6. Demonstrator B2 – Inn River Basin, Austria

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolution	Coverin g all demonst ration area?	Good quality to use in indicator assessm ent?
	Surface Run- off Reduction	Precipitation	Precipitation data	YES	Hydrological service		Rain gauge	daily basis	Since 1984	mm	txt	On-site sensors			
		Surface run-off					Weir	Minutes			txt	On-site sensors			
		Soil moisture					TDR type sensors / Cosmic ray Neutron sensors (CRNS)	Minutes / hourly basis			txt		point / 200- 300m		
		Discharge time series	Measured discharge				Water level gauge	Minutes		m³/s	txt	On-site sensors			
		Discharge time series	Simulated discharge				Hydrologic al model	Minutes		m³/s	txt				
	Slowing and Storing Run- off	Precipitation	Precipitation data	YES	Hydrological service		Rain gauge	daily basis	Since 1984	mm	txt	On-site sensors			
		Surface run-off					Weir	Minutes			txt				
ater		Soil moisture					Sensors / Cosmic ray Neutron sensors (CRNS)	Minutes / hourly basis			txt		point / 200- 300m		
3		Discharge time series	Measured discharge				Water level gauge	Minutes		m³/s	txt	On-site sensors			
		Discharge time series	Simulated discharge				Hydrologic al model	Minutes		m³/s	txt				
	Flood Hazard	Precipitation	Precipitation data	YES	Hydrological service		Rain gauge	daily basis	Since 1984	mm	txt				
		Topography/DEM	Digital elevation model	YES	Government Tyrol				2006		GIS				
		Roughness coefficient													
		Cross sections	Diver												
		Discharge time series	discharge							m³/s					
	Delay time to peak	Precipitation	Precipitation data	YES	Hydrological service		Rain gauge	daily basis	Since 1984	mm	txt	On-site sensors			
	reduction	Precipitation	data	YES	service		Rain gauge	daily basis	Since 1984	mm	txt	On-site sensors			
		Surface run-off					Weir	Minutes			txt	On-site sensors			
		Soil moisture					TDR type sensors / Cosmic ray	Minutes / hourly basis			txt		point / 200- 300m		

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolution	Coverin g all demonst ration area?	Good quality to use in indicator assessm ent?
	Landslide hazard	Discharge time series Discharge time series Land use Topography/DEM Infrastructure	Measured discharge Simulated discharge Land use map Digital elevation model Infrastructure data	YES YES	Government Tyrol Government Tyrol		Neutron sensors (CRNS) Water level gauge Hydrologic al model Aerial images	Minutes Minutes	Since 1945 2006	m³/s m³/s	txt txt jpg GIS	On-site sensors Remote sensors			
		Building/housing Streams Precipitation	Precipitation data	YES			Rain gauge	Minutes		mm	txt				
Nature	Vulnerability Changes in land use Change in land cover Reduced/avoi	Land use Land use Land cover	Land use map Land use map Land cover data	YES YES	Government Tyrol Government Tyrol		Aerial images Aerial images		Since 1945 Since 1945		ipg gqi	Remote sensors Remote sensors			
People	ded damage cost from hydro- meteorological risk reduction	Hazard maps Value maps										On-site sensors On-site sensors			

7. Demonstrator B3 – Aarhus, Egå Engsø and Lystrup, Denmark

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolution	Coverin g all demonst ration area?	Good quality to use in indicator assessm ent?
Wat	Surface Run- off Reduction	Precipitation	Precipitation data	YES	Danish Meteorologi Institute (DMI)	ical	automatic			mm		On-site sensors		NO	

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolution	Coverin g all demonst ration area?	Good quality to use in indicator assessm ent?
	Slowing and Storing Run- off	Precipitation	Precipitation data	YES	Danish Meteorolog Institute (DMI)	ical	automatic			mm		On-site sensors		NO	
	Flood Hazard	Precipitation	Precipitation data	YES	Danish Meteorolog Institute (DMI)	ical	automatic			mm		On-site sensors		NO	
		Flood depth	Flood depth	YES			OTT Ecolog with pressure sensor, OTT Orpheus with pressure sensor and Campbell with pressure sensor	15 minutes	1976- now	m		On-site sensors		NO	
		River discharge	River discharge	YES			Water flow meter	measurem ents per	1976- now	m³/s		On-site sensors		NO	
		Topography/DEM	Digital elevation model					your							
		Roughness coefficient													
		Cross sections													
	Flood peak reduction	Precipitation	Precipitation data	YES	Danish Meteorolog Institute (DMI)	ical	automatic OTT Ecolog with pressure sensor, OTT			mm		On-site sensors			
		Flood depth	Flood depth	YES			Orpheus with pressure sensor and Campbell with pressure sensor	15 minutes	1976- now	m		On-site sensors		NO	
Nature	presence of certain species	River discharge	River discharge	YES			Water flow meter	10 measurem ents per year	1976- now	m³/s		On-site sensors		NO	

In	dicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolution	Coverin g all demonst ration area?	Good quality to use in indicator assessm ent?
Cha ripa Cha aqua Cha wetl habi Cha terre habi	nges in rian habitat nges in atic habitat nges in and tiat estrial tiat easing eational ortunities	WHO Urban Green Space Indicator													
of N	BS area	Accessible Natural Greenspace Standard (UK definition)													
		Length of footpaths													
		Number of access													
Nun valu peoj spei time	nber and e of ple visit or nd free e in NBS	points to NBS area													
area	1	Personal													
Valu redu emis carb	ue of uced CO2 ssion and oon uestration	characteristics													
Cha land prop valu Phy heal s	nge in l and/or berty es sical th/activitie	Change in property value local and large scale add	e divided into led values												

People

8. Demonstrator B4 – Thur River Basin, Switzerland

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
	Flood Peak Reduction	Precipitation	Precipitation data	YES	Automatic Weather Stations of Cantons		Automatic	daily basis	-	mm	ASCII	On-site sensors	<u>.</u>		
		River discharge	River discharge	YES	Federal and cantonal stations		Automatic	hourly basis	1975 - today	m3/s	ASCII	On-site sensors			
		Water level time series		?											
	Change in Groundwater level/water table	Electrical conductivity		YES	Federal and cantonal stations		Automatic	15 min to daily basis	1999 to today	m3/s	ASCII	On-site sensors			
		Groundwater level		?											
	Flood Hazard	River discharge	River discharge	YES	Federal and cantonal stations		Automatic	hourly basis	1975 - today	m3/s	ASCII	On-site sensors			
		Rainfall time series		?											
		roughness		?											
		permeability		?											
		topography		?											
		channel networks		?											
	Attenuation of pollution in groundwater	Electrical conductivity		YES	Federal and cantonal stations		Automatic	15 min to daily basis	1999 to today	m3/s	ASCII	On-site sensors			
	Signaturater	Major ions		YES	Federal and cantonal sampling			four times a year	1975 - today	mg/L	ASCII	Survey and questionn aire			
		Micropollutants		YES	Federal and cantonal sampling			four times a year	2015 - today		ASCII	Survey and questionn aire			
ē	Shoreline characteristics and erosion protection	Change habitat area		NO	Areal evaluation				Once 2023		ASCII	Remote sensing			
Natur	Number and type of protected species	Change habitat area		NO	Areal evaluation				Once 2023		ASCII	Remote sensing			
	Changes in riparian habitat	Change habitat area		NO	Areal evaluation				Once 2023		ASCII	Remote sensing			

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
Increasing recreational	Changes in length of paths		?								Survey and questionn aire			
opportunities of NBS area	Number of access points to NBS area		?								Survey and questionn aire			
Number and	Total number of visitors per day		?								Survey and questionn aire			
value of people visit or spend free time in NBS	Average duration of visit		?								Survey and questionn aire			
area	Activity during visit		?								Survey and questionn aire			
Provision of NBS sites for education and research			?											
Change in land and/or property values			?											

9. Demonstrator B5 – The Var Éco-Vallée, France

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
Flood hazard	Precipitation	Precipitation data	YES	Meteo France					mm	Table	On-site sensors			
	Land use	Land use map	YES	INSEE - Statistical Institute						Table	derived map			

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
				•	MNCA AquaVar project				•				•	•	
		Infrastructures data	Infrastructure data	YES	INSEE - Statistical Institute MNCA AquaVar project						Table	derived map			
		Population	Population	YES	INSEE - Statistical Institute MNCA AquaVar project						Table	derived map			
		Building/Housing	3D data/cadastre	YES	INSEE - Statistical Institute MNCA AquaVar project						Table	derived map			
		roughness		?											
		permeability		?											
		topography		?											
		channel networks		?											
Water	/ulnerability	Land use	Land use map	YES	INSEE - Statistical Institute MNCA AquaVar project						Table	derived map			
		Infrastructure	Infrastructure data	YES	Institute MNCA AquaVar project						Table	derived map			
		Population	Population	YES	INSEE - Statistical Institute MNCA AquaVar project						Table	derived map			
		Building/Housing	3D data/cadastre	YES	INSEE - Statistical Institute MNCA AquaVar project The data will be followed from						Table	derived map			
Nature	Restricted- ange species	The numbers of restricted- range species		YES	given link: https://inpn.mhn .fr/site/natura200 0/FR9312025 If during the project we find additional source for monitoring we						Table	Survey and questionn aire			

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
	The numbers of restricted- range the area		YES	will include it in the program. The data will be followed from given link: https://inpn.mnhn .fr/site/natura200 0/FR9312025 If during the project we find additional source for monitoring we will include it in the program. The data will be						Table	Survey and questionn aire			
Number and type of protected species	Type of protected species		YES	followed from given link: https://inpn.mnhn .fr/site/natura200 0/FR9312025 If during the project we find additional source for monitoring we will include it in the program.						Table				
	Number of protected species		YES	The data will be followed from given link: https://inpn.mhn .fr/site/natura200 0/FR9312025 If during the project we find additional source for monitoring we will include it in the program						Table				
Type, density of native species	Type of native species		YES	The data will be followed from given link: https://inpn.mnhn .fr/site/natura200 0/FR9312025 If during the project we find additional source						Table				

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
	Number of native species		YES	for monitoring we will include it in the program. The data will be followed from given link: https://inpn.mhn .fr/site/natura200 0/FR9312025 If during the project we find additional source for monitoring we will include it in the program. The data will be followed from given link:						Table				
	Area that native species are located		YES	given link: https://inpn.mnhn .fr/site/natura200 0/FR9312025 If during the project we find additional source for monitoring we will include it in the program					m²	Table				
Increasing	Number of recreation activity in the area	Number of recreation activity in the	YES	MNCA (Metropole Nice cote dAzur)						Table				
opportunities of NBS area	Changes in length of paths Number of access points to	ared	? ?											
People	Flood depth		YES	INSEE - Statistical Institute MNCA						Table				
Reduced/avoi ded damage cost from hydro- meteorologica	Flood velocity		YES	AquaVar project INSEE - Statistical Institute MNCA AquaVar project						Table				
l risk reduction	Land use map	Data collection, survey	YES	INSEE - Statistical Institute MNCA AguaVar project						Table				

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
	Infrastructure data	Data collection	YES	INSEE - Statistical Institute MNCA AquaVar project						Table				
	Damage data	Data collection	YES	INSEE - Statistical Institute MNCA AquaVar project						Table				
	Inundation map	Data collection	YES	INSEE - Statistical Institute MNCA AquaVar project						Table				
	Value map		?											
Number of cultural events in NBS area	Variables needed	Survey	YES	INSEE - Statistical Institute MNCA						Table				

10. Demonstrator B6 – Les Boucholeurs, France

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
	Flood hazard	Precipitation	Precipitation data	YES	Meteo France					mm		On-site sensors			
		Land use	Land use map	YES	INSEE - Statistical Institute							derived map			
5		Infrastructure	Infrastructure data	YES	INSEE - Statistical Institute						Table	derived map			
Wate		Population	Population	YES	INSEE - Statistical Institute						Table	derived map			
		Building/Housing	3D data/cadastre	YES	INSEE - Statistical Institute						Table	derived map			
		Shoreline change		?						m					
		wind speed		?											

	Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
		wave height		?											
		Rainfall time series		?											
		roughness		?											
		permeability		?											
		topography		?											
		channel networks		?											
		Water depth		?											
	Vulnerability	Land use	Land use map	YES	INSEE - Statistical Institute						Table	derived map			
		Infrastructure	Infrastructure data	YES	INSEE - Statistical Institute						Table	derived map			
		Population	Population	YES	INSEE - Statistical						Table	derived man			
		Building/Housing	3D data/cadastre	YES	INSEE - Statistical Institute						Table	derived map			
	Coastal vulnerability	Shoreline rate		YES	EMODnet					m/yr					
Vature	Restricted- range species	The numbers of restricted- range species		YES	The data will be followed from given link: https://inpn.mhn .fr/site/natura200 0/FR5410013 If during the project we find additional source for monitoring we will include it in the program. The data will be followed from						Table				
2	Number and	The numbers of restricted- range the area		YES	given link: https://inpn.mnhn .fr/site/natura200 0/FR5410013 If during the project we find additional source for monitoring we will include it in the program.						Table				
	Number and type of	Type of protected species		YES	The data will be followed from						Table				

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	quality to use in indicato assessn ent?
protected species	Number of protected		YES	given link: https://inpn.mnhn .fr/site/natura200 0/FR5410013 If during the project we find additional source for monitoring we will include it in the program. The data will be followed from given link: https://inpn.mnhn .fr/site/natura200 0/FR5410013		<u>.</u>	•	·		Table		·		
Type, density of native species	species			If during the project we find additional source for monitoring we will include it in the program. The data will be followed from given link: https://inpn.mnhn .fr/site/natura200 0/ER5410013										
	Type of native species		YES	If during the project we find additional source for monitoring we will include it in the program. The data will be followed from given link: https://inpn.mnhn fr/site/natura200						Table				
	Number of native species		YES	0/FR5410013 If during the project we find additional source for monitoring we will include it in						Table				

Indica	tors	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
	۲ ا	Area that native species are ocated (m ²)		YES	The data will be followed from given link: https://inpn.mhn .fr/site/natura200 0/FR5410013 If during the project we find additional source for monitoring we will include it in the program.						Table				
Changes in riparian habitat	ו		remote sensing	?								Remote sensing			
Change in wetland habitat			remote sensing	?								Remote sensing			
Increase g area Distributio	reen		remote sensing	?								Remote sensing			
public gree	en		remote sensing	?								Remote sensing			
Reduced n for manageme and	eed N r ent i i	Maintenance and nanagement cost of grey nfrastructures (if mplemented) Maintonaco and	Number of recreation activity in the area	?											
Change in	land	nanagement cost of NBS		?											
and/or property values	F	Price of land and/or properties (euro)		?											
ble	١	Willingness to pay		?											
Reduced / avoided	F	lood depth		YES	INSEE - Statistical Institute						Table				
damage co from hydro	ost o-	lood velocity		YES	INSEE - Statistical Institute						Table				
meteorolo I risk reduc	ogica ction	and use map	Land use map	YES	INSEE - Statistical Institute						Table				
	I	nfrastructure data	Infrastructure data	YES	INSEE - Statistical Institute						Table				
	[Damage data		YES	INSEE - Statistical Institute						Table				
	I	nundation map		YES	INSEE - Statistical Institute						Table				

Indicators	Variables needed	Data	Data available	Data source	Data Owner	Sensor/ Accuracy 	Frequency monitorin g	Period of available data	Unit	Format	Type of data	Spatial resolutio n	Covering all demonstra tion area?	Good quality to use in indicator assessm ent?
	Value map		?											
Increasing recreational	Number of recreation activity in the area		YES							Table				
opportunities	Changes in length of paths		?											
of NBS area	Number of access points to NBS area		?											
Number of cultural events in NBS area	Number of cultural events		YES	INSEE - Statistical Institute						Table				