MERLIN

Deliverable D2.3
Case study implementation plans

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MERLIN

Imprint

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MERLIN Key messages

1. Half of the funding in the EU MERLIN project – almost 10 million € - will be used to realise freshwater restoration measures across Europe.
2. Restoration measures will be implemented at sixteen case studies within the lifetime of MERLIN (2021–2025).
3. This deliverable comprises the implementation plans of all MERLIN case studies, describing the hands-on restoration activities that are to be implemented in MERLIN.
4. The implementation plans support the case study leads in their planning and implementation process, by detailing their goals, listing necessary work steps, planning budget and time, distributing tasks and considering optimisation potential.
5. Being aware of anticipated or potential risks is crucial in the implementation process. Strategies for mitigating these risks are developed to avoid delays or hinderances in restoration implementation.
6. Implementation planning is carried out on the basis of accomplished tasks, including: SWOT analysis, optimisation planning, self-assessment of the IUCN criteria for nature-based solutions, stakeholder screening, and monitoring of indicators for the European Green Deal goals.
7. The implementation planning process thus offers a basis for the participatory and transparent implementation of freshwater restoration measures.

MERLIN Executive Summary

Restoration measures will be implemented at sixteen case studies within the lifetime of the EU Horizon MERLIN project (2021–2025). EU funding for these restoration activities amount to almost 10 million €. Each MERLIN case study has developed their individual implementation plan.

The case studies have been grouped into three clusters:

1. Peatlands and wetlands;
2. Small stream and basins;
3. Large transboundary rivers.

The types of restoration measures that will be implemented in MERLIN comprise:

- re-wetting, partly in combination with re-vegetating/ bog restoration/ afforestation;
- channel restoration, partly re-meandering;
- riparian restoration, e.g. removal of embankment and creation of buffer strips;
- reconnection of floodplains;
- removal of dams and small barriers;
- creation of flowering strips and meadows alongside streams;
- restoration and improvement of habitats;
- control of invasive species;
- reintroduction of beavers;
- educational information centres;
- citizen science initiatives.

The MERLIN case studies differ in the extent to which they are already pursuing multiple objectives. However, a wide range of EU Green Deal goals are already covered across the case studies. Optimisation potential with regard to the EU Green Deal goals has been obtained from the partner cluster case studies, from case study board meetings, and from the optimization plans.

In general, the short time-frame (2021–2025) of the MERLIN project presents a challenge in achieving full implementation of large-scale restoration measures. The main risks that may delay hinder progress include:

- landowners unwilling to participate in land consolidation schemes;
- local farmers objecting to the implementation;
- conflicts with other land uses, but also with navigation or with the expansion of photovoltaic systems due to the energy crisis, conflicting water use / obstruction;
- insufficient availability of contractors and skilled practitioners to undertake restoration on schedule;
- tender processes restricted by a small number of companies who are able to perform the described work;
- a lack of employees, building materials and increase in prices;
- delayed approval by agencies;
- conservation concerns and/or public opposition;
- unfavourable or extreme weather conditions, specifically heavy rainfall, flooding, periods of drought, too high or too low water levels.

Therefore, early submission of applications for approvals and planning of tender processes is needed. Additionally, good pre-discussion and agreements with the relevant stakeholders can help to speed up the process and avoid further problems and risks. Predicting good timing with regard to weather conditions and to be as flexible as possible is recommended as well.

In a number of case studies, participation and collaboration with external partners is already foreseen. Mostly, these partners are landowners, farmers and/or local communities and municipalities. Also, state/province agencies as well as experts and consultants will be involved, as will, where appropriate, the media.

Many of the measures are co-financed or are part of a larger restoration programme with further funding from public sources (national, EU), and also from different sectors (e.g. Ministry of Agriculture and Forestry). Alternative private financial mechanisms are still limited. Potential is seen, for example, in strengthening cooperation between local farmers.

Content

1 Introduction

The implementation of restoration measures is the central hands-on action in MERLIN. These measures represent a selection of effective and nature-based approaches for ecosystem restoration. Roughly 10 million € of the MERLIN budget (9,493,750 €) is allocated for the restoration activities, which will be implemented during the lifetime of MERLIN (2022-2025).

Figure 1 shows the location of the MERLIN case studies in Europe and beyond. The cases cover different areas and freshwater types (Figure 2), comprising small streams as well as large rivers in upper, middle and lower catchment sections. Both urban and agricultural areas are covered and further freshwater ecosystems represented in the MERLIN case studies are wetlands as well as peatlands. According to these categories, the case studies have been grouped into three clusters: peatlands and wetlands (green); small stream and basins (blue); large transboundary rivers (purple).

Figure 1 The geographical positions of the MERLIN case studies. Note that CS 12 has been changed to peatlands/wetlands, CS 7 has been split into 7a (Upper Danube, Austria) and 7b (Lower Danube, Hungary) and CS 17 was split into a "peatlands and wetlands" part and a "small streams and their basins" part.

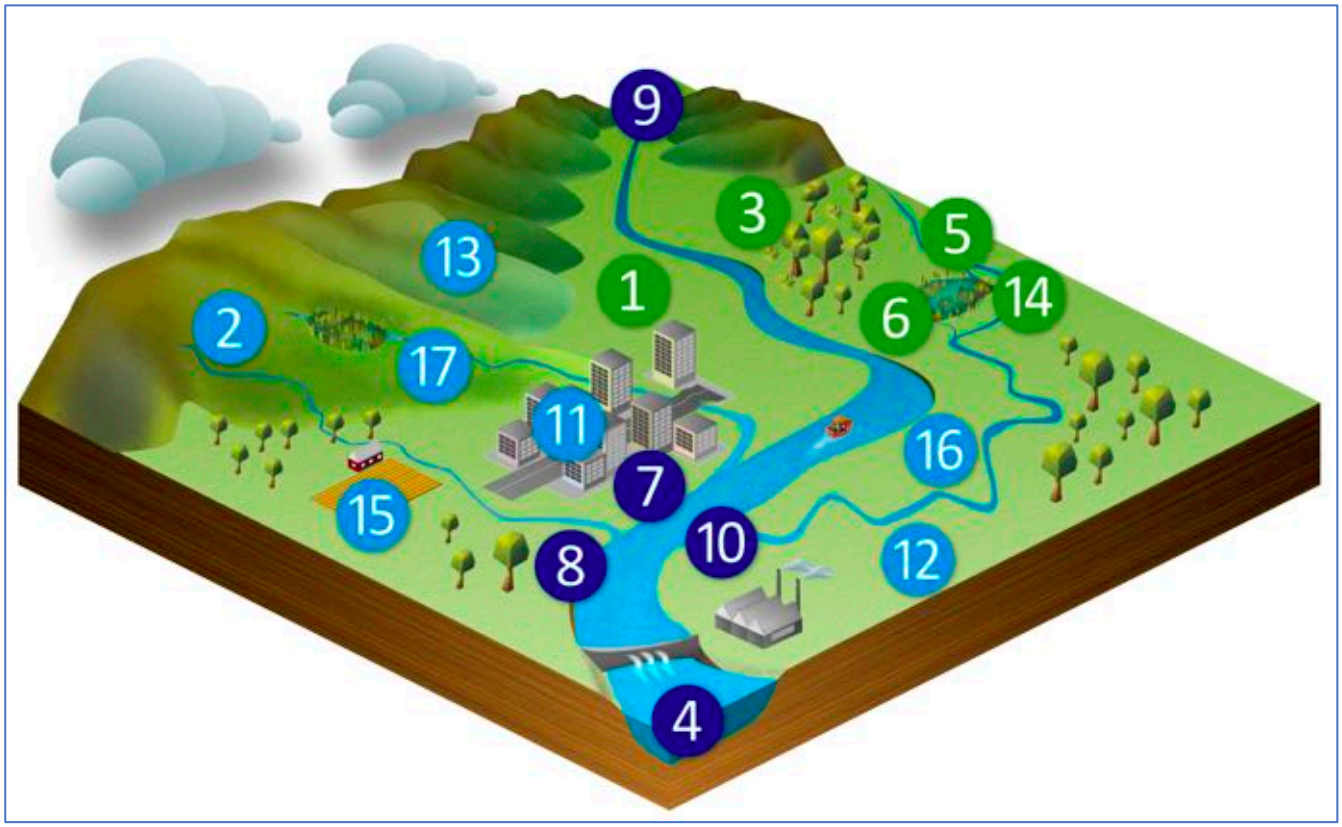


Figure 2 The MERLIN case studies placed in a hypothetical catchment.

The measures that are to be implemented in the course of MERLIN in each case study are listed in Figure 3. The measures are grouped into the categories rewetting, channel restoration, riparian restoration, floodplain reconnection and dam removal (Figure 3). The short description of each measure specifies the final goals that are to be completed by the end of the MERLIN project, according to the Description of Action. However, planning is an ongoing process. Therefore, some changes with regard to specific implementation goals were necessary. Further alterations might occur through the MERLIN life time.
Note that results of a minimum of 10 restoration actions will already be visible in 2024.

Figure 3 also gives the budget for each implementation case study. This MERLIN contribution will be spent as seed money that already has been matched by external funding and will be used to leverage additional financial resources. This means that during the project further funding and financing will be searched for by applying strategies and approaches suggested by WPs 3 and 4, allowing to extend or enhance the measures.

Case studies	Channel restoration	Riparian restoration	Floodplain reconnection	Dam removal	Re-wetting	Planned measures to be implemented in MERLIN	Transferability potential	MERLIN allocated budget incl. 25% overhead (k€)
1					✓	Construction of two gangways over two small deeply incised inlet streams in the restored area, enabling cattle to access the re-wetted sites àenabling grazing of the restored areas.	RNE	56,250
2				✓		Removal of eight dams	Rne	787,500
3	✓	✓				Riparian management to enable the establishment of beavers (including dam building activity) in 30 sites; removal of beaver dams in another 30 sites where conflicts with land users occur.	RNE	375,000
4			✓		✓	Modification of land use (nature replacing agriculture). Adjusting sluices to retain water. Dredging of silted channels to restore hydrological connectivity. About 400 ha of floodplains will be reconnected.	RNE	787,500
5	✓		✓	✓	✓	Re-meandering and connection of channel and floodplains (2 km); removal of an old weir and unblocking the watercourse (2.5 km); renovation of two weirs for re-wetting 6 ha of peatplans. Reconnection of 865 ha floodplains.	Rne	787,500
6					✓	Restoration of watercourses, gullies and channels; restoration of flooded meadows and reeds; restoration of spawning grounds for fish, grain sowing (1,488 ha of the Hutovo Blato peatland); water quality measures related to illegal waste disposal and mitigation of agricultural practices; restoration fish stocks and birdlife.	rne	787,500
7		✓	✓			Removal of bank fixations along 800 m shoreline. Connection of 10.8 ha floodplain.	rne	885,714
8			✓			Decrease the flood-risk downstream by improving the connectivity with the Danube on 700 ha and recreating habitat mosaics.Removing the sediments and vegetation from 200 ha.	RNE	500,000
9			✓			Restoration / construction of nature based water retention systems, rehabilitation of local ecosystems lacking water or drying out (e.g. wetlands) (200 ha). Setting up nature friendly floodplain farming systems,	Rne	500,000
11			✓			Establishment of flowering meadows along dikes, synergies between river restoration and nature protection, participatory rivermaintenance (approx. 100 ha).	RNE	787,500
12		✓	✓			Removal and control of invasive plants (1 ha); passive restoration through cattle exclusion (3 ha); active restoration through planting keystone native species priority habitat 91E0 (1 ha); stakeholder agreements for rewetting and rewildening (9 ha).	RNE	150,000
13		✓		✓		Riparian rehabilitation, reconstruction and habitat enhancement for biodiversity (20 km); clearing of exotic invasive vegetation (22 km); connectivity reposition (1 fish pass retroffiting, 1 removal of small barriers, 2 rock ramp construction); bank stabilization (600 m)	RNE	787,500
14					✓	Re-wetting and afforestation of approx. 200 ha peat extraction area.	RNe	600,000
15	✓	✓	✓			Restoration and reconnecting of ca. 300 ha the river floodplain.	RNe	787,500
16	✓	✓		✓		Establishment of 3 ha grass-flower strips along the river Zwalm, working with 50 farmers. Support with sowing and maintenance. 1 km of channel restoration and removal of two small fish migration barriers. Restoration of two spawning beds for rheophilic fish species.	RNE	225,000
17	✓	✓	✓		✓	Large woody debris additions and embankment removal along 22.8 km river length to restore channel geomorphology and restore 350 ha of floodplain habitat. Re-wetting of lowland bog peatland (150 ha).	Rne	787,500
							Sum :	9,493,750

Figure 3 Overview of measures to be implemented in the course of MERLIN with total budget and budget for each implementation case study, including 25% overhead costs. Note that CS 10 and 7b will not implement measures.
Transferability potential: R/r = regional; N/n = national; E/e = European-wide; major letter = high potential; minor letter = moderate to low potential.

2 Methodology

The restoration works will be carried out by the case studies within WP2 as Task 2.3 "Implementation of measures for maximising synergies through innovation". The completion of this task is in line with and is carried out on the basis of accomplished tasks in WP1 and WP2, including: SWOT analysis, optimisation planning, self-assessment of the IUCN criteria for nature-based solutions, stakeholder screening, and monitoring of indicators for the European Green Deal goals (Figure 4). Task 2.3 itself helps preparing for upcoming tasks, e.g. the regional scalability plans (Task 2.2).

In Task 2.3, the following steps were conducted:

- Where several measures per case study were proposed, a prioritisation was conducted with regard to demand and to impact concerning the Green Deal goals.
- In the planning phase, the optimisation potential of the proposed implementation measures was identified through collaboration within the case study boards. For each case study, the desired targets of the measures were optimised in an integral approach, aiming at enhancing ecosystem services, climate adaptation, biodiversity, and socio-economic benefits. Aim was to maximise synergies and avoid trade-offs. A time and budget plan were set up and implementation tasks allocated.
- In the implementation phase, the optimised measures will be put in place in a transparent and participatory way.
- Good governance aspects from WP4 will be considered in the implementation.
- Potential financing mechanisms identified in WP3 will mobilise additional budget.
- The implementation measures will be evaluated within the case study clusters and boards with regard to their success, efficiency, contribution to Green Deal goals and participatory implementation process (Task 2.4).
- MERLIN announced a competition for best-practice restoration cases, which was won by the Portuguese company EDIA with the case study "Ervidel floodplains". This case study will implement new restoration measures on small streams within the framework of MERLIN. As contract negotiations with EDIA are not yet fully completed, this case study is not addressed in this deliverable."

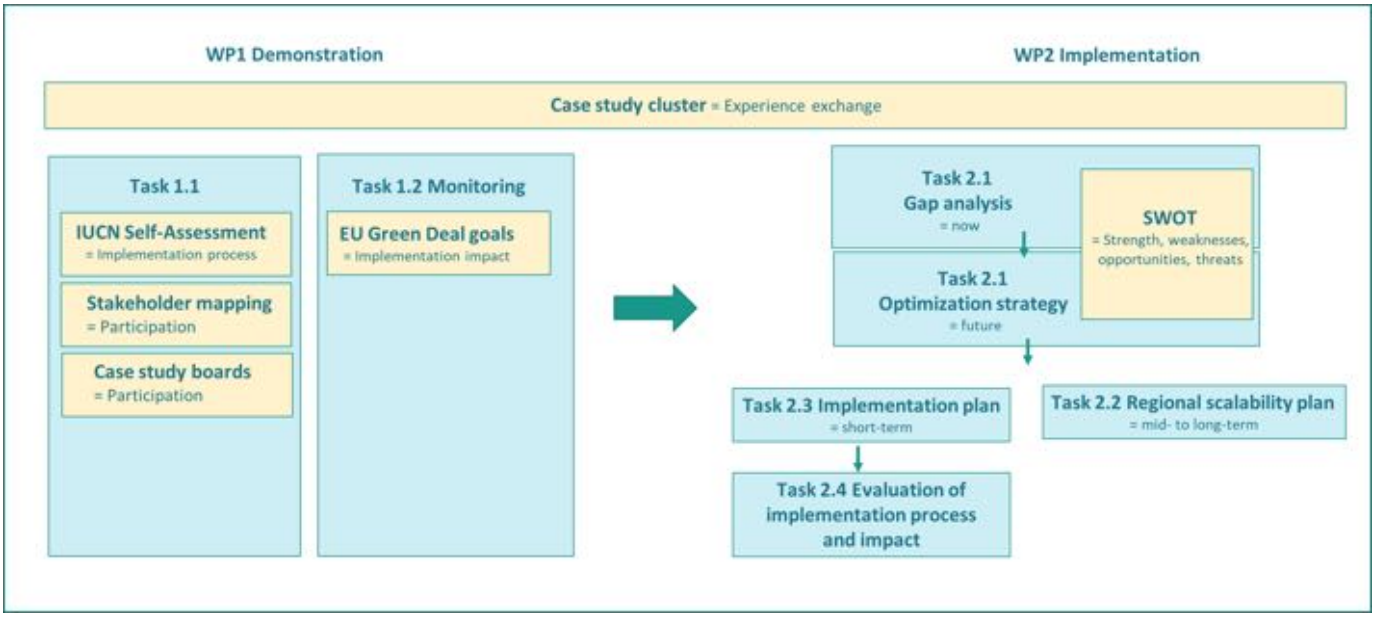


Figure 4 Overview of the various tasks in WP1 and 2 that were used to set up and optimise the implementation plan.

For the deliverable at hand the MERLIN case studies specified their implementation measures, including a detailed description of the tasks to be completed, a schedule and budget, the skills and support needed, the people to be involved, how to optimise, the risks to be expected, and the aspects to be monitored. For this purpose, a template was provided by the WP2 leads to all case study partners.

The template for the implementation plans includes the following sections:

Case study name
Person(s) completing this template
MERLIN case study goals
Prioritise measures

1. Measure
1.1. Site
0. Detail the implementation measure
1. Map the measure (site)/ Visualise the measure
2. Integrate the Green Deal criteria
3. Optimise your plan
4. Mobilise additional external funding
5. Consider risks
6. Plan time
7. Plan budget
8. Distribute tasks transparently
9. Implement the measure
10. Monitor the impact of the measure

Note that if a case study comprises very different types of action or different locations (defined as “measure”), the planning was split into several parts by filling the template questions 0 to 10 for each measure individually (e.g. "M1 - M4").

Implementation and scientific partners jointly completed the detailing of their implementation measures. The resulting implementation plans of all case studies are collected in this Deliverable 2.3.

The implementation plans are meant to support the case study leads in their planning and implementation process. The plans can also give support for the discussions with stakeholders in the case study boards, and thus, to optimise and implement the measures in an open, transparent and participatory way.

3 Implementation plan per case study

This chapter provides the implementation plans of each of the individual cases within MERLIN. The contributions are clustered in the three main MERLIN clusters “peatlands and wetlands”, “small streams and basins” and “large transboundary rivers”.

3.1 Cases within the cluster peatland and wetlands

3.1.1 Case study 1 Kvorning wetland (Denmark)

Case study name	**Nørreådalen, Kvorning**
Person(s) completing this template	**Linda Udklit (NST), Martin Nissen Nørgaard (NST), Annette Baattrup-Pedersen (AU)** AU: Aarhus Universitet NST: Naturstyrelsen

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Possible re-wetting of parts of the project area (areas owned by NST). However, this will not occur since it would most likely make it more difficult to access the rest of the project area with machinery. Re-wetting will there for, expectedly, take place during 2024.
Goals set for M 48 in the proposal	Land consolidation is expected to be final by the end of 2023. Environmental screening is expected to be final during 2023. M48 = Oct. 2025: Project fully Implemented. I.e. Ditches closed etc., area re-wetted, cattle passages established, connecting the area for the grazing cattle.
Can you imagine further goals beyond MERLIN?	To establish grazing following project implementation to improve conditions for habitats and species including those protected by the Habitats Directive. To implement monitoring to assess status and trends for habitats and species in the years following project implementation.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	In MERLIN only the cattle passage is planned.
Is there a need to select/prioritise?	No need for prioritizing

1. Measure	**Rewetting in 2024 (other financing) + Cattle passage to enable grazing of the rewetted area (financed by MERLIN)**
1.1. Site	**Kvorning, Nørreådalen DK**

0. Detail the implementation measure

Prior to implementation/re-wetting, biomass is being harvested regularly in parts of the project area to remove nutrients, and thereby, hopefully, facilitating establishment and growth of diverse plant communities.

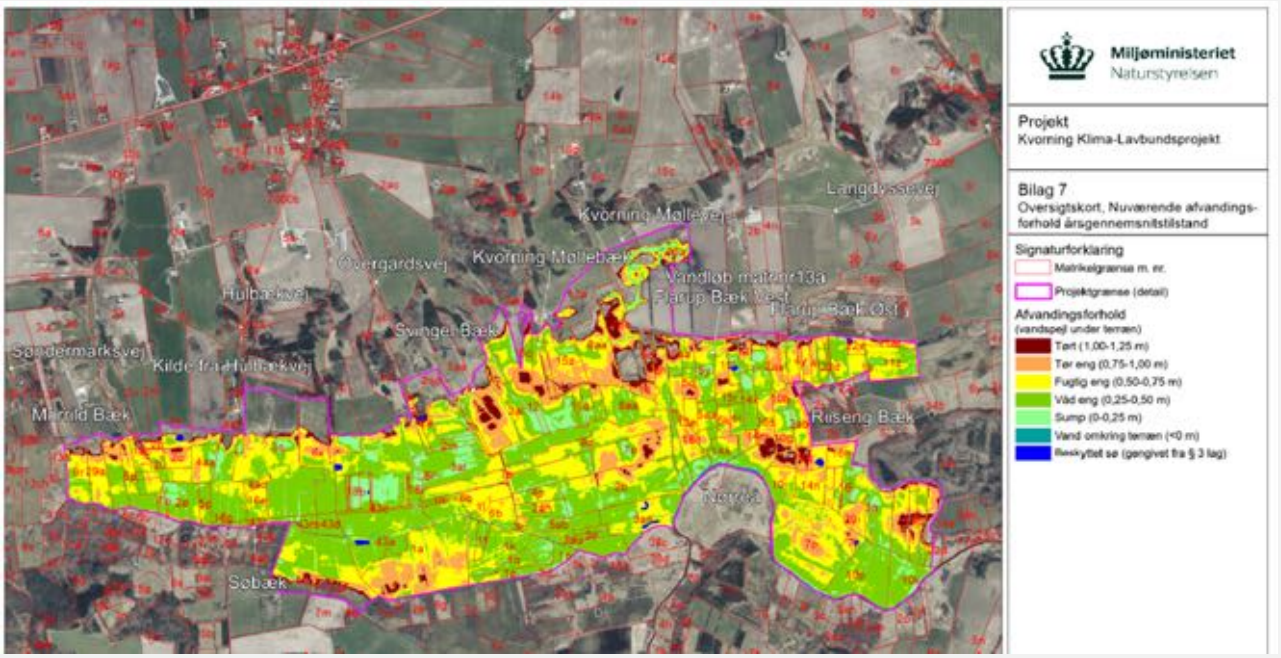
Re-wetting is planned for 2024. Along with the physical restoration work, the cattle passage will also be established.

For the time being (medio/ultimo 2022 - primo/medio 2023) an environmental screening (VVM) is being conducted which is needed to fulfil requirements of the Habitats Directive because the project area is part of the N2000 network in Denmark. After this screening, the conclusions will be reviewed by the Ministry of Environment of Denmark. This may Influence the implementation plan if it is considered that there can be a negative effect on protected species and habitats within the area. In that case, measures/adjustments may be necessary to accommodate, e.g. red list species and their habitats in the N2000 area.

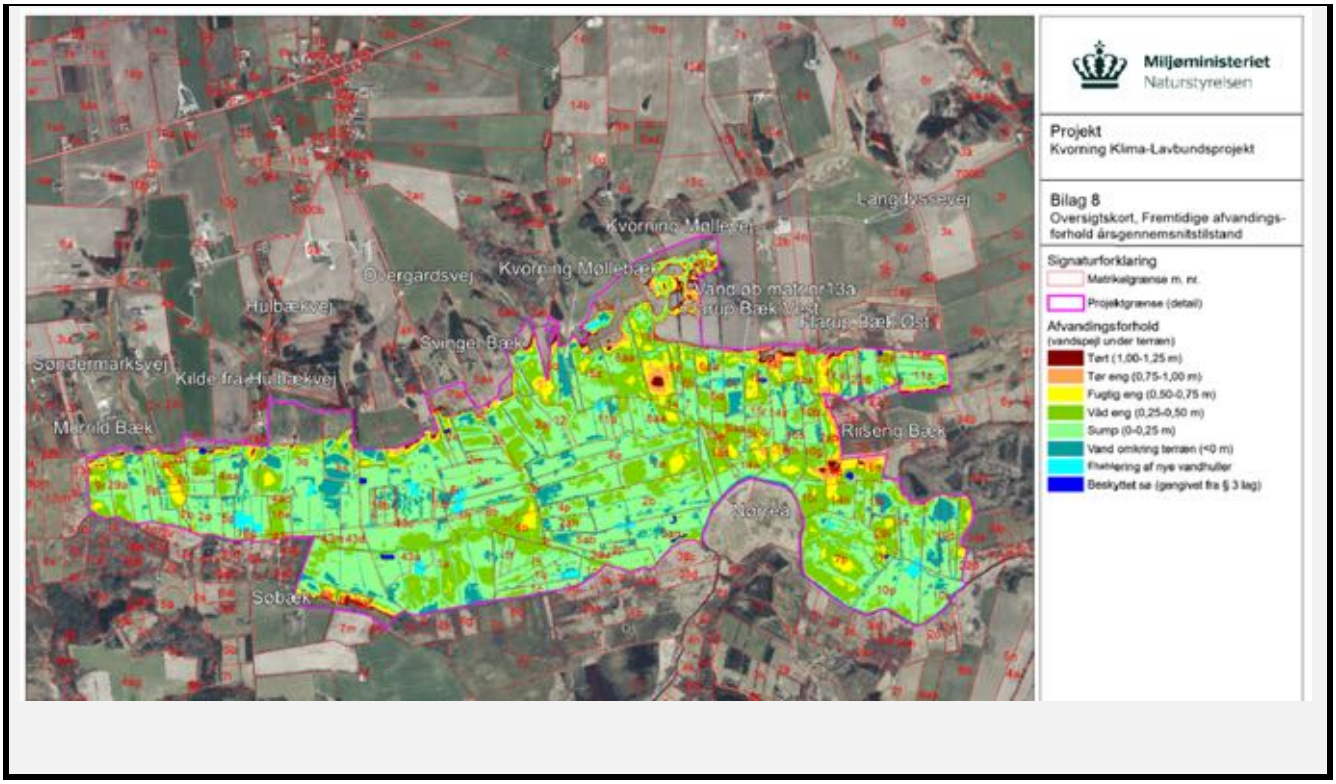
1. Map the measure (site)/ Visualise the measure

Pink: Project boundary
Red: Dry, water table 1-1,25 m below terrain
Orange: "Dry meadow", water table 0,75-1 m below terrain
Yellow: "Moist meadow", Water table 0,5-0,75 m. below terrain
Green: "Wet meadow", Water table 0,25-0,5 m. below terrain
Light green: "Swamp" Water table 0-0,25 m. below terrain

Annual average water table before project



Expected annual average water table after implementation


Miljøministeriet
Naturstyrelsen
Projekt
Kvorning Klima-Lavbundsprojekt
Bilag 8
Oversigtskort, Fremtidige afvandings-forhold årsgennemsnitstilstand
Signaturforklaring
Matrikelgrænse m. nr.
Projektgrænse (detail)
Afvandingsforhold
(vandspejl under terræn)
Tørt (1,00-1,25 m)
Tør eng (0,75-1,00 m)
Fugtig eng (0,50-0,75 m)
Våd eng (0,25-0,50 m)
Sump (0-0,25 m)
Vand omkring terræn (<0 m)
Etablering af nye vandhuller
Beskyttet sø (gengivet fra § 3 lag)
Langdyssevej
Kvorning Møllevej
Overgårdsvej
Kvorning Møllehave
Vand på mark nr 13a
Hulbækvej
Svinget Bæk
Sønder Bæk Øst
Sønder Bæk Vest
Sondermarksvej
Kilde fra Hulbækvej
Mørkild Bæk
Rilseng Bæk
Nørreå
Søbæk

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	X
Sustainable energy	X	X
Sustainable transport		
Inclusivity	X	X
Circular economy		
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Stakeholder engagement, monitoring and adaptive management (see SWOT) The self-assessment actually shows "strong" on most indicators, and "adequate" on many. Only one is "partial". Partial is in regards to cost-effectiveness. However, the cost-effectiveness has been analysed prior to the project. Our prioritised focus is on stakeholder engagement, monitoring and adaptive management. We are strong on stakeholder engagement, but monitoring and adaptive management is generally a challenge in projects like these in DK.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Tracks/public access (see MoM with CSB Jun 27. 2022) A working group was established, consisting of local citizens and Martin Nissen Nørgaard from the Danish Nature Agency, in close collaboration with the Municipality. The working group is working on public access to the area.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	See optimization strategy In the optimization strategy we have tried to describe more in detail (descriptive/narrative) how we work with optimization, upscaling, inclusivity etc. as well as challenges in relation to policy/regulations.
How can you optimise the **impact** of your measure?	See optimization strategy In the optimization strategy we have tried to describe more in detail (descriptive/narrative) how we work with optimization, upscaling, inclusivity etc. as well as challenges in relation to policy/regulations.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	Not applicable
What additional funding can you actually acquire?	Public funding (national funds) is given (reserved).
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	The Municipality is collaborating on the project and also working to establish grazing upon implementation.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	The main risk that may hinder the implementation of some measures and/or delay the project is if some of the landowners are unwilling to participate. Then it may be necessary to further adapt the project boundary. The environmental screening ("VVM" concerning species and habitats in the N2000 area) may also cause delays or modification to the project, in order to mitigate any foreseen negative impact on any N2000 habitats or rare/endangered/red list species etc.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	The above-mentioned risks are low, and it is more likely that the project could be delayed, not that it would be hindered entirely. Some measures might be hindered or partly modified to accommodate e.g. species/habitats.
Which risks can be prevented and how?	Above mentioned risks can be mitigated/prevented by adaptation.

6. Plan time

Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Land consolidation		X	X	X	X	X	X										
Biomass harvesting			X	(X)			X	(X)			X	(X)					?
Re-wetting										X	X	X	X				
Grazing																	(X)
Monitoring		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(X)
Cattle passage											X	X					
Tracks/Public access										X	X	X	X	X	X		

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Cattle passage	56.250 €	MERLIN Implementation budget
SUM MERLIN	**56.250 €**	
Land consolidation	400,000 €	Danish Government
Compensation (re-wetted land)	7,240,000 €	Danish Government
Re-wetting/implementing	1,133,333 €	Danish Government
Facilitating grazing	100,000 €	LIFE IP Natureman
SUM	**8,929,583 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Re-wetting/ implementation	NST, Martin Nissen Nørgaard	Landowners, entrepreneurs etc.	N/A
Land consolidation	NST, LBST	Landowners, lawyers	N/A
Monitoring	AU, Annette Baattrup-Pedersen	AU, NST	N/A
Cattle passage	NST, Martin Nissen Nørgaard	Landowners, Livestock keepers, Viborg Municipality	N/A
Grazing	Viborg Municipality	Landowners, Livestock keepers	N/A

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Biodiversity net gain Climate regulation Flood resilience Drought resilience Health and wellbeing Zero pollution goals F2F Sustainable energy Inclusivity Financing the transition Green growth
Do you expect to see short-term or long-term impacts?	Monitoring will be short term, but we expect long term impact

3.1.2 Case study 3 Beaver reintroduction (Sweden)

Case study name	**Beaver reintroduction**
Person(s) completing this template	**Frauke Ecke (SLU), Daniel Thorell (SFA), Karin Eklöf (SLU), Linnéa Jägrud (SFA)** SFA: Skogsstyrelsen (Swedish Forest Agency) SLU: Sveriges Lantbruksuniversitet (Swedish University of Agricultural Sciences)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Rewetting of forests and/or riparian zones in 30 sites. Building of dams in these 30 sites.
Goals set for M 48 in the proposal	Removal of beaver dams in 30 sites where amongst others conflicts with landowners occur.
Can you imagine further goals beyond MERLIN?	In long-term increase incidence of deciduous trees in the riparian zone and in the whole forest landscape to enhance the establishment of a) beavers within and outside their current distribution range along ditch- and river sections and b) biodiversity in a broad sense (e.g., bats and amphibians) in ditched forests.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	Building and removal of dams. Building and removal mimics the natural process of colonization-abandonment-recolonization and/or natural processes of flooding and drought.
Is there a need to select/prioritise?	In a first step, dams will be built. In a second step, dams will be removed. Removal will partly occur in the same systems where the dams have been built earlier in MERLIN.

1. Measure	**Build and remove**
1.1. Site	**Sweden with focus on catchments Ljungan (demonstration), Vindelälven & Dalälven (implementation)**

0. Detail the implementation measure

At 30 sites in different parts of Sweden, beaver dams will be built (either by beavers or artificially) towards enhancement of lateral connectivity and reduction of the input of fine sediments, and nutrients. At 30 sites in Sweden, 30 beaver dams will be removed. Removal occurs either passively upon abandonment by beavers or actively, by man-made removal of the dams. Both the building and removal are accompanied by monitoring according to selected Green Deal criteria. Focal area will be the sub-catchment Krycklan in the Vindelälven catchment and beaver systems in the Dalälven catchment. Some monitoring will also be done in the demonstration area in the Ljungan catchment, and in other parts of Sweden where sites are rewetted in 2023.

1. Map the measure (site)/ Visualise the measure

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	X
Sustainable energy		
Sustainable transport		
Inclusivity		
Circular economy		
Financing the transition		
Green growth		

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Opportunities arise from the very essence of this being a nature-based solution (since it is the beavers that are restoring the ecosystems) and threats result from possible changes in legislation connected to landowner structure or beaver population management.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Beaver dams are considered as potential temporally barriers for e.g., migrating fish. It is important to study how such potential barriers can be avoided by for example beaver management (dam removal, hunting) or technical solutions that make beaver dams more permeable (e.g., beaver deceivers that are used in Canada).
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	A major constraint for the NbS is the low degree of deciduous trees in the Swedish forest landscape, which results in beaver conflicts in riparian zones that are rich in deciduous trees (e.g., biodiversity conflicts due to other species exploiting coarse aspen trees). To avoid this conflict, there is a need for a (long-term) transformation in the Swedish forest sector towards cultivation and allowance of natural regrowth of deciduous trees and growth of mixed forests.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	The Swedish forest landscape is dominated by even-aged coniferous stands. To contribute to a transformation of forest management, more knowledge on best-practices and the use of NbS solutions is required. At the same time, education of forest owners could be incorporated to increase awareness of the challenges associated with the goal of sustainable development. Here, the MERLIN NbS might be used as pioneering and showcase example for multiple functional forests and for forestry in the riparian zone.
How can you optimise the **impact** of your measure?	The current high abundance and spatial distribution of beavers in Sweden offers a significant strength for gaining more information regarding so far understudied environmental, ecological and socio-economic effects and hence to gain more knowledge on potential services (biodiversity, recreation [bird watching, hunting], flood and drought mitigation) and disservices (risk [need to look at hazard and exposure] for zoonotic and vector-borne diseases, recreation [impaired canoeing dues to felled trees in the water], economic losses due to flooded forest and agricultural fields).

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	National rewetting program, Grip of Life
What additional funding can you actually acquire?	Unknown
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	No

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: 1. Decrease of beaver population at spatial scale of implementation due to overexploitation. The problems caused by beavers in Sweden are minor. They are mainly related to potential damage to infrastructure, and potential flooding of productive forests. There are not many examples where this occurs (mainly extremely flat landscapes). Low risk: 1. Abandonment of implementation sites by beavers during the lifetime of MERLIN. This might occur if beavers are hunted or if local food resources (deciduous trees) decrease to a critical level. 2. Challenges to identify dams which landowners want to remove.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High risk: 1. Low probability of the risk of significant reduction of beaver population during the lifetime of MERLIN. Low risk: 1. High probability: The life length of a beaver system is unpredictable and almost impossible to affect by any measures. 2. Low probability
Which risks can be prevented and how?	The potential risk of decrease in local beaver population will be discussed with the case study boards. Here limitation of hunting of beavers at implementation sites can be one option. The unpredictability of the life length of beaver systems, we compensate by building artificial beaver dams, which will convert the high risk-high probability into low risk-low probability. Good communication with landowners and relevant authorities mitigates the probability.

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential areas for dam building, dam removal, and monitoring areas	X	X	X	X	X	X											
Site visits			X	X	X	X		X		X		X		X			
Dam building and dam removal (incl. planning & performance of measures)						X	X	X	X	X	X	X	X	X			
Identify relevant stakeholders and actors		X	X	X	X												
Develop implementation and monitoring design				X	X	X	X										
Monitoring						X	X	X	X	X	X	X	X	X	X		
Communication and outreach						X	X	X	X	X	X	X	X	X	X		

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for dam building, dam removal, and monitoring areas		MERLIN personnel budget
Site visits		MERLIN personnel budget
Dam building and dam removal	ca. 300,000 €	MERLIN implementation budget
Identify relevant stakeholders and actors		MERLIN personnel budget
Develop implementation and monitoring design		MERLIN personnel budget
Monitoring		MERLIN personnel and implementation budget
Communication and outreach		MERLIN personnel budget
SUM	**ca. 300,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Case study Board contact	Sophie Gröndahl/Daniel Thorell	Stakeholders	Contact with landowners
Case study visits	Daniel Thorell	Daniel Palm, Frauke Ecke	Media contacts (i.e. local newspapers, radio stations and local and regional NGOs engaged in nature conservation)
Implement measures	Daniel Thorell	TWIN-project (Hillevi Eriksson)	Media contacts

Monitoring - terrestrial	Frauke Ecke	Lovisa Hökby, Mikael Marberg	Media contacts
Monitoring – aquatic (fish)	Daniel Palm	Annika Holmgren, Mikael Marberg, Daniel Thorell	Media contacts
Monitoring – aquatic (water biogeochemistry)	Karin Eklöf	Johannes Tiwari, Frauke Ecke, Lovisa Hökby	Media contacts
Monitoring – aquatic (pathogens)	Frauke Ecke	Lovisa Hökby, Johannes Tiwari, Frauke Ecke,	Media contacts
TWIN-project contacts	Daniel Thorell		Contact with GRIP on Life and the Swedish rewetting project
Data compilation	Frauke Ecke	Daniel Palm, Karin Eklöf, Lovisa Hökby	
Evaluation	Frauke Ecke	Karin Eklöf, Daniel Palm, Daniel Thorell	
Reporting to WP leaders	Frauke Ecke	Karin Eklöf, Daniel Palm, Daniel Thorell	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Biodiversity net gain Climate regulation Flood resilience Drought resilience Health and wellbeing Zero pollution goals
Do you expect to see short-term or long-term impacts?	Both. Short-term: biodiversity (birds, fish, mammals) GHG emissions, methylmercury, flood mitigation, drought mitigation, pathogen occurrence and prevalence. Long-term: Biodiversity (plants, lichens, mosses, fungi, fish, mammals), GHG emissions, flood mitigation, drought mitigation, pathogen occurrence and prevalence, phosphorous traps.

3.1.3 Case study 5 Kampinos (Poland)

Case study name	**Kampinos wetlands**
Person(s) completing this template	**Julian Rudziński (KPN), Paweł Trandziuk (SGGW), Anna Andrzejewska (KPN), Anna Wilińska (KPN)** KPN: Kampinoski Park Narodowy (Kampinos National Park) SGGW: Szkola Glowna Gospodarstwa Wiejskiego (Warsaw University of Life Sciences)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	The choice of additional measures to complement the LIFE project (additional re-meandering in the lower course of Łasica or improvement of fish passages or old hydraulic structure removal) will be finalized. The concept of action including hydrological and ecological assumptions, and the feasibility study for the technical project will be finalized.
Goals set for M 48 in the proposal	• Re-meandering and connection of channel and floodplains – 2 km. • Removal of an old weir and unblocking the watercourse (2.5 km) – this goal will be achieved within LIFE project – so it is not considered in MERLIN in the implementation plan. • Renovation of two weirs for rewetting 6 ha of peatlands. • Reconnection of 865 ha of floodplains.
Can you imagine further goals beyond MERLIN?	Restoration of remaining wetlands after buying up lands. Further naturalisation of Łasica and Ł9 ditches. Unblocking barrier on the outlet of Łasica ditch. Reconstruction of the old weirs into stone riffles.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• Floodplain reconnection and rewetting in Cisowe • Channel restoration in Janówek and protection from flooding in Brzozówka • Rewetting and slowing water run-off by renovation of weirs
Is there a need to select/prioritise?	1. Floodplain reconnection and rewetting in Cisowe 2. Channel restoration in Janówek and protection from flooding in Brzozówka 3. Rewetting and slowing water run-off by renovation of weirs

1. Measure	**Floodplains reconnection and rewetting in Cisowe**
1.1. Site	**Ł9 ditch in Cisowe village**

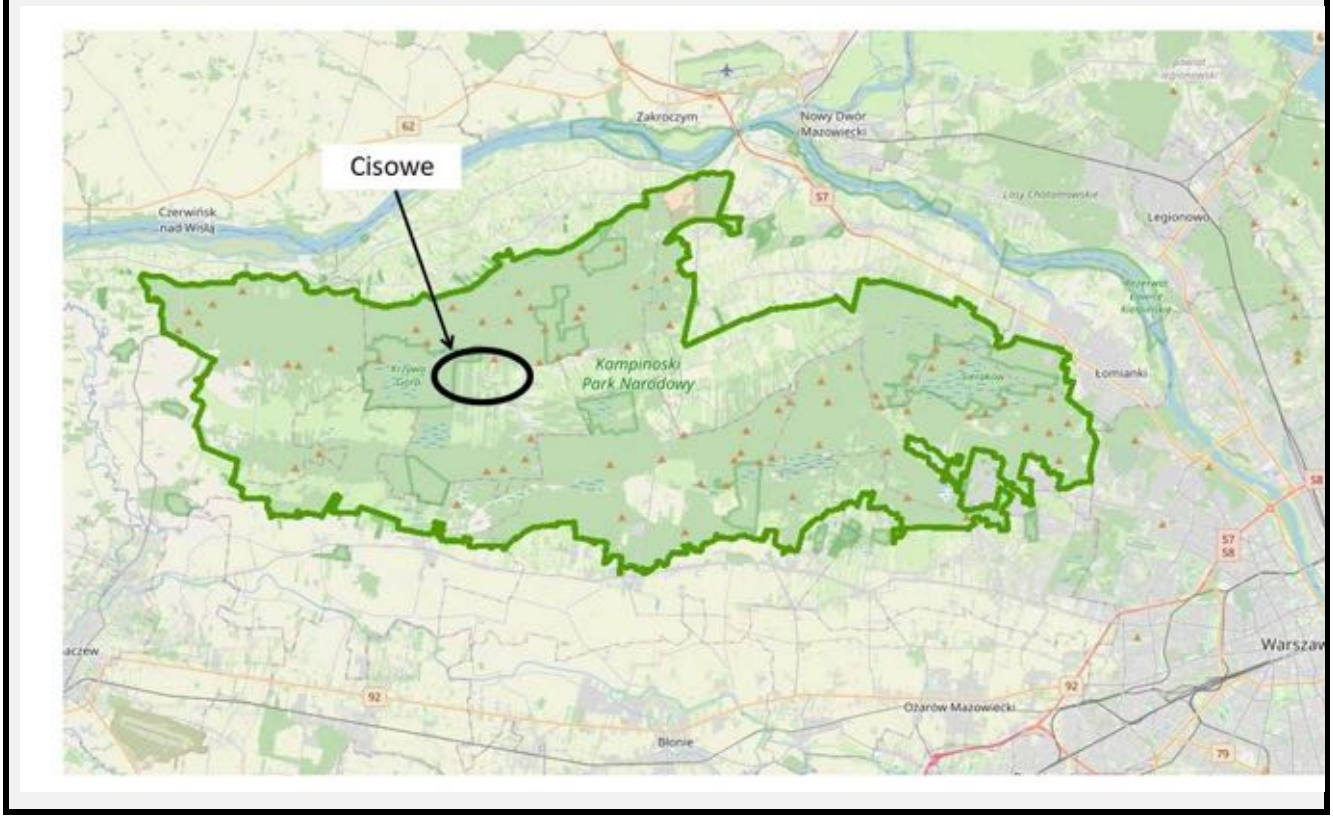
0. Detail the implementation measure

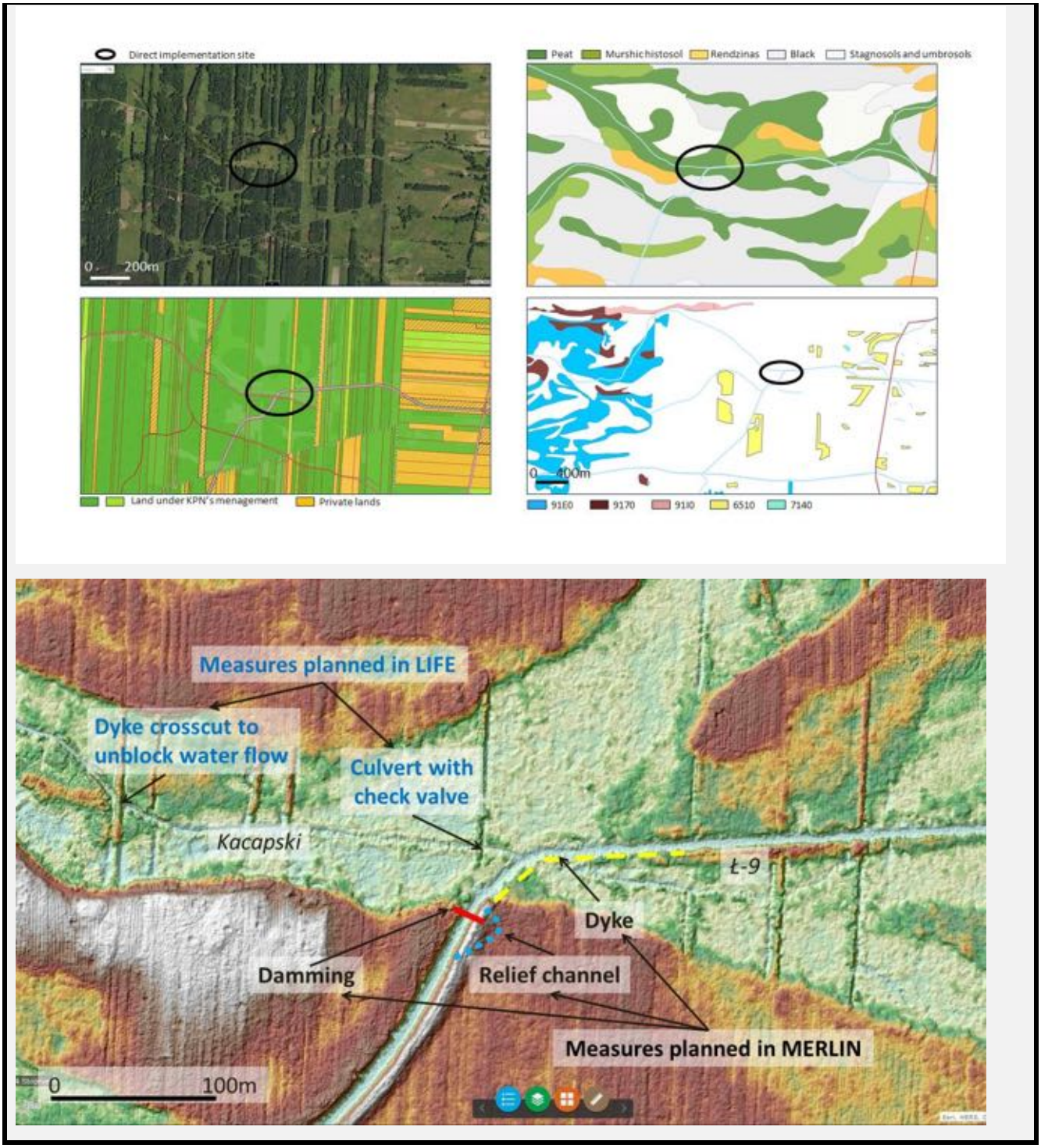
Measure:
One of the measures planned within MERLIN in the Kampinos wetlands is floodplain reconnection and rewetting in Cisowe.

Site:
Cisowe village where Ł9 ditch connects with inflow/outflow of Kacapski ditch. Kacapski ditch brings water to “Krzywa Góra” reserve where there are vast 91E0 – alluvial forests habitats. In case of long-lasting periods of low water table in Ł9 ditch the Kacapski ditch is actually draining “Krzywa Góra” reserve.

Here, we intend to dam up the water in Ł9 ditch to increase water level in Ł9 and restore the hydrating role of Kacapski ditch. The damming is planned to be a gravel riffle which ensure watercourse connectivity.

1. Map the measure (site)/ Visualise the measure





2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X

Sustainable food systems (F2F)	X	
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy		
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Focus on farmers and local communities. Improve or create relationships with local farmers, establish small working groups for every case and conduct a set of meetings. Work out together the best possible implementation measures aligned to the local communities' needs (tailor made solutions).
Did you obtain recommendations for optimization from your **case study board**? If so, which?	No
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	We are implementing the recommendations from gap analysis and SWOT.
How can you optimise the **impact** of your measure?	Ensuring the acceptance of the local communities for the planned measures will allow for long-lasting results.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	• At this point there is no need for additional funding for measure implementation. Activities in the MERLIN project will be complementary to those in the LIFE project, which is currently being implemented in the Kampinos National Park. • There is a need for additional funding for buying up private lands that would allow further wetlands restoration.
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	• Not applicable in our case

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • lacking employees, building materials and difficult to predict changes in prices (due to the economic crises because of Ukrainian war) • strong opposition from local communities Low risk: • heavy rainfall and high-water level may delay construction works until the water level subside
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • lacking employees, building materials and difficult to predict change in prices • strong opposition from local communities Low probability: • heavy rainfall and high-water level may delay construction works until the water level subside
Which risks can be prevented and how?	• lacking employees, building materials and difficult to predict change in prices ○ start construction works as soon as possible to get more time for probable delay caused by lacking employees and materials • strong opposition from local communities ○ meeting and discussions with local communities, farmers and commune authorities ○ small working groups to work out solutions aligned to local communities' needs ○ looking for alternative measures and/or compensatory measures ○ recognise the potential of blue-green services • heavy rainfall and high-water level may delay construction works until the water level subside ○ start construction works as soon as possible to get more time for probable delay caused by high water level.

6. Plan time

Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Identify relevant stakeholders and actors			X														
Meetings with farmers/local communities			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Meeting with other stakeholders (Water Management authority, communes etc.)			X	X	X	X	X	X	X							X	X
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engage experts for concept works and cost-effectiveness analyses						X											
Engage company for detailed design of implementation measures							X										
Obtain all administrative permissions							X	X	X								
Construction works										X	X	X					

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Identify relevant stakeholders and actors	-	MERLIN personnel budget
Meetings with farmers/local communities	5,000 €	MERLIN personnel budget
Meeting with other stakeholders (Water Management authority, communes etc.)	5,000 €	MERLIN personnel budget
Monitoring	-	
Engage experts for concept works and cost-effectiveness analyses	5,000 €	MERLIN implementation budget
Engage company for detailed design of implementation measures	5,000 €	MERLIN implementation budget
Obtain all administrative permissions	-	MERLIN personnel budget
Construction works	60,000 €	MERLIN implementation budget
SUM	**80,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Identify relevant stakeholders and appoint stakeholder board and working groups	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Farmers/local communities, communes, Polish Water Management Authority	-
Meetings with farmers/local communities	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Farmers/local communities	Relationships are already existing, need to continue meetings and discussions
Meetings with other stakeholders (Water Management authority, communes etc.)	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Polish Water Management Authority, Regional Directorate for Environment Protection, Ministry of Climate and Environment, KPN Scientific Council, NGO's, local and regional authorities	Relationships are already existing, need to continue meetings and discussions
Monitoring	Paweł Trandziuk Anna Andrzejewska		
Engage experts for concept works and cost-effectiveness analyses	Anna Wilińska, Julian Rudziński	Consult with farmers/local communities	-
Engage company for detailed design of implementation measures	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (design company)	-
Obtain all administrative permissions	Julian Rudziński	Communes, Polish Water Management Authority, Regional Directorate for Environment Protection, Ministry of Climate and Environment	-
Construction works	Anna Andrzejewska, Julian Rudziński	External service (construction company)	-

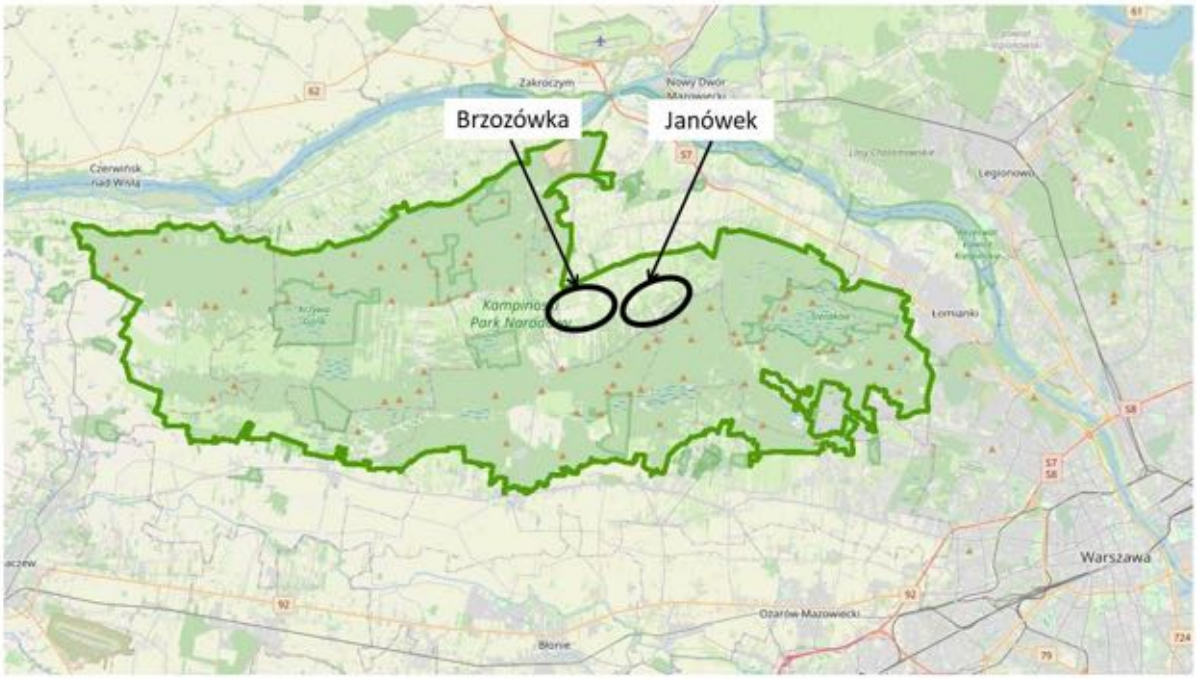
9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

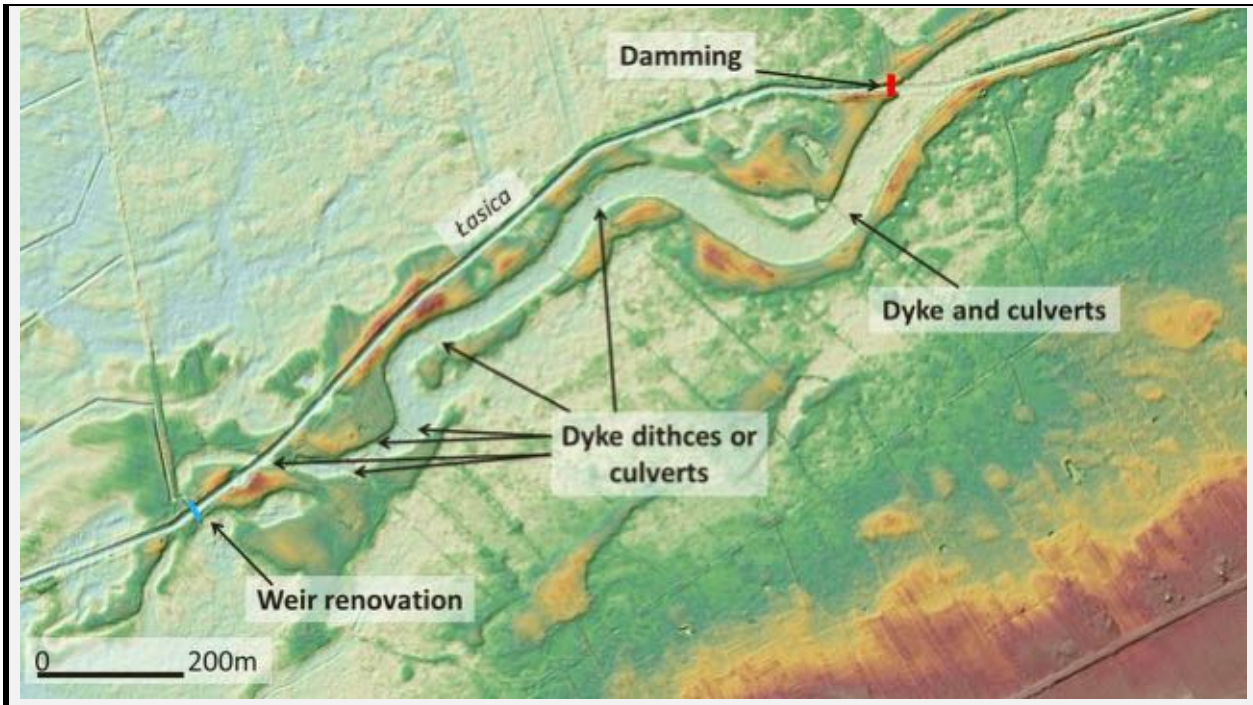
10. Monitor the impact of the measure		
Which indicators will you monitor to assess the impact of your measure?	Monitoring is planned for 20 indicators from the 10 Green Deal criteria:	
	Green Deal Criterium	**Indicator**
	Biodiversity net gain	Conservation status of HD Annex I listed habitats including peatland, wetland and freshwater habitats in case study area (should be specified from the Annex)
		Conservation status of Annex I listed (freshwater/wetland) species in the Birds Directive
		Conservation status of species of community interest (Habitats Directive)
	Climate regulation	Overall extent of wetland-type soils in the study area Pre- and post-intervention land cover on wetland-type soils
		Pre- and post-intervention condition of areas under wetland vegetation
	Flood/drought resilience	Changes in water table depth within wetland soils and area, duration and depth of surface water where it occurs. Change in storage capacity (m3) of wetlands (based on surface area of restored wetlands and floodplains)
	Health and wellbeing	Length of active travel route (km per km2)
	Zero emission goals	Improvement in ground water quality as a result of restoration Pre- and post-intervention land cover on wetland-type soils
	Sustainable Food Systems	Land use
		Land tenure (public vs. private)
	Inclusive Participation and Governance	Number of visitors to project website
		Number of participants in information sessions about the project
		Ability to join a formal stakeholder forum/board/working group
	Financing the transition	Breakdown of the total restoration budget by funding source and type [%]
		Private finance mobilised (€)
	Green growth	Number of jobs created (attributable in part to restoration activities or restoration outcomes)
		Number of scientific or educational activities taking place in, or dependent upon the ecosystem
Do you expect to see short-term or long-term impacts?	Long-term effects of the activities are expected.	

2. Measure	**Channel restoration in Janówek + Protection from flooding in Brzozówka**
2.1. Site	**Łasica ditch near Janówek and Brzozówka villages**

0. Detail the implementation measure
Measure: The measure aims to restore part of the old extensive meander near Janówek village, which was part of the valley water flow in the old Vistula River valley - that is, before the construction of the Łascia canal, by reconnecting the canal and the old meander/watercourse/ braided lowering. In addition, in the vicinity of the village of Brzozowka, technical measures are needed to partially protect flooded private agricultural land, i.e. to allow free drainage in situations of excess water, and to prevent dryness in situations of water shortage (solutions will be agreed with individual field owners - tailor made solutions Site: Part of Łasica ditch near Janówek village was built in 1960s cutting straight braided terrain lowerings which are remnants of Vistula River floods watercourses. At this site the old meander is close to the ditch and there is a possibility to redirect water from Łasica ditch to the old meander/ braided lowering (old watercourse). Here, we intend to dam up the water in Łasica Canal and redirect water to the old meander / braided lowering. There is need to restore and build culverts in dyke used by a local farmer to reach his lands. We plan to check all the other dykes crossing the braided lowering to ensure water flow. The damming is planned to be a gravel riffle which ensures watercourse connectivity. As an additional measure (only if there are savings in the budget) at this site we're planning renovation of an old weir located just below the old meander/ braided lowering. Second issue is the protection from flooding near Brzozówka village. It is necessary to protect meadows and pastures from flooding from the Łasica canal. Due to the process of peat mucking, the ground level has dropped in some areas used for agriculture. At high water levels in the canal, this causes water to overflow its sides into these lowered areas. Farmers report the need for safeguards their land against flooding. On the other hand, in other areas, better irrigation/rewetting of the land is needed so that natural peat-forming processes can recover. The solution to these problems is to carry out small earthworks, e.g. embankments, dikes, shunting on small drainage ditches, and installing culverts with backflow flaps in the Łasica's sides. Such solutions are elaborated in the process of detailed agreements with individual farmers, so as to reconcile the goals of agriculture with those of nature conservation.

1. Map the measure (site)/ Visualise the measure





2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	X
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy		
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Focus on farmers and local communities. We have to improve or create relationships with local farmers, establish small working groups for every case and conduct a set of meetings. Work out together the best possible implementation measures aligned to local community's needs (tailor made solutions). Create working group with Polish Water Management Authority, that manages weir Janówek.
Did you obtain recommendations for	No.

optimization from your **case study board**? If so, which?	
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	We are implementing the recommendations from gap analysis and SWOT.
How can you optimise the **impact** of your measure?	Measures aligned to beaver needs at this site. Ensuring the acceptance of the local communities for the planned measures will allow for long-lasting results. Establish with Polish Water Management Authority weir management plan.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	• At this point there is no need for additional funding for measure implementation. • There is a need for additional funding for buying up private lands what would allow further wetlands restoration.
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	• Not applicable in our case.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • lacking employees, building materials and difficult to predict change in prices • strong opposition or misunderstanding of local community Low risk: • the existence of beavers and their dams at the same place as planned in MERLIN might influence the direct locations and methods of implementing measures. • heavy rainfall and high-water level may delay construction works until the water level subside
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • lacking employees, building materials and difficult to predict change in prices • the existence of beavers and their dams at the same place as planned in MERLIN might influence the direct locations and methods of implementing measures. • heavy rainfall and high-water level may delay construction works until the water level subside

	Low probability: • strong opposition or misunderstanding of local community

Which risks can be prevented and how?	• the existence of beavers and their dams at the same place as planned in MERLIN might undermine the sense of implementing measures
	  ○ monitor beavers at site
	  ○ design measures in accordance to beavers sites
	• strong opposition from local communities
	  ○ meeting and discussions with local communities, farmers and commune authorities
	  ○ small working groups to work out solutions aligned to local communities needs
	  ○ looking for alternative measures and/or compensatory measures
	  ○ recognise the potential of blue-green services
	
	• heavy rainfall and high-water level may delay construction works until the water level subside
	  ○ start construction works as soon as possible to get more time for probable delay caused by high water level.
	• lacking employees, building materials and difficult to predict change in prices
	  ○ start construction works as soon as possible to get more time for probable delay caused by lacking employees and materials

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
Identify relevant stakeholders and actors			X														
Meetings with farmers/local communities			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Meeting with other stakeholders (Water Management authority, communes etc.)			X	X	X	X	X	X	X								X
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engage experts for concept works and cost-effectiveness analyses						X											
Engage company for detailed design of implementation measures							X										
Obtain all administrative permissions							X	X	X	X							
Construction works										X	X	X					
Weir renovation										X	X	X					

7. Plan budget

Task	Expected costs [€]	Source of funding
Identify relevant stakeholders and actors	-	MERLIN personnel budget
Meetings with farmers/local communities	5,000 €	MERLIN personnel budget

Meeting with other stakeholders (Water Management authority, communes etc.)	5,000 €	MERLIN personnel budget
Monitoring		
Engage experts for concept works and cost-effectiveness analyses	5,000 €	MERLIN implementation budget
Engage company for detailed design of implementation measures	10,000 €	MERLIN implementation budget
Obtain all administrative permissions	-	MERLIN personnel budget
Construction works	110,000 €	MERLIN implementation budget
Weir renovation	110,000 €	MERLIN implementation budget
SUM	**245,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Identify relevant stakeholders and appoint stakeholder board and working groups	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Farmers/local communities, communes, Polish Water Management Authority, ...	-
Meetings with farmers/local communities	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Farmers/local communities	Relationships are already existing, need to continue meetings and discussions
Meetings with other stakeholders (Water Management authority, communes etc.)	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Polish Water Management Authority, Regional Directorate for Environment Protection, Ministry of Climate and Environment, KPN Scientific Council, NGO's, local and regional authorities	Relationships are already existing, need to continue meetings and discussions
Monitoring	Paweł Trandziuk		
Engage experts for concept works and cost-effectiveness analyses	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Consult with farmers/local communities	-
Engage company for detailed design of implementation measures	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (design company)	-
Obtain all administrative permissions	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Communes, Polish Water Management Authority, Regional Directorate for Environment Protection, Ministry of Climate and Environment	-
Construction works	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (construction company)	-
Weir renovation	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (construction company)	-

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Monitoring is planned for 20 indicators from the 10 Green Deal criteria: **Green Deal Criterium** — **Indicator** Biodiversity net gain — Conservation status of HD Annex I listed habitats including peatland, wetland and freshwater habitats in case study area (should be specified from the Annex) Biodiversity net gain — Conservation status of Annex I listed (freshwater/wetland) species in the Birds Directive Biodiversity net gain — Conservation status of species of community interest (Habitats Directive) Biodiversity net gain — Overall extent of wetland-type soils in the study area Biodiversity net gain — Pre- and post-intervention land cover on wetland-type soils Climate regulation — Pre- and post-intervention condition of areas under wetland vegetation Climate regulation — Changes in water table depth within wetland soils and area, duration and depth of surface water where it occurs. Flood/drought resilience — Change in storage capacity (m^3) of wetlands (based on surface area of restored wetlands and floodplains) Health and wellbeing — Length of active travel route (km per km^2) Zero emission goals — Improvement in ground water quality as a result of restoration Zero emission goals — Pre- and post-intervention land cover on wetland-type soils Sustainable Food Systems — Land use Sustainable Food Systems — Land tenure (public vs. private) Inclusive Participation and Governance — Number of visitors to project website Inclusive Participation and Governance — Number of participants in information sessions about the project Inclusive Participation and Governance — Ability to join a formal stakeholder forum/board/working group Financing the transition — Breakdown of the total restoration budget by funding source and type [%] Financing the transition — Private finance mobilised (€) Green growth — Number of jobs created (attributable in part to restoration activities or restoration outcomes) Green growth — Number of scientific or educational activities taking place in, or dependent upon the ecosystem
Do you expect to see short-term or long-term impacts?	Long-term effects of the activities are expected.

3. Measure	**Rewetting and slowing water run-off by renovation of weirs**
3.1. Site	**Renovation of two weirs in Zamość, Nowa Dąbrowa and adaptation of weir Sianno**

0. Detail the implementation measure

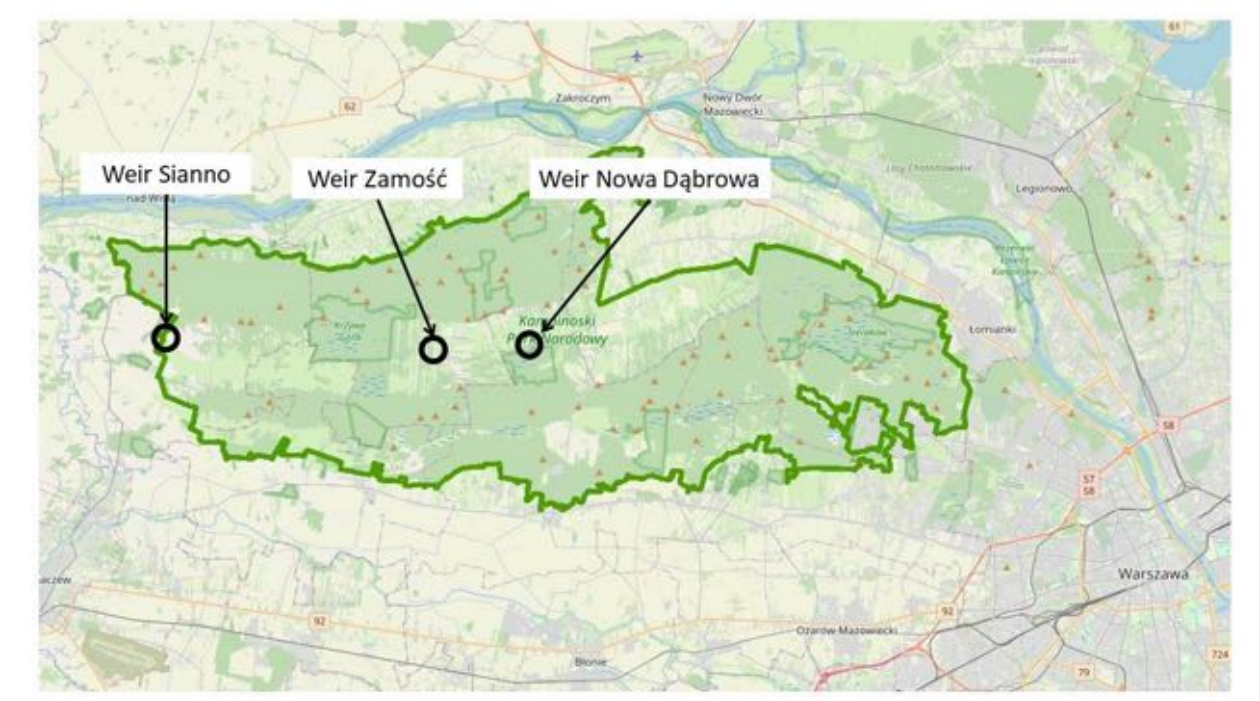
Measure:
This measure aims to slow water run-off and rewetting - by renovation of two weirs and one weir adaptation

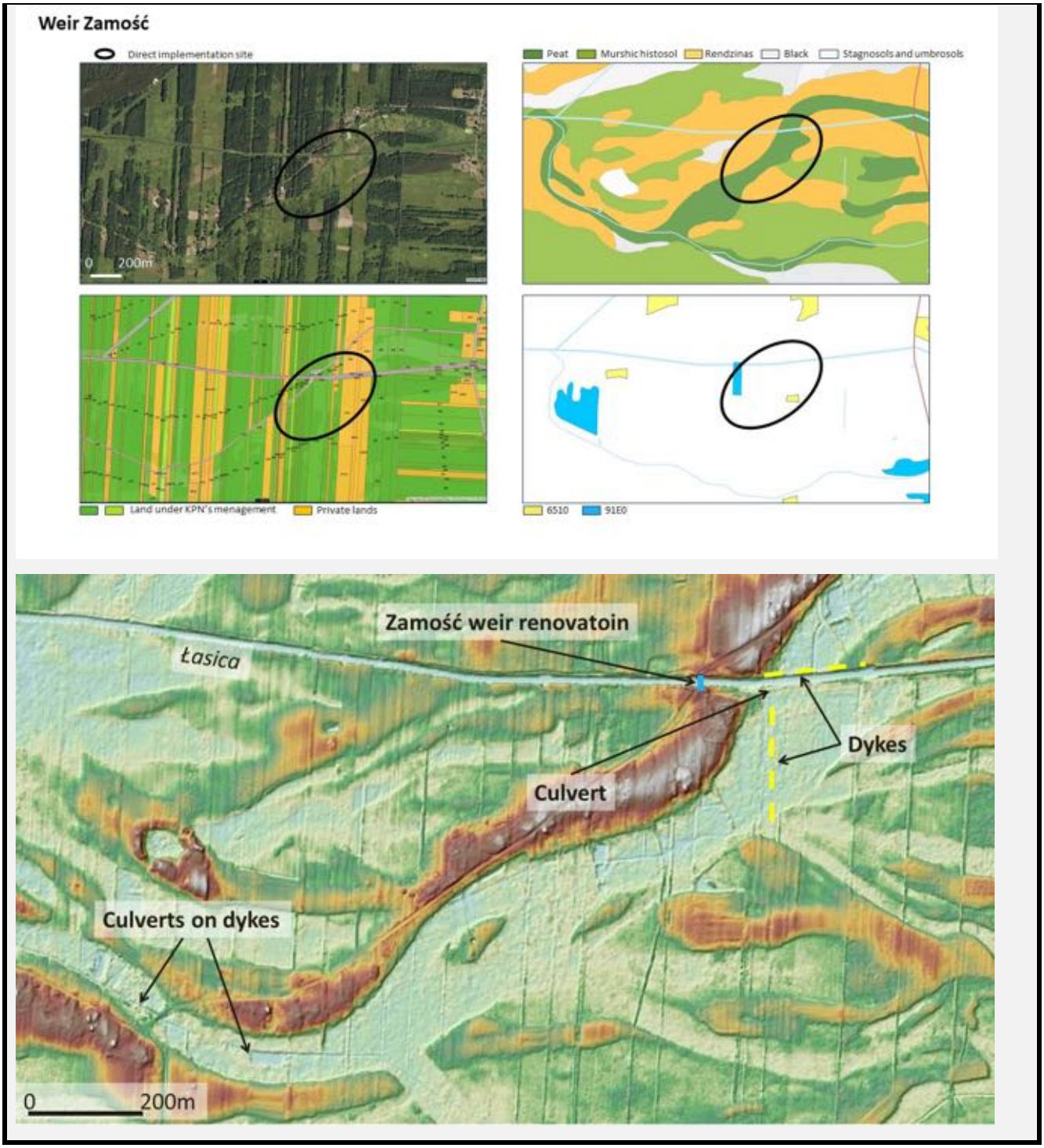
Site:
The Nowa Dąbrowa weir was built in 1969. It is located on the Łasica Canal in the vicinity of the strict reserve "Żurawiowe" with alluvial forests. It is located at some distance from the settlements.
The Zamość weir was built in 1975. It is located on the Łasica Canal where old meanders/braided lowering occurs. It is located in vicinity of building in village of Zamość.
The Sianno weir was built in 1996. It is located on the Łasica Canal on western border of Kampinos NP. Majority of lands within the impact area of that weir are managed by Kampinos NP.

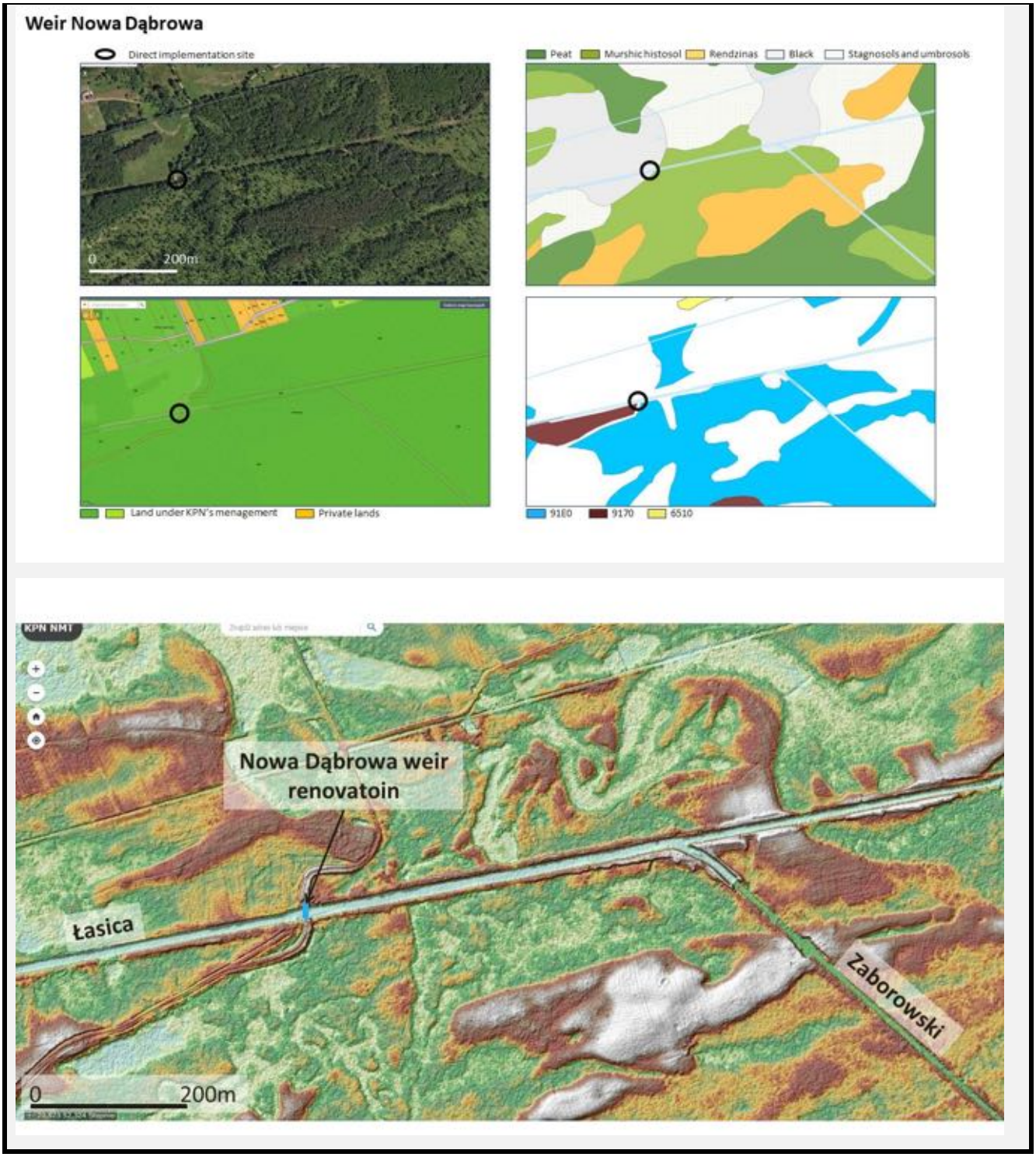
Weirs are owned and managed by the Polish Water Management Authority. Weirs Zamość and Nowa Dąbrowa are in poor technical condition and renovation of those weirs is needed to improve their effectiveness. Due to technical conditions the weir Sianno must be open during winter season and water runs away. This weir needs technical adaptation, which allows retaining water during winter seasons.

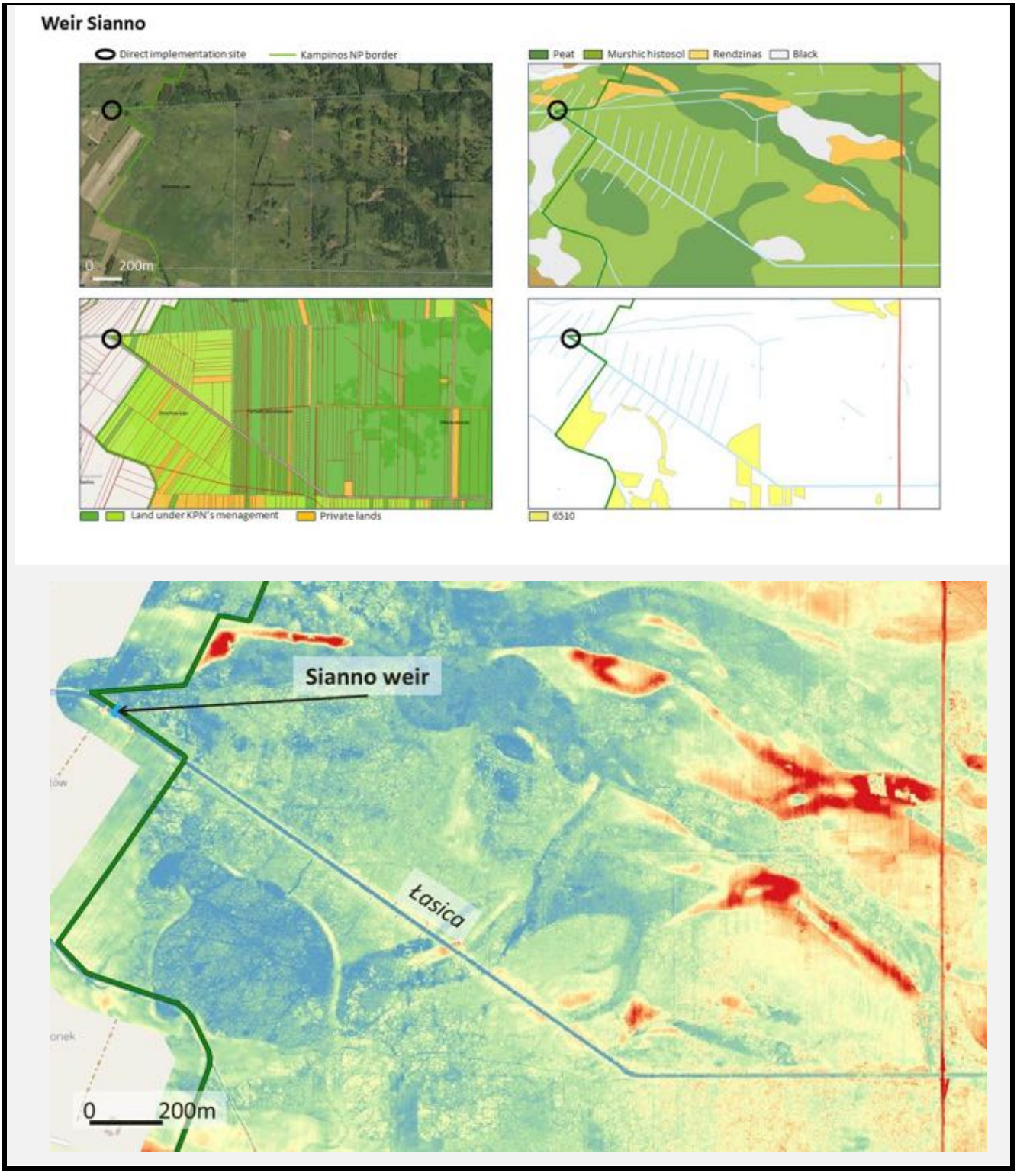
Correct damming of water on renovated and adapted weirs will allow to slow the water run-off from strict reserve "Żurawiowe", rewetting old meander/ braided lowering in Zamość, and will slow water run-off and rewet meadows near Bieliny village in winter seasons.

1. Map the measure (site)/ Visualise the measure




Weir Zamość
Direct implementation site
0 200m
Peat
Murshic histosol
Rendzinas
Black
Stagnosols and umbrosols
Land under KPN's menagement
Private lands
6510
91E0
Łasica
Zamość weir renovatoin
Dykes
Culvert
Culverts on dykes
0 200m


Weir Nowa Dąbrowa
Direct implementation site
0
200m
Peat
Murshic histosol
Rendzinas
Black
Stagnosols and umbrosols
Land under KPN's menagement
Private lands
9180
9170
6510
KPN NMT
Nowa Dąbrowa weir renovatoin
Łasica
Zaborowski
0
200m


Weir Sianno
Direct implementation site
Kampinos NP border
0
200m
Peat
Murshic histosol
Rendzinas
Black
Land under KPN's menagement
Private lands
6510
Sianno weir
Łasica
0
200m

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	X
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy		
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Create working group with the Polish Water Management Authority who manages the weirs Zamość and Nowa Dąbrowa. Focus on farmers and local communities. We have to improve or create relationships with local farmers, establish small working groups for every case and conduct a set of meetings. Work out together the best possible implementation measures aligned to local community's needs (tailor-made solutions).
Did you obtain recommendations for optimization from your **case study board**? If so, which?	No.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	We are implementing the recommendations from the gap analysis and SWOT.
How can you optimise the **impact** of your measure?	Ensuring the acceptance of the local communities for the damming water by weirs will allow for long-lasting results. Establish with Polish Water Management Authority weirs management plans.

4. Mobilise additional external funding
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!

What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	• At this point there is no need for additional funding for measure implementation. • There is a need for additional funding for buying up private lands that would allow further wetlands restoration.
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	• Not applicable in our case.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • lacking employees, building materials and difficult to predict change in prices • strong opposition of local community Low risk: • heavy rainfall and high-water level may delay construction works until the water level subside
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • heavy rainfall and high-water level may delay construction works until the water level subside • Lacking employees, building materials and difficult to predict change in prices • strong opposition of local community

Which risks can be prevented and how?	• strong opposition from local communities
	  ○ meeting and discussions with local communities, farmers and commune authorities
	  ○ small working groups to work out solutions aligned to local communities needs
	  ○ looking for alternative measures and/or compensatory measures
	  ○ recognise the potential of blue-green services
	
	• heavy rainfall and high-water level may delay construction works until the water level subside
	  ○ start construction works as soon as possible to get more time for probable delay caused by high water level.
	• lacking employees, building materials and difficult to predict change in prices
	  ○ start construction works as soon as possible to get more time for probable delay caused by lacking employees and materials

6. Plan time

Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Identify relevant stakeholders and actors			X														
Meetings with farmers/local communities			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Meeting with other stakeholders (Water Management authority, communes etc.)			X	X	X	X	X	X	X								X
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engage experts for concept works and cost-effectiveness analyses						X											
Engage company for detailed design of implementation measures							X										
Obtain all administrative permissions							X	X	X								
Construction works										X	X	X					

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Identify relevant stakeholders and actors	-	MERLIN personnel budget
Meetings with farmers/local communities	5,000 €	MERLIN personnel budget
Meeting with other stakeholders (Water Management authority, communes etc.)	5,000 €	MERLIN personnel budget
Monitoring	-	
Engage experts for concept works and cost-effectiveness analyses	5,500 €	MERLIN implementation budget
Engage company for detailed design of implementation measures	30,000 €	MERLIN implementation budget
Obtain all administrative permissions	-	MERLIN personnel budget
Zamość weir renovation	160,000 €	MERLIN implementation budget
Nowa Dąbrowa weir renovation	160,000 €	MERLIN implementation budget
Sianno weir adaptation	50,000 €	MERLIN implementation budget
Other construction works	40,000 €	MERLIN implementation budget
SUM	**455,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Identify relevant stakeholders and appoint stakeholder board and working groups	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Farmers/local communities, communes, Polish Water Management Authority, ...	
Meetings with farmers/local communities	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Farmers/local communities	Relationships are already existing, need to continue meetings and discussions
Meetings with other stakeholders (Water Management authority, communes etc.)	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Polish Water Management Authority, Regional Directorate for Environment Protection,	Relationships are already existing, need to continue meetings and discussions

		Ministry of Climate and Environment, KPN Scientific Council, NGO's, local and regional authorities	
Monitoring	Paweł Trandziuk		
Engage experts for concept works and cost-effectiveness analyses	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Consult with farmers/local communities	
Engage company for detailed design of implementation measures	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (design company)	
Obtain all administrative permissions	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	Communes, Polish Water Management Authority, Regional Directorate for Environment Protection, Ministry of Climate and Environment	
Zamość weir renovation	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (construction company)	
Nowa Dąbrowa weir renovation	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (construction company)	
Sianno weir adaptation	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (construction company)	
Other construction works	Anna Wilińska, Anna Andrzejewska, Julian Rudziński	External service (construction company)	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure		
Which indicators will you monitor to assess the impact of your measure?	Monitoring is planned for 20 indicators from the 10 Green Deal criteria:	
	Green Deal Criterium	**Indicator**
		Conservation status of HD Annex I listed habitats including peatland, wetland and freshwater habitats in case study area (should be specified from the Annex)
	Biodiversity net gain	Conservation status of Annex I listed (freshwater/wetland) species in the Birds Directive
		Conservation status of species of community interest (Habitats Directive)
		Overall extent of wetland-type soils in the study area Pre- and post-intervention land cover on wetland-type soils
	Climate regulation	Pre- and post-intervention condition of areas under wetland vegetation
		Changes in water table depth within wetland soils and area, duration and depth of surface water where it occurs.
	Flood/drought resilience	Change in storage capacity (m^3) of wetlands (based on surface area of restored wetlands and floodplains)
	Health and wellbeing	Length of active travel route (km per km^2)

	Zero emission goals	Improvement in ground water quality as a result of restoration Pre- and post-intervention land cover on wetland-type soils
	Sustainable Food Systems	Land use Land tenure (public vs. private)
	Inclusive Participation and Governance	Number of visitors to project website Number of participants in information sessions about the project Ability to join a formal stakeholder forum/board/working group
	Financing the transition	Breakdown of the total restoration budget by funding source and type [%] Private finance mobilised (€)
	Green growth	Number of jobs created (attributable in part to restoration activities or restoration outcomes) Number of scientific or educational activities taking place in, or dependent upon the ecosystem
Do you expect to see short-term or long-term impacts?	Long-term effects of the activities are expected.	

3.1.4 Case study 6 Hutovo Blato peatland (Bosnia-Herzegovina)

Case study name	**Peatland Bosnia**
Person(s) completing this template	**Matea Jarak (WWF Adria)** WWF Adria: WWF Adria -Udruga Za Zastitu Prirode I Ocuvanje Bioloske Raznolikosti

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Negotiations with the hydropower company for the implementation of Environmental Flow and the restoration of close-to-nature hydrological conditions (re-wetting 1488 ha of the peatlands impacted by the hydro-power infrastructures) will have been performed. Restoration of specific habitats in key areas (restoration of watercourses, gullies and channels; restoration of flooded meadows and reeds; restoration of spawning grounds for fish, grain sowing) covering a total area of 16.9 ha and of 42.1 km of watercourses/gullies/channels will have been performed. Additional options to restore populations of other species and habitats will have been identified.
Goals set for M 48 in the proposal	Restoration of watercourses, gullies and channels Restoration of flooded meadows and reeds Restoration of spawning grounds for fish Grain sowing (1,488 ha of the Hutovo blato peatland) Water quality measures related to Illegal waste disposal and mitigation of Agricultural practices Restoration fish stocks and birdlife
Can you imagine further goals beyond MERLIN?	Negotiations with hydropower company will be performed after the project end, as the negotiations could take more time than it was presumed during project proposal period.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	Restoration of watercourses, gullies and channels Restoration of flooded meadows and reeds Restoration of spawning grounds for fish Grain sowing (1,488 ha of the Hutovo Blato peatland) Water quality measures related to Illegal waste disposal and mitigation of Agricultural practices Restoration fish stocks and birdlife
Is there a need to select/prioritise?	Priority will be restoration of watercourses, gullies and channels as other restoration activities depend on It.

1. Measure	**Restoration of watercourses, gullies and channels**
1.1. Site	**Hutovo blato- Deransko blato**

0. Detail the implementation measure

1.2. Cleaning watercourses, gullies and channels to maintain and improve ecological and hydrological conditions
1.2.1. Mowing, cutting, vegetation and silt removal
Škrka - 14000 m2
Londžina jaruga (the gully of Londža) - 5800 m2
Podsrp - 5300 m2
Babino oko - 7350 m2
Gabeokino vrelo/jaruga - The well/gully of Gabela (Smokvica) - 5000 m2
Jelimska jaruga (the gully of Jelim) - 6200 m2
Gornja Galebica Donja Galebica (Galebica upper and lower) - 5600 m2
Bočinska Jaruga (The gully of Bočin) - 2500 m2
Markotina Jaruga (Markota's gully) - 1000 m2
Kusićka jaruga (the gully of Kusić) - 4000 m2
Barišina jaruga - Puhaluša (Barišas gully - Puhaluša) - 9600 m2
Kanal Sunca (the channel of Sunca) - 9600 m2
Kanal Žalonja (the channel of Žalonja) - 3300 m2
Jaruga Džinavica (the gully of Džinavica) - 3600 m2

List of watercourses, gullies and channels to be worked on, total of 16.9 ha and of 42.1 km restored.

Depending on the state of water body, different methods will be used such as mowing, silt removal etc. Monitoring points will be planned on different locations to monitor water levels before and after restoration. In accordance with the above, fire prevention activities are planned within this project and revitalization of the natural habitats of the swamp-marsh ecosystem of the Deran blato, which are based on the establishment of a network of gullies and canals in the area of Deransko blato. The spatial position of the gully network is defined according to the basic types of coverage of the Deran blato and spatial location of the most important open water areas: Deransko and lakes Orah, Jelim, and Drijen and the canals that connect them, the Krupa - Karaotok - Krupa canal as well as the Krupa River. Accordingly, the ravines are positioned in a total of six spatial zones. Information about surface coverage of the gully were obtained on the basis of the mean diameter of the gully width of 4 m.

The whole location designated for restoration is separated into 6 zones described below:

Zone I is located in the north-eastern part of Deransko blato, between the peripheral canal in the west and to the north, Lake Škrka in the northwest, the Krupa - Karaotok - Krupa canal in the south and the wetland area around Jelim Lake in the east of Deransko blato. The total area is about 3.2 km^2. Within this space zone, cleaning is planned and removal of reed and sedge vegetation at the level of a total of 13 hydro-morphological gullies (gullies number: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 13) with a total length of about 11.3 km. Total cleared open area of the water surface of the mentioned canal and gully is about 1.83 ha.

Zone II is located in the extreme western part of Deransko blato, between the channels: Krupa - Karaotok - Krupa in the east and north, or the Krupa river in the south and west. The total area amounts to about 87.25 ha. The units of the specified area are defined spatial zones for planned cleaning of a certain amount of reeds and sedges. More specifically, cleaning is planned and removal of reed and sedge vegetation at the level of the Krupa - Karaotok - Krupa river canal and a total of 5 gullies (gullies number: 15, 16, 17, 20 and 21) with a total length of about 3.9 km. Totally cleaned the area of open water surfaces of the mentioned channel and ravine is about 1.8 ha.

Zone III is located in the southwestern part of Deransko blato, between the Krupa River in the west, north and east, Deran Lake in the southeast and the northern coast of the Island and Gradina in the south and to the south-west of the mud. The total area of this zone in the described area is about 3 km^2. Unitar of the mentioned area, spatial zones are defined for which the cleaning and removal of larger ones is planned quantity of reeds and sedges. More specifically, it is planned to clean and remove the vegetation of reeds and sedges level, a total of 14 hydro-morphological gullies (gullies number: 22, 23, 24, 25, 26, 27, 28, 29, 30,

31, 32, 33, 34 and 35) with a total length of about 8.55 km. Total cleared area of open water surfaces of the mentioned channel and gully is about 1.72 ha.

The IV zone is located in the extreme northeastern part of Deransko blato, between the I zone on in the west, the Krupa River in the southwest, the ravine north of Lake Jelim in the south, and the land rim in the east and north. The total area of the IV zone is 2.3 km^2. Inside this zone, it is planned to clean and remove vegetation of reeds and sedges at the level of a total of 5 hydro-morphological gullies (gullies number: 12, 36, 37, 38 and 39) with a total length of about 5.77 km. In total the cleared area of open water areas of the mentioned channel and ravine is about 2.31 ha.

Zone V is located in the extreme eastern part of Deransko blato, between the Krupa River in the west, Lake Deran in the south, the channel between Lake Deran and Lake Orah in the southeast, Lake Drijen and Orah in the east, Jelim lakes in the northeast and ravines 37 (IV zone) in the north. The total area of V zone is 5.5 km^2. Cleaning and removal is planned within this zone vegetation of reeds and sedges at the level of a total of 9 hydro-morphological gullies (gullies number: 40, 41, 42, 43, 44, 45, 51, 52 and 53) with a total length of about 9.19 km. Total cleared area of open water the area of the mentioned canal and gully is about 3.69 ha.

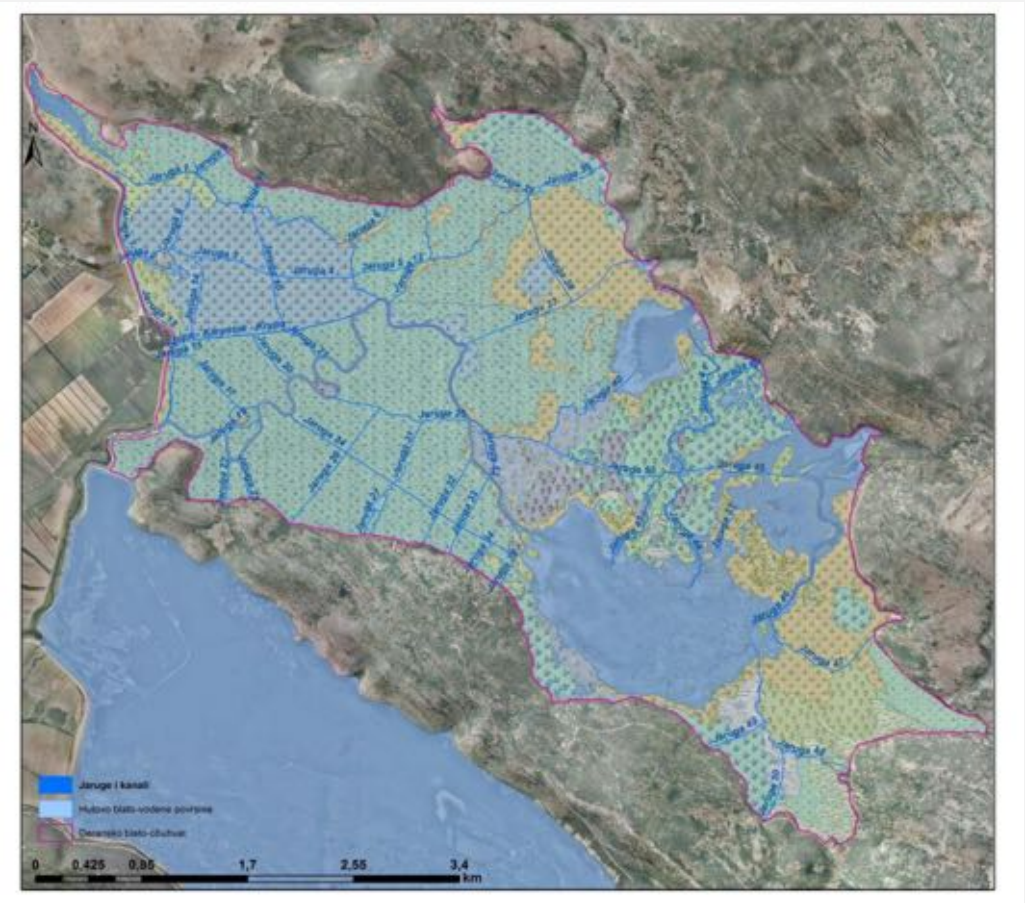
Zone VI is located in the extreme southeastern part of Deransko blato, between the land rim in the west, Deran Lake in the north, the channel between Deran Lake Orah in the northeast, and the land rim in the east, southeast and south. The total area of the VI zone in the described catchment is 2.5 km^2. Within this zone, it is planned to clean and remove vegetation of reeds and sedges at the level a total of 5 hydro-morphological gullies (gullies number: 46, 47, 48, 49 and 50) with a total length of about 4.85 km. The total cleared area of open water areas of the mentioned canal and ravine is approx. 1.95 ha. The total length of all planned channels is about 42.1 km, with a pronounced longitudinal surface variation, ranging from a maximum of 3.16 km in length and 1.26 ha of associated area (gully 1.) up to only 64.9 m in length, or 272.1 m^2 surface (gully 29.).

Table of channels and gullies

R.br.	Naziv	L_d (km)	$L_š$ (m)	P (m^2)	P (ha)
1.	Jaruga 1	3,159	4	12630,206	1,263
2.	Jaruga 2	1,068	4	4269,975	0,427
3.	Jaruga 3	0,854	4	3429,743	0,343
4.	Jaruga 4	0,659	4	2647,959	0,265
5.	Jaruga 5	0,503	4	2025,732	0,203
6.	Jaruga 6	0,457	4	1838,922	0,184
7.	Jaruga 7	0,761	4	3056,331	0,306
8.	Jaruga 8	0,678	4	2723,136	0,272
9.	Jaruga 9	0,317	4	1282,038	0,128
10.	Jaruga 10	1,050	4	4212,677	0,421
11.	Jaruga 11	0,190	4	771,870	0,077
12.	Jaruga 12	1,038	4	4161,267	0,416
13.	Jaruga 13	0,835	4	3353,792	0,335
14.	Jaruga 14	0,724	4	4962,702	0,496
15.	Jaruga 15	0,115	4	472,404	0,047
16.	Jaruga 16	0,087	4	358,992	0,036
17.	Jaruga 17	0,872	4	3499,335	0,350
18.	Jaruga 18	0,419	4	1689,171	0,169
19.	Jaruga 19	0,093	4	382,834	0,038
20.	Jaruga 20	0,479	4	1930,137	0,193
21.	Jaruga 21	0,345	4	1393,972	0,139
22.	Jaruga 22	0,359	4	1447,302	0,145
23.	Jaruga 23	0,322	4	1301,925	0,130
24.	Jaruga 24	2,146	4	8597,477	0,860
25.	Jaruga 25	1,129	4	4528,395	0,453
26.	Jaruga 26	1,172	4	4700,959	0,470
27.	Jaruga 27	0,532	4	2141,326	0,214
28.	Jaruga 28	0,068	4	282,670	0,028
29.	Jaruga 29	0,065	4	272,119	0,027
30.	Jaruga 30	0,366	4	1477,016	0,148

31.	Jaruga 31	0,567	4	2279,866	0,228
32.	Jaruga 32	0,787	4	3160,676	0,316
33.	Jaruga 33	0,691	4	2775,310	0,278
34.	Jaruga 34	0,250	4	1013,169	0,101
35.	Jaruga 35	0,178	4	723,124	0,072
36.	Jaruga 36	1,782	4	7139,202	0,714
37.	Jaruga 37	1,625	4	6512,378	0,651
38.	Jaruga 38	0,922	4	3702,379	0,370
39.	Jaruga 39	0,400	4	1612,426	0,161
40.	Jaruga 40	1,926	4	7716,559	0,772
41.	Jaruga 41	1,671	4	6696,139	0,670
42.	Jaruga 42	0,545	4	2192,318	0,219
43.	Jaruga 43	1,073	4	4302,894	0,430
44.	Jaruga 44	1,169	4	4689,555	0,469
45.	Jaruga 45	0,987	4	3962,343	0,396
46.	Jaruga 46	0,795	4	3192,472	0,319
47.	Jaruga 47	1,211	4	4857,982	0,486
48.	Jaruga 48	1,715	4	6872,461	0,687
49.	Jaruga 49	0,513	4	2065,068	0,207
50.	Jaruga 50	0,618	4	2486,128	0,249
51.	Jaruga 51	0,451	4	1815,600	0,182
52.	Jaruga 52	0,402	4	1621,634	0,162
53.	Jaruga 53	0,965	4	3872,692	0,387
	Ukupno:	**42,108**	**4**	**171104,760**	**17,110**

1. Map the measure (site)/ Visualise the measure



2. Measure	**Restoration of water regime and water quality improvement**
2.1. Site	**Hutovo blato- Deransko blato**

0. Detail the implementation measure
Backfilling of illegally dug channels, preventing of unauthorised entry, securing of hydrological activities in Deran area will be done during the whole project, and beyond. Map construction and solving the problem of illegal waste will be done as part of desk research, and the implementation is to be done outside the project life. There is a consideration to do a peat depth testing on Hutovo, to estimate the carbon storage potential of Hutovo blato, especially the Deran blato as it is not used as an accumulation lake for hydropower plant as Svitava lake is, but is under its impact.

3. Measure	**Restoration of fish population**
3.1. Site	**Hutovo blato- Deransko blato**

0. Detail the implementation measure
Monitoring and impact analysis, with recommendations from experts (defined through procurement) will be made. Several locations on Hutovo blato will be defined for monitoring of freshwater fish, and spawning grounds will be defined. Experts will define monitoring protocols to be used during and beyond the project life. Preliminary design of spawning grounds for endemic and commercial fish species will be done by experts and in the last year of the project it will be constructed and put in defined location on Hutovo blato. Experts will develop a protocol for monitoring of fish spawning and educate Hutovo blato employees how to implement it.

4. Measure	**Restoration of birdlife**
4.1. Site	**Hutovo blato- Deransko blato**

0. Detail the implementation measure
Monitoring and impact analysis, with recommendations from experts (defined through procurement) will be made. Several locations on Hutovo blato will be defined for monitoring of birdlife, there is a birdwatching station for tourists being made at the moment and could be used for monitoring purposes. Experts will define monitoring protocols to be used during and beyond the project life. For monitoring purposes ornithology equipment will be purchased and experts will educate parks employees how to use it and use the monitoring protocol.

5. Measure	**Preparation of activities and monitoring**
5.1. Site	**Hutovo blato- Deransko blato**

0. Detail the implementation measure
Preparation work and pre-feasibility studies will be made for activities M1 and M2. During this sub-activity, monitoring points will be defined. Monitoring and evaluation of impacts of restoration activities will be also made. Additional projects to preserve biodiversity on Hutovo blato will be prepared to ensure financing in the future and broaden the scope of biodiversity preservation and monitoring on Hutovo blato post-project.

2. Integrate the Green Deal criteria

Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.

Green Deal criteria	Relevance in demo case (WP1)	Relevance in implementation case (WP2)
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing		
Zero pollution goals	X	X
Sustainable food systems (F2F)		
Sustainable energy		
Sustainable transport		
Inclusivity		
Circular economy		
Financing the transition		
Green growth		

3. Optimise your plan

Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!

Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Yes, SWOT analysis was made on the beginning of the project. SWOT analysis showed that discussing pressing challenges through stakeholder engagement, explaining importance of conservation of Hutovo blato for the region through provision of ecosystem services relevant for local stakeholders, engaging federal government in stakeholder dialogue and explaining role of balanced tourism in the area is a priority action to take. During the project we should endure monitoring of water balance, water quality, GHG emissions, biodiversity values and socio-economic aspect in the area, and also into the future.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Case study board will have to be re-assembled as it didn't take into consideration all stakeholders. So, no recommendations were obtained for now.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	Implementation process will have to be somewhat changeable as the work that are part of activities will depend on water levels on the location.
How can you optimise the **impact** of your measure?	

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	Not applicable at the moment.
What additional funding can you actually acquire?	Not applicable at the moment.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	Not applicable at the moment.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	Risk assessment still needs to be conducted.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	Risk assessment still needs to be conducted.
Which risks can be prevented and how?	Risk assessment still needs to be conducted.

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
1.1.1. Cleaning of shrubs, sanitary logging, extraction of roots, filling up terrain, grass sowing					X	X	X	X	X	X	X	X	X	X	X		
1.2. Cleaning watercourses, gullies and channels to maintain and improve ecological and					X	X	X	X	X	X	X	X	X	X	X		

hydrological conditions- 1.2.1. Mowing, cutting, vegetation and silt removal																	
1.3. Restoration of flooded meadows and reeds- 1.3.1. Mowing, cutting, vegetation and silt removal					X	X	X	X	X	X	X	X	X	X	X		
1.4. Restoration of spawning grounds for fish- 1.4.1. Mowing and making fures at spawning grounds					X	X	X	X	X	X	X	X	X	X	X		
2. Restoration of water regime and water quality improvement- 2.1. Office and field activities (water regime)											X	X	X	X	X	X	
2.1.1. Backfilling of illegally dug channels, preventing of unauthorized entry, securing of hydrological activities in Derane area											X	X	X	X	X	X	
2.1.2. Map construction and solving the problem of illegal waste											X	X	X	X	X	X	

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
1.1. Restoration of the key areas of Hutovo Blato Nature Park- 1.1.1. Cleaning of shrubs, sanitary logging, extraction of roots, filling up terrain, grass sowing	92,000 €	HORIZON 2020 MERLIN
1.2. Cleaning watercourses, gullies and channels to maintain and improve ecological and hydrological conditions	185,500 €	HORIZON 2020 MERLIN
1.3. Restoration of flooded meadows and reeds	30,700 €	HORIZON 2020 MERLIN
1.4. Restoration of spawning grounds for fish	92,200 €	HORIZON 2020 MERLIN
2. Restoration of water regime and water quality improvement- 2.1.1. Backfilling of illegally dug channels, preventing of unauthorised entry, securing of hydrological activities in Derane area	17,400 €	HORIZON 2020 MERLIN
2.1.2. Map construction and solving the problem of illegal waste	15,400 €	HORIZON 2020 MERLIN
3. Restoration of fish population- 3.1. Design of a pilot spawning ground	30,700 €	HORIZON 2020 MERLIN
3.2. Implementation of pilot spawning ground	77,000 €	HORIZON 2020 MERLIN
4. Restoration of birdlife- 4.1. Monitoring of the impact of restoration activities on birdlife	19,000 €	HORIZON 2020 MERLIN

5. Preparation of activities and monitoring	64,000 €	HORIZON 2020 MERLIN
SUM	**623,900 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
1.1.1. Cleaning of shrubs, sanitary logging, extraction of roots, filling up terrain, grass sowing	NP Hutovo blato/ WWF Adria		
1.2. Cleaning watercourses, gullies and channels to maintain and improve ecological and hydrological conditions	NP Hutovo blato/ WWF Adria		
1.3. Restoration of flooded meadows and reeds	NP Hutovo blato/ WWF Adria	Ichthyology expert	
1.4. Restoration of spawning grounds for fish	NP Hutovo blato/ WWF Adria	Ichthyology expert	
2.1.1. Backfilling of illegally dug channels, preventing of unauthorised entry, securing of hydrological activities in Derane area	NP Hutovo blato/ WWF Adria		
2.1.2. Map construction and solving the problem of illegal waste	NP Hutovo blato/ WWF Adria		
3.1. Design of a pilot spawning ground	NP Hutovo blato/ WWF Adria	Ichthyology expert	
3.2. Implementation of pilot spawning ground	NP Hutovo blato/ WWF Adria	Ichthyology expert	
4.1. Monitoring of the impact of restoration activities on birdlife	NP Hutovo blato/ WWF Adria	Ornithology expert	
5. Preparation of activities and monitoring	WWF Adria/ NP Hutovo blato		

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Water levels will be monitored before and after the restoration activities. We'll propose to the park director to set the monitoring on several gullies and channels, and also to monitor the growth rate of channel vegetation (reeds etc), so the further cleaning plans can be made.
Do you expect to see short-term or long-term impacts?	We expect to see long-term impacts especially as we plan to negotiate with hydropower plant to assure close-to-nature hydrological conditions and rewetting of Hutovo blato.

3.1.5 Case study 12 Lima (Portugal)

Case study name	**Lima**
Person(s) completing this template	**Patricia M. Rodríguez-González (ISA-ULisboa), Estêvão Portela-Pereira (ISA-ULisboa), Francisco Lourenço Correia (CPML)** ISA-ULisboa: Instituto Superior de Agronomia (ISA) [Scientific Partner] CPML: Camara Municipal de Ponte de Lima (MPL) [Implementation Partner]

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Until Month 24, the planning of passive and active restoration will be completed, including diagnosis, territorial analyses and mapping. By the same time, the stakeholder agreements will be completed to enlarge the target area of floodplain restoration from that addressed by LIFE FLUVIAL. Until Month 24, the removal and control of invasive plants will be completed for 1 ha in the floodplain forest area. The detailed restoration planning is delayed in relation to the proposal, to month 24 due to the extension of demonstration project LIFE FLUVIAL and need to coordinate with finalization of previous restoration actions.
Goals set for M 48 in the proposal	• Removal and control of invasive plants (1 ha); • passive restoration through cattle exclusion (3 ha); • active restoration through planting keystone native species priority habitat 91E0 (1 ha); • stakeholder agreements for rewetting and rewildening (9 ha). • Areas for each measure are expected to be adjusted according to the finalization of detailed restoration plan (see previous point).
Can you imagine further goals beyond MERLIN?	

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• M1. Removal and control of invasive plants • M2. Passive restoration • M3. Active restoration • M4. Stakeholder agreements for rewetting and rewildening

Is there a need to select/prioritise?	**M1. Removal and control of invasive plants** M1.1. Reinforcement of control of invasives in Estorãos floodplain (site EC-Purgueira) “EC”. M1.2. Removal and Control of invasives, *Acacia melanoxylon* stand in the left bank of Estorãos river, next to EN202 – debarking and cut. (site EN-EN202) M1.3. Control of invasives, *Eucalyptus camaldulensis* and *E. globulus* (with *A. melanoxylon, A. dealbata*) stand at Loureiro site – cut *Eucalyptus* spp., debark and cut *Acacia* spp. (site LOU-Loureiro). M1.4. Restoration of wet meadows (Molinia habitat 6410) through the removal of *Eucalyptus camaldulensis* (and subsequent control of stump shoots), with the least possible impact on the soil during timber extraction (site MO-Molinia) **M2. Passive restoration through cattle exclusion** M2.1. Management of cattle grazing. Individual protection of target riparian species regeneration (site AP-APACRA) **M3. Active restoration through planting keystone native species** M3.1. Plant production and plantation of native species typical of habitat 91F0 and 91E0* (site LOU-Loureiro) M3.2. Renaturalisation of the right bank of the Estorãos River, elimination of the dike (EC-Purgueira, upstream EN202 bridge). Planting of native tree species (site RBA-Right bank). **M4. Stakeholder agreements for rewetting and rewildening** M4.1. Spot control of invasives (cutting of Eucalyptus and debarking-cutting Acacia – and promoting natural regeneration of 91E0* (Site EXM) M4.2. Reconnecting incipient secondary channels and promoting meandering at Loureiro floodplain (sites to be defined)

1. Measure	**M1. Removal and control of invasive plants**
1.1. Site	**Estorãos river floodplain (sites EC-Purgueira, LOU-Loureiro, EN-EN202, MO-Molinia)**

0. Detail the implementation measure

Measure:

One of the measures planned within MERLIN in the Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is removal and control of invasive plants

Site: EC-Purgueira, LOU-Loureiro, EN-EN202, MO-Molinia

Objective: The main objective is to recover the natural floodplain habitats (e.g. 91E0*, 91F0, 6410), and recovering the wetland hydroperiod as an indirect effect of removing high water consumption species.

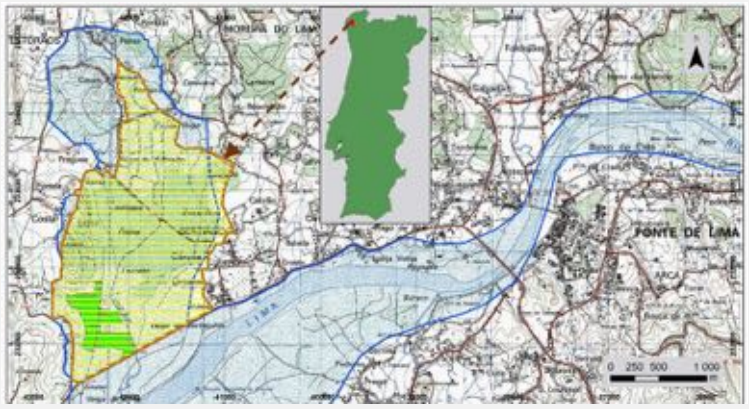
Description: Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is characterised by mosaics of hygrophilous, swampy woods and wet meadows, but in the past Eucalyptus plantations were made to drain the wetlands. Later, *Acacia melanoxylon* (and occasionally *Acacia dealbata*) invaded from upstream of the Estorãos river basin where they were planted. For example, the case of Site EN, on the banks of the Estorãos river (alluvial plain) is located upstream of the EN202 with a dense stand of *Acacia melanoxylon*.

Here, we intend to cut the *Eucalyptus* and *Acacia* stands (these will only be cut after they have died as a result of debarking several months before) (EC-Purgueira site, EN-EN202, LOU-Loureiro). In the right (EC-Purgueira site) and left (LOU-Loureiro, EN-EN202) alluvial plain of Estorãos river the control and management of invasive species (including herbaceous) will be carried out, as a follow-up to the previous demonstration project (LIFE FLUVIAL).

On the other hand, in a small area (MO-Molinia) wet meadows (habitat 6410) will be recovered through the cutting of *Eucalyptus camaldulensis* (and subsequent control of the stump shoots), with the least possible impact on the soil when removing the timber from the cut.

Removal and control of invasive plants will be monitored with respect to GD Goals

1. Map the measure (site)/ Visualise the measure



Left: Location of Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape in relation to Portugal and Lima main river course

Above: Location of implementation area (grey) in relation to Estorãos river hydrographic network

Above: Location of Measure M1 (polygons in orange), M1. Removal and control of invasive plants, sites: EC-Purgueira, LOU-Loureiro, EN-EN202, MO-Molinia)

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing		X
Zero pollution goals		X
Sustainable food systems (F2F)	X	X
Sustainable energy	X	X
Sustainable transport		
Inclusivity	X	X
Circular economy		X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	-
Did you obtain recommendations for optimization from your **case study board**? If so, which?	-
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	Visit to field site conducted in December 2022 by Tomasz Okruzsko from Kampinos Case study allowed recommendations for the restoration in this study site, notably in the Loureiro Floodplain where the invasive species will be removed, in a second step, the reconnection of secondary channel in the floodplain of Estorãos river (left margin, see also M4) can be facilitated.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	-
How can you optimise the **impact** of your measure?	

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	-
What additional funding can you actually acquire?	Sale of Eucalyptus and Acacia timber
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	Associação Florestal do Lima could be engaged.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • Duration of flooding can delay access to sites by machinery low risk: • The prices for cutting and removal timber could increase. • Permissions of the Portuguese Environmental Agency will be necessary to cut trees in Hydric Public Domain of Estorãos River but the Implementation Partner is the current managers of the protected area so this will be coordinated among institutions. After implementation, invasive species might again sprout and regeneration from seed bank
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • Flooding
Which risks can be prevented and how?	The measure must be discussed with mapped stakeholders to identify unrecognised problems. There is a need to present the measure to all relevant national agencies to identify conflicting activities planned.

6. Plan time

Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential areas for control or remove invasives	X	X	X	X	X	X	X										
Site visit	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Identify relevant stakeholders and actors (e.g. for maintenance plan)	X	X	X	X													
Develop implementation and monitoring design	X	X	X	X	X	X											
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Preparation of accesses to remove the timber to be cut	X	X	X	X	X	X	X	X									
Engage timber company for debark of Acacia species					X	X	X	X									
Engage company for cutting and removal Eucalyptus spp. and Acacia spp.					X	X	X	X									
Control of the Eucalyptus stump shoots (and Acacia spp.)							X	X	X	X	X	X	X	X	X	X	X
Control invasive seedlings							X	X	X	X	X	X	X	X	X	X	X

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for control or remove invasives	1,400€	MERLIN budget
Site visit	2,500€	MERLIN budget
Identify relevant stakeholders and actors (e.g. for maintenance plan)	600€	MERLIN personnel budget
Develop implementation and monitoring design	5,000€	MERLIN budget
Monitoring (vegetation)	6,500€	MERLIN budget
Preparation of accesses to remove the timber to be cut	2,500€	MERLIN implementation budget
Engage timber company for debark of Acacia species	1,900€	MERLIN implementation budget
Engage company for cutting and removal Eucalyptus spp. and Acacia spp.	2,500€	MERLIN implementation budget
Control of the Eucalyptus stump shoots (and Acacia spp.)	1,750€	MERLIN implementation budget
Control invasive seedlings	4,500€	MERLIN implementation budget
SUM	**29,150 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for control or remove invasives		Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Site visit		Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, ...	
Identify relevant stakeholders and actors (e.g. for maintenance plan)	Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira	
Develop implementation and monitoring design	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Monitoring	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, Susana Pereira Arthur Cupertino	
Preparation of accesses to remove the timber to be cut	Francisco Lourenço Correia	Francisco Lourenço Correia, CMPTL workers	Preparation of a map (UAV flight)
Engage timber company for debark of Acacia species	Francisco Lourenço Correia		
Engage company for cutting and removal	Francisco Lourenço Correia	Francisco Lourenço Correia, Patricia Rodriguez	

Eucalyptus spp. and Acacia spp.		Gonzalez, Estêvão Portela-Pereira	
Control of the Eucalyptus stump shoots (and Acacia spp.)	Francisco Lourenço Correia	CMPTL workers, Volunteers,	
Control invasive seedlings of trees and herbaceous species spread	Francisco Lourenço Correia	CMPTL workers, Volunteers,	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	
Do you expect to see short-term or long-term impacts?	both

2. Measure	**M2. Passive restoration through cattle exclusion**
2.1. Site	**Mosaic of wet meadows and alluvial forest (site AP-APACRA)**

0. Detail the implementation measure

Measure:

One of the measures planned within MERLIN in the Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is passive restoration through cattle exclusion.

Site: AP-APACRA

Objective: Conciliate maintenance of wet meadows with natural regeneration of target riparian species to ensure genetic diversity and long-term sustainability of priority hygrophilous habitats.

Description: Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is characterised by mosaics of hygrophilous, swampy woods and wet meadows, but nowadays the maintenance of natural pastures is very difficult as pastoralism has been abandoned. Site AP-APACRA represents one of the areas in the Protected Landscape that are under agreements for this grazing to be maintained with the autochthonous breed of cows "Minhota". The agreements are done with APACRA (Association of producers of Minhota race), that are included in the Case study Board as a key stakeholder. However, with the weakened phytosanitary status of alder, due to the attack of the oomycete *Phythophtora* x*alni* (already confirmed in the area), alder populations are decreasing and the natural regeneration is compromised by herbivory, so it is important to protect the limited alder regeneration that still exists.

In this sense, it is intended to establish areas of local cattle exclusion through different type of fences, including individual target species seedlings protection until they are high enough, through nets so that the cows do not impede their growth or end up decimating the small specimens in these areas of mosaic of natural pasture and "tapadas" (hedges and small woods of habitats 91E0* and 91F0).

Protected plants of alder will be monitored; identification of new seedlings - with respect to GD Goals

1. Map the measure (site)/ Visualise the measure

See location map in section M1

Above: Location of Measure M2 (polygons in orange), M2. Passive restoration through cattle exclusion Site: AP-APACRA

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing		X
Zero pollution goals		
Sustainable food systems (F2F)	X	X
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy		
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	-
Did you obtain recommendations for optimization from your **case study board**? If so, which?	-
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	-
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	-
How can you optimise the **impact** of your measure?	-

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	-
What additional funding can you actually acquire?	-
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	CMPLworkers, Sapadores Florestais da AFL

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	low risk: • duration of flooding can delay access to sites • The prices of protection materials could increase.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • flooding
Which risks can be prevented and how?	-

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
Internal meetings to identify potential areas for passive restoration through cattle exclusion	X	X	X	X	X												
Site visit	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Identify relevant stakeholders and actors (e.g. for maintenance plan)	X	X	X	X													
Develop implementation and monitoring design	X	X	X	X	X	X											
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Detection and identification of Alnus specimens to apply individual protection						X	X	X	X	X	X	X	X	X	X	X	
Engage company/personal for apply individual protection						X	X	X	X	X	X	X	X	X	X	X	
Engage APACRA to establish the timing of placement of protections	X	X	X	X	X	X											

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for passive restoration through cattle exclusion	-	MERLIN personnel budget
Site visit	8,500€	MERLIN budget
Identify relevant stakeholders and actors (e.g. for maintenance plan)	-	MERLIN personnel budget
Develop implementation and monitoring design	4,500€	MERLIN budget
Monitoring (vegetation)	9,500€	MERLIN budget
Detection and identification of Alnus specimens to apply individual protection	1,800€	MERLIN implementation budget
Engage company/personal for apply individual protection	4,500€	MERLIN implementation budget
Engage APACRA to establish the timing of placement of protections	2,400€	MERLIN implementation budget
SUM	**31,200 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for passive restoration through cattle exclusion		Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, ...	
Site visit		Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Identify relevant stakeholders and actors (e.g. for maintenance plan)		Francisco Lourenço Correia, Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira	

Develop implementation and monitoring design	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Monitoring	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, Susana Pereira	
Detection and identification of Alnus specimens to apply individual protection	Francisco Lourenço Correia	Francisco Lourenço Correia, Estêvão Portela-Pereira,	Preparation of a map (UAV flight)
Engage company/personal for apply individual protection	Francisco Lourenço Correia	Francisco Lourenço Correia, CMPL workers	
Engage APACRA to establish the timing of placement of protections	Francisco Lourenço Correia	Francisco Lourenço Correia, APACRA	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	-
Do you expect to see short-term or long-term impacts?	both

3. Measure	**M3. Active restoration through planting keystone native species**
3.1. Site	**Estorãos river banks (LOU-Loureiro and RBA-Right bank sites)**

0. Detail the implementation measure

Measure:

One of the measures planned within MERLIN in the Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is active restoration through planting keystone native species.

Site: LOU-Loureiro and RBA-Right bank

Objective: complement measure M1 (removal and control of invasive species) to assist the regeneration of native species

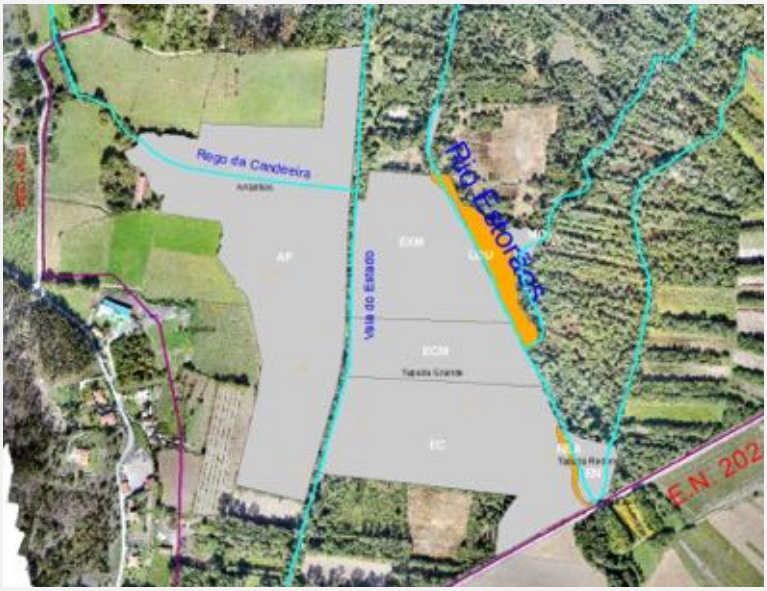
Description: Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is characterised by mosaics of hygrophilous, swampy woods and natural meadows, but in the past Eucalyptus plantations were made to help drain the land. Later, *Acacia melanoxylon* (and occasionally *Acacia dealbata*) invaded from upstream of the Estorãos river basin where they were planted. In the 20th century (1995), the Estorãos river was also intervened, and its bed was deepened in an attempt to reduce the silting of the bed and improve the drainage of the lands of the alluvial plain. This action led to the imbalance of the river slopes, which today suffer from erosion due to the artificial profile of the slopes, which are vertical. In some places (site RBA) the bed sediments were piled up on the banks forming dikes between the river channel and the floodplain. It is intended to locally renaturalise some aspects of the natural hydro-morphology of the river and its banks.

In site LOU it is intended to restore natural forests of habitats 91E0* and 91F0 through planting target native species or cuttings in areas that had denser exotic forests and on the banks of the Estorãos river that suffered some intervention.

Elimination of the dike upstream the bridges of National Road EN202 will involve the use of heavier machinery, but the intention is to remove the sediments that are piled up above the natural level of the floodplain, without intervening in the slope seasonally flooded by the waters. These sediments will be used to fill some artificial drainage ditches that remain in the EC-Purgueira site (just next to the dike), where in the LIFE Fluvial Project a large (at the local scale) Eucalyptus plantation was cut and dense Acacia grove were eliminated. These and other invasive species will continue to be controlled (M1).

1. Map the measure (site)/ Visualise the measure

See location map in M1



Above: Location of Measure M3 (polygons in orange), Active restoration through planting keystone native species. sites: LOU-Loureiro and RBA-Right bank

2. Integrate the Green Deal criteria

Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.

Green Deal criteria	Relevance in demo case (WP1)	Relevance in implementation case (WP2)
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing		X
Zero pollution goals		X
Sustainable food systems (F2F)		
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy		
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan

Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!

Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	-

Did you obtain recommendations for optimization from your **case study board**? If so, which?	-
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	Visit to field site conducted in December 2022 by Tomasz Okruzsko from Kampinos Case study allowed recommendations for the restoration in this study site, notably in the Loureiro Floodplain where the invasive species will be removed, in a second step, the reconnection of secondary channel in the floodplain of Estorãos river (left margin, see also M4) can be facilitated
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	-
How can you optimise the **impact** of your measure?	-

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	-
What additional funding can you actually acquire?	-
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	-

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	low risk: • duration of flooding can delay access to sites and actions in riverbanks • availability and survival of plants
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • flooding
Which risks can be prevented and how?	-

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential areas for active restoration through planting keystone native species					X	X	X										
Site visit	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Identify relevant stakeholders and actors (e.g. for maintenance plan)	X	X	X	X													
Develop implementation and monitoring design	X	X	X	X	X	X											
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Collection of seeds of native tree species to be introduced				X	X			X	X								
Collection of Salix cuttings					X	X			X	X							
Establishment of a nursery					X	X	X	X	X	X	X	X	X	X	X	X	
Establishment of the planting and cutting calendar					X	X	X										
Organise a workshop on bioengineering (to be decided according to task development in articulation with M1, M4)																	
Engage company/CMPL Backhoe loader								X									

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for active restoration through planting keystone native species	2,500€	MERLIN budget
Site visit	3,500€	MERLIN budget
Identify relevant stakeholders and actors (e.g. for maintenance plan)	-	MERLIN personnel budget
Develop implementation and monitoring design	4,500€	MERLIN budget
Monitoring	9,500€	MERLIN budget
Collection of seeds of native tree species to be introduced	300€	MERLIN implementation budget
Collection of Salix cuttings	500€	MERLIN implementation budget

Establishment of a nursery for seed plants	1,250€	MERLIN implementation budget
Establishment of the planting and cutting calendar	250€	MERLIN implementation budget
Organise a workshop on bioengineering Engage company/CMPL Backhoe loader	25,000€	MERLIN implementation budget MERLIN implementation budget
SUM	**47,300 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for active restoration through planting keystone native species		Patricia Rodríguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, ...	
Site visit		Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Identify relevant stakeholders and actors (e.g. for maintenance plan)		Francisco Lourenço Correia, Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira	
Develop implementation and monitoring design	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Monitoring	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, Susana Pereira	
Collection of seeds of native tree species to be introduced	Francisco Lourenço Correia	Francisco Lourenço Correia, Estêvão Portela-Pereira,	
Collection of Salix cuttings	Francisco Lourenço Correia	Francisco Lourenço Correia, CMPTL workers	
Establishment of a nursery for seed plants	Francisco Lourenço Correia	Francisco Lourenço Correia, CMPTL workers	
Establishment of the planting and cutting calendar	Francisco Lourenço Correia	Francisco Lourenço Correia, Estêvão Portela-Pereira, Patricia Rodriguez Gonzalez,	
Organise a workshop on natural engineering	Francisco Lourenço Correia, Patricia Rodriguez Gonzalez,	Francisco Lourenço Correia, Estêvão Portela-Pereira, Patricia Rodriguez Gonzalez,	
Engage company/CMPTL Backhoe loader	Francisco Lourenço Correia		

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	-
Do you expect to see short-term or long-term impacts?	both

4. Measure	**M4. Stakeholder agreements for rewetting and rewildening**
4.1. Site	**Floodplain of Estorãos river (EXM, ECM, EC and LOU sites)**

0. Detail the implementation measure

Measure:

One of the measures planned within MERLIN in the Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is stakeholder agreements for rewetting and rewildening.

Site: EXM-EXMERLIN, ECM-ECMERLIN, EC-Purgueira and LOU-Loureiro

Bertiandos and São Pedro d'Arcos Lagoons Regional Protected Landscape is characterised by mosaics of hygrophilous, swampy woods and natural meadows, but in the past *Eucalyptus* plantations were made to help drain the land. Later, *Acacia melanoxylon* (and occasionally *Acacia dealbata*) invaded from upstream of the Estorãos river basin where they were planted. In the 20th century (1995), the Estorãos river was also intervened, and its bed was deepened in an attempt to reduce the silting of the bed and improve the drainage of the lands of the alluvial plain. This action led to the imbalance of the river slopes, which today suffer from erosion due to the artificial profile of the slopes, which are vertical. In some places the bed sediments were piled up on the banks forming dikes between the river channel and the floodplain. It is intended to locally renaturalise some aspects of the natural hydro-morphology of the river and its banks and floodplain. These past interventions also stimulated the invasion of *Acacia melanoxylon* along the banks of the river, including some specimens of the even more dangerous and difficult species to control *Acacia dealbata*.

Includes parts of the EC-Purgueira site (municipal lands), and other upstream areas with a mix of landowners (EXM-MERLIN, ECM-MERLIN), where agreements are intended for the elimination of exotic species and subject to future follow-up control, as well as some specific actions that may be necessary to maintain a natural flow, as much as possible, in the Estorãos river, in this area where the banks suffer erosion.

Other actions involve promoting incipient secondary channels existing in the Estorãos floodplain (several sites including Loureiro site) to promote the recovery of the meandering style of this river. This action will be very localised and can be developed using a workshop on bioengineering in rivers, with the aim of demonstrating some bioengineering techniques to restore river banks.

1. Map the measure (site)/ Visualise the measure

Above: Location of Measure M4 (polygons in orange), M4. Stakeholder agreements for rewetting and rewildening sites: Floodplain of Estorãos river (EXM, ECM, EC and LOU sites)

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing		X
Zero pollution goals		X
Sustainable food systems (F2F)	X	X
Sustainable energy	X	X
Sustainable transport		
Inclusivity	X	X
Circular economy		X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	-
Did you obtain recommendations for optimization from your **case study board**? If so, which?	-
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	Visit to field site conducted in December 2022 by Tomasz Okruzsko from Kampinos Case study allowed recommendations for the restoration in this study site, notably in the Loureiro Floodplain where the invasive species will be removed, in a second step, the reconnection of secondary channel in the floodplain of Estorãos river (left margin) can be facilitated
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	-
How can you optimise the **impact** of your measure?	-

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	-
What additional funding can you actually acquire?	-
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	Associação Florestal do Lima could be engaged.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • Lack of agreement with landowners low risk: • Duration of flooding can delay access to sites and actions in riverbanks After implementation, invasive species might sprout and regeneration from seed bank.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • Flooding
Which risks can be prevented and how?	

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential areas for stakeholder agreements for rewetting and rewildening	X	X	X	X	X												
Site visit	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Identify relevant stakeholders and actors (e.g. for maintenance plan)	X	X	X	X													
Develop implementation and monitoring design	X	X	X	X	X	X											
Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engage volunteers' journeys or CMPL workers for debark of Acacia species							X	X	X	X	X	X	X	X	X	X	
Engage CMPL workers to cut died Acacia and some Eucalyptus									X	X	X	X	X	X	X	X	
Control invasive seedlings and herbaceous							X	X	X	X	X	X	X	X	X	X	X
Organise a workshop on bioengineering (to be decided according to task development in articulation with other measures)																	

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for stakeholder agreements for rewetting and rewildening	3,000€	MERLIN budget
Site visit	4,500€	MERLIN budget
Identify relevant stakeholders and actors (e.g. for maintenance plan)	-	MERLIN personnel budget
Develop implementation and monitoring design	4,500€	MERLIN budget
Monitoring (vegetation)	9,500€	MERLIN budget
Engage volunteers' journeys or CMPL workers for debark of Acacia species	2,750€	MERLIN implementation budget
Engage CMPL workers to cut died Acacia and some Eucalyptus	2,250€	MERLIN implementation budget

Control invasive seedlings	4,500€	MERLIN implementation budget
Internal meetings to identify potential areas for stakeholder agreements for rewetting and rewildening	3,750€	MERLIN implementation budget
SUM	**34,750 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for stakeholder agreements for rewetting and rewildening		Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, ...	
Site visit		Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Identify relevant stakeholders and actors (e.g. for maintenance plan)		Francisco Lourenço Correia, Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira	
Develop implementation and monitoring design	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	
Monitoring	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia	Patricia Rodriguez Gonzalez, Estêvão Portela-Pereira, Francisco Lourenço Correia, Susana Pereira	
Engage volunteers' journeys or CMPL workers for debark of Acacia species	Francisco Lourenço Correia	Francisco Lourenço Correia,	
Engage CMPL workers to cut died Acacia and some Eucalyptus	Francisco Lourenço Correia	Francisco Lourenço Correia, CMPTL workers	
Control invasive seedlings	Francisco Lourenço Correia	Francisco Lourenço Correia, CMPTL workers	
Organise a workshop on bioengineering	Francisco Lourenço Correia, Patricia Rodriguez Gonzalez,	Francisco Lourenço Correia, Estêvão Portela-Pereira, Patricia Rodriguez Gonzalez,	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	
Do you expect to see short-term or long-term impacts?	both

3.1.6 Case study 14 Komppasuo peat extraction area (Finland)

Case study name	**Komppasuo**
Person(s) completing this template	**Isra Alatalo (Tapio Oy, implementation partner)** Tapio: Forestry consultant SYKE: Suomen Ymparistokeskus (Finnish Environment Institute)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Our mid-term goal is that we have completed a large part of the restoration work. - establishment of wetlands - restoration of bog vegetation - afforestation - plant cover of the area should be over 50 % by the end of 2023. Important goal for us is that environmental permit can be revoked by the end of 2023. After that we can do more construction works. The restoration of 100 ha former peat extraction site will have been prepared: identification and commitment of the relevant stakeholders, mapping of the target site, drafting a detailed implementation plan, initiating monitoring, producing an IUCN self-assessment, application for the needed permissions and initiate tendering of contractors for the implementation of planned restoration actions.
Goals set for M 48 in the proposal	Re-wetting and afforestation of whole peat extraction area. Monitoring the effects of the measures taken.
Can you imagine further goals beyond MERLIN?	

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	Re-wetting (creation of wetlands and restoration of the bog vegetation) and afforestation of peat extraction area.
Is there a need to select/prioritise?	1) Re-wetting 2) Afforestation

1.1 Measure	**Re-wetting – wetlands**
Site	**Komppasuo**

1.1 Detail the implementation measure

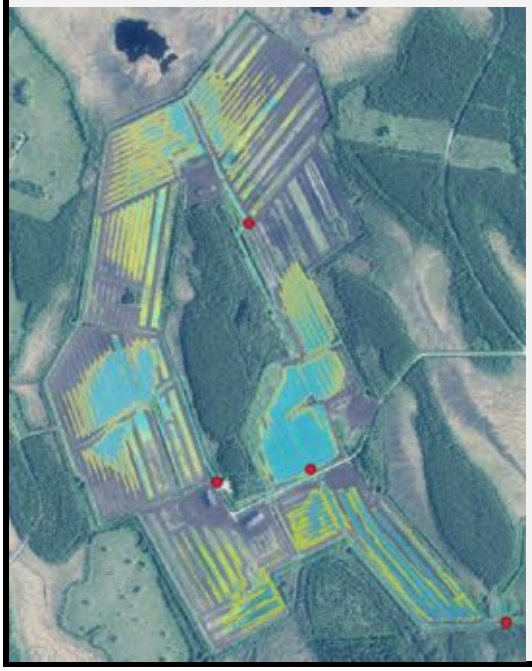
Measure: Three wetlands will be created by rising the water level in the areas (the size varies between five to ten hectares).

Site: Komppasuo offers good possibilities for creation of the wetlands. Water flows from north to the south-east where is the discharge ditch. Topography enables to raise water level in different areas.
Creation of wetlands:

- building of dams for the raising of water level
- blocking of drainage ditches
- sowing area that vegetation would grow before water lever rises
- spreading ash for the vegetation
- Returning of the waters from the outside of the old peat extraction area.

Re-wetting is carried out by blocking drainage ditches and building a few dams in them. Ash will be spread on bare peat surfaces because it'll bring necessary nutrients back. Our target is the return of vegetation as much as possible before re-wetting areas. Some areas which will be under the water after re-wetting will be sowed that vegetation would grow faster.

1.2 Map the measure (site)/ Visualise the measure



Wetlands: The map shows where the wetlands will be formed.

- red dot = location of dam
- blue area = water area after water rises
- yellow area = area which is wet after water rises

1.2 Measure	**Re-wetting – restoration of bog vegetation**
Site	**Komppasuo**

1.1 Detail the implementation measure

Measure: Restoration of bog vegetation

Site: Area is in the northern part of Komppasuo. It's next to bog which is in natural state.

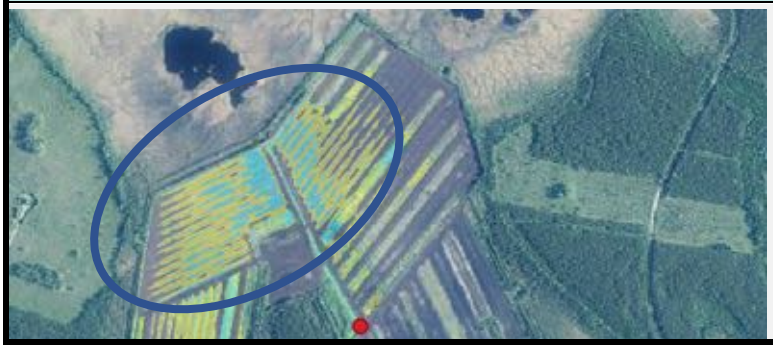
Restoration of bog vegetation:

- levelling of remaining peat layer
- dropping the surface level
- building of dam for the raising of water level
- blocking of ditches
- making of small pools
- collecting of bog vegetation
- spreading of bog vegetation

Bog vegetation is spread in the northern part to help it spread back in the area. Vegetation is collected from the badly dried out bog area. The water level will be raised by the dam being built and by blocking the ditches. The old structure of the peat production field must be levelled. The surface level must also be lowered in part of the area.

We also think that we could make small pools in the northern part that imitate the natural structure of the bog. At the same time, these provide habitats, e.g. to the birds.

1.2 Map the measure (site)/ Visualise the measure



Restoration of bog vegetation is inside of the ring.

- Red dot = location of dam

1.3. Measure	**Afforestation**
Site	**Komppasuo**

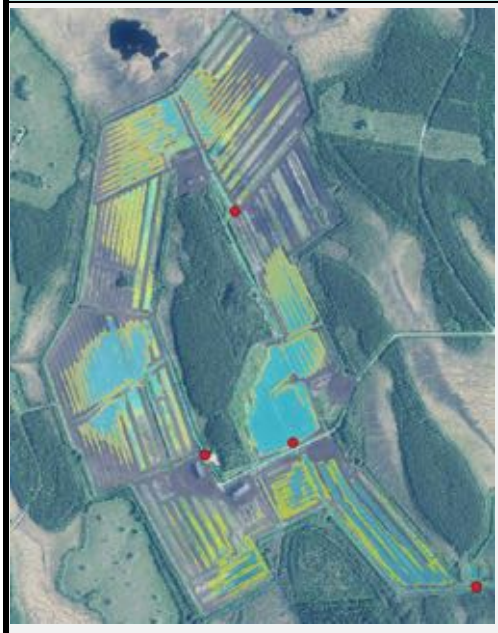
2.1 Detail the implementation measure

Measure: Afforestation of the dry areas of the Komppasuo.

Site: Parts of the Komppasuo where re-wetting isn't possible will be afforested.

We'll do the ash fertilization which will return nutrients back to the cut away peatland. After that, Scots pine will be sowed to the dry areas for the afforestation. Fertilization also enables downy birches to spread in the area.

2.2 Map the measure (site)/ Visualise the measure



Areas which aren't blue or yellow in the map will be afforested.

Starting point before afforestation.

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain		X
Climate regulation		X
Flood resilience		X
Drought resilience		X
Health and wellbeing		X
Zero pollution goals		X
Sustainable food systems (F2F)		
Sustainable energy		
Sustainable transport		
Inclusivity		X
Circular economy		
Financing the transition		
Green growth		

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Creating wetlands and restoring bog vegetation gives us best chance to get positive effects to biodiversity and water quality and greenhouse gases. Main weakness is that there is trade-off between water and climate regulation, a high groundwater table is good for water regulation but may increase carbon emissions. Afforested areas will be carbon sinks after few decades, but peat layer is still source of carbon. Perceived threat is related to water table level. It effects all the measures at Komppasuo: how well wetland will be formed, how well peatland vegetation survives, how well will trees grow.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Restoring bog vegetation to bog bottoms is a new activity in Finland. From CSB we have got many good ideas and sources where to look for information. Many issues have been discussed in CSB regarding the creation of wetlands. How do I optimise the wetland for waterfowl? How to prevent solids loading? How to make the area vegetate quickly? There has not been as much discussion about afforestation as about other land uses. This is due to the fact that the afforestation of cut away peatlands is quite known in Finland.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	-
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	Knowing and adjusting the water level is the basis of everything to do with the cut away peatlands. We have used recent laser scanning data from the area. Based on this, we created a digital elevation model (DEM) of the area. Based on the DEM, a flow network can be created from the area and the locations and extents of the wetlands can be optimised. Also, the locations of dams, areas that remain dry, and the possibilities for diverting external water to the area can be preliminarily defined.
How can you optimise the **impact** of your measure?	The most important things are that the topography and hydrology of the area must be known. The DEM must be up-to-date.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	In addition to MERLIN, the implementation is financed by the Ministry of Agriculture and Forestry of Finland.
What additional funding can you actually acquire?	-
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	-

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	Re-wetting: - Too wet weather → If peat layer is too wet it can't hold machines. After that construction works can't be done as planned. (Low) - Frost comes too early that levelling and dropping surface layer can't be done as planned. (This happened → works continued after winter) - Drought → Re-established bog vegetation can die if water level is too low. (med) Afforestation: - Too warm winter → Ash fertilization can't be done because field doesn't hold machines. (low)
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	Too wet weather for construction works – low risk Drought – medium risk Too warm winter – medium risk Finding suitable material - low risk
Which risks can be prevented and how?	To the weather we can't do anything, but of course we have to think that when is the next possible time to do construction works or ash spreading if weather doesn't allow to do it on first attempt.

6. Plan time																
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Field visits	X		X	X	X		X	X	X		X	X	X		X	X	
Dam design				X													
Dam building							X										
Ash fertilization					X	X											
Sowing of Scots pine							X										
Sowing of wetlands							X										
Bog vegetation to northern area					X		X										
Monitoring: greenhouse gases			X	X	X		X	X	X		X	X	X		X	X	
Monitoring: water quality			X	X	X		X	X	X		X	X	X		X	X	
Monitoring: peat samples			X														
Monitoring: biodiversity			X	X	X		X	X	X		X	X	X		X	X	
Restoration of water treatment area										X							

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Field visits	-	MERLIN personnel budget
Land construction	35,000	MERLIN implementation budget
Ash fertilization	35,000	MERLIN implementation budget
Sowing Scots pine	15,000	MERLIN implementation budget
Other sowing	9,000	MERLIN implementation budget
Restoration of bog vegetation	35,000	MERLIN implementation budget
Dam plans	9,000	MERLIN implementation budget
Restoration of water treatment area	10,000	MERLIN implementation budget
Maintenance during winter (roads etc.)	5,000	MERLIN implementation budget
Building of duckboards	30,000	MERLIN implementation budget
Monitoring: Greenhous gas	59,000	MERLIN implementation budget
Monitoring: Biodiversity	12,000	MERLIN personnel budget + implementation budget
Monitoring: Water quality	170,000	MERLIN personnel + implementation budget
Monitoring: Peat samples	5,000	MERLIN personnel budget + implementation budget
Further restoration	200,000	MERLIN implementation budget
SUM	**ca. 600,000 € (costs estimated)**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Land construction	Tapio		
Ash fertilization	Tapio	Stora Enso	
Sowing Scots pine	Tapio	Stora Enso	
Other sowing	Tapio	not decided	
Restoration of bog vegetation	Tapio	Metsähallitus (Owns bog areas near Komppasuo, from which bog vegetation could be moved to the area.)	
Dam plans	Tapio	Neova (landowner and also makes dam plans)	
Restoration of water treatment area	Tapio	Metsähallitus (Landowner)	
Monitoring: Greenhous gas	SYKE	University of Helsinki (makes the measurements)	
Monitoring: Biodiversity	SYKE		
Monitoring: Water quality	SYKE		
Monitoring: Peat samples	SYKE		

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Water quality: suspended solids, nitrogen, phosphorus, pH, discharge Biodiversity: vegetation (species and plant cover), bird species monitoring Greenhous gases: carbon dioxide and methane
Do you expect to see short-term or long-term impacts?	both

3.1.7 Case study 17 Forth (UK Scotland)

Case study name	**Forth– Peatland restoration**
Person(s) completing this template	**Iain Sime (NatSc)** NatSc: Scottish Natural Heritage UKCEH: UK Centre For Ecology & Hydrology USTIR: University of Stirling

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	50 ha of peatland will be restored delivering associated benefits to freshwater and wetland biodiversity, reduced greenhouse gas emissions and C sequestration. It is envisaged that this will take place at Knoxfauld, a peatland identified near (within 3 km) of the Allan Water (restoration site for small streams element). The scoping work for this restoration will be complete, with restoration work potentially underway. Restoration will also commence, funded by PeatlandACTION, at Hare Moss, and subject to considerable monitoring.
Goals set for M 48 in the proposal	Restore at least 150 ha of bog peatland. Further sites to be identified for restoration up to M24 of the project
Can you imagine further goals beyond MERLIN?	PeatlandACTION is undertaking considerable restoration in Scotland and the Forth catchment. There are further goals in the MERLIN case study area, that will be implemented by the Forth Peatland Programme, which MERLIN is supporting at present and will be implemented beyond the MERLIN project.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• Blocking of historic drainage ditches through peatland • Blocking of ditches using peat dams • Blocking of ditches using piling • Reprofiling of exposed peat (if needed) • Forest to bog restoration (on subsequent restoration sites).
Is there a need to select/prioritise?	Feasibility work will be completed prior to physical restoration works, to establish and confirm appropriate restoration techniques, and scale of work (and budget) required. This will work will select and prioritise the restoration measures.

1. Measure	**Peatland Restoration**
1.1. Site	**Knoxfauld Moor, near Braco, Perth & Kinross**

0. Detail the implementation measure

Measure:
Initial feasibility study to be completed to confirm extent of drainage ditches and scale of measures needed to complete restoration. Blocking of drainage ditches, to raise water table and rewet degraded peatland, allowing long term recovery. Areas of any exposed peat hags will be reprofiled to reduce peat erosion. Potential conifer trees, reseeding from surrounding forestry will be removed during restoration to improve long term measures.

Site:
Knoxfauld – Landowner has already expressed willingness to support restoration. The site offers the potential for up to 100 ha of peatland to be put on the road to restoration.

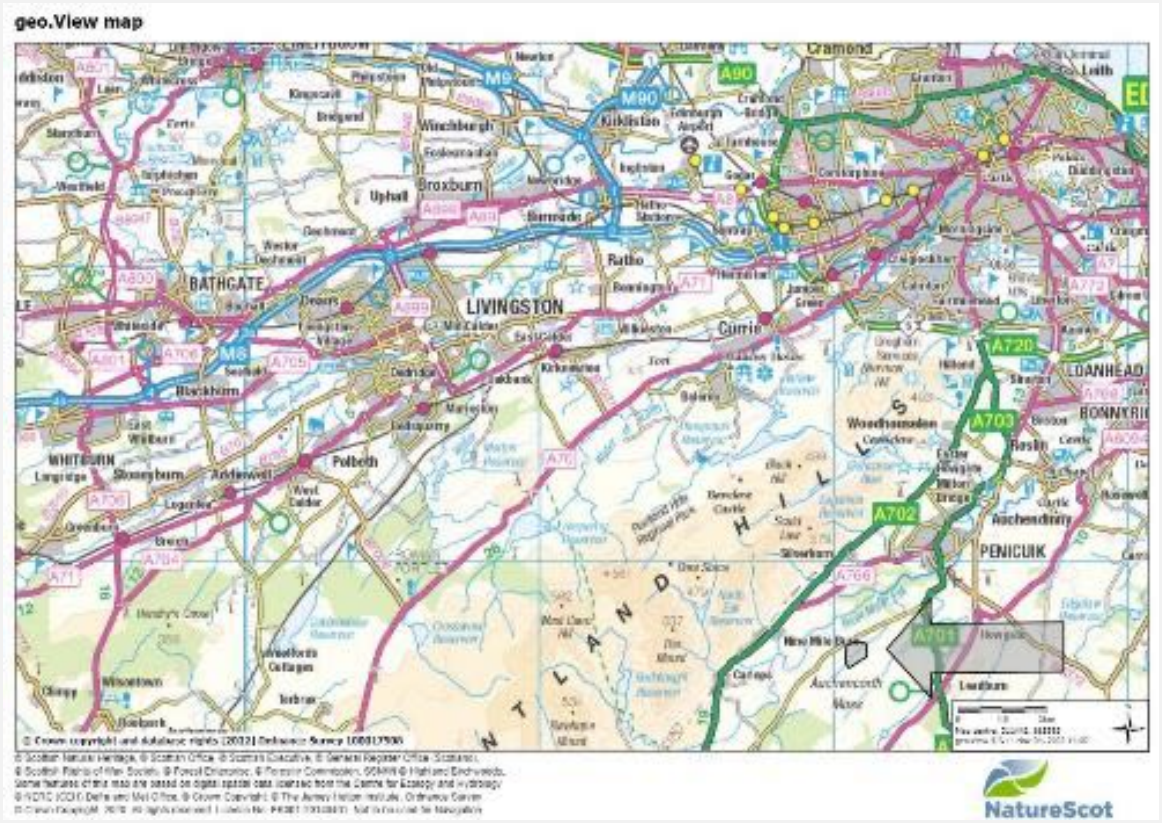
Ditch blocking will be completed using peat dams and/or piling depending on local conditions, particularly slope and existing extent of drainage, and determined during feasibility study, prior to restoration works.

1. Map the measure (site)/ Visualise the measure

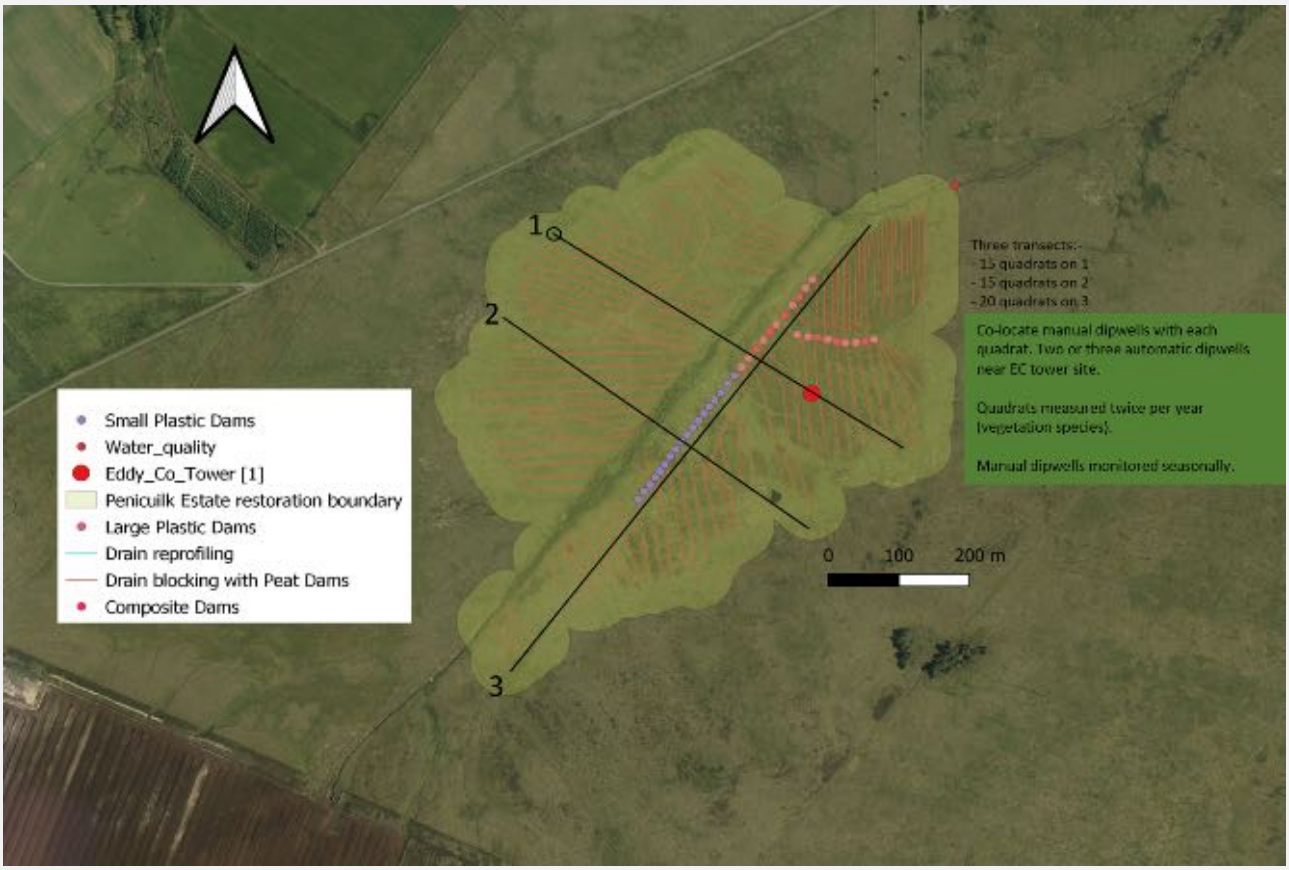
Allan Water catchment

site map

site map of Hare Moss in the Forth catchment



Planned restoration works at Hare Moss peatland.



2. Integrate the Green Deal criteria

Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.

Green Deal criteria	Relevance in demo case (WP1)	Relevance in implementation case (WP2)
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing		
Zero pollution goals	X	X
Sustainable food systems (F2F)		
Sustainable energy		
Sustainable transport		
Inclusivity	X	
Circular economy	X	X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Forth case study, with both peatland and river restoration, offers potential to optimise synergies between restoration sites (if co-located or in same sub-catchment). The Knoxfauld peatland restoration site is located in the same catchment as the proposed works for the small streams implementation plan, so has become a focus to achieve this due to the unique potential to have input on the restoration of both landscape features. A gap, to date, are further restoration sites across the Forth catchment which are still to be identified and confirmed.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Proposals for peatland restoration have been discussed at the Forth Peatland Programme board and the Knoxfauld site confirmed as the most appropriate by the board, due to proximity to small streams restoration site and willing land owner. The board also recommended optimisation by establishing indicator monitoring at another peatland restoration site (implementation of measures not funded by MERLIN) within the Forth catchment (Hare Moss), with monitoring commencing by UKCEH.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No recommendations for optimisation were obtained.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	The implementation process will be optimised by building on experience in peatland restoration, using an established process of feasibility works informing practical implementation. The works will be scaled up, potentially to a further site to the north and/or to other locations across the catchment, and monitoring with non-MERLIN restoration to maximise measurement and benefits to biodiversity net gain, climate regulation and drought resilience.
How can you optimise the **impact** of your measure?	Effectively work with the monitoring partners to share site knowledge and combine efforts to deliver works that achieve targets and can be monitored in the most valuable ways possible. The impact can also be optimised by the monitoring being part of wider Forth-ERA and PeatlandACTION funded monitoring across the Forth case study. In particular UKCEH have been very successful in securing funding to undertake BACI monitoring at a peatland restoration site (Hare Moss) being undertaken by PeatlandACTION within the Forth catchment, and pair the site with their adjacent long-term monitoring site (Auchencorth), which will optimise monitoring of peatland restoration.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	There is considerable additional funding to support both monitoring and upscaling of restoration. For monitoring, the Forth-ERA initiative is providing additional resource to support monitoring of peatland restoration. More widely, PeatlandACTION is able to provide considerable additional public funding for peatland restoration in Scotland, incl. Forth catchment. Private funding, via accreditation to the Peatland Code, is also available to support restoration.
What additional funding can you actually acquire?	Stakeholders with our case study board manage PeatlandACTION funding to support monitoring and are able to utilise the same funding to undertake restoration. The scale of additional future funding cannot be quantified as it is competitive, but £250m will be available between 2020 and 2030.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	To date it has not been necessary to mobilise in-kind contributions as public funding via PeatlandACTION is able to provide 100% of costs although there may be opportunities for in kind contributions for some supporting elements, not always funded by public sources (e.g. publicity).

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • Landowner may change decisions about works that can take place on their land, as they have their own set of motivations for allowing works to take place. This is a particular issue for peatland restoration at present, with many landowners delaying the opportunity to use project or public funds to pay for capital works until they have secured accreditation for long term private, Peatland code investment. This has significantly hindered the identification of restoration sites in year 1 of MERLIN. • The relationship between NatureScot and the Forth Rivers Trust requires further embedding to ensure smooth running of the remainder of the MERLIN project. • Further delays to peatland restoration would hinder the implementation of monitoring measures on MERLIN implementation sites. Low risk • Reseeding of conifers onto peatland restoration sites may reverse some of the benefits and requires longer term maintenance • Insufficient contractors and skilled practitioners to undertake peatland restoration on schedule, although stakeholders have good relationship with local contractors. • Potential breakdown in relations with other landowners prevents upscaling of measures as planned. • Adverse weather including high rainfall, particularly during restoration, hinders implementation of peatland restoration.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • Landowner may change decisions about the timing or openness to peatland restoration. • Adverse weather is likely at some point during restoration process, particularly as ditch blocking often takes place outside bird breeding season. Low probability • Delays to identify restoration site are a low probability due to good working relations with landowner by Forth Rivers Trust. • Insufficient contractor base – although a national issue for peatland restoration in Scotland, it is not considered high probability for the Forth. • Good working relations are continuing between project partners with a new lead in NatureScot providing greater capacity. • Relations with wider landowners are likely to remain good, with peatland restoration (and its public benefits) having a relatively high profile.
Which risks can be prevented and how?	Risks can be mitigated, rather than prevented • Through established stakeholder groups, particularly our case study group, maintain and foster good working relations and feedback to landowners. At Hare Moss, a contract with PeatlandACTION has already been signed, with restoration due to take place during mid-late 2023. • Mitigate the potential impact of bad weather and high rainfall by providing contingency within the timescale and budget for restoration.

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Meetings to identify potential areas for restoration	X	X	X	X	X	X	X	X	X								
Site visits	X	X	X	X	X	X			X	X							
Engage with relevant stakeholders – landowners, local communities			X	X	X	X	X	X									
Develop implementation and monitoring design				X	X												
Monitoring (vegetation, C and water level/quality)					X	X	X	X	X	X	X	X	X	X			
Installation of, and monitoring at, Hare Moss					X	X	X	X	X	X	X	X	X				
Feasibility works					X	X											
Restoration works						X	X	X	X	X	X	X	X	X			
Reporting															X	X	

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Development, feasibility, stakeholder engagement, delivery (Staff Time)	**Prep + meeting time – Internal Meetings:** Staff day – 3 - £1050 Staff mileage - £80 **Prep + meeting time – Site Visits:** Staff day – 6 - £2100 **Public engagement day:** Staff day – 3 - £1050 Staff mileage - £80 **Landowner visit:** Staff day – 3 - £1050 Staff mileage - £80 **Internal meetings to identify sites:** Staff day – 1.5 - £525 **Implementation** **Planning with stakeholders:** Staff day – 1.5 - £525 **Site visits:** Staff day – 3 - £1050 Staff mileage - £80 **Liaising with landowner + GO's + NGO's:** Staff day – 1.5 - £525 **Procurement:** Staff day – 1.5 - £525	MERLIN implementation budget

	On-site Delivery: Engage landowner for preparation of the area Engage contractor for works to be undertaken Management and overseeing of the project on the ground Landowner engagement throughout course of the project including "field fitting" Staff day – 20 - £7000 Staff mileage - £500 ECoW Works (Blackford) 3 Days – £1050 Staff mileage - £80 **Total Mileage (inc. monitoring):** £1840	
Delivery (Contractor)	Excavator (Greenloaning) - £40,000 Excavator (Blackford) – £25,000 Site Engineer – 6 days - £2100	MERLIN Implementation budget
Delivery (Materials + additional costs)	Leaky dams/Large woody material (Greenloaning) – 20,000 20 Leaky Dams (Blackford) - £2500 Vehicle Hire: 10 days - £850	MERLIN Implementation budget
Monitoring (vegetation and zoology) (Staff time)	**Wader surveys, vegetation survey, site walkover, otter + mammal surveys, ecological reporting:** Staff day – 6 - £2100 Staff mileage - £160	MERLIN implementation budget
Reporting, Finances and Post-project Engagement (Staff time)	Staff Day – 10 £3500 Staff Mileage 3 days - £80	MERLIN implementation budget
Sum	**£113,640 / ~ 129,313 €** **+25% overhead + travel & sustenance:** **~ 254,998 €**	
Additional Implementation Works 2023/24 – Forth River Restoration	~ £160,000 € (~ 182,000 €)	MERLIN Implementation budget

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for restoration/ reconnection	Ewan Lawrie	Sandra Stewart, Niall Proven	
Site visit	Sandra Stewart	Ewan Lawrie	
Engage with relevant stakeholders	Sandra Stewart	Niall Provan	
Develop implementation and monitoring design	Justyna Olszewska, Amy Pickard	Other CEH staff	
Monitoring at Knoxfauld	Justyna Olszewska, Amy Pickard	Other CEH staff	
Monitoring at Hare Moss	Justyna Olszewska, Amy Pickard	Other CEH staff	

Peatland feasibility	Ewan Lawrie	Sandra Stewart	Potential use of contractors, following practice of PeatlandACTION
Restoration works	Ewan Lawrie	Sandra Stewart, landowner, works contractors, NatureScot procurement staff, other FRT staff as appropriate to assist with delivery/inspection	
Reporting, finances	Ewan Lawrie	FRT Senior project officer, FRT finance staff as required	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Biodiversity net gain - Indicator: Species richness and diversity of native flora; Climate regulation - Indicator: Greenhouse gas emission, water quality; Flood resilience - Indicator: additional water storage capacity in peatland; Drought resilience – Indicator: increase in surface water level in peatland; Zero pollution – Indicator: surface water chemical status, nutrient concentrations (phosphorus and nitrogen), dissolved and total organic carbon (potential in downstream river site); Inclusive participation and governance - Indicator: number of visitors to project website. This can potentially be estimated using the FRT Website, as well as recording of engagement and reach from content posted on social media platforms.
Do you expect to see short-term or long-term impacts?	As implementation partners we would expect to see both – short-term changes will result in a greater retention of water in the peatland following ditch blocking. These changes will develop further in the longer term, leading to changes in vegetation (particularly increase in *Sphagnum* presence and diversity) and overall biodiversity of the site. Restoration of high-water table, and resulting increase in water storage potential, is also expected to lead to both, short-term and long-term changes in greenhouse gas emissions.

3.2 Cases per cluster small streams and basins

3.2.1 Case study 2 Deba River – Basque country (Spain)

Case study name	**Basque Country**
Person(s) completing this template	**Miriam Colls (UPVEHU)** UPVEHU: Universidad Del Pais Vasco/Euskal Herriko Unibertsitatea (University of the Basque Country) DFG: Gipuzkoako Foru Aldundia (Gipuzkoa Provincial Council)

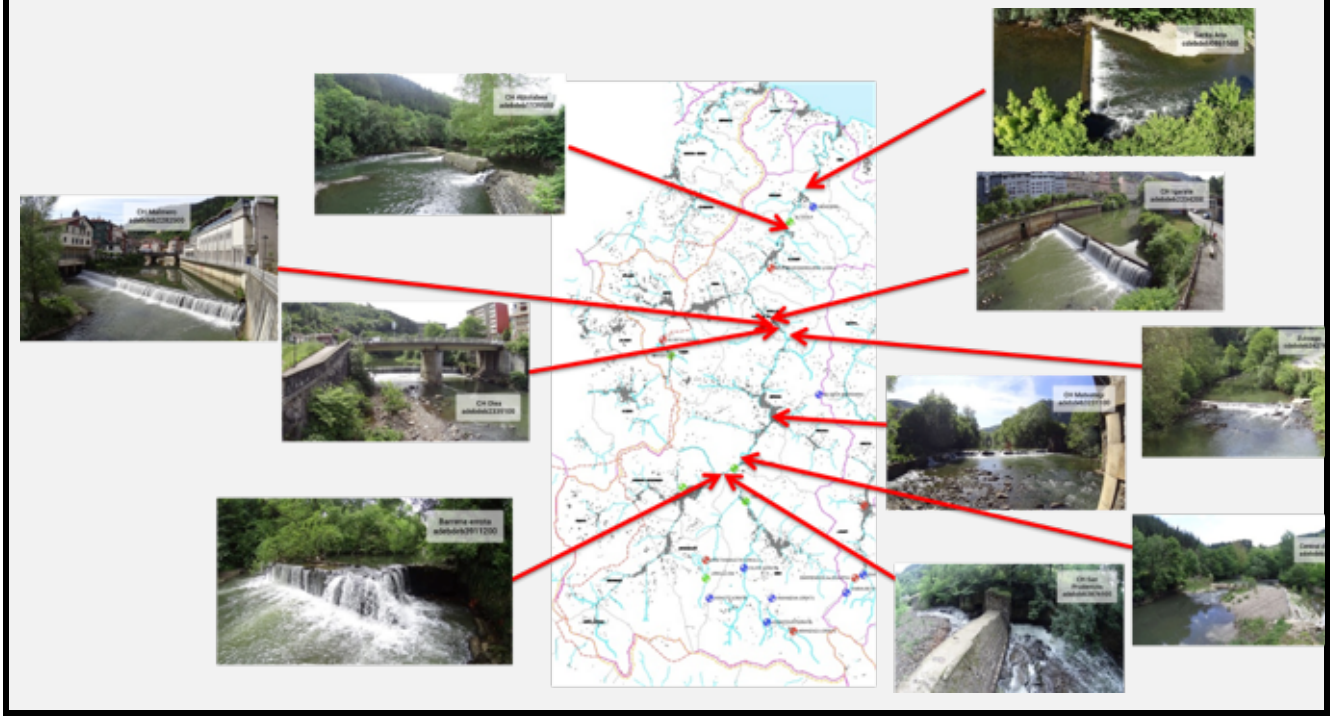
MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	The technical solution(s) for the removal of the dams will be adopted base on technical studies. Five of the ten dams to be removed will have been removed. Together with the Gipuzkoa Provincial Council, workshops and talks will be held to help spread the importance of river restoration in the society.
Goals set for M 48 in the proposal	The restoration of the longitudinal connectivity of Deba River due to the removal of ten of the dams present along their course.
Can you imagine further goals beyond MERLIN?	Continue to improve the connectivity and ecological status of river ecosystems through dams and weirs removal with the joint collaboration of the scientific and implementation (public stakeholder in charge of river ecosystem management in Gipuzkoa) partner.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• Re-establishment of river longitudinal connectivity (along Deba River) • Participatory river maintenance, e.g., Citizen Science
Is there a need to select/prioritise?	1. Re-establishment of river longitudinal connectivity of Deba River 2. Participatory river maintenance, e.g., Citizen Science

1. Measure	**Re-establishment of river longitudinal connectivity**
1.1. Site	**Deba river**

0. Detail the implementation measure
Measure: Deba River restoration planned within MERLIN is a river restoration action that consist in the removal of 10 dams situated along the main course of Deba River. Site: Longitudinal connectivity re-establishment include the removal of 10 dams.

1. Map the measure (site)/ Visualise the measure



2. Integrate the Green Deal criteria

Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.

Green Deal criteria	Relevance in demo case (WP1)	Relevance in implementation case (WP2)
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience		
Health and wellbeing	X	X

Zero pollution goals	X	X
Sustainable food systems (F2F)		
Sustainable energy		
Sustainable transport	X	X
Inclusivity	X	X
Circular economy		
Financing the transition		
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Yes. The Deba River basin is suffering a lot of impacts, not only from the dams but also from the anthropogenic activities within the basin. Hence, we are working in a multiple stress system. We have to improve the relationship with reticent citizens to dam removal basin on this concept, since after the MERLIN restoration Deba will continue suffering other impacts. The role of citizens is key to continue investing and working to improve this ecosystem. Therefore, we must try to work in the same direction. Understanding, at the same time, the nature of the ecosystem.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	No
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	One of the first obstacles we encountered is a lack of trust, on the part of citizens who are reluctant to believe that dams are really part of the problem. This will be done by informing through different channels (press, radio, etc.) about the effects of dams, e.g. on biodiversity, floods, insurance sector... With this action we hope to help raise awareness that dams are really a problem.
How can you optimise the **impact** of your measure?	Also acting on other stressors

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	During the MERLIN project, the Gipuzkoa Provincial Council budget represent a potential source of additional public funding. Private companies already stablished in the basin (e.g., clothing factories) represent a potential source of private funding.

What additional funding can you actually acquire?	Public funding from the Gipuzkoa Provincial Council and potentially private once.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	-

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • The main risk of the restoration is related to the presence of other anthropogenic impacts in the area, which may reduce the expected improvements (i.e., Deba river is a multiple stressed system). Low risk: • The short time-frame of the MERLIN project and the balance between be inclusive and execute the restoration action. • The prioritization of other issues before restoration actions because nature conservation usually loses priority under "emergency" situations (COVID, financial crises or Ukraine war).
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • The reduction of expected improvement due to the presence of other stressors within the basin. • The short time-frame of the MERLIN project is highly probable since the project period is already determined. • Prioritization of other issues, not natural capital prioritization, under "emergency" situations.
Which risks can be prevented and how?	The short term of the MERLIN project can be avoided through the approval of protection plans and laws, as well as by applying the knowledge acquired throughout MERLIN in future restoration actions. Given that the Provincial Council of Gipuzkoa is the implementing partner of CS2, these actions are highly probable. Moreover, the impact of "emergency" situations on CS2 restoration actions can be easily managed as no additional funding is required to implement restoration actions and, in case it is needed, the public manager of the river ecosystem in Gipuzkoa (Provincial Council of Gipuzkoa) could add external budgets.

6. Plan time

Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Site visit	X		X		X		X		X		X		X		X		
Internal meeting to identify potential issues, discuss working plan, etc.	X																
Identify relevant stakeholders and actors		X															
Develop implementation and monitoring design		X															
Monitoring	X		X		X		X		X		X		X		X		X

Talks and workshops with strategic stakeholders			X													
Talks and workshops with local stakeholders			X			X			X			X			X		
Dam removal			X				X				X						
Data analysis						X	X			X	X			X	X		
Data interpretation								X	X			X	X			X	

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Dam removal	711,000 €	MERLIN implementation budget
Field visits	30,000 €	MERLIN implementation budget
Meetings	30,000 €	MERLIN implementation budget
Others	25,000 €	MERLIN implementation budget
SUM	**796,000 €**	
Meetings	4,500 €	MERLIN travel budget
Field visits	4,500 €	MERLIN travel budget
Monitoring	3,000 €	MERLIN consumable budget
SUM	**808,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings	Arturo Elosegi	Arturo Elosegi Iñaki Bañares Miriam Colls	-
Site visit	Arturo Elosegi Iñaki Bañares Miriam Colls	Arturo Elosegi Iñaki Bañares Miriam Colls	-
Monitoring	Arturo Elosegi Miriam Colls	Arturo Elosegi Iñaki Bañares Miriam Colls	-
Dam removal	Iñki Bañares	Arturo Elosegi Iñaki Bañares Miriam Colls	-

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure

Which indicators will you monitor to assess the impact of your measure?	Biodiversity net gain: • Length of free-flowing river by means of drone flight • Ecological Status of Deba River: degree to which species composition (fish, macroinvertebrates, and biofilm) and ecosystem functions (nutrient uptake, decomposition, and metabolism) in Deba River after the restoration correspond to the control and differ from the before composition. The Gipuzkoa provincial council have a monitoring network where periodically take samples of fish and macroinvertebrates. Additionally, gauging stations throughout the basin continuously measured dissolved oxygen. These data could be used as a secondary data. Climate regulation: • River metabolism: Production-Respiration balance, using deployed dataloggers and gauging stations • GHG emissions: GHG measurements (CH4 and CO2) Flood resilience: • Area of restored river (ha) by means of drone flight. • Flood models: Base on flood models we will extract the return period for 10, 20, 50... years and all the related information. Health and wellbeing: • Changes in the number of people using green roads within and connected to the restoration area: base on eco-counters present in the area we have information about the green roads flow • Faecal bacteria: presence of faecal bacteria in the stream water (e.g., E. Coli) and relationship with hydro-morphological changes Zero pollution goals: • Surface water chemical status, nutrients concentrations, organic carbon pollution, chemical and biological oxygen demand (COD and BOD), salt loading, conductivity, chemicals concentration, bacterial load and hygienic pollution. The Gipuzkoa Provincial Council periodically measure all these variables from all the basins of Gipuzkoa (monitoring network). Consequently, we have historic data (approx. 30 years). Inclusivity: • Public active Involvement: We are organizing workshop with the local and strategic stakeholders to improve the perception and reasoning of dam removal benefits Financing the transition: • Private finance mobilised and new financial products or solutions implemented in the case study: throughout the whole project strategic stakeholders and public administrations will communicate to us the private financing and implemented solutions in the case study area. Green Growth: • Carbon sequestration: Monetary value of the amount of carbon sequestered annually in the ecosystem, ton C/year converted to € based on EU ETS carbon price.

Do you expect to see short-term or long-term impacts?	Some indicators will respond faster than others (i.e., short vs. long-term).
	Short term:
	• Biodiversity net gain:
	  ○ Length of free-flowing river
	• Flood resilience:
	  ○ Area of restored river (ha)
	• Zero pollution goals:
	  ○ Some physico-chemical parameters will respond at short-term
	Long term:
	• Biodiversity net gain:
	  ○ Ecological status of Deba River
	• Climate regulation:
	  ○ River metabolism
	  ○ GHG emissions

	• Health and wellbeing:
	  ○ Num. of people using green roads
	  ○ Faecal bacteria
	• Zero pollution goals:
	  ○ Physico-chemical parameters
	• Inclusivity
	• Financing the transition
	• Green growth

3.2.2 Case study 11 Emscher (Germany)

Case study name	**Emscher**
Person(s) completing this template	**Svenja Karnatz (EGLV), Nadine Gerner (EGLV), Mario Sommerhäuser (EGLV), Daniel Hering (UDE), Sebastian Birk (UDE), Andrea Schneider (UDE)** EGLV: Emschergenossenschaft Lippeverband UDE: Universitaet Duisburg-Essen (University of Duisburg-Essen)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Technical solution(s) for mowing high flowering meadows and collecting and using the cutting material along dykes will be in the pilot testing phase. The establishment of flowering meadows on dykes along the Emscher and its tributaries will have started. Together with EGLV's collaboration partner NABU (an NGO) changes in national regulations and laws will have been suggested to leverage synergies between river restoration and nature protection. In parallel, action plans and guidance for participatory river maintenance and biodiversity enhancement programs (involving citizens, rangers, NGOs etc.) will be developed and ready to be put in practice.
Goals set for M 48 in the proposal	Establishment of flowering meadows along dykes, synergies between river restoration and nature protection, participatory river maintenance (approx. 100 ha).
Can you imagine further goals beyond MERLIN?	Continue implementing flowering meadows at as many sites as possible at dykes, near to rivers, and in the remaining area. Apply the "temporary nature" concept to all areas without current land use to enhance nature protection. Use the citizen science approach to gather data and thus to involve people into monitoring and maintenance tasks. Have an efficient, participatory and economically viable implementation process in place.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• Establishment of flowering meadows (with several sites) • Synergies between river restoration and nature protection (with several sites) • Participatory river maintenance e.g. Citizen science (with several sites and activities)
Is there a need to select/prioritise?	• Establishment of flowering meadows .1. Reuse of cutting material .2. Change of maintenance/extensification .2.1. Site: Wastewater treatment plant Lower Emscher (KLEM) .2.2. Site: Adenauerallee .2.3. Site: Nordsternpark .3. Sowing new flowering meadows

	• Synergies between river restoration and nature protection: "temporary nature" • Participatory river maintenance: Citizen science project

1. Measure	**Establishment of flowering meadows**
1.1.	**Reuse of cutting material**

0. Detail the implementation measure

One of the measures planned within MERLIN in the Emscher basin is to increase extensive meadow maintenance on areas belonging to Emschergenossenschaft. The meadows on dykes, on water management facilities like waste water treatment plants or on pumping stations are mostly intensively maintained which includes mowing up to 6 times per year. In order to increase the biodiversity not only in streams (aquatic) but also on the areas adjacent to the water bodies (terrestrial), a change in maintenance of these meadows must take place. Therefore, it is recommended to mow twice a year and remove the cutting material. The biggest challenge is the process changeover: more and different maintenance steps are needed; the cutting material has to be removed and transported and additional disposal costs of the composting plants incur. The general assumption is that the cost of disposal of the cutting material is the main reason for the additional total cost due to the change of maintenance. Finding solutions for the reuse of the cutting material, e.g. for biogas production or pyrolysis, should be considered from an economic point of view.

This Implementation measure focusses on researching possibilities for the utilization of the cutting material and how these can be established cost-effectively in the long term within the maintenance concept of EGLV. The main focus will be on co-digestion in the digestion towers of the wastewater treatment plant but also other possibilities like pyrolysis should be considered. The result of this implementation measure should lead to a feasibility study which refers to all of the questions above.

1. Map the measure (site)/ Visualise the measure

The measure covers the entire catchment area (and beyond).

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	
Drought resilience	X	
Health and wellbeing	X	
Zero pollution goals	X	
Sustainable food systems (F2F)	X	
Sustainable energy	X	X
Sustainable transport	X	
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Production of regenerative energy is already conducted at EGLV's waste water treatment plants (photovoltaic, wind energy, thermo-solar sludge drying, geothermal energy, biogas/sludge fermentation) and is currently enhanced. Additional minor form of sustainable energy production involves to use the potential of flowering meadows for energy production: The clippings or materials cut/mowed/trimmed from flowering meadows can potentially be used for energy production.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	At the symposium on urban biodiversity in September 2022 in Essen, Germany, there was an exchange with around 100 regional representatives about what to do with cutting material on urban areas.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	We are in exchange with CS #16 Scheldt to further discuss the options for reuse of biomass from cutting material and how-to best sow and maintain the areas.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	Options include the use as sustainable feed for cattle or sheep (cooperation has already been established or initiated) or as renewable energy (e.g. as biomass material for co-digestion with sewage sludge in WWTP). To put this into practice, large-scale concepts are required, to harmonise the alternative maintenance schemes with other requirements that address dikes and non-used areas (e.g. photovoltaic systems on flowering meadows). Such synergies will be evaluated together with EGLV's operating and planning departments.
How can you optimise the **impact** of your measure?	

4. Mobilise additional external funding
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!

What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	During the life time of MERLIN, the Emscher restoration budget represents a source of additional funding.
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	We are striving for several cooperation with other institutes and universities that are also interested in the marketing of green energy and support us with personal resources and budget.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • The preparation of the material before and after digestion is very costly and therefore not profitable • The additional personnel work steps for the disposal of cutting material impedes the implementation • The transport routes become longer and therefore more expensive • Recycling of the cutting material might only be possible on the small scale of the implementation sites, but cannot be scaled up. low risk: • The addition of cutting material has possible negative effects on the following sludge treatment • The success of the restoration of meadow depends on the commitment of the operational department of EG, which will be responsible for managing the meadows. • The current overall tendered maintenance process must be retendered on a modular basis which can become a time obstacle
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • The preparation of the material before and after digestion is very costly and therefore not profitable • The current overall tendered maintenance process must be retendered on a modular basis which can become a time obstacle and lead to a delay low probability: • The addition of cutting material has possible negative effects on the following sludge treatment • The success of the restoration of meadow depends on the commitment of the operational department of EG, which will be responsible for managing the meadows. • The additional personnel work steps for the disposal of cutting material impedes the implementation • The transport routes become longer and therefore more expensive • Recycling of the cutting material is only possible on the small scale of the implementation sites, but cannot be scaled up.
Which risks can be prevented and how?	The measure must be discussed intensively with all stakeholders to quickly identify unrecognised problems. There is a need to present the measure to all relevant departments of EGLV to identify conflicting activities planned (e.g. land use conflicts with other restoration activities planned).

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Research recycling/reuse possibilities		X	X	X													
Identification of feasible recycling/reuse options for EGLV (fermentation/pyrolysis)				X													
Initiate internal and external cooperation					X	X											
Public procurements for feasibility/pilot projects						X											
Preparation of outlines for feasibility/pilot projects						X											
Tests of material preparation and composition/texture						X	X										
Fermentation/ digestion in test run (“Technikum”)								X	X								
Construction of a hall for material preparation											X	X	X	X			
Acquisition of equipment						X					X	X	X	X			
Upscaling to increase the amount of material in the digestion towers										X	X						
Feasibility check: pyrolysis								X	X	X	X						
Economic efficiency analysis														X	X		
Feasibility study for EGLV														X	X		

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Research recycling/reuse possibilities		MERLIN personnel budget
Identification of feasible recycling/reuse options for EGLV (fermentation/pyrolysis)		MERLIN personnel budget
Initiate internal and external cooperation		MERLIN personnel budget
Public procurement for feasibility/pilot projects coordination		MERLIN personnel budget
Preparation of outlines for feasibility/pilot projects	15,000 €	MERLIN implementation budget
Tests of material preparation and composition/texture	50,000 €	MERLIN implementation budget
Fermentation/ digestion in test run (“Technikum”)	50,000 €	MERLIN implementation budget
Construction of a hall for material preparation	100,000 €	MERLIN implementation budget
Acquisition of equipment	50,000 €	MERLIN implementation budget

Upscaling to increase the amount of material in the digestion towers	100,000 €	MERLIN implementation budget
Feasibility check: pyrolysis	25,000 €	MERLIN implementation budget
Economic efficiency analysis	5,000 €	MERLIN implementation budget
Feasibility study for EGLV	10,000 €	MERLIN implementation budget
SUM	**405,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Research recycling/reuse possibilities	Svenja Karnatz	23-FL (Department EGLV)	
Identification of feasible recycling/reuse options for EGLV (fermentation/pyrolysis)	Svenja Karnatz, Carla Große-Kreul	23-FL (Department EGLV), division 23, Symposium Urban Biodiversity	
Initiate internal and external cooperation	Svenja Karnatz, Carla Große-Kreul	Dr. Daniel Klein (23-AW (Department EGLV)), FH Südwestfalen, Fraunhofer Institut UMSICHT	
Public procurements for feasibility/pilot projects	Svenja Karnatz	Dr. Daniel Klein	
Preparation of outlines for feasibility/pilot projects	Svenja Karnatz	External institution	
Tests of material preparation and composition/texture	Svenja Karnatz, Dr. Daniel Klein	23-AW (Department EGLV), FH Südwestfalen, Division 21	
Fermentation/digestion in test run (“Technikum”)	Svenja Karnatz, Dr. Daniel Klein	23-AW (Department EGLV), FH Südwestfalen, Division 21	
Construction of a hall for material preparation	Svenja Karnatz, Dr. Daniel Klein	Division 21, 22, 23 (EGLV)	
Acquisition of equipment	Svenja Karnatz, Dr. Daniel Klein	Division 21, 22, 23 (EGLV)	
Upscaling to increase the amount of material in the digestion towers	Svenja Karnatz, Dr. Daniel Klein	23-AW (Department EGLV), FH Südwestfalen, Division 21	
Feasibility check: pyrolysis	Svenja Karnatz, Dr. Daniel Klein	Fraunhofer Institut UMSICHT	
Economic efficiency analysis	Svenja Karnatz	Revision/Audit EGLV, external	
Feasibility study for EGLV	Svenja Karnatz	external	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	• Biogas output • Economic efficiency
Do you expect to see short-term or long-term impacts?	long-term impact

1. Measure	**Establishment of flowering meadows at dykes**
1.2	**Change of maintenance/extensification:** **1.2.1. Site: Wastewater treatment plant Lower Emscher (KLEM)** **1.2.2. Site: Adenauerallee** **1.2.3. Site: Nordsternpark**

0. Detail the implementation measure

Measure:
One of the measures planned within MERLIN in the Emscher basin is the establishment of flowering meadows at dykes and near the river/streams.
Here, we intend to transform the grass area, which is currently mown at least 3 times per year into a biodiverse extensive meadow, cut approx. 2 times per year. Plus, the cutting material will have to be removed and disposed to support the development of low-nutrient, species-rich meadows. The change of maintenance is carried out without a new sowing of the meadow but via extensification. In total, about four hectares are to be redesigned.
Time efficient and cost-effective solutions will have to be found. Possibly, the cutting material can even be used in an economically viable way, e.g. for biogas production (see implementation measure: 1.1. Reuse cutting material).

The development of the meadow will be monitored with respect to biodiversity (species richness of flora and fauna), appearance (flowering meadows) and with respect to dyke stability (sod closure and root density).

Site:

1. Wastewater treatment plan Lower Emscher (KLEM):
   Two areas are being redesigned at the wastewater treatment plant (WWTP) Lower Emscher ("KLEM"): one large meadow area is located directly on the grounds of the treatment plant and extends to the Emscher River (approximately 8.000 m2); the second area is located on the right Emscher dyke just downstream of the WWTP (approximately 15.000 m2).

2. Adenauerallee:
   The Emscher dyke "Adenauerallee" is a dyke section located in Gelsenkirchen, where an establishment of flowering meadows through a change of maintenance is possible (approximately 7.000 m2). The dyke section is bordered by two bridges and is crossed by a pedestrian bridge. A bicycle path runs along the dyke.

3. Nordsternpark:
   The Emscher dyke "Nordsternpark" is a dyke section located in Gelsenkirchen, where an establishment of flowering meadows through a change of maintenance is possible (approximately 10.000 m2). The dyke is located at Nordsternpark and is crossed by some pedestrian bridges.

1. Map the measure (site)/ Visualise the measure

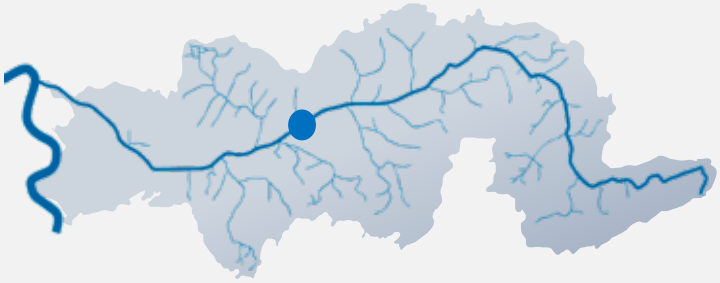
1. "Wastewater treatment plant Lower Emscher (KLEM)":

1. Map the measure (site)/ Visualise the measure

2. Adenauerallee, Gelsenkirchen

1. Map the measure (site)/ Visualise the measure

3. Nordsternpark, Gelsenkirchen



2. Integrate the Green Deal criteria

Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.

Green Deal criteria	Relevance in demo case (WP1)	Relevance in implementation case (WP2)
Biodiversity net gain	X	X
Climate regulation	X	
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	
Sustainable food systems (F2F)	X	
Sustainable energy	X	X
Sustainable transport	X	
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Currently, dikes and non-used areas are frequently mowed. Biodiversity of these spaces is low due to the high mowing frequency and high nutrient content in the soil. Transformation into flowering meadows is currently obstructed by legislation, effort, unclear responsibility and/or higher costs.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	See M1.1.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	See M1.1.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	See M1.1. Future optimization potential includes to modify the maintenance of dikes and non-used areas for enhancing biodiversity. If these areas would be mowed less frequently, the mowed grass would need to be removed and used.
How can you optimise the **impact** of your measure?	A new association (“Emscher Natur”) is about to be founded, which will allow EGLV to market natural products, such as honey, wine and apple juice. This will support the transformation of land into organically maintained orchards or vineyards. Furthermore, “Emscher Natur” can also potentially incorporate the maintenance of flowering meadows. Sheep grazing might be a way to reduce costs. Urban gardening and other environmentally friendly ways of land-use in the Emscher region should be encouraged. This is also a way to involve many stakeholders in the region.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	During the life time of MERLIN, the Emscher restoration budget represents a source of additional funding.
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • The energy crisis and the associated expansion of photovoltaic systems on meadows are creating additional conflict on land use; synergies need to be searched • The short-time period of the MERLIN project does not span the time period of the expected effects on natural succession. Perhaps an effect cannot be identified in this time period. • The predicted periods of drought in the upcoming years can counteract the effects of increasing biodiversity. • This could result in slow plant growth and the meadow sod on the dykes not being completely closed. This would indicate low dyke stability and could be a reason for the agencies to not give approval to the transformation of further grass areas into meadows. • The sites are extremely sun-exposed. Possibly the sites' characteristics are too extreme to achieve the desired effect. • The quality of the soil may not be as needed to achieve higher biodiversity. low risk: • Technical solution(s) for mowing high flowering meadows and collecting cutting material from steep dykes could not be found. • The prices for disposal of the cutting material could increase. • Coordination of grazing periods through sheep is not yet well arranged between EG and the sheepherders. Therefore, flowing meadows could be grazed on unintentionally at the wrong time of the year. • The success of the restoration of meadows depends on the commitment of the operational department of EG, which will be responsible for managing the meadows. • An approval of the agencies might be necessary. However, this dyke section is not officially classified as a dyke. Therefore, legal requirements and concerns are less probable.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • Drought is highly probable in 2022 and beyond. • The energy crisis and the associated expansion of photovoltaic systems on meadows are creating additional conflict on land use; synergies need to be searched • The short-time period of the MERLIN project does not span the time period of the expected effects on natural succession. Perhaps an effect cannot be identified in this time period. • The sites are extremely sun-exposed. Possibly the sites' characteristics are too extreme to achieve the desired effect. • The quality of the soil may not be as needed to achieve higher biodiversity low probability: • Technical solution(s) for mowing high flowering meadows exist and will only need to be check for appropriateness. • The operational department of EG is already quite committed. • Coordination of grazing periods through sheep is not yet well arranged between EG and the sheepherders. Therefore, flowing meadows could be grazed on unintentionally at the wrong time of the year.
Which risks can be prevented and how?	The measure must be discussed very well with all stakeholders to quickly identify unrecognised problems. There is a need to present the measure to all relevant departments of EGLV to identify conflicting activities planned (e.g. land use conflicts with other restoration activities planned).

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential areas for flowing meadows		X	X	X													
Site visits			X	X	X												
Identify relevant stakeholders and actors (e.g. for maintenance plans)			X														
Development of implementation and monitoring design				X	X												
Monitoring (vegetation and fauna)			X				X	X			X	X			X	X	
Public procurement of new modular maintenance process					X	X											
Mowing and removal of the cutting material							X	X			X	X			X		
Report on the dyke safety												X				X	
Study and monitoring on carbon storage in extensive meadows							X	X			X	X			X	X	

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for flowing meadows	-	MERLIN personnel budget
Site visits	-	MERLIN personnel budget
Identify relevant stakeholders and actors (e.g. for maintenance plans)	-	MERLIN personnel budget
Development of implementation and monitoring design	-	MERLIN personnel budget
Monitoring (vegetation and fauna)	-	MERLIN personnel budget
Public procurement of new modular maintenance process	-	MERLIN personnel budget
Mowing and removal of the cutting material	30,000 €	MERLIN implementation budget
Report on the dyke safety	20,000 €	MERLIN implementation budget
Study and monitoring on carbon storage in extensive meadows	5,000 €	MERLIN implementation budget
SUM	**55,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for flowing meadows	Nadine Gerner, Svenja Karnatz	Nadine Gerner, Svenja Karnatz, operation team, real estate team, ecological restoration team, construction team (EGLV)	-
Site visits	Nadine Gerner, Svenja Karnatz	PhD student (UDE), operation team (EGLV)	-
Identify relevant stakeholders and actors (e.g. for maintenance plans)	Nadine Gerner, Svenja Karnatz	EGLV operational department, Genossenschaft Emscher-Natur, sheepherder, external experts	?
Development of implementation and monitoring design	Andrea Schneider (PhD Student & SCI Partner), Nadine Gerner, Svenja Karnatz	Experts in statistics and monitoring (SCI UDE is responsible)	
Monitoring (vegetation and fauna)	Andrea Schneider (PhD Student & SCI Partner)	Additional scientists (UDE)	
Public procurement of new modular maintenance process	Svenja Karnatz		
Mowing and removal of the cutting material	Svenja Karnatz	External	
Report on the dyke safety	Svenja Karnatz	External evaluator	
Study and monitoring on carbon storage in extensive meadows	Svenja Karnatz	Additional scientists	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	• Biodiversity net gain: monitoring on flowering meadows (vegetation diversity and biomass, insect diversity and biomass) • Official report on the dyke safety aspects with focus on a closed sod and root density • Carbon storage in meadows
Do you expect to see short-term or long-term impacts?	long-term

1. Measure	Establishment of flowering meadows
1.3.	Sowing new flowering meadows

0. Detail the implementation measure

In the context of the Emscher restoration, meadow areas on the Emscher dikes and on water management facilities such as waste water treatment plants or pumping stations are often redesigned and newly planted. Regional seeds with a high proportion of herbs and wildflowers are used to create more biodiverse and pollinator-friendly vegetation and at the same time habitat and food supply for terrestrial fauna. The transformation of grassland into such meadows can be realised via extensification (M1.1) and via sowing on new areas (M1.3).

The main aspect of this implementation measure is to establish new flowering meadows through seeding. Additionally, the following research question will be addressed: Does the creation of new flowering meadows (M1.3) lead to more biodiversity than a changeover in maintenance from intensive mulching to extensive mowing (M1.1)?

For this purpose, within the framework of the MERLIN project, suitable areas for sowing will be identified and on these flowering meadows will be established.

1. Map the measure (site)/ Visualise the measure

The measure covers the entire catchment area of Emscher (and potential neighbouring areas of the Lippe catchment and beyond); different sites will be identified during the lifetime of MERLIN.

2. Integrate the Green Deal criteria

Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.

Green Deal criteria	Relevance in demo case (WP1)	Relevance in implementation case (WP2)
Biodiversity net gain	X	X
Climate regulation	X	
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	

Sustainable food systems (F2F)	X	
Sustainable energy	X	X
Sustainable transport	X	
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	
Did you obtain recommendations for optimization from your **case study board**? If so, which?	See M1.1.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	See M1.1.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	See M1.1. and M1.2
How can you optimise the **impact** of your measure?	See M1.2.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	During the life time of MERLIN, the Emscher restoration budget represents a source of additional funding.
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • Drought can complicate seeding. This could result in slow plant growth and the meadow sod on the dykes not being completely closed. This would indicate low dyke stability and could be a reason for the agencies to not give approval to the transformation of further grass areas into meadows. low risk: • The success of the restoration meadow depends on the commitment of the operational department of EG, which will be responsible for managing the meadows. • An approval of the agencies might be necessary. However, this dyke section is not officially classified as a dyke. Therefore, legal requirements and concerns are less probable.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • Drought is highly probable in 2022 and beyond. • Dyke restoration plans exist in this section. The transformation of the respective sections into a flowering meadow should only be done after this restoration. low probability: • Technical solution(s) for mowing high flowering meadows exist and will only need to be checked for appropriateness. • The operational department of EG is already quite committed.
Which risks can be prevented and how?	The measure must be discussed very well with all stakeholders to quickly identify unrecognised problems. There is a need to present the measure to all relevant departments of EGLV to identify conflicting activities planned (e.g. restoration construction).

6. Plan time

Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential areas for flowing meadows				X	X												
Site visit					X	X											
Identify relevant stakeholders and actors (e.g. for maintenance plan)					X	X											
Developing implementation and monitoring design						X	X										
Monitoring (vegetation and zoology)																	
Preparation of the area (Soil crumbling, ploughing, ...)							X										
Sowing (include all steps)								X									

Mowing, removal and dispose of the cutting material											X	X				
Report on the dyke safety															X	X
Study and monitoring carbon storage															X	X
Analysis and feasibility study																X	X

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for flowing meadows	-	MERLIN personnel budget
Site visit	-	MERLIN personnel budget
Identify relevant stakeholders and actors (e.g. for maintenance plan)	-	MERLIN personnel budget
Developing implementation and monitoring design	5,000 €	MERLIN implementation budget
Monitoring (vegetation and zoology)	10,000 €	MERLIN implementation budget
Preparation of the area (Soil crumbling, ploughing, ...)	15,000 €	MERLIN implementation budget
Sowing (include all steps)	30,000 €	MERLIN implementation budget
Mowing, removal and dispose of the cutting material	30,000 €	MERLIN implementation budget
Report on the dyke safety	7,000 €	MERLIN implementation budget
Study and monitoring carbon storage	5,000 €	MERLIN implementation budget
Analysis and feasibility study	5,000 €	MERLIN implementation budget
SUM	**107,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for flowing meadows	Nadine Gerner, Svenja Karnatz	Nadine Gerner, Svenja Karnatz, operation team, real estate team, ecological restoration team, construction team (EGLV)	-
Site visit	Nadine Gerner, Svenja Karnatz	PhD student, operation team	-
Identify relevant stakeholders and actors (e.g. for maintenance plan)	Nadine Gerner, Svenja Karnatz	EGLV operational department, Genossenschaft „Emscher-Natur“, sheepherder, external experts	?
Developing implementation and monitoring design	Nadine Gerner, Svenja Karnatz,	External partner (e.g. Biostation)	

Monitoring (vegetation and zoology)	Nadine Gerner, Svenja Karnatz,	External partner (e.g. Biostation)	
Preparation of the area (Soil crumbling, ploughing, ...)	Svenja Karnatz	Gardening and landscaping company	
Sowing (include all steps)	Svenja Karnatz	Gardening and landscaping company	
Mowing, removal and dispose of the cutting material	Svenja Karnatz	e.g. Gardening and landscaping company or Genossenschaft "Emscher-Natur"	
Report on the dyke safety	Svenja Karnatz	external	
Study and monitoring carbon storage	Svenja Karnatz	external	
Analysis and feasibility study	Svenja Karnatz	external	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	• Biodiversity net gain: monitoring on flowering meadows (vegetation diversity and biomass, insect diversity and biomass) • Official report on the dyke safety aspects with focus on a closed sod and root density • Carbon storage
Do you expect to see short-term or long-term impacts?	Both, maybe seeding has more effect on short-term then only a changeover in maintenance

2. Measure	**Synergies between river restoration and nature protection: "temporary nature"**
Site	**Emscher catchment**

0. Detail the implementation measure

"Temporary nature" as a concept describes a possibility in nature conservation to increase biodiversity and allow measures for protected species on temporarily available/ time-limited areas. These temporary areas are for example areas reserved for future construction projects that may become necessary for additional flood water retention or if retention filters have been renewed. Currently, it is not legally confirmed that (re)usage of these areas at a later date does not lead to renewed assessments of environmental effects and - if protected species are found - also to the search for new compensation areas.
As a consequence, landowners do not make these reserved areas available for species protection measures, and thus, these areas continue to be intensively cultivated instead of allowing natural succession.
But many of these areas could temporarily act as habitat and stepping stones, and thus, actively contribute to species conservation. There is a large area potential, as there numerous of these small unused areas exist.

In Germany, there is no common approach or legal basis for the concept "temporary nature" and the possibility of "prior exemption" is not found in practice. Therefore, this implementation measure (M2) aims at showing possibilities how species protection measures on temporary areas can be realised in practice. For this purpose, areas are to be found, species protection measures are to be designed and then legally secure solutions are to be agreed on with all stakeholders (e.g. the government and Nature conservation organizations (NGOs)). This measure has the potential to pave the way for a new concept for Germany. The concept is already established in the Netherlands which shows that its possible in accordance with the EU law.

1. Map the measure (site)/ Visualise the measure

The measure covers the entire catchment area of Emscher (and potential neighbouring areas of the Lippe catchment and beyond); different sites will be identified during the lifetime of MERLIN.

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	
Flood resilience	X	
Drought resilience	X	
Health and wellbeing	X	
Zero pollution goals	X	
Sustainable food systems (F2F)	X	
Sustainable energy	X	
Sustainable transport	X	
Inclusivity	X	X
Circular economy	X	
Financing the transition	X	
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	The occurrence of protected native species can be a challenge for planning. Especially birds and amphibians may colonise areas purchased by EG for potential later demand, e.g. for use as retention basin or constructed wetland area or for the exchange of land properties. The settlement of protected species may limit or inhibit later use. A policy that allows to classify this type of land as “areas for temporary nature” would solve this problem.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	EG-internal case study board meetings were held and individual interviews with external experts have taken place. But the most frequently mentioned advise was to identify potential areas, develop a time plan and involve all stakeholders at an early stage.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	Not yet
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	The interpretation of nature and species conservancy laws (i.e. BNatSchG) needs to be adapted, to facilitate synergies between river restoration and nature protection rather than obstructing restoration if single protected species occur. Agreements with agencies will need to be addressed to classify areas reserved for later use as “areas for temporary nature”. Currently, the risk of delay or stop of river restoration programs forces operators to scare off protected animals before settling down. The project “Beleidslijn Tijdelijke Natuur” in the Netherlands shows that the concept of temporary nature is compatible with EU law. Solutions applied in pilot projects, local agreements with municipal agencies as well as discussions with higher level agencies are planned to modify the static idea of nature protection from a legal point. Therefore, legal professionals are involved as well.
How can you optimise the **impact** of your measure?	

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	During the life time of MERLIN, the Emscher restoration budget represents a source of additional funding.
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • The concept is not recognised by the responsible regulatory/licencing agencies • The necessity of the changes is not seen • Transforming the concept into legally compliant procedures takes a very long time • No areas can be found for the measures • Other NGOs might not approve the project and maybe hinder the project idea low risk: • It takes a lot of time to make changes, especially in law or administrative regulation
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • The concept is not recognised by the responsible regulatory/licencing agencies • The necessity of the changes is not seen • Transforming the concept into legally compliant procedures takes a very long time • It takes a lot of time to make changes, especially in law or administrative regulation low probability: • No areas can be found for the measures • Other NGOs might not approve the project and maybe hinder the project idea
Which risks can be prevented and how?	The measure must be discussed very well with all stakeholders to quickly identify unrecognised problems. There is a need to present the measure to all relevant departments of EGLV to identify conflicting activities planned (e.g. land use conflict with other restoration activities planned).

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Workshops to identify stakeholders		X		X	X												
Research and expert interviews (based on stakeholder analysis)					X	X	X										
Cooperation with NABU (NGO)						X	X	X	X	X	X	X	X	X	X	X	X
Project outline						X	X	X									
Legal opinion								X	X	X							

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Workshops to identify involved stakeholders	5,000 €	MERLIN implementation budget
Research and expert interviews (Survey on stakeholders)	7,000 €	MERLIN personnel budget
Agreement with Cooperation NABU (NGO)	24,000 €	MERLIN implementation budget
Project outline	15,000 €	MERLIN personnel budget
Legal opinion	25,000 €	MERLIN implementation budget
SUM	**76,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Workshops to identify stakeholders	Svenja Karnatz	External agency, Gunnar Jacobs, EGLV (23 FL-10, 11-LI, 10 RS, 22 GM)	
Research and expert interviews (Survey on stakeholders)	Svenja Karnatz	External	
Cooperation NABU (NGO)	Mario Sommerhäuser	NABU	
Project outline	Svenja Karnatz	External	
Legal opinion	Svenja Karnatz	External	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	
Do you expect to see short-term or long-term impacts?	

3. Measure	**Participatory river maintenance: Citizen science**
Site	**Emscher catchment**

0. Detail the implementation measure

Participation is already an integral part and common practice at EGLV. Establishing a citizen science project at EGLV to enhance participation creates many additional benefits. In a densely populated area like the Emscher region, many people use the Emscher and its tributaries for local recreation, e.g. during walks, cycling trips, etc., and are thus direct observers of their surroundings. Citizens can support EGLV in monitoring dry streams. This knowledge about the rivers and streams is especially helpful during the increasingly frequent periods of drought. In the summer of 2022, many residents were very concerned about the streams that were drying up, and EGLV has been asked to play an active role in drought monitoring and management. In addition, people want to actively participate and do something against climate change.

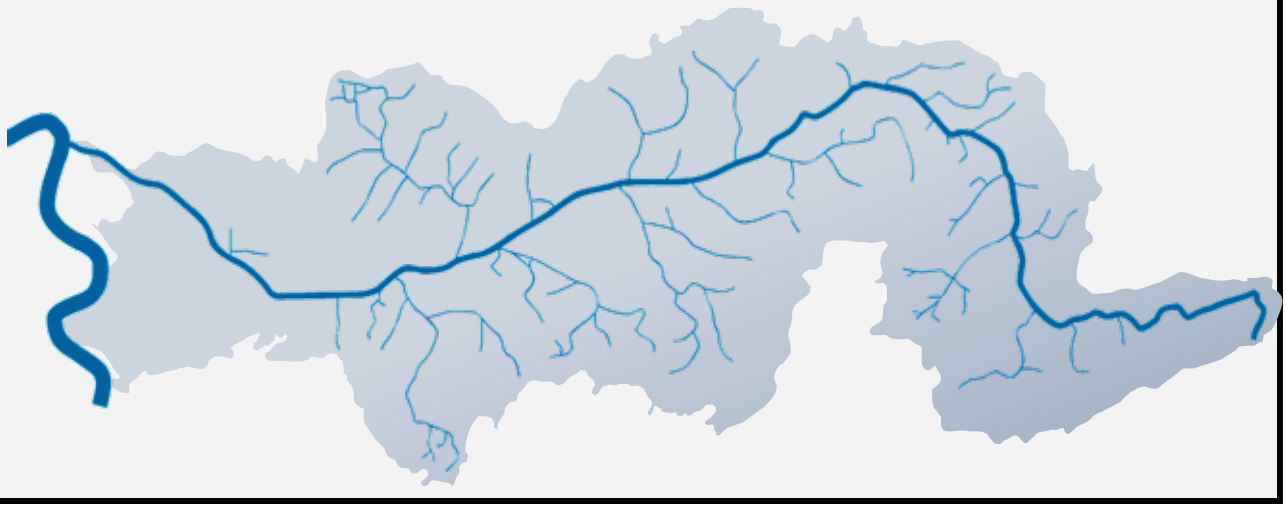
The goal of this implementation measure is to establish a citizen science project at EGLV, in which data on drought-prone waters are collected from citizens, thus complementing the in-house monitoring. Since there are already some apps available that address the same question, a cooperation is useful and desirable. In detail, the measure comprises four phases with separate goals within the MERLIN project.

In order to collect initial data as early as possible in the coming summer of 2023, the measure begins with an immediate initial phase (M12-M24). The main focus in this initial phase is on developing a concept and identifying target groups, starting an official cooperation with the app provider, and developing a temporally and spatially limited campaign to collect initial data in the summer of 2023. The second phase includes an evaluation and if necessary update of the concept (M24-M27). In the third phase (M28-M36), additional target groups are to be involved and actively recruited for the project in order to find multipliers for the project, such as in adult education (e.g. VHS, NUA) and other educational institutions (e.g. schools) and in cooperation with NGOs such as NABU in local groups around the region. In a fourth phase (M36-48), the project will be spread and transferred to other regions e.g. to the region of our twin case study in Leipzig and maybe other water management associations in NRW.

Beyond of the end of the MERLIN project in October 2025, the concept and the app shall also be usable for the other MERLIN case studies and further interested parties.

1. Map the measure (site)/ Visualise the measure

The measure covers the entire Emscher catchment area (and potential neighbouring areas of the Lippe catchment and beyond); different sites will be identified during the lifetime of MERLIN.



2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	
Sustainable food systems (F2F)	X	
Sustainable energy	X	
Sustainable transport	X	
Inclusivity	X	X
Circular economy	X	
Financing the transition	X	
Green growth	X	

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Citizen science is one way to involve people actively in the monitoring of streams and – at the same time – communicate important environmental topics to them.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	We have had several rounds of meetings with internal and external partners to discuss various options; for this, it is important to involve all relevant stakeholders as early as possible.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	Not yet
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	
How can you optimise the **impact** of your measure?	

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify?	During the life time of MERLIN, the Emscher restoration budget represents a source of additional funding.

Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	
What additional funding can you actually acquire?	
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • No official collaboration with an app provider (two apps exists on the German market so far) • No dataset of Emscher region is available • little user behaviour, people are poorly interested in using an app • consumption of many human resources at EGLV low risk: • data entry is too complicated • incorrect or false data is collected
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • consumption of many human resources at EGLV • little user behaviour, people are poor Interested of using an app • data entry is too complicated • keep participants active over a longer period of time low probability: • No official collaboration with an app provider • No dataset of Emscher region is available • incorrect or false data is collected
Which risks can be prevented and how?	The measure must be discussed very well with all stakeholders to quickly identify unrecognised problems. There is a need to present the measure to all relevant departments of EGLV to identify concerns.

6. Plan time

Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Research at EGLV what kind of citizen science project is needed	X	X															
Establishment project team and concretization project idea			X	X	X												
Initial phase					X	X	X	X									
Evaluations phase								X	X								
Third phase										X	X	X					
Forth phase												X	X	X	X	X	
Transfer to other MERLIN case studies																	X

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Researching citizen science recommendations at EGLV level	-	MERLIN personnel budget
Advetisement costs in the initial phase	15,000 €	MERLIN implementation budget
Adapting an app (e.g. Crowd water app)	10,000 €	MERLIN implementation budget
Developing concept via external partner	20,000 €	MERLIN implementation budget
Conduct courses in adult and youth educational institutions	15,000 €	MERLIN implementation budget
Practical expanses during courses	5,000 €	MERLIN implementation budget
Advertising costs in the third phase	15,000 €	MERLIN implementation budget
Feasibility study	7,000 €	MERLIN implementation budget
SUM	**87,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Research at EGLV what kind of citizen science project is needed	Svenja Karnatz	Nadine Gerner, Dr. Sonja Heldt, Nicolai Bätz, Lukas Kociok	
Establishment of project team and concretization project idea	Svenja Karnatz	Nadine Gerner, Dr. Sonja Heldt, Nicolai Bätz, Lukas Kociok	
Initial phase	Svenja Karnatz	Dr. Sonja Heldt, Nicolai Bätz, Lukas Kociok	Marketing or education agency
Evaluations phase	Svenja Karnatz	Dr. Sonja Heldt, Nicolai Bätz, Lukas Kociok	Data analyst EGLV
Third phase	Svenja Karnatz	Dr. Sonja Heldt, Nicolai Bätz, Lukas Kociok	
Forth phase	Svenja Karnatz	Dr. Sonja Heldt, Nicolai Bätz, Lukas Kociok	
Transfer to other MERLIN case studies	Svenja Karnatz, Nadine Gerner	WP5 leads	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	
Do you expect to see short-term or long-term impacts?	

3.2.3 Case study 13 Sorraia (Portugal)

Case study name	**Sorraia**
Person(s) completing this template	**Cláudia Barndão (DGADR), Henrique Dias (DGADR), Luis Sá (DGADR), Teresa Ferreira (ISA-ULisboa), Gonçalo Duarte. André Fonseca, Leonor Santos (ISA-ULisboa)** DGADR: Direcao-Geral De Agricultura E Desenvolvimento Rural (Directorate-General for Agriculture and Rural Development) ISA-ULisboa: Instituto Superior De Agronomia Universidade de Lisboa (School of Agronomy – University of Lisbon)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	▪ Establishment of an optimal blue-green infrastructure configuration for the floodplain in function of ecological indicators ▪ Riparian rehabilitation by planting, weed control and width increase ▪ Habitat enhancement for pollinators, amphibia and birds ▪ Construction of small ponds ▪ River crossing improvement Until Month 24 (October 2023), the planning of the irrigated floodplain restoration will be completed, and riparian wood rehabilitation procedures will have been implemented, and as well as pollinator flower fields and wetland points. A nature-based river crossing will be in place and being tested. Other hydro-morphological interventions will be followed and its effects on fish fauna.
Goals set for M 48 in the proposal	▪ Riparian rehabilitation and channel reconstruction, and clearing of exotic invasive vegetation ▪ Three ponds created, good area/s of flowering fields and pollinator shelters ▪ Development of a prototype of ecoscheme contract for irrigation farmland ▪ Development of a monitoring protocol to evaluate restoration efficacy ▪ Development of a crossing prototype in Mediterranean rivers
Can you imagine further goals beyond MERLIN?	▪ Continue implementing riparian rehabilitation at as many sites as possible, according to the optimal BGI configuration. ▪ Implement further the dialogue between farmers and river managers

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	All measures proposed are relevant
Is there a need to select/prioritise?	All measures proposed are relevant

1. Measure	Riparian rehabilitation with habitat enhancement and river crossings Improvement
1.1. Site	Sorraia Valley, near the confluence with Erra tributary

0. Detail the implementation measure

Measures:
1- Riparian rehabilitation including underwood clearing and increase in the width of riparian areas; this will be done in an area close to Erra tributary, mostly chirurgical and by hand
2- Weed cutting and control of exotic species, particularly water hyacinth, harvesting by hand and special machinery
3- Implementation of 3 temporary ponds (3x6 m, and 3 flower bed areas, planted with native annual seeds)
4-Creation of a lateral oxbow and waterlogged areas close to Erra tributary
5-Development of a nature-based river crossing enabling fish passage and bed stability, using natural materials and enabling fish habitat under the structure; the structure will have different configurations to be tested
6- Stakeholder Involvement, accompanying the restoration

Site:
Sorraia Valley, between the confluence with Erra tributary and Couço (see Figures)

Monitoring on site
1- Birds
2-Pollinators
3-Amphibia
4-Riparian features
5-Fish and its movements

1. Map the measure (site)/ Visualise the measure

Area/Zone: Main reach Sorraia River (nearly 5.8 km)

Lateral Wetland area in on Area 1 (nearly 28.8 ha) between Ribeira Erra and Sorraia River related to the main channel in the previous Figure

Location for improvement of river crossing

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	x
Sustainable energy	X	X
Sustainable transport	-	-
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	▪ Establish regional/local cooperation platform for Sorraia ▪ Improve stakeholder engagement ▪ Respond to a call for a Living Lab in Sorraia ▪ Local Schools Educational Programs to include Wetlands themes
Did you obtain recommendations for optimization from your **case study board**? If so, which?	No
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	▪ By enhancing the cooperation with stakeholders. The water quality and the quality of the riparian habitat is extremely dependent on the farmers good practices ▪ Prepare CAP mechanisms for restoration funding and obligation
How can you optimise the **impact** of your measure?	▪ The monitoring phase must have a strong participation of local stakeholders

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	• Riparian clearing and weed management are already part of the Farmers activities and annual budget • Stabilization of river beds • During the lifetime of MERLIN, the Sorraia CS budget represents a very important source of additional funding and aimed at more ecological driven measures
What additional funding can you actually acquire?	None more, for now. CAP funding in future
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	Yes. From the Sorraia Farmers Association. Lending of Machinery and possible Manpower.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or	high risk: ▪ Drought and water deficit, not enough flow, especially from May to September;

hinder (= high risk) the implementation of your measure?	▪ Low water quality due to the nutrients and pollutants (upstream dam management) specially in dry season; ▪ The prices for cutting and disposal of the plant material and river crossing will increase. low risk: ▪ The success of the restoration depends on the commitment of the stakeholders, which are responsible for managing the surrounding areas. ▪ Hydraulic risk linked to flooding from the Sorraia river and flooding from the upstream dam's discharge, or contrarily, to no-flow situations for long periods
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • Drought is probable in 2023 and beyond. • Some of these challenges are being exacerbated by climate change, requiring adaptation of the local community, especially involving the agriculture sector. • Present high Inflation can generate a budget deviation low probability: • Intervention on culverts and bridges and weirs are scheduled in this area.
Which risks can be prevented and how?	The measure must be discussed with all stakeholders to quickly pinpoint unidentified problems. There is a need to present the measure to all relevant members of the CS13 board to identify conflicting activities planned

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023			Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
Internal meetings to identify potential areas for riparian restoration and river crossings	X	X	X	X													
Identify relevant stakeholders and actors (e.g. for maintenance plan)				X	X	X											
Site visit, monitoring and other trips related with MERLIN		X	X		X	X			X								
Developing implementation and monitoring design			X	X	X												
Monitoring (vegetation, pollinators, fish, amphibian and birds and water)			X	X						X	X			X			X
Outsourcing the site intervention planning			X	X	X	X											
Outsourcing river crossing structure construction																	
Outsourcing cleaning, mowing and removal of material						X			X								
Reporting of monitoring and evolution, adaptive management										X	X	X	X	X	X	X	X

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Internal meetings to identify potential areas for riparian restoration and river crossings	13,000 €	MERLIN personnel budget
Site visit and other trips related with MERLIN	15,000 €	MERLIN implementation budget
Developing implementation and monitoring design	35,000 €	MERLIN personnel budget
Monitoring (vegetation, zoology and water): 2 Fellowships	56,000 €	MERLIN personnel budget
Riparian rehabilitation	204,000 €	MERLIN implementation budget
River crossing development	234,000 €	Farmers Association and MERLIN implementation budget
Oxbow, later channels and wetland promotion	230,500 €	MERLIN implementation budget
SUM	**787,500 € (Costs are estimates)**	**--**

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for riparian restoration and river crossings	Henrique Dias Teresa Ferreira	Luis Sá, Cláudia Brandão, Henrique Dias, Gonçalo Duarte, André Fonseca	-
Site visit and other trips related with MERLIN	Claudia Brandão	Gonçalo Duarte, André Fonseca	-
Identify relevant stakeholders and actors (e.g. for maintenance plan)	Henrique Dias	Farmers Association, Gonçalo Duarte, André Fonseca, Leonor Santos	-
Monitoring	Teresa Ferreira	JL Santos, Pedro Segurado, Susana Dias, Robin Payne, others	-
Engage company for planning and restoration	Henrique Dias	Luis Sá	-
Reporting	Claudia Brandão	Luis Sá, André Fonseca, Leonor Santos	-

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	1. Biodiversity net-gain: 1.1. Improvement of animal biodiversity (birds, insect pollinators, amphibians); 1.2. Vulnerability status of bird, pollinator, and amphibian species; 1.3. Length of free-flowing river (fish movement). 2. Climate regulation: 2.1. Greenhouse gas emissions (estimated based on nitrogen and phosphorus concentrations);

	2.2. Carbon storage (estimated based on orthophotos and modelling). 3. Flood resilience: 3.1. Area of rewetted wetlands; 3.2. Area of restored rivers and streams; 3.3. Storage capacity of restored rivers and streams. 4. Drought resilience: 4.1. Length of river gained through reconnection of oxbows 4.2. Water savings resulting from agricultural practices; 4.3. Temporary pool refuges. 5. Health and well-being: 5.1. Leisure activities (e.g., geocaching, hiking, mountain biking). 6. Zero pollution goals: 6.1. Control of soil erosion; 6.2. Nitrogen reduction for crop runoff. 7. Sustainable food systems (F2F): 7.1. Land-use changes following floodplain greening and restoration. 8. Sustainable energy: 8.1. Plant biomass collected during restoration. 9. Sustainable transport: N/A – Sorraia is not navigable 10. Inclusive governance: 10.1. World wide web divulgation (e.g., number of visitors to websites, blog posts, social media) 10.2. Meetings with local landowners. 11. Circular economy: 11.1. Sediment reuse; 11.2. River crossing prototype. 12. Financing the transition: 12.1. Breakdown of the budget for water and river management actions in the irrigated floodplain. 13. Green growth: 13.1. Number of scientific activities; 13.2. Area of flowering fields.
Do you expect to see short-term or long-term impacts?	Both

3.2.4 Case study 15 Tzipori (Israel)

Case study name	**Tzipori**
Person(s) completing this template	**Yaron Hershkovitz (TAU), Avital Katz (TAU)** TAU: Tel Aviv University AVIV-AMCG: Private consultancy firm KRDA: Kishon Drainage and River Authority

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Spatial planning and land acquisition of ca. 10 ha of agricultural land will be completed. The restoration plan of floodplain and riparian buffer strips will be at its initial stage. In addition, hiking and cycling trails will be planned along a 2 km section, for connecting the upper reaches to the newly restored segments. Preliminary pre-restoration assessment will be completed and the main stressors that are impacting the ecological state of the stream will be identified and mapped.
Goals set for M 48 in the proposal	48 M goals are yet to be finalised as some of the actions that fall under the MERLIN scope rely on a water plan that will provide farmers with an alternative water source (today they divert the water using a dam and have no alternative water source. The "water plan" will provide this alternative water source). Once the plan is approved and is implemented, the diversion dam will be relocated further downstream and will allow for the restoration of the existing diversion canal. The relocated dam will be used to divert winter flows into a reconstructed floodplain to form a seasonal multifunctional waterbody.
Can you imagine further goals beyond MERLIN?	The newly structured waterbody and the restoration of the channel will serve as a local interest point for hikers, bicycle riders and bird watchers from the surrounding villages and towns. We also aim to leverage this project for educational purposes concerning stream restoration benefits (e.g. climate change, biodiversity, nature protection).

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• De-canalization and reconnecting the stream to its floodplain (flood resilience) • Dam removal (drought resilience) • Riparian buffer strip – reducing the impacts of agricultural land use (zero pollution)
Is there a need to select/prioritise?	The restoration primarily aims to create a floodplain in an unused fishpond. This is an acceptable action for both the landowners (a Kibbutz) and the river authority. It will provide protection against flooding and reduce potential damages to adjacent Avocado plantations, while enhancing ecological services including water retention, groundwater recharge and biodiversity. The other components are dependent on the progress of the regional water plan and the deployment of pipelines to supply substitute water to the farmer land.

1. Measure	**1. De-canalization and reconnecting the stream to its floodplain** **2. Dam removal** **3. Riparian buffer strip – reducing the impacts of agricultural land use**
1.1. Site	**Zvulun Valley**

0. Detail the implementation measure

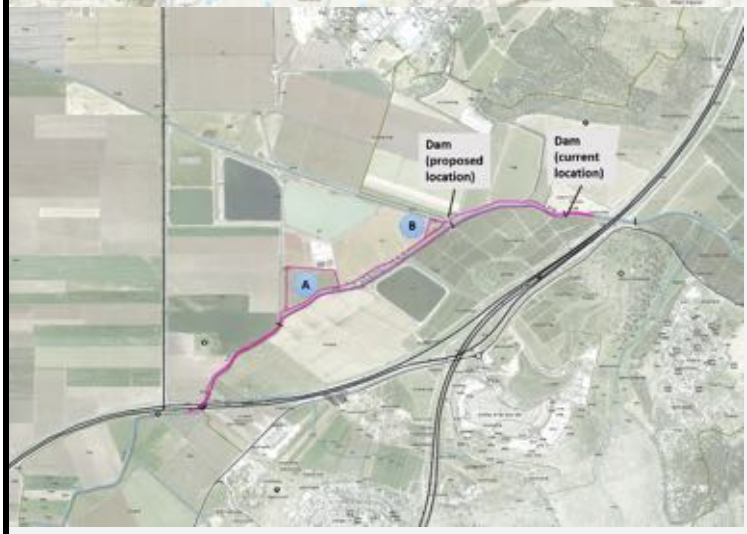
Detailed Implementation measures as shown in map 2 below:

- Nature-based runoff management - a multi-functional floodplain that will allow natural process to develop and providing several benefits (A).
- Relocating the Malik Dam to divert storm flows to reservoirs ONLY during flood events.
- Development of an educational centre, focusing on restoration, research and education, near the confluence of the stream and the Malik canal - an accessible location for research of restoration sites and outdoor class (B)
- The stream trail - extending the existing trail from road 70 to the Malik dam and to road 70 (Rechasim park), widening the trail, adding seating's, planting, bins, purifying irrigated water from agriculture prior to discharging them into the stream
- trails and viewpoints - completion of a circular trail through the Kiryat Ata forest to the crossroads of Highway 70 and connecting to the Zevulon trails project. Connecting the trail to Tel Far (archaeological site) and the development of an observation deck
- Improving the path under Highway 70 for pedestrian, bicycles and ecological crossings

- as part of the preparation phase, invasive Parkinsonia trees will be mapped and eradicated

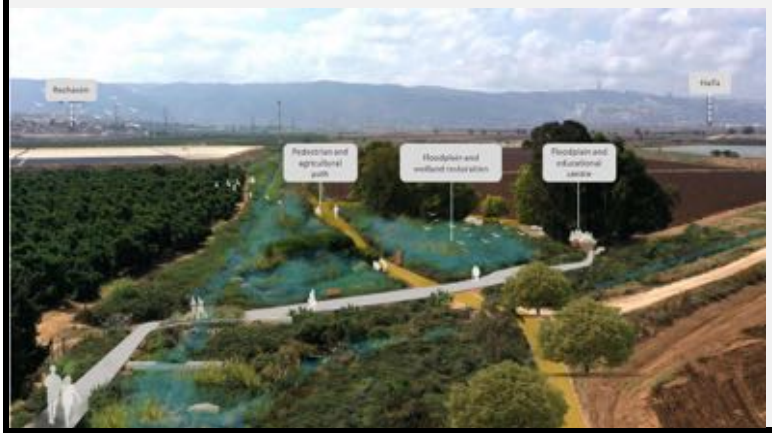
1. Map the measure (site)/ Visualise the measure

Map 1: The Tzipori basin and the location of the implementation project (highlighted)



Map 2: Location of implementation measures:
(A) multi-functional floodplain
(B) educational floodplain

Map 3: ca. 10 ha of a floodplain (view upstream). See map 2A



Map 4: ca. 0.2 ha of an educational floodplain and the removal/relocation of the Malik dam (view downstream). See map 2B

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy		
Financing the transition	X	
Green growth	X	

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Incorporating and improving existing NbS into the restoration plan, involvement of stakeholders, local communities, and educational programs as well as social challenges and restoration design scale.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Working together with the local farmers allowed for a better understanding of their needs (i.e. flood protection measures). This was then used in the negotiation phase to compensate for their "lost" land in exchange for better land management.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	-
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	The Tzipori is a unique region, there are several communities from multi-cultural backgrounds that share the same landscape. In addition, land ownership (private vs. state-owned), type of crops (vineyards, orchards, vegetables, or livestock) or land use (urban, sub-urban and cultivated) that often leads to a conflict of interest concerning for water rights, pollution, and access to the stream.
How can you optimise the **impact** of your measure?	

4. Mobilise additional external funding
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!

What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	Additional funding may be obtained through governmental grants (open landscape fund). Proposals have been submitted.
What additional funding can you actually acquire?	See above
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	We are currently discussing the option to engage the forestry division of the JNF-KKL in the riparian restoration process. This includes using the JNF-KKL plant nursery to acquire local trees (e.g., willows) and their staff to assist with replanting and riparian design. The ministry of agriculture will be involved in supporting farmers in using service cover-crops to reduce agricultural runoff. Specifics are yet to be discussed.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • Water obstruction: For the time being, farmers have no alternative source of water for irrigation. Until the water plan is approved and implemented, they will continue to divert water using the Malik dam and pump stream water directly in the upper sections. Low risk: • Water use: not all landowners are in full agreement with the aims of the project. Some are concerned from loss of water use privileges. • Buffer strip implementation Is planned in several sections of the Tzipori. It involves delicate negotiations with the farmers • Floodplain implementation • The trails: Some farmers are threatened by overcrowding of visitors and vandalism to crops and plantations. This may also require further discussions with the landowners to allow educational activities as part of the restoration plan
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • Water obstruction: Until the “water plan” takes place farmers will keep obstruction and diverting water from the stream via the Malik dam. However, this is not expected to affect the implementation plan of the floodplain (flood protection issue) Low probability: • Lack of cooperation to generate a buffer strip – Some of the crops come all the way to the shoulder of the stream. • Farmers from the Kibbutz might not be willing to sell the land intended for the planned floodplain.
Which risks can be prevented and how?	• Farmers are supposed to stop pumping water directly from the stream once a water plan (one is currently being promoted by the government) provides them with an alternative water source for irrigation

6. Plan time																
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential issues	X																
Meetings: Board/Stakeholder, Site visits			X														
Planners and ecologists site visits	X		X			X											
Identify relevant stakeholders and actors	X																
General planning and on ground measurements					X												
Detailed planning of restoration measures: riparian planning, cross-section design, water storage capacity, bicycle tracks						X	X	X	X								
Develop of implementation and monitoring design								X	X								
Implementation of measures: sediment excavation											X						
Implementation of measures: channel restoration											X	X					
Implementation of measures: re-vegetating the riparian buffer strips and the floodplain											X	X					
Implementation of measures: societal aspects – bike tracks, educational centre,												X	X				
Monitoring (Geomorphology, hydrology, aquatic invertebrates, fish and amphibia, arthropods, vegetation)										X	X	X	X	X		X	

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Cross-sectional improvements, Remaindering, Habitat enhancement, Revegetation	675,000 €	MERLIN (635,000 €) KRDA (40,000 €)
Monitoring	152,000 €	MERLIN (for TAU)
SUM MERLIN	**787,000 €**	
Floodplain excavation	135,000 €	KRDA
Relocation of the Malik Dam	60,000 €	KRDA
Hiking trails and bicycle tracks	275,000 €	KRDA
Recreation and educational focal points	120,000 €	KRDA
Roads, parking, and signs	85,000 €	KRDA
SUM	**1,502,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential issues	KRDA	KRDA, ecology team, planners	
Meetings: Board/Stakeholder, Site visits	KRDA	Planners, agricultural team, representatives of the farmer association	
Planners and ecologists site visits	KRDA	KRDA, Planners, ecology team, agriculture representative	
Identify relevant stakeholders and actors	KRDA		
General planning and on ground measurements	KRDA	Landscape planners	
Detailed planning of restoration measures: riparian planning, cross-section design, water storage capacity, bicycle tracks	KRDA	Ecology team Landscape planners Hydrological team agriculture representative	
Develop of implementation and monitoring design	KRDA	Ecology team Landscape planners	
Implementation of measures: sediment excavation	KRDA	Ecology team Landscape planners	
Implementation of measures: channel restoration	KRDA	Ecology team Landscape planners	
Implementation of measures: re-vegetating the riparian buffer strips and the floodplain		Ecology team Landscape planners JNF-KKL (forestry)	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Biodiversity net gain: Species richness and diversity of native fauna (macroinvertebrates, amphibians, fish) and flora (marsh vegetation). Birds will be added at a later stage. Flood resilience: water storage capacity Zero pollution: nutrient concentrations (phosphorus and nitrogen), organic matter, E-coli, dissolved oxygen
Do you expect to see short-term or long-term impacts?	We expect both short- and long-term impacts on the stream and its floodplain. Sort term: With the planned relocation and repurpose of the dam (water that is currently being used for irrigation) and the riparian restoration, we expect to see an impact in flood and drought management as well as the hydrology, geomorphology and biodiversity in the stream and its surroundings. Long term: we expect to see more visitors and an increase in educational programs surrounding the stream. This will impact on the local economy as well as the wellbeing of visitors and local communities.

3.2.5 Case study 16 Scheldt (Belgium)

Case study name	**Scheldt**
Person(s) completing this template	**Pieter Boets (POV, implementation), Kaat Smis (POV, implementation), Marie Anne Forio (UGent, scientific)** POV: Provincie Oost-Vlaanderen (Province of East Flanders) UGent: Universiteit Gent (Ghent University)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Apply for a permit for channel restoration, detailing the specification of the channel restoration measures and finding a contractor. Agreement with farmers for the establishment of grass flower strips, first implementation of grass-flower buffer strips as pilots within the Zwalm river basin. Find the proper seeding mixture and inform farmers about the possibilities of the mixture and the compensation that they get for it.
Goals set for M 48 in the proposal	Establishment of 3 ha grass flower strips along the river Zwalm mainly on parcels that are sensitive to erosion. 1 km of channel restoration and removal of two small fish migration barriers. Restoration of two spawning beds for rheophilic species.
Can you imagine further goals beyond MERLIN?	Establishment of grass flower strips in the neighbouring basins of Zwalm, which are part of the upper Scheldt.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• Establishment and management of grass-flower buffer strips via participation of farmers • Management of the grass-flower buffer strips via participation of farmers • Channel restoration, fish migration barrier removal and installation of spawning beds for rheophilic species
Is there a need to select/prioritise?	No, all will be implemented

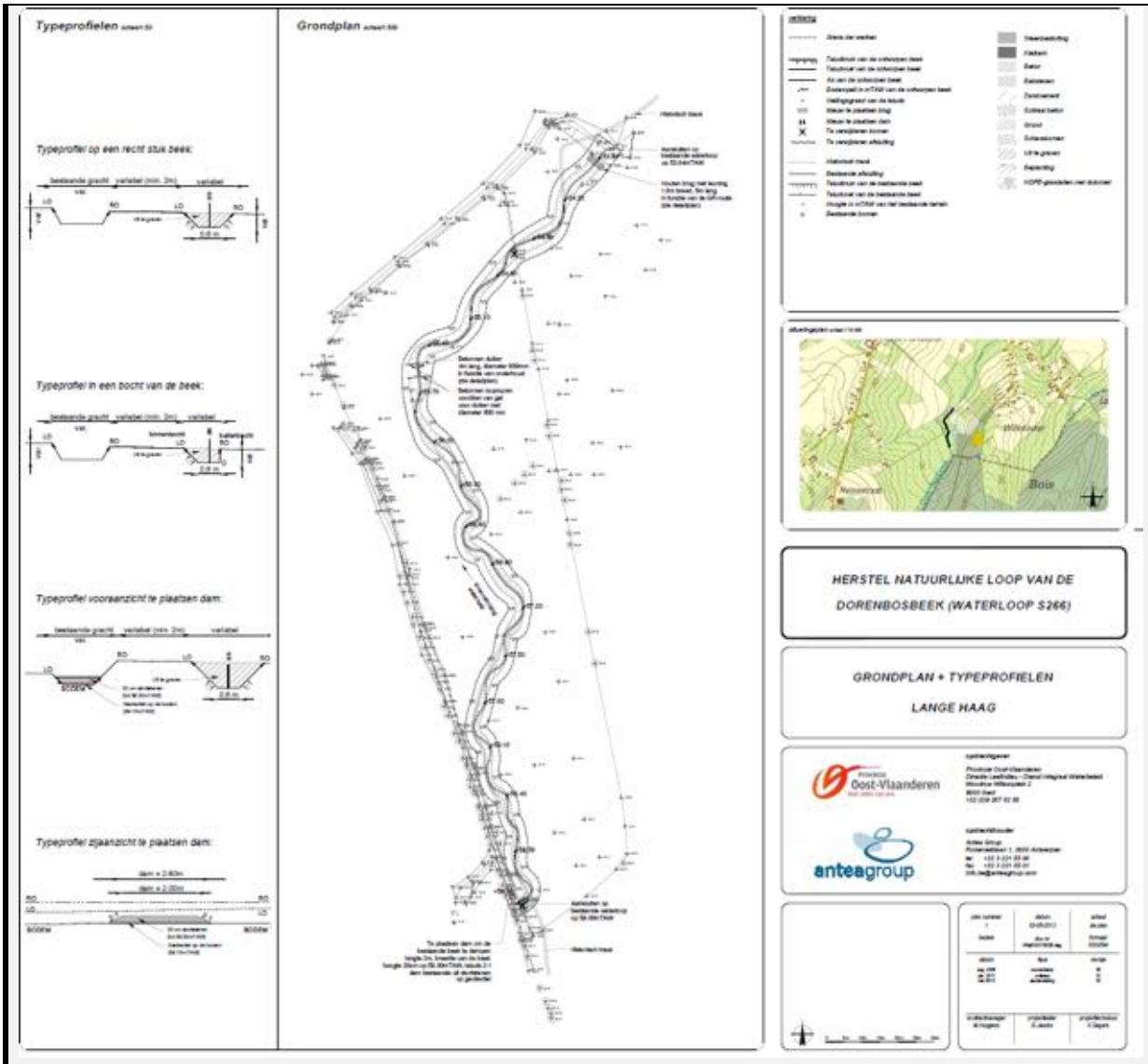
1. Measure	**Channel restoration fish migration barrier removal and installation of spawning beds for rheophilic species**
1.1. Site	**Dorenbosbeek (upstream source stream within the Zwalm river basin)**

0. Detail the implementation measure

The Dorenbookbeek will be restored. Remeandering will take place, two small fish barriers will be removed. Part of the river will also be levelled up as it was artificially levelled down and, in this way, the draining effect will be reduced. Spawning beds will also be Implemented. A buffer pond/ erosion pond will be installed to reduce run-off from agricultural fields. Two new bridges will be installed, one for accessing on maintenance of the meadow, one for accessing a small walking trail. A few pine trees will be removed and replaced by indigenous trees. Attention will be paid to the connection with the existing river part and for buffering water. Specific arrangements have been made with local nature organisations and with the farmer to have sustainable management of the surrounding meadows afterwards.

1. Map the measure (site)/ Visualise the measure

Location where the newly restored watercourse will come.



Maps and detailed plan of the restoration

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	
Sustainable food systems (F2F)	X	
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy	X	
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	No; for this first measure on habitat restoration this is less relevant
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Yes, the local nature organisation (Natuurpunt) suggested to have the new watercourse less deep present in the landscape so it has to a lesser extent a draining effect compared to the current watercourse. There will also be a discussion with the local farmer to do some change of land so the current land is not needed anymore by the farmer and the land that he used could be optimised. In this way, more space is available for the current project. There is probably no need to foresee fencing if cattle are not grazing anymore on this adjacent meadow.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	No, not for this part of the measures. The meeting of the small streams and clusters indicated that preferably dams are removed, since the small weirs will be removed, the vision on free fish migration is followed also in this case study.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	By having good conversation with local stakeholders (Natuurpunt and local farmers). The adjacent land management could be optimised and maybe lower investment costs are needed for the adjacent meadows since no fencing might be needed.
How can you optimise the **impact** of your measure?	In the application procedure for approval of construction works, the removal of some old pine trees and replacement by indigenous trees will be done at the same time thanks to some direct agreements with Natuurpunt.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	Part of the funding will come from the government via the Province of East-Flanders. Part of the money for restoration can also come from the Blue deal in Flanders that provides money to try to reduce the impact of climate change and droughts. The remaining budget will come from the MERLIN project.
What additional funding can you actually acquire?	Money from the province of East-Flanders is secured.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	The cutting of willows before the restoration works will start will be done by the local volunteers of Natuurpunt.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	The restoration works depend on getting the approval of the Flemish Government. The cooperation with the local stakeholders (farmers and nature organisations) is important and finding a good contractor. The weather conditions might determine the period when construction works can be done.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	The general risk for this measure will be low, as the land on which the measure will take place is property of Natuurpunt and there is already an agreement with them on the restoration. The approval of the restoration by the Flemish government will be ok since there has been some discussion on beforehand and these issues are resolved. Weather conditions are hard to predict, but normally within the period August to October there will be some drier period, otherwise extra measures will be taken to reduce the impact as much as possible.
Which risks can be prevented and how?	As indicated above, good pre-discussion and agreements with local stakeholders can help to speed up the process and have no further problems/risks.

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
License to do restoration measures (summer 2022)			X	X													
Detailing specification (summer 2022)				X													
Finding a contractor (autumn 2022)					X												
Restoration works (summer 2023)							X	X									
Monitoring of the impacts of the measure				X		X		X		X		X		X			

7. Plan budget

Task	Expected costs [€]	Source of funding
Making de final plans for restoration + field visits	Hourly cost of 64.30 €	Internal funding POV, no MERLIN budget
Restoration work in the field, meandering watercourse, new fishpassage, installation of spawning bed, …	165,000 € detailed status plan needs to be developed/revised, the costs for implementation exceed far the funding received, certainly because of costs rising during the last 2 years	MERLIN implementation budget + internal funding POV
SUM	**165,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
License to do restoration measures (summer 2022)	Pieter Boets, POV	Dept. Integrated Water Management – Emma Denorme	
Detailing specification of restoration actions (summer 2022)	Pieter Boets, POV	Dept. Integrated Water Management, Wim Vercruysse	
Finding a contractor (autumn 2022)	Pieter Boets, POV	Dept. Integrated Water Management, Wim Vercruysse	
Follow up of restoration works (summer 2023)	Diederik Malfroid	Dept. Integrated Water Management, Johan Duprez	
Monitoring of the impacts of the measure	Marie Anne Forio (UGent)	Koen Lock, Andree de Cock, and other students	Post/notification for internships, or other students for their thesis who would like to join the monitoring

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

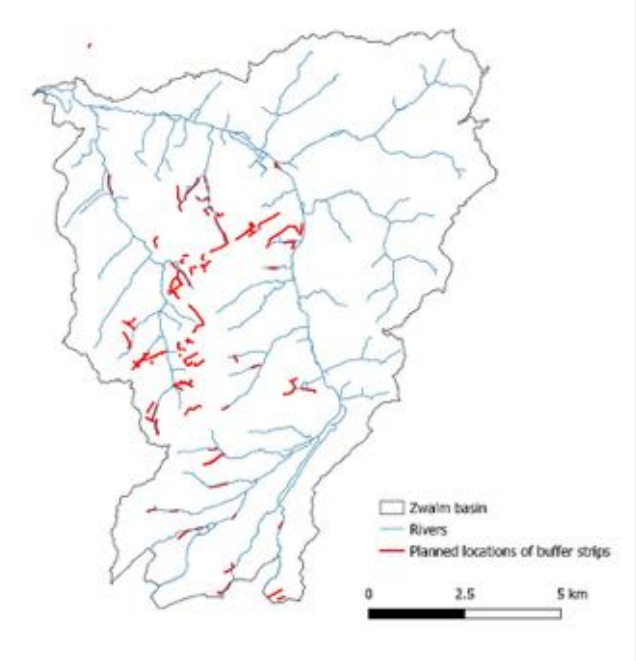
10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	We intend to monitor the following: Total area protected (Natura 2000), Conservation status of HD Annex II and Annex IV listed species, Ecological status of rivers, Presence of invasive non-native species, Nutrient and organic matter concentrations, Changes in the extent and hydrological properties of each of these due to restoration, Area of restored rivers and streams (ha), Change in storage capacity (m^3) of restored rivers and streams (based on surface area of rivers, streams and other water bodies), Increase in recreational value (restored sites as route for walking), Nutrient concentrations in water (Nitrogen, phosphorous), organic carbon pollution in water, Land cover, Number of visitors to project website, Information sessions about the site/project, Formal Public consultation processes held, Ability to join a formal stakeholder forum/board/working group, Breakdown of the total restoration budget by funding source and type [%], Private finance mobilised [€/year], In-kind contributions [€/year], Number of barriers removed, Number of jobs created (attributable in part to restoration activities or restoration outcomes), Number of scientific or education services taking place in, or dependent upon the ecosystem
Do you expect to see short-term or long-term impacts?	Yes, short-term impacts are the availability of additional jobs; long-term impacts are the ecological-related changes as a result of the measure implementation.

1. Measure	**Grass-flower buffer strips**
1.1. Site	**Within the Zwalm river basin**

0. Detail the implementation measure

Installation of grass-flower buffer strips within the Zwalm river basin (see map below). Approximately 3 ha of grass-buffer strips will be Implemented. The main aim is to reduce erosion, but it will also be beneficial for biodiversity and mitigate climate change impact. The implementation is on a voluntary basis with the farmers. They get a compensation for having these buffer strips on their land. The sowing + the seed are paid by the MERLIN budget + a compensation is given. An agreement is made with the farmer for at least two years. There is also an arrangement on how to manage these grass-flower buffer strips. In order to optimise the biodiversity value of these strips it is important to mow these strips at least once a year and remove the mowing material.

1. Map the measure (site)/ Visualise the measure



Map where the possible locations for implementation of grass flower strips

Picture of erosion problems and no buffer strip (left) and picture with buffer strip to increase diversity and reduce erosion (right)

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	X
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	No
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Yes, the restoration measure can be promoted through the Boer en Tuinder, but also other local stakeholder organisations. There were representatives from the farmers' association + another project dealing with sustainable agriculture in the region is active. Afterwards we were contacted and offered for an extension of the project with extra money for implementation. However,

	given the current personnel it is not possible to extend the project in this early phase.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	The cluster meeting was interesting to get ideas on how to do the management of the flower grass buffer strips. Although they are still searching themselves for optimisation of this. Direct contact has been made with the Emscher Case study to see how we can exchange experiences on this.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	The mixture of the seeds seems to be very important for the farmers as well as clear information on the project itself. Freedom to choose the optimal implementation per farmers and per locations seems also crucial.
How can you optimise the **impact** of your measure?	By installing more measures within the Zwalm basin and also the neighbouring basins

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	Funding from the government as well from the MERLIN project. There will be a new compensation measure that will start from 2023 onwards by the Flemish Land Agency (VLM). Funding for specific measures mainly to reduce erosion are foreseen. Some kind of agreement with the farmers can be made similar to the system used in this project as well as another project “Boer aan Boord”. https://oost-vlaanderen.be/werken-en-ondernemen/landbouw/subsidies/vergoeding-voor-de-aanleg-en-het-beheer-van-gras-bloemen-stroken.html
What additional funding can you actually acquire?	Funding via the Flemish Government mainly to reduce erosion. There are special calls for this kind of funding which is not every year. It depends on the possibilities provided by the Flemish Government. In addition, there is also funding possible via Water Land Schap 2.0 (WLS) where 80% can be financed by WLS.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	Not applicable

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk • Farmers won't be convinced to implement the measure. Medium risk • Weather conditions not favourable for the optimal growth of the grass-flower buffer strips – heavy rain events or droughts Low risk • Soil not favourable for the growth of the grass-flower buffer strips
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	Medium probability • Farmers won't be convinced to implement the measures. • Weather conditions not favourable for the optimal growth of the grass-flower buffer strips Low probability • Soil not favourable for the growth of the grass-flower buffer strips
Which risks can be prevented and how?	Consider implementing the measure in other neighbouring basin that Is still part of the Scheldt basin in order to increase the number of farmers that is willing to implement this measure.

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Contacts with farmers			X	X			X	X			X	X					X
Buffers sown				X			X	X			X	X					X
Buffers maintained								X	X		X	X	X		X	X	X
Monitoring of the impacts of the measure				X			X			X		X		X			

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Contact the farmers	Integrated within existing working hours (63.40 € per hour)	MERLIN
Organising workshop and info moment	Integrated within existing working hours (63.40 € per hour)	Regular personnel budget, not MERLIN
Buying mixture	200 €/hectare	MERLIN implementation budget
Sowing and compensation	1,800 €/hectare	MERLIN implementation budget
Follow-up of the buffer strip	200 € per contract	MERLIN implementation budget
Personnel cost for buffer strip implementation – drafting agreements, visiting farmers, organizing info sessions, …	20,000 €	MERLIN
Implementation of buffer strips, costs for seeds, plowing, …	40,000 €	MERLIN
SUM	**60,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Field visits	POV, Kaat Smis, Bruno De Cleene	Pieter Boets	
Contact farmers (*)	POV, Bruno De Cleene, Kaat Smis	farmers	
Buying mixture	POV	farmers	
Sowing of mixture	farmers		
Setting up compensation contract	POV, Kaat Smis, Bruno De Cleene		
Monitoring of the impacts of the measure	Marie Anne Forio	Koen Lock, Andree de Cock, and other students	Post/notification for internships, or other students for their thesis who would like to join the monitoring

(*) informing and raising awareness, administrative support, follow-up and knowledge sharing (including by means of a voluntary survey)

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	We intend to monitor the following: Total area protected (Natura 2000), Conservation status of HD Annex II and Annex IV listed species, Ecological status of rivers, Presence of invasive non-native species, Nutrient and organic matter concentrations, Area of restored rivers and streams (ha), Change in storage capacity (m^3) of restored rivers and streams (based on surface area of rivers, streams and other water bodies), Area of agricultural lands with applied schemes for water retention (ha), Increase in recreational value (restored sites as route for walking), Nutrient concentrations in water (Nitrogen, phosphorous), organic carbon pollution in water, Suspended solids in water, deposited solids in water, Reduction of erosion, Land cover, Labour (amount of hours needed to maintain and establish the flowering grass buffer strips), Number/presence of pollinators, Number of visitors to project website, Information sessions about the site/project, Formal Public consultation processes held, Ability to join a formal stakeholder forum/board/working group, Reduced water consumption, Breakdown of the total restoration budget by funding source and type [%],Private finance mobilised [€/year], In-kind contributions [€/year], Area of buffer strips established (area), Pollination services (Number/presence of pollinators), Number of jobs created (attributable in part to restoration activities or restoration outcomes), Number of scientific or education services taking place in, or dependent upon the ecosystem
Do you expect to see short-term or long-term impacts?	Long term impacts on the ecological impacts such as increase terrestrial diversity. Short-term impacts are the involvement of farmers.

3.2.6 Case study 17 Forth (UK Scotland)

Case study name	**Forth – Small Streams**
Person(s) completing this template	**Huw Streater (Forth River Trust), Niall Provan (Forth River Trust), with input from UKCEH** Forth River Trust UKCEH: UK Centre For Ecology & Hydrology

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	Completion of first phase of Allan Water floodplain reconnection works. This will involve expansion of the previously completed works in demonstration site. Works will include reconnecting drainage ditches to the floodplain instead of feeding into the river and removing old drains through embankments to allow greater holding of water during and after high rainfall events. Wetland habitats will be created in the floodplain area. These works would be completed across an area of 36.5ha.
Goals set for M 48 in the proposal	Proposed in the Description of Action: Small streams aspect: Large woody debris additions and embankment removal along 22.8 km river length to restore channel geomorphology and Restore 350 ha of floodplain habitat. These 48M goals are yet to be fully determined for this site in particular due to the scale of the project, as well as potential for this to be the extent of the works completed at the site due to unknown levels of landowner commitment to works beyond this initial 24 M plan. This is covered in the risks section; however, it is not a risk to the overall goals for the Forth Case Study as there are other sites formulated to fit into the restoration goals.
Can you imagine further goals beyond MERLIN?	To continue expanding floodplain reconnection further upstream on Blackford Estates land, through further embankment breakouts and drainage blocking. Landowner engagement in existing works will hopefully lead to more engagement further upstream.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• Blocking of historic drainage ditches leading through floodplain • Creating new channels to allow flow to enter floodplain • Wetland scrape creation • Creation of leaky dams on South West flowing channel • Scraping back of vegetation on drainage channel to reinstate it
Is there a need to select/prioritise?	All planned works will be completed as part of one instance of work, in a reasonable sequence. For example, scrapes will be created to house water prior to creation of new diversion channels. Ditches will be blocked last so as not to significantly re-wet the site while machines are still present and compromise access.

1. Measure	**Floodplain Reconnection and Wetland Creation**
1.1. Site	**Allan Water upstream of Greenloaning, Perth & Kinross**

0. Detail the implementation measure

Measure:
Blocking of drainage ditches, with creation of new channels to divert water back on to the floodplain. Wetland scrapes created to hold diverted water in high rainfall periods. Breaking of historic drainage channels throughout embankment on River Allan. Areas of high rank vegetation will also be cut where possible. Introduction of leaky dams to larger drainage ditches. De-vegetating and re-instatement of 1 channel to reintroduce sediment input to targeted areas of the wetland – this will be achieved through the removal of built-up bank-side vegetation (rank grasses and thick rushes) - in a sense a targeted dredging of this specific drainage ditch - which will allow for a freer flow and transport of water and sediment to selected areas of site. This measure will feed water and sediment into existing low-lying areas and created wetland scrapes through the use of an engineered log-jam as a flow diversion technique in periods of high flows.

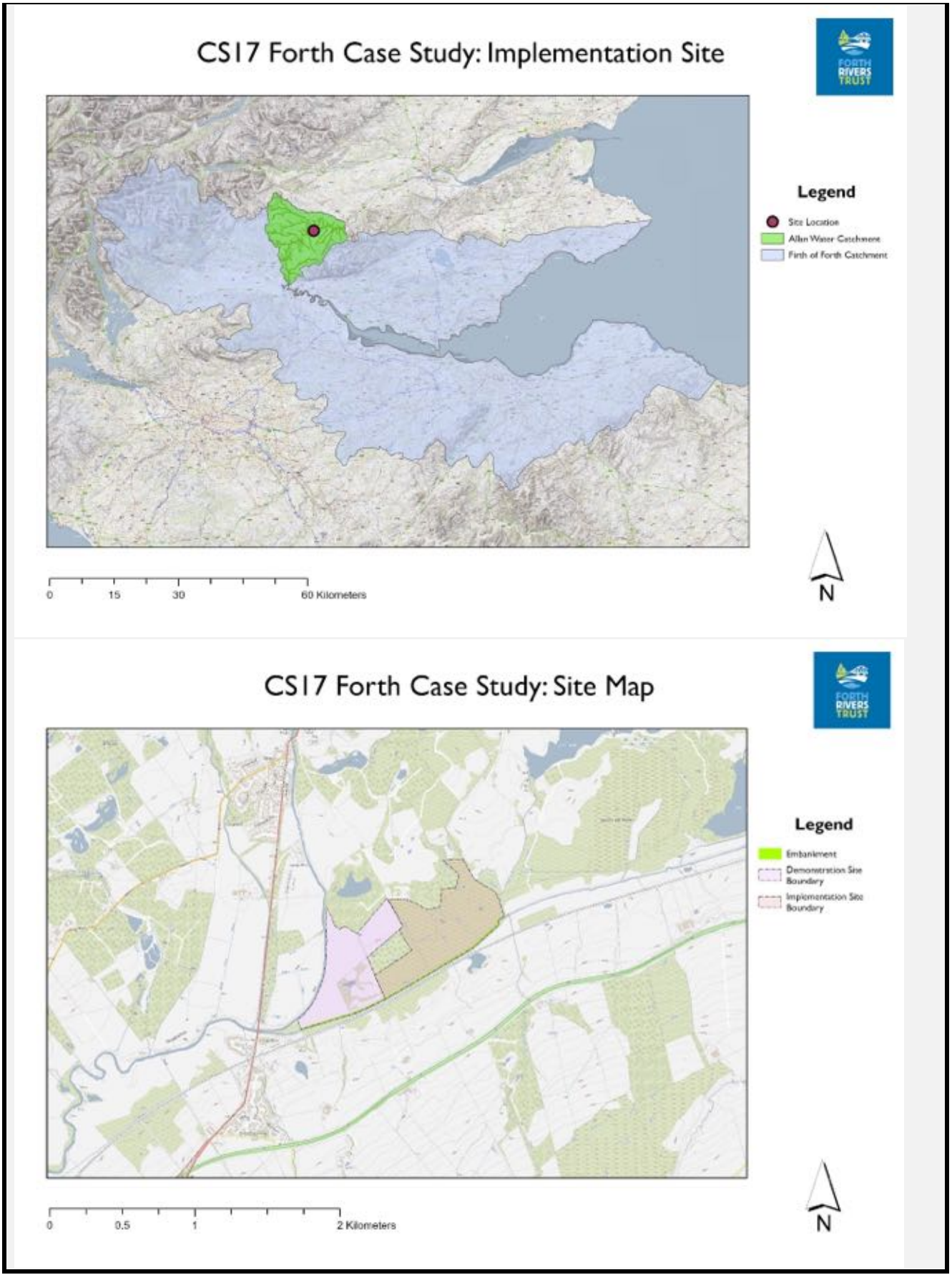
Site:
Greenloaning – Landowner (Blackford Estates) has already authorised previous work on their land just downstream of proposed site.

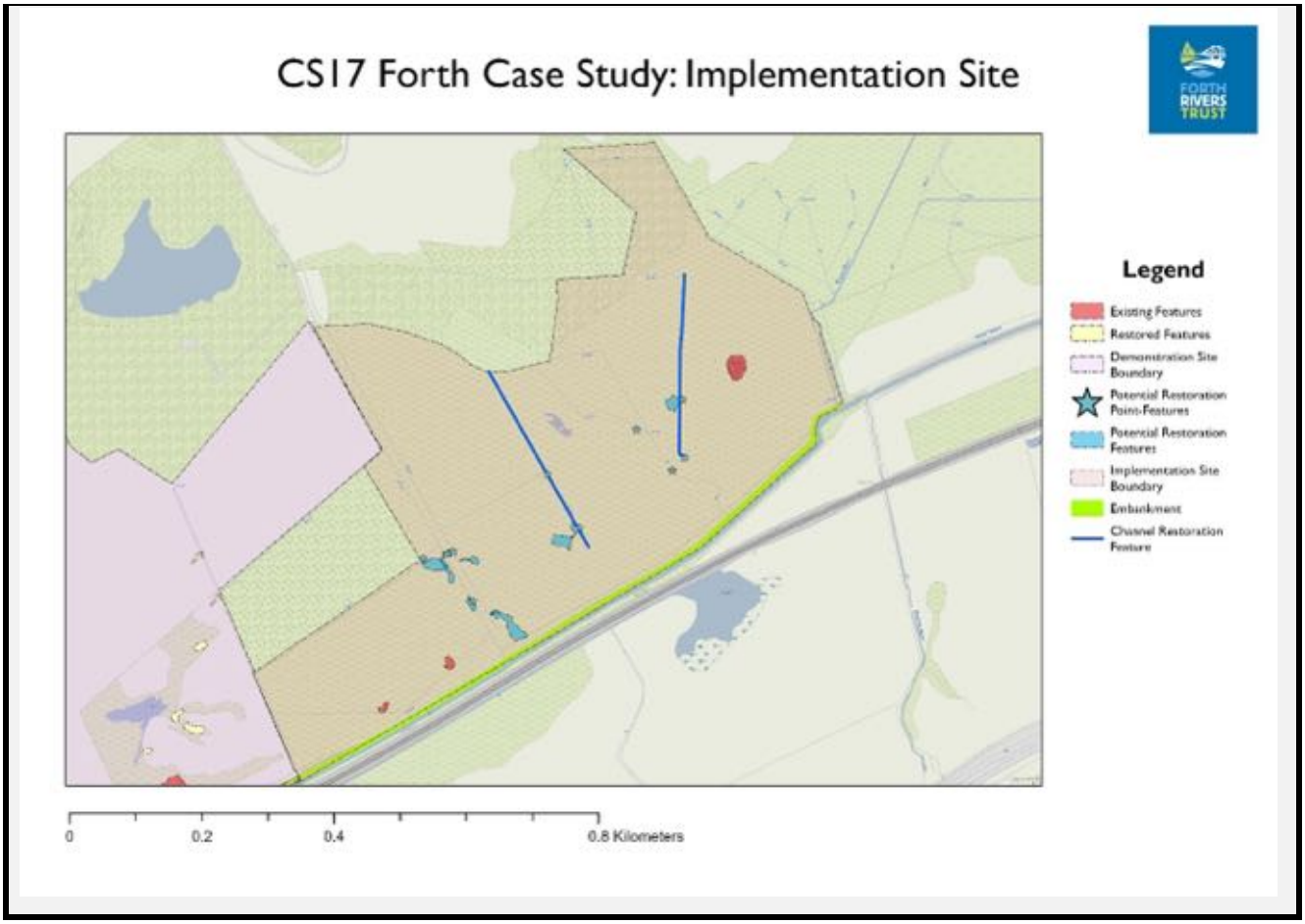
On the floodplain at Greenloaning we will look to reverse the impact of draining of the floodplain to hold water on the floodplain for longer. Existing open ditches and drains will be blocked using large woody material acquired locally from Blackford Farms estate as well as by using existing spoil on site. In addition to using spoil to block drains, leaky dams will be used as appropriate to block drainage ditches, directing any more than a low flow of water to spill out of the drainage channel and into the floodplain. The water channels from the existing drains will be redirected to flow into natural depressions on the floodplain, or into newly created wetland scrapes. Underground clay pipe drains that pass through the embankment on the west side of the River Allan will be broken to allow water to be retained on the floodplain for longer before entering the river system, and reduce point source sedimentation deposits into the river. This is part of the overall strategy for the floodplain from Panholes of Milton and Greenloaning working with the landowner incrementally with smaller interventions over time to ensure continued confidence. This project will not involve the removal of any embankments however this action continues to be discussed for potential future phases.

The area will be monitored with respect to flood water alleviation and biodiversity (plant and animal species).

1. Map the measure (site)/ Visualise the measure

See below


CS17 Forth Case Study: Implementation Site
Legend
Site Location
Allan Water Catchment
Firth of Forth Catchment
0
15
30
60 Kilometers
N
CS17 Forth Case Study: Site Map
Legend
Embankment
Demonstration Site Boundary
Implementation Site Boundary
0
0.5
1
2 Kilometers
N



2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing		
Zero pollution goals	X	X
Sustainable food systems (F2F)		
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy	X	X
Financing the transition		
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your gap analysis/ Optimisation strategies (SWOT)? If so, which?	Forth case study, with both peatland and river restoration, offers potential to optimise synergies between restoration sites (if co-located or in same sub-catchment). The potential peatland restoration site is located in the same catchment as the proposed works for this implementation plan, so has become a focus to achieve this due to the unique potential to have input on the restoration of both landscape features.
Did you obtain recommendations for optimization from your case study board? If so, which?	Plans were discussed and showcased at the Allan Water Steering Group (AWSG) quarterly meeting in December. The AWSG is an already established group not officially tied to the MERLIN project, but to the Allan Water catchment as a whole, through the Allan Water Project funded in part by the Scottish Government. Partners were consulted in principle, with approval of the works being received from those involved. Those involved include government organisations such as Scottish Forestry and the Scottish Environmental Protection Agency as well as local authorities (councils) such as representatives from Perth & Kinross Council and Stirling Council flood teams. No formal recommendations were made by the AWSG in regards to optimisation the implementation works, although the works are based on the continuation and upscaling of efforts initially approved of by the Royal Society for the Protection of Birds (RSPB) member of ASWG, in the context of their impact on wading bird habitat.
Did you obtain recommendations for optimization from your case study cluster? If so, which?	No recommendations for optimization were obtained from other members of the case study cluster for the river restoration/wetland creation aspect.
Based on all those recommendations, how can you optimise the implementation process of your measure?	Works implemented on the demonstration site prior to MERLIN works taking place will form the basis for the upscaling of the works in the implementation plan. The works will be scaled up to provide a greater impact on factors such as flood resilience, biodiversity net-gain and drought resilience.
How can you optimise the impact of your measure?	Observe the key successes of the prior works carried out, such as the bi-annual mowing of the site leading to a marked increase in wading bird activity on site and increased floodplain storage (not yet formally measured). Effectively working with the monitoring partners to share site knowledge and combine efforts to deliver works that achieve targets and can be monitored in the most valuable ways possible.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	During the lifetime of MERLIN, we anticipate applying for further funding from public sources e.g. NatureScot funds such as Nature Restoration Fund, Biodiversity Challenge Fund. By using MERLIN funding to allow staff time to not only plan and implement the works but also to apply for extra sources of funding, we will be able to achieve more over the course of the project than we would have if we were only using MERLIN funding for implementation.
What additional funding can you actually acquire?	Nature Restoration Fund money can and likely will be acquired to be used in conjunction and continuation of the MERLIN works.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	Due to the works directly benefiting watercourses and their species, particularly Atlantic salmon (*Salmo salar*), the Forth District Salmon Fishery Board may contribute towards the match funding requirement for the Nature Restoration Fund aspect of the project. This is not yet confirmed.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	high risk: • Landowner may change decisions about works that can take place on their land, as they have their own set of motivations for allowing works to take place • Not securing additional funding for the works. MERLIN funding alone can be used for capital works but it will limit further works we are able to do later in the project • The arrangement between Forth Rivers Trust and NatureScot will likely require further fine-tuning before works fully commence, which may hold back the progress of both peatland and small streams implementation works low risk: • External funding may only cover capital works and not further site management. • External funding from NatureScot may not be achieved, resulting in the goals of the implementation works having to be scaled back to be achievable within solely the MERLIN Implementation budget. • Stakeholder relationships can break down due to unforeseeable circumstances. • Public perception of the works may not represent true effectiveness of NbS compared to other flood management techniques. • Large-scale flood event limiting access of machinery to site.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	high probability: • Landowner decisions - cannot be predicted and are not usually based on environmental benefits, rather economic benefits • Not securing additional funding – through previous experience with FRT applying to a variety of funding sources for a range of projects, there is no guarantee of success and competition is high • External funding may not cover further site management – additional funding sources may be required for ongoing site maintenance e.g. AECS low probability: • Stakeholder relationships can break down – not likely at this stage as good relationships are already in place from existing works and previous projects in the area • Public perception of the works may not represent true effectiveness of NbS • Large scale flood event limiting access of machinery to site
Which risks can be prevented and how?	• Stakeholder relationships can break down – This can be avoided through maintaining constant communication and reassurance throughout the implementation process. • Public perception of works – This can be combatted with frequent social media posts and community engagement efforts throughout the implementation and monitoring process demonstrating the effectiveness of the works being carried out.

6. Plan time																
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Internal meetings to identify potential areas for restoration/reconnection			X	X	X												
Site visits			X	X	X												
Engage with relevant stakeholders – landowners, local communities		X	X	X	X	X	X	X	X	X							
Develop implementation and monitoring design			X	X	X												
Monitoring (vegetation and zoology)					X	X	X				X	X					
Project Delivery								X	X								
Final funder reporting, finances													X				

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Development, feasibility, stakeholder engagement, delivery (Staff Time)	**Management costs:** 15 days – £8,250 **Staff Day costs:** ~70 - £24,300 **Additional Management costs – Licencing + Permissions:** £1750 **Mileage (0.45/mile):** £5,970 **Subsistence Allowance:** £1428.57	**MERLIN implementation budget = £2,600** Nature Restoration Fund
Delivery (Contractor)	**Excavator Hire:** £40,000 **Site Engineer Hire:** £4000	**MERLIN implementation budget = £6000** Nature Restoration Fund
Delivery (Materials + additional costs)	**Vehicle + Equipment Hire:** Vehicle hire - £7000 Equipment hire for leaky dams - £3000 **Materials:** Live willow – £21,461.43 Leaky dam materials - £20,000 Tree trunks - £3000 Wildflower plug/seed mix - £3000	**MERLIN Implementation budget = £12,000** Nature Restoration Fund
Monitoring (Staff time)	**Drone Survey and Processing:** 4 days – £1,600 **Phase 1 Habitat Survey:**	**MERLIN implementation budget = £1000**

	2 days - £700 **Fixed Point Photography:** 1 day - £350 **Report:** 1 day - £350 £7000	Nature Restoration Fund
Reporting, Finances and Post-project Engagement (Staff time)	**Management:** 3 days - £1650 **Staff Time:** 5 days - £1750	Nature Restoration Fund
SUM	**MERLIN Implementation - £21,600 / ~ 24,550 €** **Nature Restoration Fund - £131,960**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Internal meetings to identify potential areas for restoration/reconnection	Huw Streater	Niall Provan, Sandra Stewart	
Site visit	Sandra Stewart	Huw Streater, Niall Provan	
Engage with relevant stakeholders – landowners, local communities (e.g. for maintenance plan)	Huw Streater, Niall Provan, Sandra Stewart	Other FRT staff to assist with public engagement as required	
Develop implementation and monitoring design	Justyna Olszewska, Amy Pickard	Other CEH staff	
Monitoring (vegetation and zoology)	Justyna Olszewska, Amy Pickard	Other CEH staff	
Project Delivery	Senior Project Officer, Niall Provan, Sandra Stewart	Landowner, works contractors, other FRT staff as appropriate to assist with delivery	
Final funder reporting, finances	Senior Project Officer	FRT finance staff as required	

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Biodiversity net gain - Indicator: Species richness and diversity of native flora; Climate regulation - Indicator: Greenhouse gas emission, water quality; Flood resilience - Indicator: additional water storage capacity created; Zero pollution – Indicator: surface water chemical status, nutrient concentrations (phosphorus and nitrogen), dissolved and total organic carbon; Inclusive participation and governance - Indicator: number of visitors to project website - This can potentially be estimated using the FRT Website, as well as recording of engagement and reach from content posted on social media platforms.

Do you expect to see short-term or long-term impacts?	As implementation partners we would expect to see both – short term changes will result in a greater retention of water on the floodplain and an increase in wading bird activity due to the mown, disturbed ground. These changes will develop further in the longer term, leading to changes in vegetation make-up and overall biodiversity of the site. Enhanced water storage capacity is also expected to lead to both, short-term and long-term changes in greenhouse gas emissions.

3.3 Cases per cluster large rivers

3.3.1 Case study 4 Room for the Rhine branches (Netherlands)

Case study name	**Room for the rhine branches | reconnecting floodplains – ecological flood retention**
Person(s) completing this template	**Gertjan Geerling (Deltares, scientific partner), Marieke de Lange (RWS, implementation partner)** Deltares RWS: Ministerie van Infrastructuur en Waterstaat (Ministry of Infrastructure and Water Management)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	100 ha of floodplains will be reconnected or rewetted. A risk assessment and prioritisation of other potential floodplains will be ready, as well as an implementation plan for the remaining 300 ha.
Goals set for M 48 in the proposal	Our main goals are modification of land use (nature replacing agriculture) and subsequent rewetting. The exact type of rewetting will be tuned to the restoration site's local opportunities, this ensures both maximizing the biodiversity gain and being able to seize more opportunities. Types of rewetting in scope are: addition to adjusting sluices to retain water after floods (simulating relic river hinterlands); dredging of silted channels to restore hydrological connectivity; improving conditions for natural ground water seepage to kickstart wetland formation. About 400 ha of floodplains in total will be reconnected or rewetted.
Can you imagine further goals beyond MERLIN?	Further goals beyond MERLIN are linked to two long term programmes in which we embed the MERLIN results for upscaling (and data, MERLIN lessons): these are the Programmatic Approach Large Waters (a long-term nature rehabilitation programme), and the Integral River Management program (that encompasses nature as one of the river 'functions').

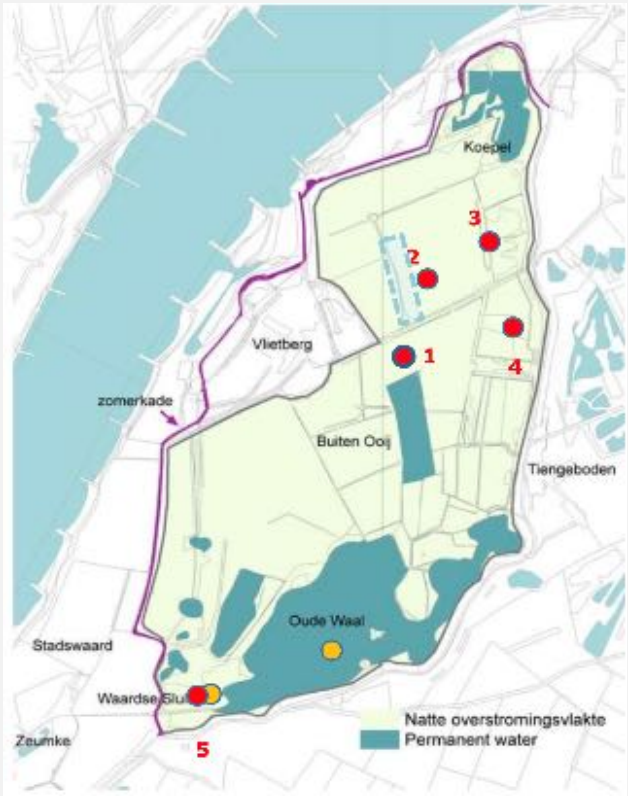
Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	No
Is there a need to select/prioritise?	No, there is only one type of measure (rewetting). We only prioritise locations to pick those that are most easy to realise.

1. Measure	Floodplain reconnection | ecological retention areas
1.1. Site	

0. Detail the implementation measure

Creation of ecological flood retention by changing land use from (often) agriculture to nature, rewetting floodplains, reconnecting floodplains and change of sluice management in summer dikes.

1. Map the measure (site)/ Visualise the measure



Map of the location, left, and aerial photo, right. Total area is about 100 ha. The green coloured area in the map is the area for ecological retention, the blue areas are permanent water inside the retention area. The red dots are monitoring locations used in a pilot study (see literature source below).

Source: G. Kurstjens, M. Nijssen, A. van Winden, M. Dorenbosch, H. Moller Pillot, C. van Turnhout & P. Veldt, 2020. Natte overstromingsvlakten in het rivierengebied. Ecologisch functioneren en ontwikkelkansen, rapport 2020/OBN237-RI. VBNE, Driebergen.

We have started a selection process. Firstly, we based this on a study focussing on the physical suitability for adapting sluice management, see image below (green/red both mean sites are suitable).

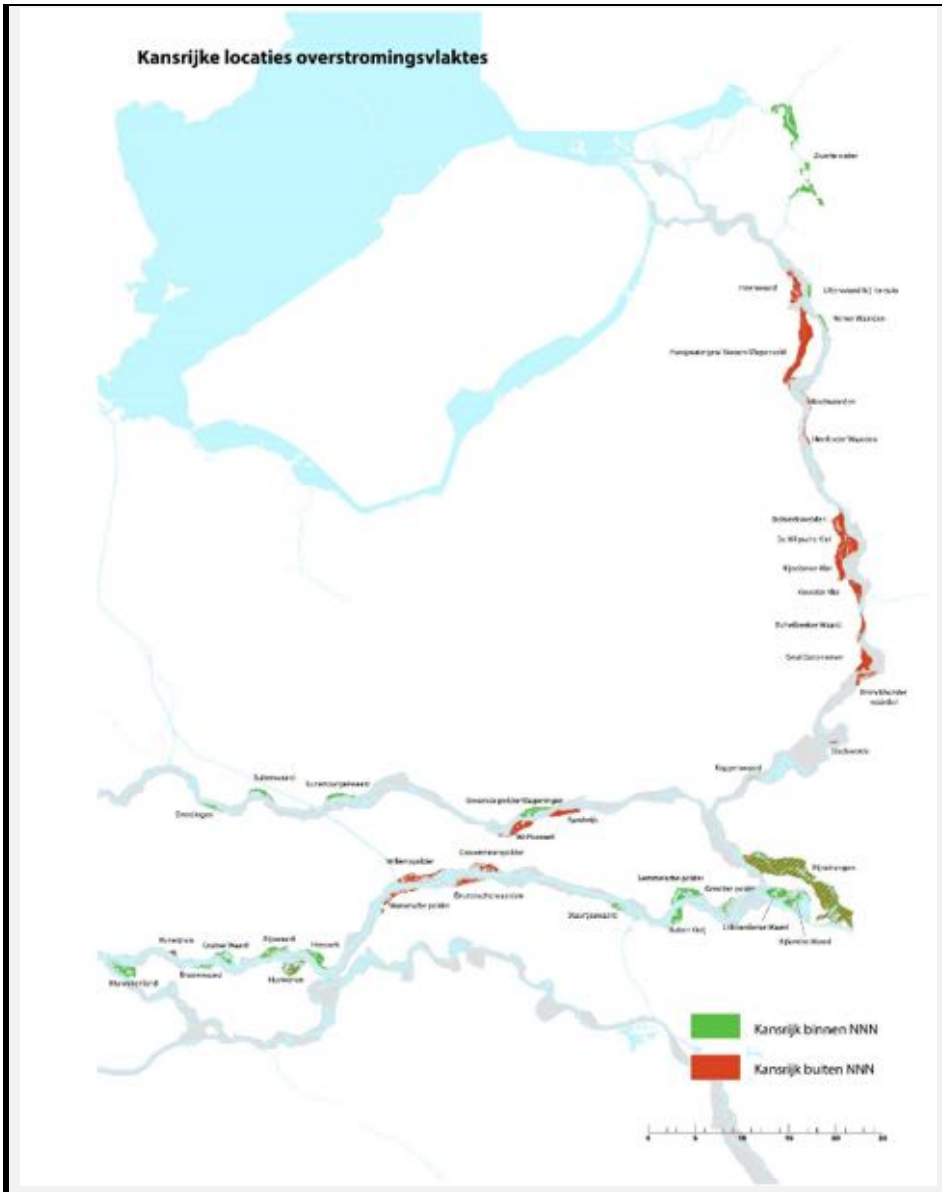


Figure 1: potential locations for rewetting by sluice management adaptation. Selection based on physical characteristics of rewetting and retaining floods for at least 6-8 weeks for highest biodiversity response (Kurstjens et al., 2020).

We talked to the main stakeholders and filtered on land ownership. During the talks with the major stakeholders we encountered that similar implementation processes are in place with the Province of Gelderland. We are now teaming up, and have broadened our selection with their input. Since there are some sites that have complicated stakeholder settings, while on the other hand we have many sites, we determine the 'low hanging fruits' to implement in co-operation with RWS (MERLIN partner), Province Gelderland and the State Forestry agency. See also point 3 optimising the plan.

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	
Sustainable food systems (F2F)		
Sustainable energy		
Sustainable transport	X	
Inclusivity		
Circular economy		
Financing the transition	X	
Green growth	X	

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	The SWOT analysis resulted in the following aspects/recommendations that we will incorporate in our implementation case. - climate change may increase flood- and drought risk to a level beyond what was designed for in the original plans - drought reduced navigation possibilities might take prevalence above nature restoration goals - potential conflict with GD goal on sustainable transport (increase in inland navigation & navigability during low discharges might request weirs) - excessive recreation pressure can have negative effects on biodiversity - future dialogue may be influenced by bad experiences by specific stakeholders in the past - it is important to avoid solutions that are too much a compromise, with none of the functions at satisfactory level.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	Yes, the first optimisation came from a pilot study conducted to show the most hydrological relevant locations based on summer dike, sluice presence and soil infiltration rates (slow), see figure 1. The second optimisation recommended was to choose the sites in which land ownership is not too complex, mostly land in ownership by the national authorities or the state forestry agency, yielding a short list of locations based on the first two optimisations. The third optimisation was that the province of Gelderland was also working on the same measure in their N2000 areas in the Rhine Branches (a fact formerly unknown). So now we team up with them and added their locations to the list.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	We discussed some of the recommendations with our study cluster during the field visit.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	The exchange of knowledge and experience in the case study board already fostered an alliance of goals between RWS (river authority) and province of Gelderland (N2000 manager).
How can you optimise the **impact** of your measure?	The alliance with province of Gelderland can be beneficial for the speed and size of the impact, we might realise more locations after MERLIN than expected.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	- The Province of Gelderland can bring their own funding for the realisation of N2000 areas. - The Water Boards can bring some funding for the maintenance of summer dike or sluice infrastructure. Depends on each site's unique local history. - Research budget in use for further monitoring of species dynamics in flooded retention areas. Provided by OBN, Dutch research program aimed at practical nature management practices, www.natuurkennis.nl.
What additional funding can you actually acquire?	Probably the above mentioned.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc.)?	Yes, the days spend in the case study boards and planning meetings.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	- Land ownership can hamper implementation, we carefully select sites - HIGH RISK: Surrounding farmers can object to implementation, and the farmers have very recently (after start of MERLIN) expressed fierce opposition to N2000 areas next to their fields. (They have to reduce nitrogen emissions and are, in some places, strongly urged to close down). This is not under our control and has developed after the MERLIN project started. - HIGH RISK: potential conflict with GD goal on sustainable transport (increase in inland navigation & navigability during low discharges might request weirs)
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	- Risk of opposing farmers is HIGH, not sure what the consequences will be. - Risk of conflict with navigation is HIGH.
Which risks can be prevented and how?	- Land ownership problems can be avoided by carefully selecting sites - We have included Rijkswaterstaat colleagues in our case study board, to develop the plans together with them - We are considering other methods for rewetting floodplains, without reconnection to the main stream, which will have no effects on navigation

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Setting up boards / connecting to stakeholders	X	X															
Scoping of potential for upscaling (outscaling) sites		X	X														
Workshop on hydrological issues		X															
Establishing synergy with Province (N2000 manager)			X	X													
Implementation plans			X	X													
Implementation “Oude Waal site” (100 ha)					X	X											
Prelim studies additional sites (to 300 ha)				X	X	X	X										
Implementation plans additional sites						X	X	X									
Implementation additional sites									X	X	X	X	X	X	X	X	

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Field visit Large rivers cluster (2022)	10,000 €	MERLIN
Stakeholder activities	10,000 €	MERLIN
Preparatory studies floodplains	75,000 €	Together with Province of Gelderland
Implementation floodplain 1	150,000 €	MERLIN
Implementation floodplain 2	150,000 €	MERLIN
Implementation floodplain 3	150,000 €	MERLIN
Contribution to other work packages	50,000 €	MERLIN
Travel and consumables	20,000 €	MERLIN
Rijkswaterstaat overhead	147,500 € 25,000 €	MERLIN
unforeseen	10,000 €	MERLIN
SUM	**787,500 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Field visit 2022	Rijkswaterstaat	Dr. Marieke de Lange	
Scientific underpinning of measure and associated choices	Deltares	Dr. Gertjan Geerling	Good contact with acting researchers, OBN and contact/inputs from the field/stakeholders to help local optimisation (work from co-creation perspective, not desk studies).
Stakeholder activities	Rijkswaterstaat/Deltares	Dr. Marieke de Lange / Dr. Gertjan Geerling	
Preparatory studies floodplains	Rijkswaterstaat, Deltares	Dr. Marieke de Lange / Dr. Gertjan Geerling	Together with State Forestry Agency and Province of Gelderland
Implementation floodplains	Rijkswaterstaat, Deltares, State Forestry Agency, Province of Gelderland, Water board	Dr. Marieke de Lange / Dr. Gertjan Geerling	When the exact floodplains are chosen, this will be further filled in with detailed description of responsible colleagues

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Biodiversity (change of ha land use and land cover in case of land changing from terrestrial to below the water table). Detailed monitoring on the species level is not foreseen by a large-scale effort. However, on some sites species inventories might take place, we will report biodiversity gains on the species level for sites if they become available.
Do you expect to see short-term or long-term impacts?	Short term when land use is changed, ecological processes take time to really affect biodiversity. We opt for 'nature-based restoration' meaning no planting or seeding of flora, but rather create the processes that enable the return of species. Additionally, for rewetting by floods, it's also longer term because we need an actual flood to have occurred in the retention areas affecting local ecology

3.3.2 Case study 7a Danube (Austria)

Case study name	**Upper Danube Case Study**
Person(s) completing this template	**Iris Kempter (viadonau; implementation partner), Robert Tögel (viadonau; implementation partner), Alice Kaufmann (viadonau; implementation partner), Silke-Silvia Drexler (BOKU-IHG; scientific partner)** BOKU-IHG = Universitaet fuer Bodenkultur Wien (University of Natural Resources and Life Sciences, Vienna) viadonau = Osterreichische Wasserstrassen Gesellschaft MBH (Viadonau)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	The planning process will be finalised and the project documents submitted to the authorities for approval and all necessary permissions will have been gained. Furthermore, the preparation of the tender process for the construction works will be under way. The monitoring program to evaluate the effect of the measures will be defined by the authorities and part of the implementation.
Goals set for M 48 in the proposal	River bank restoration and removal of groyne fragments done for approx. 1 km of shoreline. Connection of 10.8 ha floodplain.
Can you imagine further goals beyond MERLIN?	Apply river bank restoration on the Danube stretch eastwards of Vienna (where no further impacts are to be expected) and also at other free-flowing stretches of the Austrian Danube.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	No
Is there a need to select/prioritise?	No

1. Measure	**Riverbank restoration and removal of groyne fragments**
1.1. Site	**Danube river km 1882,6 to 1881,85**

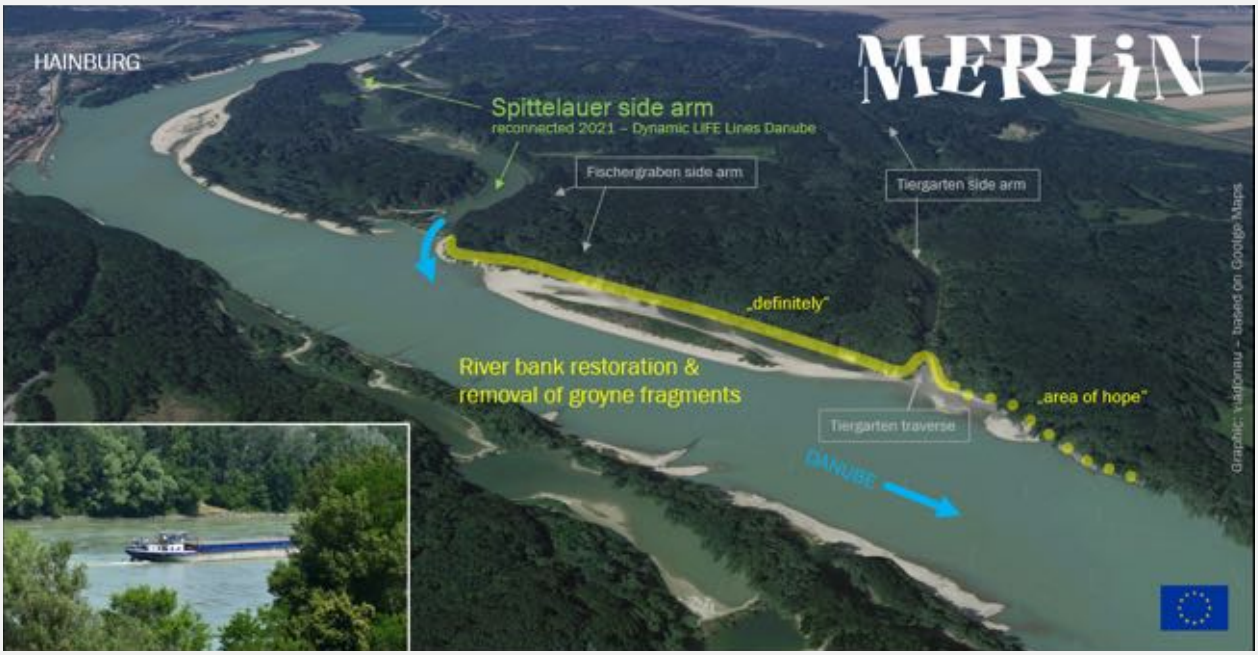
0. Detail the implementation measure

Measures: The aim of the MERLIN project at the Austrian case study area is to restore the riverbank by removing the “Treppelweg”, the bank protection and groyne elements.

Site: Danube stretch eastwards of Vienna (in the Danube NP) at river km 1882,6 to 1881,85.

In case enough money is left, additionally the restoration will also be conducted from river km 1881,8 to 1881,6.

1. Map the measure (site)/ Visualise the measure



2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	
Drought resilience	X	
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	
Sustainable energy		
Sustainable transport	X	X
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	To check the stakeholder involvement/engagement regularly especially in terms of including stakeholders from new fields (e.g. eco-tourism, recreation). Integrating the Green Deal Goals in the planning process to screen on new important topics like, for example, drought resilience in relation to climate change. To focus more on NbS in implementation and awareness raising and highlight the benefits of NbS among authorities but also among the broad public. The follow-up on circular economy by selling removed stones from restoration works. Proceeding with the work on a new action plan for the Austrian Danube to provide stability and long-term perspectives.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	The case study in the MERLIN project was presented to the CSB. The design corresponds to the already known concept from other restoration projects. Therefore, the advisory board members agreed to the planned procedure without any additional recommendations.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	When developing the optimisation strategy, we were also motivated to think about drought and flood aspects for the demonstration site.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	For the MERLIN implementation the recommendations are too late, as it is already close to implementation. But for future restoration projects it will make sense to think outside the box and not only focussing on biodiversity and navigation. Including the Green Deal Goals in future planning processes and analysis will help to address also new impacts like drought or climate change in general.
How can you optimise the **impact** of your measure?	Close collaboration with different stakeholders from the CSB (e.g. ministries, economy, environmental sector etc.) at a very early stage of restauration implementation.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	The restoration measures are financed via MERLIN with approx. 800,000 €. Additionally, half of that amount is invested from viadonau (public money).
What additional funding can you actually acquire?	None.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	No. Only in-kind contribution from viadonau (70% of eligible costs financed by EU the other 30% are in-kind contribution from viadonau).

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	Low risk: • approval of project documents by authorities might be delayed and therefore the necessary permissions too • tender process might be influenced due to a small number of companies who are able to perform the described work • delay of implementation due to environmental reasons (e.g. too high-water levels etc.)
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	Low probability for all listed risks due to vast experience with such projects.
Which risks can be prevented and how?	All risks can be prevented when the whole process is started early enough.

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
Define area for implementation	X																
Involve stakeholder-board	X																
Start process with authorities to get the respective permissions	X																
Start tendering process for implementing companies				X													

Define area for MERLIN monitoring (fish ecology)	X																
Get permissions for fish-monitoring		X															
Conduct fish-monitoring			X														
Start restoration at MERLIN site (r-km 1882,6 to 1881,85)						X											
Further proceed with restoration from r-km 1881,8 to 1881,6							X										
Apply restoration at other free-flowing Danube stretches in AUT																	X

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Define area for implementation		MERLIN funding (viadonau) / viadonau
Involve stakeholder-board		MERLIN funding (viadonau) / viadonau
Start process with authorities to get the respective permissions		MERLIN funding (viadonau) / viadonau
Start tendering process for implementing companies		MERLIN funding (viadonau) / viadonau
Site and ecological supervision		MERLIN funding (viadonau) / viadonau
Investigation for explosive ordnance		MERLIN funding (viadonau) / viadonau
SUM	**MERLIN 186,000 €** viadonau 85,000 €	
Start restoration at MERLIN site (r-km 1882,6 to 1881,85)	**MERLIN 700,000 €** viadonau 229,000 €	MERLIN funding (viadonau) / viadonau
Further proceed with restoration from r-km 1881,8 to 1881,6	-	Optional, if money is left
Apply restoration at other free-flowing Danube stretches in AUT	-	Viadonau (after project end)
Define area for MERLIN monitoring (fish ecology)	-	MERLIN funding (BOKU)
Get permissions for fish-monitoring	-	MERLIN funding (BOKU)
Conduct fish-monitoring	-	MERLIN funding (BOKU)
TOTAL SUM	**MERLIN 886,000 €** viadonau 314,000 €	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Define area for implementation	viadonau		The CSB was involved from the very beginning of the plans for the MEASURES implementation and is updated in regular meetings on the progress of the restoration measures (applies for all other listed tasks).
Involve stakeholder board	viadonau	BOKU-IHG, stakeholders (environment, navigation, authorities etc.)	
Start process with authorities to get the respective permissions	viadonau	BOKU-IHG	
Start tendering process for implementing companies	viadonau		
Site and ecological supervision	viadonau		
Investigation for explosive ordnance	viadonau	Investigation company	
Define area for MERLIN monitoring (fish ecology)	BOKU-IHG, viadonau, Danube NP		
Get permissions for fish-monitoring	BOKU-IHG	viadonau, Danube NP, fishing associations	
Conduct fish-monitoring	BOKU-IHG	viadonau, Danube NP, fishing associations	
Start restoration at MERLIN site (r-km 1882,6 to 1881,85)	viadonau	Construction company, site supervision, BOKU-IHG, Danube NP, stakeholders (environment, navigation, authorities etc.)	
Further proceed with restoration from r-km 1881,8 to 1881,6	viadonau	Construction company, site supervision, BOKU-IHG, Danube NP, stakeholders (environment, navigation, authorities etc.)	
Apply restoration on other free-flowing Danube stretches in AUT	viadonau		

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	Biodiversity net gain: monitoring of fish species. Additional including standard data from NATURA 2000 assessment as the implementation site is in a NATURA 2000 area.
Do you expect to see short-term or long-term impacts?	Long-term effects

3.3.3 Case study 7b Danube (Hungary)

CS7b does not implement measures in MERLIN.

3.3.4 Case study 8 Danube (Romania)

Case study name	**Danube Floodplain RO**
Person(s) completing this template	**Iulia Puiu (WWF Ro), Cătălin Anton (WWF Ro)** WWF Ro = Asociatia WWF Romania (WWF Romania)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	By month 24, the tendering procedure to develop the technical design and to implement the measure based on the technical documentation will be finalised. All the necessary permits will be obtained from the relevant authorities. The implementation of the measure will likely have started.
Goals set for M 48 in the proposal	Decrease the flood-risk downstream by improving the connectivity with the Danube on 700 ha. Removing the sediments and vegetation on 2.5 ha and creating a habitat mosaic on 200 ha.
Can you imagine further goals beyond MERLIN?	Continue implementing restoration projects, aiming to improve floodplain connectivity to the Danube pulse. Continue implementing monitoring in order to gain evidence on floodplain importance in terms of floods and droughts mitigation, biodiversity conservation and local socio-economic development.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	No
Is there a need to select/prioritise?	No

1. Measure	**Improving the ecological status of the wetlands**
1.1. Site	**Gârla Mare - Vrata**

0. Detail the implementation measure

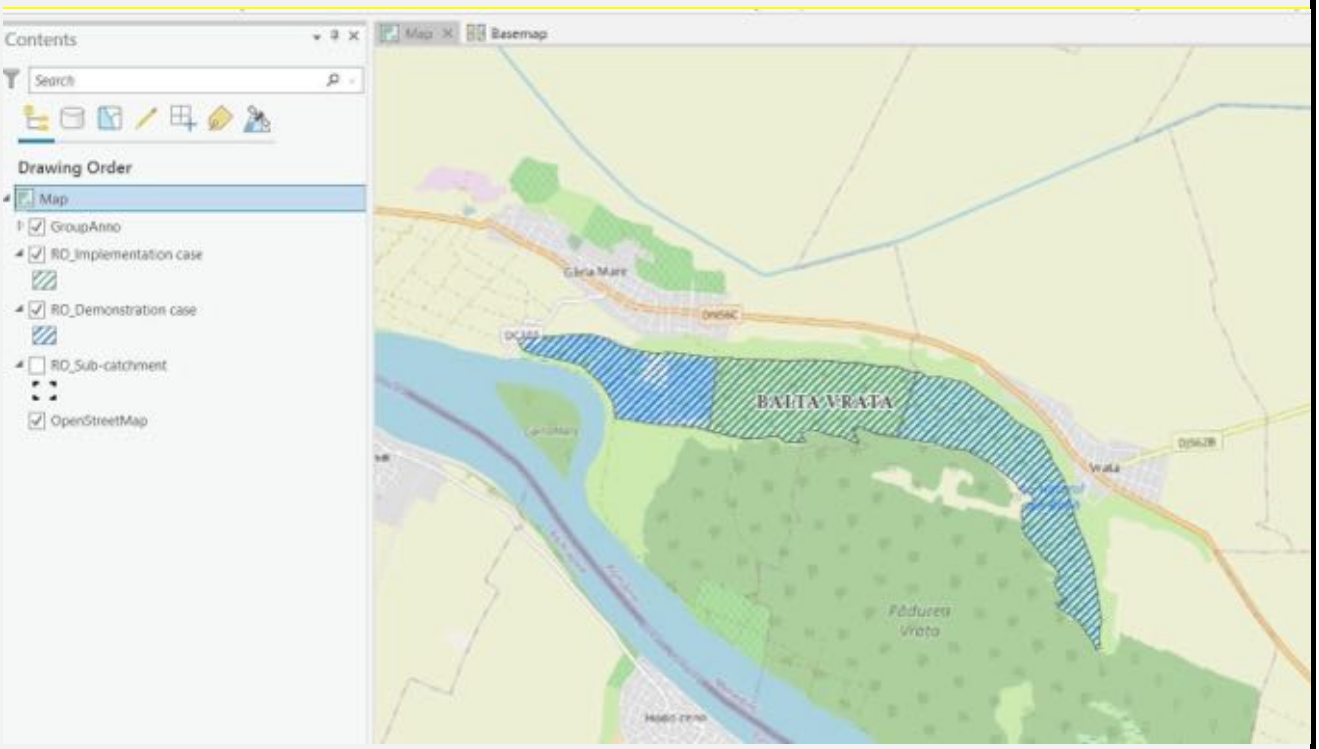
Gârla Mare – Vrata area has been designated a Natura 2000 site, even though the status of the marsh was degraded. In order to overcome this situation, WWF Romania started a process of improving the habitats aiming to enhance the conservation status by increasing the amount of water necessary for the aquatic species identified in the area.

This Nature Based Solution (NbS) will increase the water storage capacity inside the marsh, reducing the flood risk, in parallel with increasing the biodiversity and creating the potential for developing new business using the ecosystem services provided by the restored area.

Identified activities required as part of the implementation:

- conduct tendering process to develop the technical design
- develop technical design
- conduct other technical necessary studies
- start process with authorities to get the necessary permits
- start implementing the restoration project in the pilot site
- develop implementation and monitoring design
- monitoring (vegetation, zoology and water quality)

1. Map the measure (site)/ Visualise the measure



2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals	X	X
Sustainable food systems (F2F)	X	
Sustainable energy	X	
Sustainable transport	X	
Inclusivity	X	
Circular economy	X	X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	The restoration projects take into account the multiple benefits, besides the improving of conservation status of species and habitats, also the benefits of the local business (fish farming and other potential business), flood risk mitigation and the needs of the local communities to access natural resources (access to fishing). Also, the River Basin Management Plan is already considering the restoration projects as a measure that improves the water body status.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	For the river restoration/wetland creation aspect, the case study board has not yet provided optimization recommendations.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	In regards to river restoration/wetland creation, no recommendations for optimization were received from other members of the cluster.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	The optimization strategy considers all of these aspects, analysing how the area can be optimised while also factoring in socio-economic factors and challenges related to politics and regulations.
How can you optimise the **impact** of your measure?	In this regard, the required aspects can be found in detail in the optimization strategy, in which we analysed both socio-economic factors and the challenges associated with politics and regulations.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	The restoration measures are financed via MERLIN with approx. 500,000 € (400,000 €: technical design, removing sediments work, other technical necessary studies, monitoring, permits cost and 100,000 €: indirect costs/overheads (preparing the tendering procedure, legal assistance in contracting, financial management, etc.)). Before MERLIN, 600,000 € were invested by The Coca Cola Company Foundation.
What additional funding can you actually acquire?	-
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	-

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	Low risk: • approval of project documents by authorities might be delayed and therefore the necessary permissions too • tender process might be influenced due to a small number of companies who are able to perform the described work • delay of implementation due to environmental reasons (e.g. too high-water levels etc.)
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	Low probability for all listed risks due to experience with such projects in the pilot area. Too high-water level cannot be predicted.
Which risks can be prevented and how?	All risks can be prevented when the whole process is started early enough.

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
Start tendering process for implementing companies				X													
Develop technical design					X												
Start process with authorities to get the necessary permits						X											

Start implementing the restoration project in the pilot site									X							
Develop implementation and monitoring design									X							
Monitoring (vegetation, zoology and water quality)											X	X	X	X	X	X

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Restoration works (technical design, removing sediments work, other technical necessary studies, monitoring, permits cost)	400,000 €	MERLIN Implementation budget
Indirect costs/overheads (preparing the tendering procedure, legal assistance in contracting, financial management, etc.)	100,000 €	MERLIN Implementation budget
SUM	**ca. 500,000 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Conduct tendering process for implementing companies	WWF RO		-
Develop technical design	WWF RO	GEOECOMAR	-
Other technical necessary studies	WWF RO	GEOECOMAR	-
Start process with authorities to get the necessary permits	WWF RO		-
Start implementing the restoration project in the pilot site	WWF RO	GEOECOMAR	-
Develop implementation and monitoring design	WWF RO	GEOECOMAR	-
Monitoring (vegetation, zoology and water quality)	WWF RO	GEOECOMAR	-

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	**Biodiversity net gain:** Conservation status of HD Annex I listed habitats including peatland, wetland and freshwater habitats in case study area, focusing on selected indicator species Conservation status of HD Annex II and Annex IV listed species including peatland, wetland and freshwater species in case study area, focusing on selected indicator species Conservation status of Annex I listed species in the Birds Directive, focusing on selected indicator species Ecological status of rivers and lakes in the case-study area Area of floodplain re-connected to river (ha) **Climate change:** Pre- and post-intervention land cover on these wetland-type soils (i.e. land-use change) (indicator 1) Pre- and post-intervention condition of areas under wetland vegetation (surface wetness, vegetation type, any information on active restoration measures) (Indicator 2) Overall extent and type of water bodies in the catchment (rivers, lakes, reservoirs, natural and constructed ponds, ditches) (indicator 1) Any changes in the extent and hydrological properties of each of these due to restoration (e.g. removal of barriers may reduce area and/or residence time of reservoirs, wetland restoration could reduce ditch extent but may increase the number of ponds) (Indicator 2) Baseline levels of nutrient and organic matter inputs and/or concentrations and/or trophic status in all water bodies. (Indicator 1) Changes in nutrient and organic matter inputs and/or concentrations and/or trophic status in water bodies affected by restoration (Indicator 2) **Flood resilience:** Area of newly designated areas for flooding (e.g., area of floodplain gains in result of dyke relocation; ha), (indicator 1) Area of rewetted wetlands (other than peatlands) (ha), (Indicator 2) Volume of channel retention gained as a result of restoration (m3), (indicator 3) Area of developed wetland buffer zones / length of developed buffer zone. (Indicator 4) **Drought resilience:** Area of rewetted wetlands (other than peatlands) (ha), (Indicator 1) Average annual increase of water levels in restored wetlands (cm) (indicator 2) **Health Wellbeing:** Change in length of active travel routes within or connected to the restoration area (km of routes per km^2 of restoration scheme) **Zero pollution:** Improvement in surface water quality before/after or downstream of the restoration • Surface water chemical status • Nutrient concentrations (Nitrogen, phosphorous) • Organic carbon pollution (dissolved and total organic carbon (DOC, TOC), chemical/biological oxygen demand (COD, BOD) • Salt loading, conductivity (Chloride, sulphate)
Do you expect to see short-term or long-term impacts?	Both

3.3.5 Case study 9 Tisza (Hungary)

Case study name	**Tisza**
Persons completing this template	**Péter Kajner (WWF HU), Tamás Gruber (WWF HU)** WWF HU: WWF Vilag Termeszeti Alap Magyarorszag Alapitvany (WWF Hungary)

MERLIN case study goals	
What goals were promised for your case study in the MERLIN project proposal (see Description of Action – Part B, pages 40-42)? It is important to fulfil these goals by mid-term (M24) and end (M48) of the MERLIN project. In case you identify further goals for the time beyond MERLIN, you can already note them down here. They will go into your regional scalability plan.	
Goals set for M 24 in the proposal	By Month 24, we will have selected the pilot site(s), where concrete restoration measures can be implemented. Furthermore, the details of the measures will have been specified, feasibility studies prepared, interventions planned in collaboration with communities and local stakeholder boards. Documentation for environment and water management permits will have been submitted.
Goals set for M 48 in the proposal	Restoration / construction of nature-based water retention systems, rehabilitation of local ecosystems lacking water or drying out (e.g. wetlands) (200 ha). Setting up nature friendly floodplain farming systems.
Can you imagine further goals beyond MERLIN?	The MERLIN project experiences from the Implementation and the Demonstration sites will be useable in other areas along the Tisza, and can be scaled up to help NbS land use change in 150,000 ha of the deep floodplains along the Hungarian part of the Tisza River basin.

Prioritise measures	
In those case studies, where several measures are foreseen, you should prioritise with regard to demand and impact concerning Green Deal goals.	
If several measures are planned, use one template for each (see below)!	
Are several measures foreseen in the proposal? If so, which?	• Regular inundation in a flood risk reduction reservoir system, landscape rehabilitation on the Upper Tisza • Planning and implementing water retention and floodplain farming systems on the Middle Tisza (with several sites)
Is there a need to select/prioritise?	• Regular inundation in a flood risk reduction reservoir system, landscape re-habilitation on the Upper Tisza - Implementation site: Bereg landscape (Hungarian part) • Planning and implementing water retention and floodplain farming systems on the Middle Tisza - Demonstration site: Nagykörű village – a floodplain farming system in the floodway of river Tisza - Demonstration site: Nagykörű village – a planned local farmer irrigation community in the floodway fringe of the Tisza

1. Measure	**Regular inundation in a flood risk reduction reservoir system, landscape rehabilitation on the Upper Tisza**
1.1. Site	**Implementation site: *Bereg landscape (Hungarian part)***

0. Detail the implementation measure

Measure:

Regular inundation of landscape units from the Tisza River within the Bereg Flood Risk Reduction Reservoir System, transition in land use, floodplain reconnection and rewetting, introduction of floodplain farming, biodiversity enhancement.

Site:

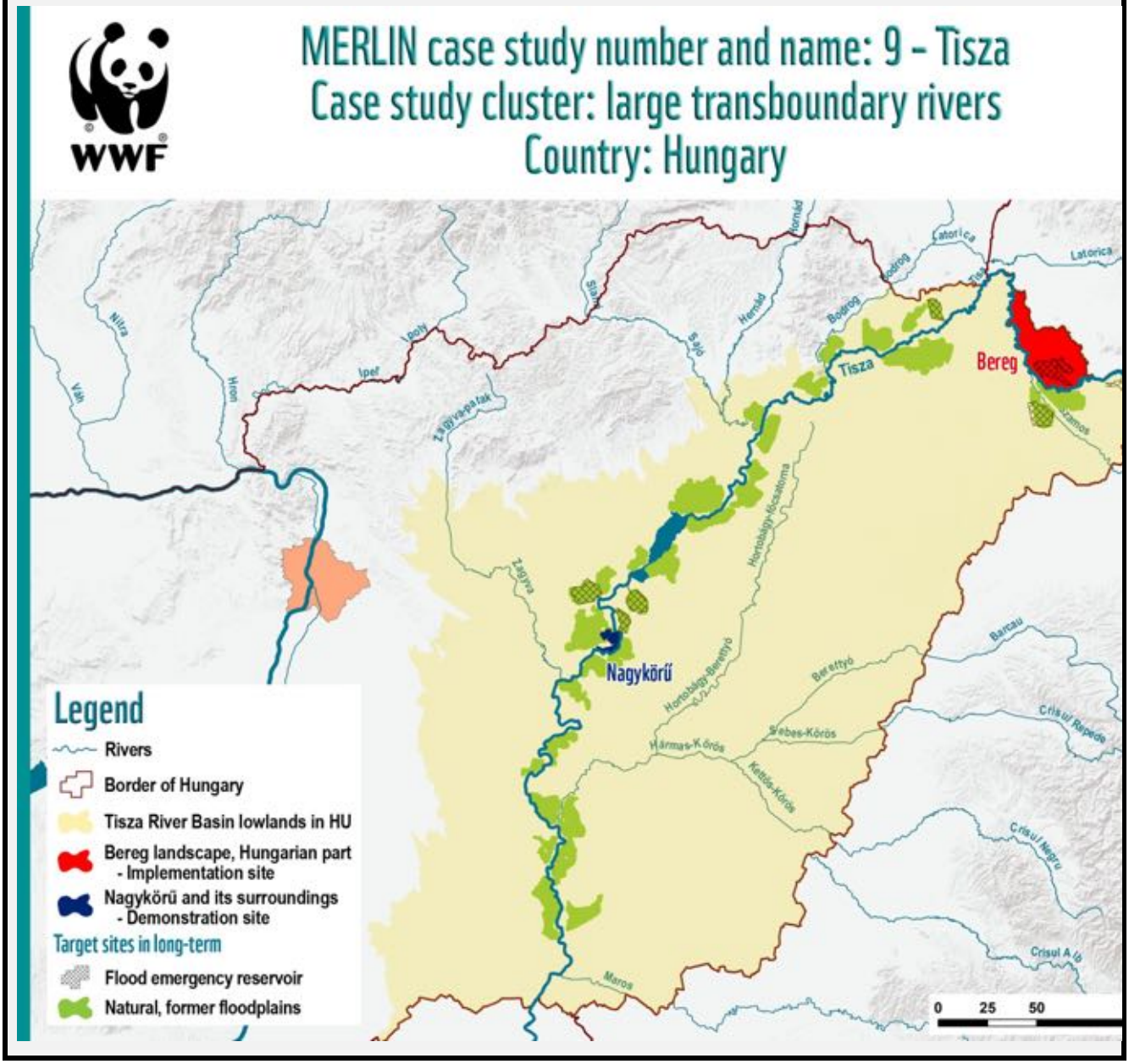
The Hungarian part of the Bereg landscape is 38,000 ha with 21 settlements, most of which belong to the Vásárosnamény district. The Bereg is situated between the Tisza River and the Hungarian border (the other part of the Bereg is in Ukraine.) At least 200 ha is to be restored in the Bereg pilot site.

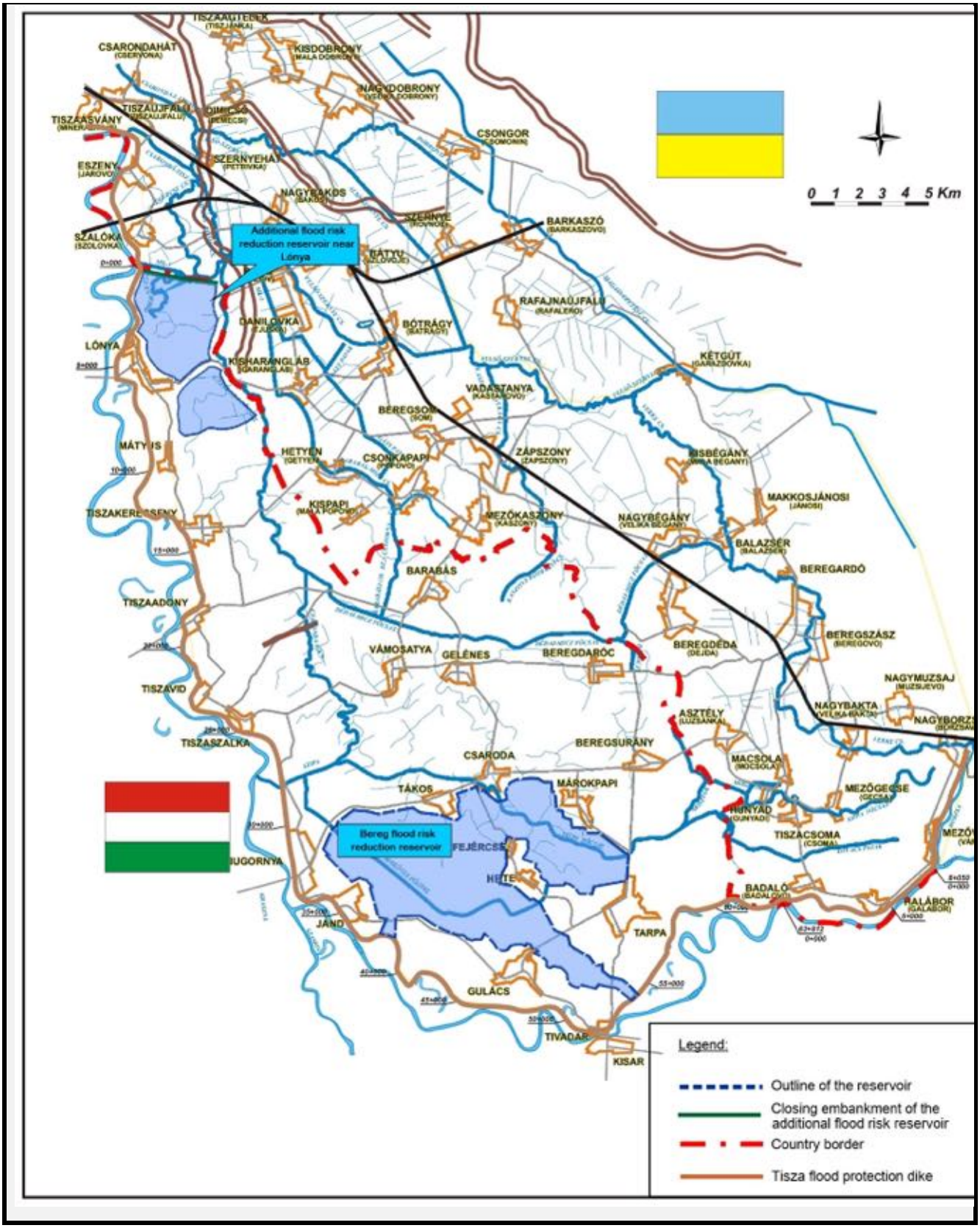
Previously the government built an emergency flood risk reduction reservoir in the former floodplain and a supplementary reservoir and water management system, which would allow water replenishment from the Tisza and nature-based floodplain farming. Agricultural lands and natural habitats are drying up due to the lack of surface water and increasingly frequent and intense droughts. After the huge state-financed investments, relatively minor further developments are needed only to operate a natural water replenishment system that would benefit natural habitats and farming.

Here, we intend to help planning and implementing a water replenishment system, which could provide this drying landscape with water from the Tisza. Flood water would be gravity fed into the floodplain, but a solar-powered pumping system would also be built to supply the water system with surplus water during low flows. A recommendation on a new land use system will be elaborated involving local farmers and other stakeholders. We advise farmers to switch to land uses that tolerate or require additional water, are nature-friendly and generate more income for local people.

The development will be monitored against almost all Green Deal criteria, as referred to in section 2.

1. Map the measure (site)/ Visualise the measure




0 1 2 3 4 5 Km
Additional flood risk reduction reservoir near Lónya
Bereg flood risk reduction reservoir
Legend:
Outline of the reservoir
Closing embankment of the additional flood risk reservoir
Country border
Tisza flood protection dike

2. Integrate the Green Deal criteria		
Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.		
Green Deal criteria	**Relevance in demo case (WP1)**	**Relevance in implementation case (WP2)**
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals		
Sustainable food systems (F2F)	X	X
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan	
Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!	
Did you obtain recommendations for optimization from your **gap analysis/ Optimisation strategies (SWOT)**? If so, which?	Due to decreasing water flows of the Tisza River, besides creating the opportunity of gravity-fed inundation of the water management system, a solar-powered pumping station will also be needed in the Bereg. Complex regional marketing will be initiated to promote local tourism. Research will help to understand farmers' motivations in current land uses and find incentives to help land use change promoting NWRM and floodplain farming.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	The first meeting of the Case Study Board was held on 29 November 2022, and its recommendations will be incorporated into the implementation plan later.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	We participated the field visit 'Room for the Rhine branches' in the Netherlands in June 2022, which was organised for the 'Large Transboundary Rivers' cluster. This Dutch program is very similar to what we plan to implement in the Bereg and the Hungarian part of the Tisza River Basin. The most important lesson from the Dutch project and the recommendations from the cluster members is that restoring floodplains requires decades of persistent work. In addition to substantial financial resources, it is of paramount importance that financial compensation and incentives are agreed with each land user or stakeholder to make land use change feasible. This is the basis for allowing water to be discharged into the floodplain and for rehabilitating habitats.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	A system of open planning must be developed and kept operational. The Case Study Board will be the engine of this process in the Bereg. Water management operational arrangements serving the interests of water retention and flood risk reduction at the same time has to be elaborated. Though, the reservoir and the water management system are operated mostly by the local water management directorate, land users should be involved in the further development and the daily operation of the system.
How can you optimise the **impact** of your measure?	Based on the site level results of research and the experiences with land users, national level policy proposals will be elaborated for better targeted subsidies, which

	would promote NWRM and floodplain farming. We will lobby to ensure that these proposals are incorporated into the Hungarian CAP measures.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	A national and EU co-financed source will be available in 2023 for planning the water management system. Given the high level of political will to address drought and flood risk management in the Bereg in an integrated way, it is expected that further Hungarian and EU co-financed funds will also be available for the implementation of the plans. Support for land-use change, agri-environmental management, forestry and local economic development will be available from the Rural Development Operational Programme (CAP). We plan to involve accommodation providers, village table service providers and tourism companies in the financing of local tourism development. To reduce agricultural risks, the insurance sector could also be involved, but this will need to be further investigated. We also plan to work with WWF's Bankable Nature Solutions initiative to attract financiers.
What additional funding can you actually acquire?	WWF NL and WWF CH co-finances our activities in the region.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	We see great potential in strengthening cooperation between local farmers. It is still common for smaller farmers to help each other by providing services (e.g. ploughing for hire). In some areas, because of the natural retention of water, land-using neighbours may be forced to cooperate in the cultivation of land. We plan to facilitate the development of this type of mutually beneficial cooperation through advisory services.

5. Consider risks	
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!	
What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • More weather extremes – Climate change may speed up the decrease of precipitation and water quantities in the Tisza. It will bring longer and more extreme droughts, but may cause unexpectedly high, extreme floods even after a decade of dry years. • Less water in the river – Due to climate change, water levels and quantities in river Tisza decrease. Floods are not long enough to supply the water management system by gravity-flow with enough water. • Conservation concerns – Rewetting landscapes must consider valuable habitats adapted to drier conditions. Low risk: • Lack of financial incentives – The farmers', land users' financial motivation for water retention and floodplain farming, instead of intensive land uses (e.g. cash crop production, intensive fruit plantations) will not be sufficient to motivate land use change adapted to water retention. The agricultural subsidy system will continue to encourage intensive arable farming, so land users will not be open to NWRM.

	• Irrigation and dams – Policy makers will push for irrigation development and dams on rivers, rather than Nature based Water Retention Measures (NWRM). • Lack of community decision-making – The land use structure and land use rights will remain fragmented, and the lack of local community decision mechanisms in land use will hinder water retention measures and setting priorities. • Weak collaboration of local economic actors – To reach success in tourism, a strong collaboration is necessary between local economic actors, but the culture of collaboration is weak.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • More weather extremes • Less water in the river • Irrigation and dams Low probability: • Conservation concerns • Lack of financial incentives • Lack of community decision-making • Weak collaboration of local economic actors
Which risks can be prevented and how?	• More weather extremes – A robust water management system that can cope with increasing extremes needs to be designed and implemented. The monitoring system should closely follow the processes in the landscape and provide feedback on project implementation so that activities can be optimised. However, some beneficial effects may be missed or different habitats may be created than what is now expected. • Less water in the river – A solar-powered pumping system will be designed to ensure an adequate water supply to the system, and we will also rely on the retention of inland water generated on site. • Conservation concerns – The local national park representative will be a member of the Case Study Board so that his opinion can be directly incorporated into the implementation of the project. Technical discussions should be held on whether existing natural values (adapted to drying of the landscape) in a given area should be protected or whether more scope should be given to landscape rewetting, which could lead to the conversion of existing habitats. • Lack of financial incentives – A key focus area for the project is the development of an appropriate incentive scheme for farmers, for which we are launching research. We will use the results of this to both advise farmers on how to access subsidies and lobby for the CAP scheme to include agri-environmental and rural development subsidies. • Irrigation and dams – Due to dwindling water resources, irrigation cannot provide an answer to the problems of drying landscapes, as the historic drought of 2022 proved. Even in the longer term, irrigation will only be available to a fraction of agricultural fields. The dams built on the rivers are also only expensive make-believe solutions, they only alleviate the drying on a regional scale to a minimal extent. A real solution can only be the rewetting of landscapes by utilizing floods and inland waters. We can convince politicians of this through lobbying and working examples. • Lack of Community decision-making – We plan to create a consultation mechanism between the owners and users of the areas affected by water retention, which guarantees transparency of the processes and the opportunity for them to have a say. Early recognition and management of conflicts of interest enables their resolution. • Weak collaboration of local economic actors – Locally, there are already fora, institutions, and players that can be connected to and rely on their authority and organizational power to strengthen local coordination. In the first round, we invited such actors to the Case Study Board.

6. Plan time																	
Task	**Oct-Dec 2021**	**Jan-Mar 2022**	**Apr-Jun 2022**	**Jul-Sep 2022**	**Oct-Dec 2022**	**Jan-Mar 2023**	**Apr-Jun 2023**	**Jul-Sep 2023**	**Oct-Dec 2023**	**Jan-Mar 2024**	**Apr-Jun 2024**	**Jul-Sep 2024**	**Oct-Dec 2024**	**Jan-Mar 2025**	**Apr-Jun 2025**	**Jul-Sep 2025**	**beyond MERLIN**
Identifying local needs	X	X															
Negotiations with major stakeholders		X	X	X	X												
Planning project implementation					X												
Local stakeholder involvement fora						X	X	X		X				X		X	
Documenting the stakeholder involvement, planning, land use change processes							X	X	X	X	X	X	X	X	X	X	X
Documenting water inundation and its effects							X				X				X		
Assessing current land use and farmers' needs, planning proposed land use, developing proposals for changes to CAP support to promote floodplain management						X	X	X									
Information material on the project						X	X			X			X			X	
Presentation of the project in the local media							X			X			X			X	
Ecotourism mobile app development											X	X	X	X			
Promotion of the ecotourism and the mobile app															X	X	
Ecological monitoring according to the MERLIN Monitoring Plan						X	X	X	X	X	X	X	X	X	X	X	X
Social and economic monitoring according to the MERLIN Monitoring Plan						X	X	X	X	X	X	X	X	X	X	X	X
Local coordination	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Consultancy for land users to help land use change							X	X	X	X	X	X	X	X	X	X	X
Contribution to planning / implementation of solar powered water provision system						X	X	X									
Study Tour for farmers and local stakeholders to present best practices								X					X				
Training for farmers to provide eco and rural tourism services									X					X			

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Local stakeholder involvement fora	8,000 €	WP2 Subcontracting
Documenting the stakeholder involvement, planning, land use change processes (video, interviews, documentary)	3,000 €	WP2 Subcontracting
Documenting water inundation and its effects (video, drone)	5,100 €	WP2 Subcontracting
Assessing current land use and farmers' needs, planning proposed land use, developing proposals for changes to CAP support to promote floodplain management	16,000 €	WP2 Subcontracting
Information material on the project	6,700 €	WP2 Subcontracting
Presentation of the project in the local media	6,000 €	WP2 Subcontracting
Ecotourism mobile app (building the database of service providers, IT-development)	10,000 €	WP2 Subcontracting
Promotion of the ecotourism and the mobile app	5,000 €	WP2 Subcontracting
Ecological monitoring according to the MERLIN Monitoring Plan (Biodiversity net gain, Climate regulation, Flood resilience, Drought resilience)	10,000 €	WP2 Subcontracting
Social and economic monitoring according to the MERLIN Monitoring Plan (Health and wellbeing, Sustainable food systems (F2F), Inclusivity, Circular economy, Financing the transition, green growth)	10,000 €	WP2 Subcontracting
Local coordinator	52,500 €	WP2 Subcontracting
Consultancy for land users to help land use change	13,500 €	WP2 Subcontracting
Contribution to planning / implementation of solar powered water provision system	60,000 €	WP2 Subcontracting
Study Tour for farmers and local stakeholders to present best practices	7,500 €	WP2 Subcontracting
Training for farmers to provide eco and rural tourism services	5,000 €	WP2 Subcontracting
Travel costs	10,800 €	WP2 Travel
SUM	**229,100 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Identifying local needs	Péter Kajner Tamás Gruber Local coordinator		
Negotiations with major stakeholders	Péter Kajner Tamás Gruber Local coordinator		
Planning project implementation	Péter Kajner Tamás Gruber	Case Study Board	
Local stakeholder involvement fora	Péter Kajner Tamás Gruber Local coordinator	Research subcontractor Case Study Board members Water Authority	The opinions and suggestions will be incorporated into the implementation of the project. During the fora we may meet stakeholders who will be invited to the Case Study Board in the future.
Documenting the stakeholder involvement, planning, land use change processes	Péter Kajner Local coordinator		
Documenting water inundation and its effects	Péter Kajner Local coordinator	Subcontractor	
Assessing current land use and farmers' needs, planning proposed land use, developing proposals for changes to CAP support to promote floodplain management	Péter Kajner Tamás Gruber Local coordinator	Research subcontractor	The results of the research will be presented to the Case Study Board and local land users.
Information material on the project	Péter Kajner	Subcontractor	
Presentation of the project in the local media	Péter Kajner Dóra Marczis Local coordinator	Subcontractor	Social media and direct feedback will help shape project implementation and communication.
Ecotourism mobile app development	Péter Kajner Local coordinator	Local Tour inform office	We plan to get as many entities as possible from the local economy to sign up to the app.
Promotion of the ecotourism and the mobile app	Péter Kajner Local coordinator	Local Tour inform office Subcontractor	
Ecological monitoring according to the MERLIN Monitoring Plan	Péter Kajner Tamás Gruber Zoltán Barina	Subcontractor	
Social and economic monitoring according to the MERLIN Monitoring Plan	Péter Kajner Tamás Gruber	Subcontractor	
Local coordination	Local coordinator		The coordinator is a member of a regional NGO who knows the locals well and understands their way of thinking.
Consultancy for land users to help land use change	Péter Kajner Local coordinator	Subcontractor	For the duration of the project, we plan to employ a permanent advisor to help local farmers change land use.

Contribution to planning / implementation of solar powered water provision system	Péter Kajner Tamás Gruber Local coordinator	Water Authority Subcontractor	
Study Tour for farmers and local stakeholders to present best practices	Péter Kajner Tamás Gruber Local coordinator	Nyíregyháza Shopping Community (CSA) Kislépték Association	Local key stakeholders will be invited to the tour. Not only can the good examples to be visited inspire participants, but it is also an opportunity to strengthen cooperation between local actors.
Training for farmers to provide eco and rural tourism services	Péter Kajner Tamás Gruber Local coordinator	Nyíregyháza Shopping Community (CSA) Kislépték Association	It is particularly important to introduce local farmers to the concept of sustainable management and the practice of higher value tourism services.

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	**Biodiversity net gain** - Conservation status of HD Annex I listed habitats including wetland and freshwater habitats in case study area, focusing on selected indicator species - Conservation status of HD Annex II and Annex IV listed species including wetland and freshwater species in case study area, focusing on selected indicator species - Conservation status of Annex I listed species in the Birds Directive, focusing on selected indicator species - Area of floodplain re-connected to river (ha) **Climate regulation** Greenhouse gas emissions Modelled for floodplain wetlands using: - Overall extent of wetland-type soils in the study area - Pre- and post-intervention land cover on wetland-type soils - Pre- and post-intervention condition of areas under wetland vegetation - Changes in water table depth within wetland soils and area, duration and depth of surface water where it occurs. **Flood resilience** - Area of rewetted wetlands (other than peatlands) (ha) - Area of restored rivers and streams (ha) - Volume of channel retention gained as a result of restoration (m^3) - Area of developed wetland buffer zones - Change in storage capacity (m^3) of restored rivers and streams (based on surface area of rivers, streams and other water bodies) - Change in storage capacity (m^3) of wetlands (based on surface area of restored wetlands and floodplains) **Drought resilience** - Area of rewetted wetlands (other than peatlands) (ha) - Area of agricultural lands with applied schemes for water retention (ha) - Change in storage capacity (m^3) of restored rivers and streams (based on surface area of rivers, streams and other water bodies) - Change in storage capacity (m^3) of wetlands (based on surface area of restored wetlands and floodplains) **Health and wellbeing**

	- Change in length of active travel routes within or connected to the restoration area (km of routes per km^2 of restoration scheme) **Sustainable food systems (F2F)** Utilisation - Land cover (ha per type, e.g. Grass) - Land use (ha per type, e.g. Pasture) primary intended use and any secondary uses - Land tenure (public vs. private land) (ha for each type) **Inclusivity** Level 1 – Public Access to Environmental Information - Presence of project website, social media, specific app - Number of visitors to website, social media, specific app Level 2 - Public Consultation Including or additional to the Case Study Board - Information sessions about the site/project - Public consultation processes held - Number of participants in information sessions about the project Level 3 - Public Active Involvement - Ability to join a formal stakeholder forum/board/working group - Surveys to measure representation within engagement and impact of the engagement **Circular economy** - Water capture (infiltration rate, rainfall storage capacity). **Financing the transition** - Breakdown of the total restoration budget by funding source and type [%] - Private finance mobilised [€/year] - In-kind contributions [€/year] **Green growth** - Number of jobs created - Nature conservation area accessible to visitors (unit: ha). - Number of people visiting an area Flood protection and other hydrological ecosystem services - Hectares of flood retention zone created - Grazing in the wetland: number of cattle or horses, use of animals, where possible expressed as Turn-over, Net and Gross Value added generated
Do you expect to see short-term or long-term impacts?	Both. Gravity-fed inundation and initial land use changes may bring short-term results, but larger investments (e.g. solar-powered water pumping system) and large-scale land use change will bring benefits close or after the project end.

1. Measure	**Planning and implementing water retention and floodplain farming systems on the Middle Tisza**
1.1. Site	**Demonstration site: *Nagykörű village***

0. Detail the implementation measure

Measure:

Nagykörű, Pilot A: Planning and implementing a floodplain farming system in the floodway of river Tisza near Nagykörű village, based on water retention in former wetlands, and restoring habitats (see “Anyita” and “Dúdor” on the map).

Nagykörű, Pilot B: Another potential pilot initiative is a local farmer irrigation community in the floodway fringe of the Tisza (on the protected side of the dike) to create the infrastructure for providing water for farming and habitat restoration, reconnecting former floodplains to the river.

Site:

Two locations near the village Nagykörű, altogether 1,800 ha. Affected areas: Pilot Site A ~300 ha, Pilot Site B ~1,500 ha. ~70 ha-s will be directly restored at Pilot A.

Between 2000–2005, WWF implemented an EU LIFE Programme supported wetland restoration project here. A sluice was built, which enabled partial inundation of wetlands from the Tisza, water retention, enhancing biodiversity. After the restoration of wetlands, between 2005–2010, traditional fishing, grazing was started, but local conflicts arose concerning the operation of the sluice after 2010. Now the sluice is not in use, no water retention measures are in effect, as several land owners oppose the idea of water retention. Nevertheless, the river can flood Pilot A for a shorter period of the year. The aim of the demonstration case in MERLIN is to lengthen the period of inundation from the Tisza by reconstructing the sluice, and start nature friendly floodplain farming here.

At Pilot A the local government intends to plan and implement a next stage of the development. The wetlands, habitats of the pilot area still can and should be restored and sustainable floodplain farming could be introduced here. A long-term cooperation between the local government, farmers, inhabitants of the village, water management authorities and other stakeholders was initiated for realizing this vision. The local government has taken the initiative to have the National Land Fund purchase potential areas of water retention for the state. In this way the whole area could be managed in a uniform way, without conflicts with land users. Most of Pilot A (the “Anyita” on the map) will be managed by the state via a national park directorate. A smaller part will remain private property (the “Dúdor” on the map), but the land owners agree with the necessity of water retention here. Concerted operation of the water management system will make it possible that the pilot area is inundated not for 3, but for 6 months and regular management (grazing, orchards management, fishing etc.) can start again.

At Pilot B local farmers have initiated the creation of an irrigation community to provide water for farming. In case they could set up the community and realise cooperation, we would help the planning and implementation of a hybrid water management system, which is capable to provide water for irrigation and for natural habitats/ wetlands, too.

The development will be monitored against almost all Green Deal criteria, as referred to in section 2.

1. Map the measure (site)/ Visualise the measure

2. Integrate the Green Deal criteria

Your implementation measure(s) should have impact on most of the Green Deal criteria. Therefore, use the identification of relevant Green Deal criteria that you made for your demo case in the Monitoring plans (Task 1.2) and check, if those criteria can also be relevant in your implementation case.

Green Deal criteria	Relevance in demo case (WP1)	Relevance in implementation case (WP2)
Biodiversity net gain	X	X
Climate regulation	X	X
Flood resilience	X	X
Drought resilience	X	X
Health and wellbeing	X	X
Zero pollution goals		
Sustainable food systems (F2F)	X	X
Sustainable energy		
Sustainable transport		
Inclusivity	X	X
Circular economy	X	X
Financing the transition	X	X
Green growth	X	X

3. Optimise your plan

Plan in collaboration with the case study boards! Include active citizen participation and co-design with several sectors (agriculture, forestry, tourism, navigation)!

Did you obtain recommendations for optimization from your **gap analysis/ Optimisation**	Economic optimization will be in the focus at the demonstration site, Nagykörű. A complex local economic development plan will be elaborated based on NbS, involving as many local stakeholders as possible. We will design

strategies (SWOT)? If so, which?	and develop short supply chains, promote local products and showcase the site through marketing to boost economic development. This is important to show land users that floodplain management and water retention can be financially successful.
Did you obtain recommendations for optimization from your **case study board**? If so, which?	No Case Study Board will be set up in the Demonstration Case, but we are in a close contact with local stakeholders. The project is based on their ideas and they are directly involved in planning and implementing.
Did you obtain recommendations for optimization from your **case study cluster**? If so, which?	Visiting the sites of the Room for the Rhine branches in the Netherlands, talking to the members of the MERLIN 'Large Transboundary Rivers' cluster we got a lot of good ideas how floodways should be technically managed to meet flood risk reduction and nature protection goals at the same time. The 'Afferdense en Deetse Waarden' site provided a very good example of harmonizing 'blue' and 'green' measures in practice. We intend to use the Dutch experiences to design our interventions.
Based on all those recommendations, how can you optimise the **implementation process** of your measure?	Monitoring activities based on our Monitoring Plan will provide feedback for fine tuning project implementation.
How can you optimise the **impact** of your measure?	NbS design, implementation and lessons learnt of our projetcs and previous experiences are to be shared with decision makers in agriculture, water management and other related policy fields from the early stage of planning.

4. Mobilise additional external funding	
Here, please indicate needs and potential for additional funding of your implementation measures. You can use support of WP3 to identify potential for additional private budget! Participate in the MERLIN competition to mobilise additional funding!	
What potential for additional funding can you identify? Please refer to both public sources of funding and private sources of funding (e.g. foundations, business, investors).	Land use change and additional developments of land users can be financed by agri-environmental and rural development subsidies of CAP from 2023. WWF is actively working on involving its corporate partners to finance a smaller part of the project here (in the 'Dúdor'). The planning and investment works of the irrigation community are eligible for high levels of public support from national funds. Farmers will have to provide their own contribution to that. Landowners and land users seem willing to finance some project elements themselves.
What additional funding can you actually acquire?	WWF NL and WWF CH co-finances our activities in the region.
Can you mobilise in-kind contributions from other organisations (e.g. lending of machinery, staff time, etc)?	The local municipality has implemented a number of improvements in recent years (e.g. a cold store, a tourist centre etc.). These are expected to be used for project activities. Local farmers and service providers are also often willing to make their premises and equipment available if they feel it is important to do so.

5. Consider risks
Which risks do you see, that could delay or hinder the implementation of your measures within the lifetime of MERLIN? Please use your SWOT analysis to identify these risks!

What are risks to the implementation? Indicate for each risk if the might delay (= low risk) or hinder (= high risk) the implementation of your measure?	High risk: • No state buyout – Economic decline in Hungary may decrease national development sources needed for implementation. The National Land Fund may not be able to purchase potential areas of water retention for the state in the 'Anyita' (Pilot A). • No irrigation community – Local farmers will find setting up the irrigation community too complicated, costly and risky, so the planned improvements will not be implemented as currently envisaged (Pilot B). Low risk: • More severe droughts, less water in the river – Climate change may cause droughts and heat waves that bring much smaller tidal surges, but dry out the floodplain even more. This could lead to smaller flooding and less visible results of rehabilitation in the sample areas. • Competition – Sectors and sectoral players are used to compete each other, although NWRM require the close cooperation of stakeholders in flood-affected areas. Stronger actors (e.g. large-scale farmers) may try to impose their will on the local community. • Water management optimised for draining – Even one farmer's protest may be enough to prevent water retention. The ruling dogma of water management is still to drain waters (floods, inland waters) as quickly as possible.
How high are the probabilities of occurrence (= low or high probability) for each of these risks?	High probability: • No state buyout • No irrigation community • More severe droughts, less water in the river • Water management optimised for draining Low probability: • Competition
Which risks can be prevented and how?	High risk • No state buyout – Now the 'Anyita' in Pilot A is planned to be bought by the state and managed by the local national park, what would be ideal for NWRM. If this does not happen, the project management team, together with local activists, will set up an advisory service to help farmers make it financially worthwhile for them to tolerate the extra water. • No irrigation community – If the irrigation community is not established as planned, a land use and water management plan will be developed that does not include irrigation development, but can provide additional water for grasslands and wetlands. This will result in a more extensive land use, but with other products to build the economic vertical. Low risk • More severe droughts, less water in the river – A robust water management system that can cope with increasing extremes needs to be designed and implemented. If even more extreme droughts and heat waves occur, habitat rehabilitation will be slower or we will see changes in other directions (e.g. less wetland habitat, wet meadow formation). Nevertheless, the additional water in the landscape will dampen the devastating effects of droughts. • Competition – A key aim of the project is to stimulate cooperation between stakeholders. This includes the creation and development of community consultation and decision-making mechanisms, assistance

	in accessing new funding opportunities, local economic development for the products of floodplain farming (e.g. through the Living Tisza trademark). • Water management optimised for draining – Droughts are making more and more farmers open to retaining more water in the field. For each parcel, the project will identify those who are in favour of water retention, those who are totally opposed and those who can be persuaded. The land of those who are totally opposed will be purchased or technically excluded from water retention (e.g. by building a dike). Those who can be persuaded can be made interested in water retention-based farming through new economic opportunities. In the case of Pilot A 'Anyita' area, if the state buys it and the national park becomes the manager, then management will be subordinated to conservation interests.

6. Plan time

Task	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024	Jul-Sep 2024	Oct-Dec 2024	Jan-Mar 2025	Apr-Jun 2025	Jul-Sep 2025	beyond MERLIN
Identifying local needs	X	X															
Negotiations with major stakeholders		X	X	X	X												
Planning project implementation					X												
Local stakeholder involvement fora						X	X	X		X				X		X	
Documenting water inundation and its effects							X				X				X		
Information material on the project						X	X			X			X			X	
Local economy system development - analysis, consultancy (complex local economic development plan)						X	X	X	X								
Ecological monitoring according to the MERLIN Monitoring Plan						X	X	X	X	X	X	X	X	X	X	X	X
Social and economic monitoring according to the MERLIN Monitoring Plan						X	X	X	X	X	X	X	X	X	X	X	X
Local coordinator						X	X	X	X	X	X	X	X	X	X	X	X
Consultancy for land users to help land use change							X	X	X	X	X	X	X	X	X	X	X
Contribution to planning / implementation of the water system for restoration						X	X	X									
Training for farmers to provide eco and rural tourism services								X						X			

7. Plan budget		
Task	**Expected costs [€]**	**Source of funding**
Travel costs	9,900 €	WP2 Travel
Local stakeholder involvement fora	2,000 €	WP2 Subcontracting
Documenting water inundation and its effects	6,000 €	WP2 Subcontracting
Information material on the project	7,000 €	WP2 Subcontracting
Local economy system development - analysis, consultancy (complex local economic development plan)	5,000 €	WP2 Subcontracting
Ecological monitoring according to the MERLIN Monitoring Plan (Biodiversity net gain, Climate regulation, Flood resilience, Drought resilience)	10,000 €	WP2 Subcontracting
Social and economic monitoring according to the MERLIN Monitoring Plan (Health and wellbeing, Sustainable food systems (F2F), Inclusivity, Circular economy, Financing the transition, green growth)	10,000 €	WP2 Subcontracting
Local coordinator	52,500 €	WP2 Subcontracting
Consultancy for land users to help land use change	13,500 €	WP2 Subcontracting
Contribution to planning / implementation of the water system for restoration	50,000 €	WP2 Subcontracting
Training for farmers to provide eco and rural tourism services	10,000 €	WP2 Subcontracting
SUM	**175,900 €**	

8. Distribute tasks transparently			
Task	**Who is responsible?**	**Who is to be involved?**	**How to further facilitate participation?**
Identifying local needs	Péter Kajner Tamás Gruber Local coordinator		
Negotiations with major stakeholders	Péter Kajner Tamás Gruber Local coordinator		
Planning project implementation	Péter Kajner Tamás Gruber	Municipality Foundation for Nagykörű	
Local stakeholder involvement fora	Péter Kajner Tamás Gruber Local coordinator	Municipality Foundation for Nagykörű Alliance for the Living Tisza	The opinions and suggestions will be incorporated into the implementation of the project.
Documenting water inundation and its effects	Péter Kajner Local coordinator	Subcontractor	
Information material on the project	Péter Kajner	Subcontractor	

Local economy system development - analysis, consultancy (complex local economic development plan)	Péter Kajner Tamás Gruber Local coordinator	Research subcontractor	The results of the research will be presented to local stakeholders and used for consultancy.
Ecological monitoring according to the MERLIN Monitoring Plan	Péter Kajner Tamás Gruber Zoltán Barina	Subcontractor	
Social and economic monitoring according to the MERLIN Monitoring Plan	Péter Kajner Tamás Gruber	Subcontractor	
Local coordination	Local coordinator		
Consultancy for land users to help land use change	Péter Kajner Local coordinator	Subcontractor	
Contribution to planning / implementation of the water system for restoration	Péter Kajner Tamás Gruber Local coordinator	Subcontractor	
Training for farmers to provide eco and rural tourism services	Péter Kajner Tamás Gruber Local coordinator	Nyíregyháza Shopping Community Kislépték Association	It is particularly important to introduce local farmers to the concept of sustainable management and the practice of higher value tourism services.

9. Implement the measure
Implement the proposed restoration measures in a transparent and participatory way! A template will be provided at a later stage to report on the implementation process.

10. Monitor the impact of the measure	
Which indicators will you monitor to assess the impact of your measure?	**Biodiversity net gain** - Conservation status of HD Annex I listed habitats including wetland and freshwater habitats in case study area, focusing on selected indicator species - Conservation status of HD Annex II and Annex IV listed species including wetland and freshwater species in case study area, focusing on selected indicator species - Conservation status of Annex I listed species in the Birds Directive, focusing on selected indicator species - Area of floodplain re-connected to river (ha) **Climate regulation** Greenhouse gas emissions Modelled for floodplain wetlands using: - Overall extent of wetland-type soils in the study area - Pre- and post-intervention land cover on wetland-type soils - Pre- and post-intervention condition of areas under wetland vegetation - Changes in water table depth within wetland soils and area, duration and depth of surface water where it occurs. **Flood resilience** - Area of rewetted wetlands (other than peatlands) (ha) - Area of restored rivers and streams (ha) - Volume of channel retention gained as a result of restoration (m^3) - Area of developed wetland buffer zones - Change in storage capacity (m^3) of restored rivers and streams (based on surface area of rivers, streams and other water bodies)

	- Change in storage capacity (m^3) of wetlands (based on surface area of restored wetlands and floodplains) **Drought resilience** - Area of rewetted wetlands (other than peatlands) (ha) - Area of agricultural lands with applied schemes for water retention (ha) - Change in storage capacity (m^3) of restored rivers and streams (based on surface area of rivers, streams and other water bodies) - Change in storage capacity (m^3) of wetlands (based on surface area of restored wetlands and floodplains) **Health and wellbeing** - Change in length of active travel routes within or connected to the restoration area (km of routes per km^2 of restoration scheme) **Sustainable food systems (F2F)** Utilisation - Land cover (ha per type, e.g. Grass) - Land use (ha per type, e.g. Pasture) primary intended use and any secondary uses - Land tenure (public vs. private land) (ha for each type) **Inclusivity** Level 1 – Public Access to Environmental Information - Presence of project website, social media, specific app - Number of visitors to website, social media, specific app Level 2 - Public Consultation Including or additional to the Case Study Board - Information sessions about the site/project - Public consultation processes held - Number of participants in information sessions about the project Level 3 - Public Active Involvement - Ability to join a formal stakeholder forum/board/working group - Surveys to measure representation within engagement and impact of the engagement **Circular economy** - Water capture (infiltration rate, rainfall storage capacity). **Financing the transition** - Breakdown of the total restoration budget by funding source and type [%] - Private finance mobilised [€/year] - In-kind contributions [€/year] **Green growth** - Number of jobs created - Nature conservation area accessible to visitors (unit: ha). - Number of people visiting an area Flood protection and other hydrological ecosystem services - Hectares of flood retention zone created - Grazing in the wetland: number of cattle or horses, use of animals, where possible expressed as Turn-over, Net and Gross Value added generated
Do you expect to see short-term or long-term impacts?	Both. However, the spectacular results are expected towards the end of the project.

3.3.6 Case study 10 Blue Belt (Germany)

CS10 does not implement measures in MERLIN.

4 Synthesis

Troughout the project life time of MERLIN, the sixteen implementation case studies will realise restoration activities with a share of approx. 10 million € invested into restoration measures. Part of the restoration will already be conducted by mid-term.

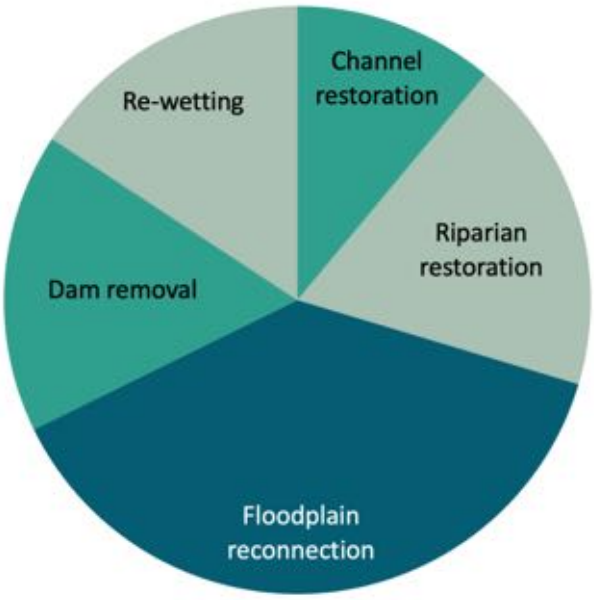
Mid-term:

- Wetlands restored: ca. 600 ha
- Floodplains restored: ca. 1,200 ha

Final goal:

- Wetlands restored: ca. 2,000 ha
- Floodplains restored: ca. 40,000 ha

The restoration activities can be clustered into five large types of restoration. The largest budgetary share of restoration activities in MERLIN is on floodplain reconnection:



To subdivide these activities further, the following restoration types and respective areas or lengths are to be implemented:

- Rewetting: 465 ha
- Afforestation: area not yet clearly defined.
- Floodplain reconnection: 2325,8 ha
- Channel restoration: 6,5 km
- Remoral of dams: 10
- Removal of small barriers: 2
- Control of invasive species: 1 ha
- Grass flower strips: 7 ha
- Large woody debris additions and embankment removal: 22,8 km
- Habitat improvement: up to 200 ha

The money will be spent with a large share on the actual implementation work. However, part of the budget is necessary for coordination tasks and monitoring. Many case studies will engage companies to conduct the restoration work.

- Hands-on implementation: approx. 6,870,600 €
- Coordination: approx. 1,298,950 €
- Monitoring: approx. 562,600 €

The aim of MERLIN is to go beyond the implementation that can be realised within the project life time and scale-up the activities on a regional and long-term scale, contributing to a transformation towards the EU Green Deal goals.