LIFE·TREMEDAL

AFTER-LIFE CONSERVATION PLAN

Inland wetlands of the Northern Iberian Peninsula: Management and restoration of peatlands and wet environments



LIFE11 NAT/ES/707

CONTENTS:

BACKGROUND

SITUATION PRIOR TO TREMEDAL

The **TREMEDAL** project, **Inland wetlands of the Northern Iberian Peninsula: Management and restoration of peatlands and wet environments,** consisted of implementing a set of actions to improve the conservation status and resilience of the peatland and hygrophilous environments at a number of wetlands in the north of the Iberian Peninsula, most which form part of Natura 2000 network sites.

Most of the **peatlands and wet environments** targeted in the project are relatively common types of wetland in Northern Europe (cold, wet climates), but are rare on the Iberian Peninsula, where not only are they small in size, but are also only found in isolated upland areas. In consequence, these ecosystems are not widely known or valued and have been subjected to interventions which are not compatible with their conservation, leading to a state of degradation.

TREMEDAL specifically worked with **7 types of peatland habitat** (7110*/ 7120 / 7130* / 7140 / 7150 / 7210* / 7230) and other related wet habitats also present at the project sites (3110 / 3190 / 4020* / 6410 / 6430 / 91E0* / 1410 / 1510*).

An **unfavourable or unknown conservation status** (based on the information available on presenting the project) was presupposed for all the project's target habitats at the sites where work was considered and several generalised **threats and conservation problems** were identified (specifying later the specific problems at and threats to each site):

HUMAN-INDUCED THREATS

- **Low appreciation**: in general, the local population does not value sites of this kind sufficiently. Over history, this has led to their modification to permit their use for other purposes.
- **Hydrological alteration**: work was performed in the past to eliminate permanent waterlogging by building drainage systems, causing peatlands to dry out and in some cases the effects were irreversible.
- **Pressure from livestock**: widespread livestock farming can be just as much a threat as a beneficial activity for the management and conservation of peatlands, so it is necessary to establish suitable management systems depending on the characteristics of each wetland.
- **Pressure from agriculture**: pollution, earth movement, alteration of the water cycle, invasion of crop species, etc.
- **Forest plantations**: forest plantations can generate negative effects, such as reductions in the quantity of water reaching wetlands, diversion of runoff, invasion of plantation species, erosive processes due to the entry of machinery, the build-up of waste from extraction work, etc.
- **Construction of tracks and paths**: disruption of surface water flows, erosive processes, etc. This also involves human traffic over sensitive sites.
- **Expansion of invasive non-native species**: which displace other structural species from the habitats of community interest/priority habitats.

	• **Disappearance of local species**: the factors which alter the natural conditions of these habitats lead to a loss of biodiversity and, more particularly, directly threaten conservation through the loss of structural species.
PEATLAND HABITAT IDENTIFICATION PROBLEMS	The official data on the distribution and state of peatland habitats in the Atlantic Biogeographical Region contained significant contradictions. There are no common state-wide criteria for the identification processes for habitats of this kind.
EFFECTS OF CLIMATE CHANGE	According to the European Environment Agency, peatlands, together with other types of wetland, are the habitats most affected by climate change. The effects mainly involve reductions in the populations of species characteristic of habitats of this kind, their fragmentation and isolation.

OBJECTIVES, ACTIONS AND RESULTS OF TREMEDAL

The chief objective of TREMEDAL was: **to improve the conservation status and resilience of habitats of this kind present within the sites where the project aimed to work.**

AND it had 5 specific objectives:

1. *To carry out restoration actions to hydrologically and topographically correct the sites, eradicate invasive species and install livestock management infrastructure.*
2. *To develop methods to ensure the timely conservation of the habitats and species targeted by the project (eliminating or reducing the intensity of the pressures to which they are subjected and developing appropriate tools such as the germplasm bank or management guidelines).*
3. *To provide up-to-date. homogenised information for the Iberian Peninsula's Atlantic Biogeographical Region and its transition zone regarding the presence, distribution, classification and characterization of their peatland habitats.*
4. *To improve our understanding of how habitats of this type should be managed and restored.*
5. *To inform society and raise its awareness of the environmental values and services provided by continental wetlands in general and wet habitats in particular.*

In order to achieve these objectives, the project specified **27 actions**:

A	**A1**. Diagnosis, territorial analysis and identification of indicators. **A2**. Technical planning of the restoration actions.
B	**B1**. Purchase of land for the environmental restoration of the Lake of Caicedo Yuso – Arreo (Basque Country).
C	**C1**. Restoration, impact prevention and creation of infrastructure for the proper management of the complex of peatlands in the Atlantic region of Navarre. **C2**. Restoration of the peatland sites in the SCI Jaizkibel (Basque Country). **C3**. Environmental restoration of the SCI Lake of Caicedo Yuso – Arreo (Basque Country). **C4**. Restoration, impact prevention and management of the Usabelartza peatland (Basque Country). **C5**. Infrastructure for livestock management compatible with the conservation of the SCIs Picos de Europa (Asturias and Castile and Leon) **C6**. Improvement of the state of conservation of the continental wetlands in the SCI Parga-Ladra-Támoga: wet and temporarily waterlogged habitats in Cospeito (Galicia).

	C7. Adaptation of the habitat and population reinforcement of *Eryngium viviparum* in the SCI Parga - Ladra - Támoga (Galicia). **C8**. Improvement of the state of conservation of the priority habitats 7210*and 91E0* in the SCI Parga-Ladra-Támoga (Galicia). **C9**. Improvement of the state of conservation of the wet habitats on the Island of San Roque (Galicia). **C10**. Collection, storage, and conservation of germplasm.
D	**D1**. Monitoring the effects of the project on the habitats. **D2**. Monitoring the effects of the project on the species. **D3**. Monitoring the socio-economic impact of the project.
E	**E1**. Communication Plan. **E2**. Material to raise awareness. **E3**. Information panels **E4**. Project website. **E5**. Dissemination and awareness-raising programme. **E6**. Technical training and skills development programme. **E7**. Layman's report
F	**F1**. Management and coordination of the project. **F2**. Networking with other projects. **F3**. External financial audit. **F4**. AFTER-LIFE Plan.

The conservation actions were carried out at **16 sites which either belonged to the Natura 2000 network** or were important in terms of connectivity in **5 Spanish Autonomous Communities**: Galicia, Asturias, Castile and Leon, Basque Autonomous Community and the Community of Navarre. Other actions, principally focusing on monitoring and management, were also implemented at several other wetlands in Navarre to favour ecological connectivity and coherence.

TREMEDAL provided an opportunity to **test the efficiency of different types of work and methodologies aimed at palliating the conservation problems identified for the project's target habitats and species**: livestock management, hydrological and topographic correction, recovery and population reinforcement of natural vegetation, forest management, eradication and control of non-native and invasive species, etc.

Actions C1 to C9 chiefly consisted of **field work for the implementation of the measures which each site needed** (actions defined in the Plans and Projects drafted within the framework of action A2). It is worth pointing out that TREMEDAL included the purchase of land at the Lake of Caicedo Yuso - Arreo (Basque Country, action B1), where the relevant restoration work was carried out (action C3), meaning an increase in the natural surface area of the site itself.

The Conservation actions included action **C10, which involved the collection, treatment, storage and conservation of the germplasm** belonging to the species most characteristic of the peatland and wet habitats in the north of the Peninsula needed for the work to recover the natural vegetation cover at different TREMEDAL sites. This action included the **Biological characterisation** of and the production of specific **Germination and cultivation protocols** for these species.

In general, these conservation actions not only **improved the state of conservation of the target habitats and species**, but also helped to **improve the landscape and increase social and cultural appreciation** of these spaces (the communication actions, actions E, played a vital role in this regard).

In parallel with the implementation of these conservation-restoration actions, **action A1 represented one of the greatest endeavours and achievements of the project**. Although initially seen as a preparatory action to diagnose the sites and identify indicators for monitoring, it became, for a number of reasons, a thorough, large-scale undertaking which addressed one of the main issues associated with the conservation of habitats of this kind: **the characterisation and identification of peatland habitats and wet environments**.

The documentation work performed to prepare the report on the presence and distribution of these habitats highlighted the heterogeneous nature of the sources, errors, outdated information, etc. and so more work than expected was required to collate the information and update the records.

The disparity of criteria and terminology also made it difficult to establish joint criteria when it came to classifying and characterising the habitats within the scope of the project. In this regard, the **Work Group on Peatlands**, consisting of international experts on the subject, proved fundamental. Proof of this is its continuity as one of the principal measures of this AFTER-LIFE Plan.

In addition to this Characterisation work and the ex-ante evaluation of each of the project sites, action A1 defined a set of **Specific indicators for the management and monitoring of the state of conservation** of these habitats consistent with those established by the *European Topic Centre on Biological Diversity* for the evaluation and presentation of reports pursuant to Article 17 of the Habitats Directive.

TREMEDAL developed specific actions through which to **evaluate the different types of impact of the project**: on **habitats** (action D1), **species** (action D2), **the economy** and **ecosystem services** (action D3). The initial results of monitoring habitats are, in general, positive. Further long-term monitoring will be necessary in order to reach more specific conclusions and assess the effectiveness of the measures implemented in the project and so this will be one of the main tasks of the AFTER-LIFE Plan.

Action D3 tested the **TESSA methodology (Toolkit for Ecosystem Service Site-Assessment)**. TREMEDAL's experience applying this methodology for the analysis of impact on ecosystem services was presented at the *Workshop: Assessing the impact of projects on ecosystem services at local level (taking the example of LIFE projects),* organised by the LIFE Programme in December 2015.

TREMEDAL also implemented several **specific dissemination, communication and awareness-raising actions** (actions E), developing its own tools; such as its **website** (www.tremedal.eu), a **folder-leaflet**, **information panels** at the sites and **bulletins**; and organising specific activities to reach different audiences (locals, schoolchildren, technical public). These actions complement the technical actions (actions A, B, C, D), but are **necessary in order to improve the social perception of these habitats**, particularly at local level.

The E actions also included **specific actions for the technical dissemination of the results of the project**. In addition to dissemination through the channels already mentioned (website, bulletins, leaflet), **articles were published in technical-scientific journals**, the project was **presented at National and International Seminars and Conferences**, and, to complete the project, **TREMEDAL held a Seminar on "Management and restoration of peatlands and wet environments"** in October 2015 with the participation of some of Europe's highest-profile speakers and benchmark experiences, with which contact was made over the length of the project (action F2 and Work Group on Peatlands).

In the same vein of technical dissemination, a **Manual of Good Practices** (action E6) was published as a result of evaluating the work performed and the methodologies employed, and analysing the overall results of the project to serve as informative-technical material on completion of the project.

CURRENT SITUATION AND CONSERVATION PRIORITIES

CURRENT SITUATION OF PEATLANDS IN THE NORTHERN IBERIAN PENINSULA

With reference to the sites where work was performed as part of TREMEDAL:

It is considered that improvements have been registered in the following regards:

- Greater and better knowledge of the state of conservation of the sites and the habitats and species in them.
- Increase in the surface area and improvement of the state of conservation of the Habitats of Community Interest/Priority Habitats restored: 109 ha

1410: 0.11 ha	**6210***: 1.32 ha	**7140**: 67.86 ha	**91E0***: 2.4 ha
3110: 2.25 ha	**6410**: 0.60 ha	**7150**: 9.30 ha	**9230**: 7.46 ha
3190: 3.13 ha	**6430**: 0.30 ha	**7210***: 1.42 ha	**9240**: 5.96 ha
4020*: 0.40 ha	**7130**: 0.40 ha	**7230**: 2.41 ha	**9340**: 3.89 ha

- Recovery of these habitats' natural processes (hydrology).
- Control of pressures: non-native and invasive species, livestock, public use, etc.
- Creation of buffer zones.
- Improvement of connectivity and ecological coherence between sites.
- Restoration of and increase in the populations of structural species (*Eryngium viviparum, Narcisus pseudonarcissus* subsp*. nobilis, Cladium mariscus).*
- Increase in biodiversity.
- Greater resilience in the face of different pressure factors.

In general, with reference to the peatlands of the Northern Iberian Peninsula:

Progress can be considered to have been made compared with the situation observed at the start of the project in a number of areas:

- Updated information on the presence and distribution of peatland habitats in the Natura 2000 network in the north of Spain.
    - ↳ Updated information for the official Natura 2000 network forms (SDF) and re-delimitation of the spaces (improved connectivity and ecological coherence).
- Specific tools to keep the information on the presence and distribution of these habitats up to date (indicator system, database, GIS).
- Common criteria for the classification and characterisation of the habitats, needed in order to identify and implement the management measures which need to be applied correctly.
- Germplasm of structural plants from peatland habitats (18 species) and specific germination and cultivation protocols (20 species).
- Operational and management systems tested. For a range of peatland problems, pressures and states of conservation.
- Monitoring system using specific indicators.

- Interaction and collaboration with local actors whose work is associated with these sites (livestock, forest and agricultural management).
- Improvement in appreciation of these habitats, particularly as far as local populations and entities with competencies regarding their management are concerned.

KEYSTONE ELEMENTS

The habitats and species targeted in the Plan are identified as keystone elements.

In terms of habitat, **8 peatland habitats** and **9 related hygrophilous habitats**, also present within the project sites, are included:

HABITAT: RAISED BOGS, MIRES AND FENS	
7110*	Active raised bogs
7120	Degraded raised bogs
7130*	Blanket bog (*active only)
7140	Transition mires
7150	Depressions on peat substrates of the *Rhynchosporion*
7210*	Calcareous fens with *Cladium mariscus* and *Caricion davallianae*
7220*	Petrifying springs with tufa formation (Cratoneurion)
7230*	Alkaline fens
91D0*	Bog woodland

HYGROPHILOUS HABITATS	
1410	Mediterranean salt meadows
1510*	Mediterranean salt steppes
3110	Oligotrophic waters containing very few minerals
3190	Lakes of gypsum karst
4020*	Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
91E0*	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

As for species, **65 plant species** to be targeted by the different monitoring and conservation actions have been identified, of which *Eryngium viviparum*, Carex hostiana, Cladium mariscus,* and *Rhynchospora fusca* are particularly worthy of note.

***List of species covered in the* AFTER-LIFE Plan**

Andreaea megistospora
Angelica razulii
Arnica montana
Barbilophozia binsteadii
Calypogeia sphagnicola
Carex vesicaria
Carex davalliana
Carex echinata
Carex hostiana
Carex lepidocarpa
Cladium mariscus
Drosera intermedia
*Eryngium viviparum**
Frullania oakesiana
Gymnomitrion crenulatum
Huperzia selago
Hydrocotile vulgaris
Hygrohypnum ochraceum
Illecebrum verticillatum
Isoetes durieui
Isoetes fluitans
Isoetes velatum
Juncus balticus subsp. cantabricus
Menyanthes trifoliata
Metzgeria temperata
Myrica gale
Narcissus asturiensis
Narcissus pseudonarcissus subsp. nobilis
Narthecium ossifragum
Odontoschisma sphagni
Parnassia palustris
Pedicularis mixta
Pilularia globulifera
Pinguicula lusitanica
Rhynchospora fusca
Salix hastata
Salix repens
Sanguisorba officinalis.
Schistostega pennata
Soldanella villosa
Sphagnum magellanicum
Sphagnum molle
Sphagnum pylgessi
Spiranthes aestivalis
Splachnum ampullaceum
Swertia perennis

Drosera rotundifolia	*Kurzia pauciflora*	*Pinguicula vulgaris*	*Tayloria tenuis,*
Equisetum variegatum	*Litorella uniflora*	*Potentilla fruticosa*	*Thelypteris palustris*
Eriophorum angustifolium	*Ludwigia palustris*	*Quercus pyrenaica*	*Triglochin palustris*
Eriophorum latifolium	*Luronium natans*	*Ranunculus omiophyllus.*	*Utricularia australis*
	Lycopodiella inundata	*Rhynchospora alba*	
	Lycopodium clavatum		

The actions planned will also benefit several species of odonata, lepidoptera, amphibians and reptiles which typically live in peatland habitats, and whose presence is associated with their state of conservation.

INSECTS	AMPHIBIANS AND REPTILES
Coenagrion caerulescens	*Lacerta schreiberi*
Coenagrion mercuriale	*Lacerta vivipara*
Coenagrion scitulum	*Chioglossa lusitánica*
Sympetrum flaveolum	*Discoglossus galganoi*
Erebia piphron xistralensis	*Rana iberica*
Maculinea alcon	*Rana temporaria*
	Triturus helveticus
	Triturus marmoratus

The habitats and species targeted by each Measure in the AFTER-LIFE Plan are specified in the next section.

CONDITIONING FACTORS

- Most of the sites are included in the Natura 2000 network (4 sites in Navarre were included in the Natura network during the TREMEDAL project).
- There exist land-use tools to guarantee the conservation of those sites not included in the Natura 2000 network (Navarrese Land Use Plans).
- The Natura 2000 network sites have approved management plans, providing protection of the sites with legal backing.
- Support from the public authorities with competencies regarding Natura 2000 network management: local authority staff, forestry protection services. Also support from other institutions, such as public companies and research centres.
- Budget availability for the restoration of new sites and the maintenance of existing structures.
- Updated and available information.
- The definition of common criteria for identification, characterisation and management leads to greater enhancement of the value and improved management of the sites.
- Hydrological functioning: the actions which aim to recover the hydrological functioning of the wetlands and peatlands guarantee greater resilience of the sites against impacts. This also entails improvements in the state of conservation of the habitats and species.

- Livestock management: The structures installed permit livestock management in line with the development of the habitats and species.
- Pressure of forestry activity: Contacts have been made and some actions have already got under way to eliminate plantations which occupy space with potential for wetland habitats and species.
- Pressure from agriculture: A buffer zone which protects the wetland from the impacts of agriculture has been created at the Lake of Caicedo Yuso - Arreo by purchasing land.
- Presence of non-native and invasive species.
- Pressure from structures for public use.
- Appreciation of the sites/habitats by the local populations and entities involved in land management.

INDICATORS OF LONG-TERM PROGRESS AND MEASUREMENT UNITS

The AFTER-LIFE Plan will use the following indicators to evaluate the progress achieved in terms of conservation:

- Surface area and conservation status of the SCI/Priority habitats.
- No. of “areas reclaimed from the wetlands” recovered / restored.
- Area of presence and populations of characteristic species.
- Maintenance of the natural systems recovered.
- Structure of vegetation: favourable/unfavourable.
- Biodiversity: variety/abundance.
- Impact of livestock farming: positive/negative; controlled/uncontrolled.
- Impact of public use: controlled/uncontrolled.
- Land ownership / Land Custody systems.
- Social appreciation of the sites/habitats.
- Monitoring: established/not established; planned/not planned.

SWOT ANALYSIS

WEAKNESSES	THREATS
• Plan with a large number of participants, hindering coordination. • No representatives from the Community of Cantabria among the chief actors in the Plan. • Need for greater consensus and uniformity in the common criteria for the identification and management of Peatland habitats at both national and international levels. • Need to continue with the work to update the information on the presence and distribution of peatland habitats. • Habitats sensitive to the pressure of different factors which may give rise to the loss of biodiversity, fragmentation and isolation of sites and communities. • Some sites are affected by large-scale infrastructures and economic activities.	• Budget cuts affecting conservation work allocations. • Habitats not very well known or appreciated. • Climate change. • Persistence of exotic and invasive species.
STRENGTHS	**OPPORTUNITIES**
• The partnership spans most of the Cantabrian seaboard. • Experience in project coordination involving large numbers of partners. • Structured Work Group on Peatlands with the participation of leading individuals/entities at different levels (regional/national/international). • Most of the sites are included in the Natura 2000 network, in spaces with land management tools. • The implementers of the Plan are or are associated with the public authorities with competencies in the management of the Natura 2000 network areas. • Budget available to lend continuity to the work of TREMEDAL. • Greater and better understanding of the state of conservation of the peatland habitats and their structural species. • 16 restored sites showing signs of favourable progress in terms of state of conservation. Improved connectivity and ecological coherence. • Set of recovery and conservation techniques tested for the different conditions and threats. • A set of tools with which to continue with work fundamental to conservation is available. • Progress in the establishment of common criteria for the identification, diagnosis and management of the target habitats and species. • Interaction and collaboration with local actors whose work is associated with the sites. • Updated information available to different recipients.	• International network of contacts for the different lines of work. Networking through the Work Group on Peatlands. • Area eligible for several European funding programmes. • Partners with great experience in the design and development of conservation projects as part of different European programmes. • Verification of the long-term effects of the actions implemented as part of TREMEDAL. Continuity of the testing of the techniques applied. • Implementation of voluntary work actions and Land Custody experiences to involve local actors in the everyday management of the sites. • Habitats Directive update period, through the provisions of Art. 17, in 2018. This will permit the official information on habitats of this kind and their structural species to be updated. • Existence of different channels for the dissemination of project results, transferable to other areas or sites in similar conditions. • Maintenance of information and awareness work aimed at the general public and, specifically, the local populations and actors.

TREMEDAL AFTER-LIFE CONSERVATION PLAN

The TREMEDAL AFTER-LIFE Plan consists of a set of measures to lend continuity to and further develop the work carried out as part of the project to improve the conservation of peatland habitats, specifically in the northern Iberian peninsula and in Europe in general.

It is based on the experience acquired over the length of the project and on the evaluation of the work performed and results obtained, the most significant of these being:

- a new overview of the current situation of the inland wetlands and peatlands of the northern Iberian peninsula, permitting more realistic continuity actions;
- the techniques employed in the field work, summarised in the Manual of Good Practices, are also a point of reference for this Plan, which aims to continue/maintain them;
- the initial results of monitoring impact on the habitats are positive, but further monitoring is required in order to reach more specific conclusions and evaluate the true effectiveness of the measures implemented in TREMEDAL;
- the Work Group on Peatlands created in TREMEDAL. It is considered necessary to continue to work in order to define common criteria in terms of classification, indicators and management measures for the conservation of sites of this kind. The Group also works to exchange experiences and transfer knowledge and good practices which bring added value;
- the effect of disseminating results, particularly at local level. The importance of activities of this kind has been demonstrated when it comes to enhancing appreciation of these sites.

Execution of the actions in the Plan envisages the participation of **11 entities** with different competencies in the territories where it is to be implemented:

GALICIA	ASTURIAS / CASTILE & LEON	BASQUE COUNTRY	NAVARRE
University of Santiago de Compostela **USC** (through IBADER) Directorate General of Nature Conservation	Consortium of the Picos de Europa National Park **PNPE** Atlantic Botanical Garden of Gijón **JBA** University of Oviedo **UNIOVI** (through INDUROT)	Provincial Council of Álava **DFA** Provincial Council of Gipuzkoa **DFG** Basque Water Agency **URA** HAZI Foundation	Government of Navarre **GN** Gestión Ambiental de Navarre, S.A. **GAN**

More entities and experts are expected to take part in the Work Group on Peatlands (see details in Measure No. 1).

OBJECTIVES

The Plan aims to achieve a set of final and operational objectives.

- The **Final Objectives** are the goals which it is hoped are reached in the long term (beyond the AFTER-LIFE period). They are related to the main problems detected concerning the conservation of the project's target habitats and species.
- The **Operational Objectives** are the short-to-medium term targets (2016-2020) which favour achievement of the final objectives. Each Plan Measure is associated with a specific Operational Objective.

FINAL OBJECTIVES	OPERATIONAL OBJECTIVES
• **O1. TO HAVE UP-TO-DATE INFORMATION ON THE DISTRIBUTION AND CONSERVATION STATUS OF PEATLANDS AND WETLANDS, AND ENSURE A SUITABLE MONITORING SYSTEM**	• ***O1.1 To form a work group of experts on peatlands to work towards defining the characterisation of wetlands and peatlands***
	• ***O1.2 To have up-to-date information on wetlands and peatlands in the Atlantic Region of the Iberian Peninsula and promote further studies***
	• ***O1.3 To establish a suitable monitoring system for the evolution of the conservation status of the target habitats and species***
• **O2. TO ARRIVE AT A FAVOURABLE CONSERVATION STATUS AT THE SITES OF ACTION**	• ***O2.1 To maintain the structures developed and work performed as part of TREMEDAL and carry out further work for the favourable conservation of habitats and species***
	• ***O2.2 To manage the density of livestock appropriately***
• **O3. TO GUARANTEE THE AVAILABILITY OF PROPAGULES AND LIVING PLANTS OF THE STRUCTURAL AND ENDANGERED PEATLAND AND WET ENVIRONMENT SPECIES**	• ***O3.1 To have propagules and living plants for reintroduction and population reinforcement work***
	• ***O3.2 To promote the inclusion of target species in existing Germplasm Banks and Nurseries***
• **O4. TO GUARANTEE ACCESS TO THE INFORMATION AND FAVOUR AWARENESS AND ENGAGEMENT REGARDING THE CONSERVATION OF WETLANDS IN GENERAL AND PEATLANDS IN PARTICULAR**	• ***O4.1 To guarantee access to the information***
	• ***O4.2 To develop specific awareness-raising and engagement actions***

SITES OF ACTION

At present, 28 wetlands have been identified for specific physical actions, most of which belong to the TREMEDAL project.

The area of action spans the Cantabrian seaboard from Galicia to Navarre, although there are no entities to implement physical actions in the Community of Cantabria. Competent entities from this Community are, however, collaborating with other measures, such as the Work Group on Peatlands (M1).

The measures of the AFTER-LIFE Plan include the study of new sites with peatland habitats to improve the information available on the presence of such habitats in the northern Iberian Peninsula. At the time of drafting this Plan, we are aware of at least 3 other areas on which no suitable information has been available until now.

Sites already identified where actions will be implemented as part of the TREMEDAL AFTER-LIFE Plan

GALICIA	ASTURIAS / CASTILE & LEON	BASQUE COUNTRY	NAVARRE
SCI Parda-Ladra-Tamoga *Island of San Roque* *Wetland of Cospeito* *Ollos de Begonte*	**SCI Picos de Europa** (Asturias) *Vega de Comeya* **SCI Picos de Europa** (Castile and Leon) *Vega de Liordes*	**SAC Jaizkibel** **SAC River Leitzarán** *Usabelartza* **SAC Lake of Caicedo Yuso - Arreo**	**SCI Belate** *Belate, Okolin, Esteribar, Xuriain, Anué* **SCI Orabidea Brook** *Alkurruntz, Arxuri* **SAC Mount Alduide** *Argintzu, Azaldegi* **SCI Sierra of Artxuga** *Baigura* **SCI Irati-Urrobi-Erro river system** *Jauregiaroztegi* **Peatlands for connectivity:** *Lixketa, Maulitx, Mendaur, Autin, Azpilleta, Zentinel*

The Plan also contains a set of measures which favour peatland habitats in general (not only certain sites). Such is the case of the actions related to the conservation of plant material (propagules, living plants) belonging to structural peatland species, the continuity of the Work Group on Peatlands and the information and awareness actions.

HABITATS AND SPECIES

Actions are planned for **17 types of habitat** (some of which are Priority Habitats), of which **8 are peatland habitats.**

		Monitoring actions	Conservation actions at sites				Structural species conservation actions	
		M3	M4	M5	M6	M7	M8	M9
Peatland Habitats	7110*	●	●				●	●
	7120	●						
	7130*	●	●				●	●
	7140	●	●	●	●	●	●	●
	7150	●	●		●	●	●	●
	7210*	●	●	●				●
	7220*		●					
	7230*	●	●				●	●
	91D0*	●	●					
Hygrophilous Habitats	1410	●	●					
	1510*	●	●					
	3110	●		●			●	●
	3190	●	●	●				
	4020*	●	●	●	●	●		
	6410	●	●	●	●	●		
	6430	●						
	91E0*	●		●				

Most of the target species are associated with monitoring actions (M3: 46 species). The target species of conservation actions are more specific.

Details of the species targeted for conservation actions at specific sites:

	Conservation actions at specific sites			
	M4	M5	M6	M7
Angelica razulii	●			●
Arnica montana	●		●	●
Carex hostiana	●		●	●
Drosera intermedia	●		●	●
*Eryngium viviparum**	●	●		
Hydrocotile vulgaris	●		●	●
Illecebrum verticillatum	●		●	●
Luronium natans		●		
Lycopodiella inundata	●		●	●
Lycopodium clavatum	●			●
Pilularia globulifera		●		
Pinguicula lusitanica	●		●	●
Rhynchospora fusca	●		●	●
Sanguisorba officinalis	●		●	●
Soldanella villosa	●		●	●
Spiranthes aestivalis	●		●	●

Details of the species targeted for Germplasm Bank- and Nursery-based structural species conservation actions:

	Structural species conservation actions	
	M8	M9
Carex davalliana	●	●
Carex echinata	●	●
Carex hostiana	●	●
Carex lepidocarpa	●	●
Cladium mariscus		●
Drosera intermedia	●	●
Drosera rotundifolia	●	●
Equisetum variegatum	●	●
Eriophorum angustifolium	●	●
*Eryngium viviparum**	●	●
Juncus balticus subsp. *cantabricus*	●	●
Narcissus pseudonarcissus subsp. *nobilis*	●	●
Narthecium ossifragum	●	●
Parnassia palustris	●	●
Pedicularis mixta	●	●
Potentilla fruticosa	●	●
Quercus pyrenaica		●
Rhynchospora fusca	●	●
Salix hastatella subsp. *picoeuropeana*	●	●
Spiranthes aestivalis	●	●
Swertia perennis	●	●
Thelypteris palustris		●
Triglochin palustris	●	●

The actions planned will also benefit several species of odonata, lepidoptera, amphibians and reptiles which typically live in peatland habitats, and whose presence is associated with their state of conservation.

		Monitoring actions	Conservation actions at sites			
		M3	M4	M5	M6	M7
Insects	*Coenagrion caerulescens*	●	●		●	●
	Coenagrion mercuriale	●	●		●	●
	Coenagrion scitulum	●	●		●	●
	Sympetrum flaveolum	●	●		●	●
	Erebia piphron xistralensis	●				
	Maculinea alcon	●	●		●	●

		Monitoring actions	Conservation actions at sites			
		M3	M4	M5	M6	M7
Amphibians and reptiles	*Lacerta schreiberi*	●	●			
	Lacerta vivipara	●	●			
	Chioglossa lusitanica	●	●			
	Discoglossus galganoi	●	●			
	Rana iberica	●	●			
	Rana temporaria	●	●			
	Triturus helveticus	●	●			
	Triturus marmoratus	●	●			

The fact sheet on each Measure specifies the target habitats and species in each case.

MEASURES AND ACTION GUIDELINES BY OBJECTIVE

FINAL OBJECTIVE	OPERATIONAL OBJECTIVES	MEASURES
• **O1. TO HAVE UP-TO-DATE INFORMATION ON THE DISTRIBUTION AND CONSERVATION STATUS OF PEATLANDS AND WETLANDS, AND ENSURE A SUITABLE MONITORING SYSTEM**	• ***O1.1 To form a work group of experts on peatlands to work towards defining the characterisation of wetlands and peatlands***	• **M1** Maintenance and promotion of the Work Group on Peatlands.
	• ***O1.2 To have up-to-date information on wetlands and peatlands in the Atlantic Region of the Iberian Peninsula and promote further studies***	• **M2** Maintenance and update of information on wetlands and peatlands in the Atlantic Region of the Iberian Peninsula.
	• ***O1.3 To establish a suitable monitoring system for the evolution of the conservation status of the target habitats and species***	• **M3** Monitoring of habitats and species at the action sites.
• **O2. TO ARRIVE AT A FAVOURABLE CONSERVATION STATUS AT THE SITES OF ACTION**	• ***O2.1 To maintain the structures developed and work performed as part of TREMEDAL and carry out further work for the favourable conservation of habitats and species***	• **M4** Maintenance of existing structures. • **M5** Control of reappearance of non-native, invasive and competing species. • **M6** New actions and structures for the management of peatlands and wet environments.
	• ***O2.2 To manage the density of livestock appropriately***	• **M7** Actions to monitor and manage livestock density and grazing periods.
• **O3. TO GUARANTEE THE AVAILABILITY OF PROPAGULES AND LIVING PLANTS OF THE STRUCTURAL AND ENDANGERED PEATLAND AND WET ENVIRONMENT SPECIES**	• ***O3.1 To have propagules and living plants for reintroduction and population reinforcement work***	• **M8** Germplasm bank. • **M9** Cultivation of plants in nurseries.
	• ***O3.2 To promote the inclusion of target species in existing Germplasm Banks and Nurseries***	
• **O4. TO GUARANTEE ACCESS TO THE INFORMATION AND FAVOUR AWARENESS AND ENGAGEMENT REGARDING THE CONSERVATION OF WETLANDS IN GENERAL AND PEATLANDS IN PARTICULAR**	• ***O4.1 To guarantee access to the information***	• **M10** Maintenance of the TREMEDAL website. • **M11** Access to the information generated by TREMEDAL through other channels/media. • **M12** Dissemination of the project results.
	• ***O4.2 To develop specific awareness-raising and engagement actions***	• **M13** Information and awareness activities. • **M14** Development of voluntary work programmes. • **M15** Implementation of shared land management pilot engagement actions (Land Custody).

O1. TO HAVE UP-TO-DATE INFORMATION ON THE DISTRIBUTION AND CONSERVATION STATUS OF PEATLANDS AND WETLANDS, AND ENSURE A SUITABLE MONITORING SYSTEM

O1.1 To form a work group of experts on peatlands to work towards defining the characterisation of wetlands and peatlands

M1. Maintenance and promotion of the Work Group on Peatlands	Period:	2016-2020
	Budget/year	€550

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	USC	PNPE · JBA · UNIOVI	DFA · DFG · URA · HAZI	GN · GAN

Current situation

The creation of the Work Group on Peatlands is considered one of TREMEDAL's major successes in terms of cooperation, the exchange of experiences and knowledge transfer. It is also a significant tool for progress regarding one of the greatest problems for the conservation of the project's target habitats (peatlands and inland wetlands): the wide-ranging criteria used to characterise, evaluate and monitor sites of this kind.

The meetings held within the framework of the project and the Final project seminar led to the consolidation of this Work Group and further conviction of the need to continue working on this cooperation and exchange dynamic. Consequently, the AFTER-LIFE Plan includes a specific measure to continue this line of work.

AFTER-LIFE actions

GAN, as coordinator of the TREMEDAL project, in collaboration with the USC, will continue to drive the group. Only the entities taking part in TREMEDAL are indicated in the table above, but the Work Group consists of a large number of additional professionals and entities (result of project action F2).

The plan is to maintain the Work Group dynamic over the period 2016-2020 through:

- An annual meeting including a field trip to sites which are of interest due to their uniqueness, representativeness (types of plant communities or Habitats of Community Interest/Priority Habitats), problems, conservation actions performed, etc.
- Exchange of information on publications, meetings and seminars within the group.
- An annual report on the activities carried out, principally, a report on the results of the meeting and trip to peatlands and wetlands.
- Collaboration between the Work Group and LIFE Ordunte to produce a publication including those results of LIFE TREMEDAL not contained in the publications already released as part of the project.

The work of the Group will also be publicised through informative activities such as presentations at seminars and conferences, publications in scientific journals and trips to other sites of interest (M12).

Deliverables

- Annual report summarising the activities of the Work Group.

Complementary guidelines

- *To encourage the integration of new experts.*
- *To encourage the exchange of information between different administrations.*
- *To encourage and drive lines of research related to wetlands and their ecology.*
- *To encourage the preparation of joint publications by the members of the Work Group.*
- *To promote participation in the Ministry's wetland work groups and the RAMSAR wetland work groups.*

O1.2 To have up-to-date information on wetlands and peatlands in the Atlantic Region of the Iberian Peninsula and promote further studies

M2. Maintenance and update of information on wetlands and peatlands in the Atlantic Region of the Iberian Peninsula	**Period:**	**2016-2020**
	Budget/year	**€6,000**

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	**USC**	**PNPE · JBA · UNIOVI**	**DFA · DFG · URA · HAZI**	**GN · GAN**

Current situation

Within the framework of action A1 of TREMEDAL, a lot of work was put in to analyse information on the types and distribution of wetlands, particularly peatlands, in the northern Iberian Peninsula. More work than initially expected was required due to the heterogeneous nature of the sources, errors in the information, outdated documentation, etc. Consequently, the degree to which the information has been updated is considered one of the most significant results as far as making progress with peatland conservation is concerned.

Several tools (database, indicator system, GIS) which will permit the work initiated in TREMEDAL to be continued in terms of maintaining and updating information were also developed.

AFTER-LIFE actions

The information generated needs to be updated on a continuous basis as more is learned about wetlands and peatlands in the Atlantic Region of the Iberian Peninsula, requiring field sessions and desk review work to analyse the information and data.

The entities involved in monitoring the sites included in the Plan (M3) will update the relevant sheets in the database if significant variations are detected. Among other things, the database tool is capable of generating reports and enables specific consultations.

Given the nature of the entities taking part in the project (public), work will place particular emphasis on the transferal of the results to the bodies responsible for or with competencies regarding the management of the Natura 2000 network in each territory to make it a useful tool for the management of these sites.

Deliverables

- Two-yearly report on the database updating work performed: corrections, inclusion of information, etc.
  - ↳ Report sent to the members of the Work Group on Peatlands.

Complementary guidelines

- *To encourage the exchange of information between different administrations.*
- *To promote the updating of each region's Wetlands Inventory to include all the peatlands and wetlands identified.*

O1.3 To establish a suitable monitoring system for the evolution of the conservation status of the target habitats and species

M3. Monitoring of habitats and species at the action sites	**Period:**	**2016-2020**
	Budget/year	**€28,900**

	GALICIA	**ASTURIAS CASTILE & LEON**	**BASQUE COUNTRY**	**NAVARRE**
Entities	**Dir. Gen. Nature Conservation USC**	**PNPE · JBA · UNIOVI**	**DFA · DFG · URA · HAZI**	**GN · GAN**
Sites	*Wetland of Cospeito Island of San Roque Pozos do Ollo*	*Vega de Comeya Vega de Liordes*	*Jaizkibel Usabelartza Lake of Caicedo Yuso - Arreo*	*Alkurruntz, Argintzu, Arxuri, Autrin, Azaldegi, Azpilleta, Baigura, Balsagorrieta, Belate, Gesaleta, Jauregiaroztegi, Lixketa, Maulitx, Mendaur, Okolin, Xuriain, Zentinel*

Target habitats		1410 · 1510* · 3110 · 3190 · 4020* · 6410 · 6430 · 7110* · 7120 · 7130* · 7140 · 7150 · 7210* · 7230* · 91D0* · 91E0*
Target species	**Flora**	*Andreaea megistospora · Arnica montana · Barbilophozia binsteadii · Calypogeia sphagnicola · Carex hostiana · Carex vesicaria · Drosera intermedia · Eriophorum angustifolium · Eriophorum latifolium · Eryngium viviparum* · Frullania oakesiana · Gymnomitrion crenulatum · Huperzia selago · Hydrocotile vulgaris, · llecebrum verticillatum · Hygrohypnum ochraceum · Isoetes durieui · Isoetes fluitans · Isoetes velatum · Kurzia pauciflora · Litorella uniflora · Ludwigia palustris · Luronium natans · Menyanthes trifoliata · Metzgeria temperata · Myrica gale · Narcissus asturiensis · Narcisus pseudonarcissus nobilis · Odontoschisma sphagni · Pilularia globulifera · Pinguicula lusitanica · Pinguicula vulgaris · Ranunculus omiophyllus · Rhynchospora alba · Rhynchospora fusca · Salix repens · Sanguisorba officinalis · Schistostega pennata · Soldanella villosa · Sphagnum magellanicum · Sphagnum molle · Sphagnum pylaessi · Splachnum ampullaceum · Tayloria tenuis · Triglochin palustris · Utricularia australis*
	Fauna	*Chioglossa lusitanica · Coenagrion caerulescens · Coenagrion mercuriale · Coenagrion scitulum · Discoglossus galganoi · Erebia piphron xistralensis · Lacerta schreiberi · Lacerta vivipara · Maculinea alcon · Rana iberica · Rana temporaria · Sympetrum flaveolum · Triturus helveticus · Triturus marmoratus*

Current situation

The monitoring work performed as part of the project (see the results of actions D1 and D2) shows the positive response of the sites to the restoration work carried out and verifies the improvement in the conservation status of the habitats and species. However, monitoring in the mid-to-long term is required in order to verify their positive evolution (surface area, structure, characteristic species, impacts, threats, etc.) and detect any unwanted effects.

AFTER-LIFE actions

This measure consists of the establishment of site monitoring systems in each territory. This monitoring work involves tracking the state of the target habitats and species (continuity of project actions D1 and D2) and checking the state of the structures created and work carried out within the framework of TREMEDAL. As a result of action D2, the species to be monitored at the TREMEDAL sites have already been defined:

Bryophytes	***Ferns***	***Vascular plants***	
Andreaea megistospora	*Huperzia selago*	*Arnica montana*	*Sanguisorba officinalis*
Barbilophozia binsteadii	*Isoetes durieui*	*Carex hostiana*	*Soldanella villosa*
Calypogeia sphagnicola	*Isoetes velatum*	*Carex vesicaria*	*Triglochin palustris*
Frullania oakesiana	*Isoetes fuitans*	*Drosera intermedia*	*Utricularia australis*
Gymnomitrion crenulatum	*Pilularia globulifera*	*Eriophorum angustifolium*	
Hygrohypnum ochraceum		*Eriophorum latifolium*	
Kurzia pauciflora		*Hydrocotile vulgaris*	
Metzgeria temperata		*Illecebrum verticillatum*	
Odontoschisma sphagni		*Litorella uniflora*	
Schistostega pennata		*Ludwigia palustris*	
Sphagnum magellanicum		*Luroniun natans*	
Sphagnum molle		*Menyanthes trifoliata*	
Sphagnum pylaessi		*Myrica gale*	
Splachnum ampullaceum		*Narcissus asturiensis*	
Tayloria tenuis		*Narcisus pseudonarcissus*	
		Pinguicula lusitanica	
		Pinguicula vulgaris	
		Ranunculus omiophyllus	
		Rhynchospora alba	
		Rhynchospora fusca	
		Salix repens	

Amphibians & Reptiles	***Insects***
Lacerta vivipara	*Coenagrion mercuriale*
Lacerta schreiberi	*Erebia epiphron xistralensis*
Chioglossa lusitanica	
Discoglossus galganoi	
Rana iberica	
Rana temporaria	
Triturus marmoratus	
Triturus helveticus	

Results analysis and research is also planned in addition to the field work.

The monitoring will be performed both at the sites where work was carried out during TREMEDAL (see list in the table above) and at those progressively included through other AFTER-LIFE measures (M2).

Conversely, depending on the observations made during monitoring, actions which are not initially foreseen in the Plan (structural actions, management actions, etc.) may need to be implemented. Insofar as possible, these will be integrated into the relevant Measures.

By territory:

- **Galicia**: the state of conservation will be evaluated by means of regular visits to the sites using the monitoring systems tested as part of TREMEDAL. This field monitoring work will be carried out together with investigation of the conservation and management measures required in order to ensure the maintenance or, if relevant, reestablishment of a favourable state of conservation for the habitats and species of Community Interest, paying particular attention to the priority taxa.

  Monitoring of the state of the sites and the structures developed in TREMEDAL will also be coordinated with the forestry protection services managed by the competent Autonomous Community organism, the Directorate General of Nature Conservation, given that they are located in Natura 2000 spaces and have also been named both Nature Protection Areas and Special Natural Value Protection Areas (ZEPVN).

- **Asturias/Castile & Leon**: staff from the JBA/UNIOVI and the Park will visit each of the sites once per season to collect the information registered on the sensors installed in the mires of Comeya and Liordes, and analyse other parameters indicating the evolution of the state of conservation of the target habitats (7110* and 7230): degree of ground coverage, flowering and fruition of keystone species, thickness of the moss layer, runoff, degree of predation by herbivores outside the fencing, number of heads of livestock present and type.

- **Basque Country**: as part of their everyday vigilance work, the Provincial Council forestry protection services (DFA and DFG) and URA will also take charge of:

  - general monitoring of the sites in the Plan. This will permit early detection of unforeseen deviations, such as acts of vandalism, sudden changes in the water systems, appearance of non-native species, etc.;
  - specific monitoring of the TREMEDAL structures. They will periodically check the state of fencing, dykes, tracks, plantations, etc.;
  - specific monitoring of activities. This will entail monitoring undesired activities (such as transit through vulnerable areas) and also those with positive effects: livestock management and tours using the routes prepared.

  These protection services perform continuous monitoring (all year round) and produce reports when they detect anomalous situations or situations which call for some kind of action.

  Specific monitoring actions are also planned. In Jaizkibel and Usabelartza, the DFG will maintain the monitoring system established for TREMEDAL, based on plant formation and their development, albeit on a less frequent basis (every two years).

  In the case of the Lake of Caicedo Yuso - Arreo, URA will:

  - ensure the continuity of data maintenance and evaluation from the Arreo weather station;
  - implement improvements to the lake's piezometer; it will evaluate the installation of a double terminal strip or an alternative to prevent interruption in the data set;
  - implement changes to the multiparameter probe: it will evaluate adding or replacing one of the sensors in favour of a chlorophyll control or equivalent alternative;
  - carry out flow testing: it will continue to gauge the flow at Arreo-Entrance and Arreo-Exit, and study the possibility of increasing it with permanent installations (triangular spillway) on the La Muera brook.
  - complement the monitoring carried out within the Water Framework Directive (WFD), it will repeat the study of Submerged Aquatic Vegetation. In order to allow relevant changes to occur, a complete study is planned for 2018. The information on changes

until then will be obtained by regular transects, completed with subaquatic video sessions of the bed;

- specifically study the recovery of *Chara sp*., evaluating the possibility of strengthening these formations with transplantations from nearby locations.

- **Navarre**: the state of conservation will be evaluated by means of regular visits to the sites and the use of the monitoring systems tested in TREMEDAL. A report will be written up every year evaluating the state of each of the wetlands monitored.

In the case of Galicia and Navarre, action M15, establishing Land Custody agreements, complements this action.

Deliverables

- Annual report on the work carried out and analysis of the evolution of the habitats and species (state of infrastructure, impacts, non-native species, etc.) (M3-M7).
- Report on the monitoring of permanent quadrats in 2018 and 2020.
- Report on the monitoring of development of the surface occupied by the habitats in 2020.
- Annual report on monitoring using the piezometer, multiparameter probe and weather station in Arreo.

Complementary guidelines

- *To encourage communication between the different actors involved in monitoring the different areas.*

O2. TO ARRIVE AT A FAVOURABLE CONSERVATION STATUS AT THE SITES OF ACTION

O2.1 To maintain the structures developed and work performed as part of TREMEDAL and carry out further work for the favourable conservation of habitats and species

M4. Maintenance of existing structures	**Period:**	**2016-2020**
	Budget/year	**€9,900**

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	**USC**	**PNPE**	**DFA · DFG · URA**	**GN · GAN**
Sites	*Wetland of Cospeito* *Island of San Roque* *Pozos do ollo*	*Vega de Comeya* *Vega de Liordes*	*Jaizkibel* *Usabelartza* *Lake of Caicedo Yuso - Arreo*	*Alkurruntz, Arxuri, Autrín, Belate, Jauregiaroztegi Lixketa, Maulitx, Mendaur, Okolin, Xuriain.*

Target habitats		1410 · 1510* · 3190 · 4020* · 6410 · 7110* · 7130* · 7140 · 7150 · 7210* · 7220* · 7230* · 91D0*
Target species	**Flora**	*Angelica razulii · Arnica montana · Carex hostiana. · Drosera intermedia · Hydrocotyle vulgaris · Illecebrum verticillatum · Lycopodiella inundata · Lycopodium clavatum · Pinguicula lusitanica · Rhynchospora fusca · Sanguisorba officinalis · Soldanella villosa · Spiranthes aestivalis. · Eryngium viviparum**
	Fauna	*Coenagrion mercuriale · Coenagrion caerulescens · Coenagrion scitulum · Sympetrum flaveolum. · Maculinea alcon*

Current situation

A lot of work was carried out and structures developed within these sites in order to restore the natural processes of the wetlands and attain an optimum state of conservation.

Different actions were required at each site depending on its initial state (studied in the ex-ante diagnoses in action A1) and the chief problems it faced. This work allowed TREMEDAL to test the efficiency of a range of methodologies and procedures, which now feature in the project's Manual of Good Practices.

AFTER-LIFE actions

This measure covers the performance of work related to the maintenance of structures for the correct management of the peatland habitats and wet environments where work was carried out as part of TREMEDAL. Maintenance work on the information panels installed at each project site is also included.

By territory:

- **Galicia**: the state of the structures created during TREMEDAL at the 3 sites of action will be monitored over time. When necessary, the structures will be repaired, plants which fail to take root replaced, plantations protected, rubble removed, the old channel closed, the natural landscape restored, natural channels through the wetland forest recovered, etc.
- **Asturias/Castile & Leon**: the livestock management structures in *Vega de Comeya and Vega de Liorde* will be maintained. Each spring, after the snow has cleared, the fencing to exclude herbivores will be inspected and repaired by the National Park work crews (approx. 6 work days a years estimated). This work will be combined with the tasks to monitor the evolution of the habitats (7110* and 7230).

- **Basque Country**: maintenance work will be carried out when the need for it is detected and, given the type of elements to check, no preventive maintenance is planned. In this case, the competencies depend on the site and/or type of structure:
    - *Jaizkibel* and *Usabelartza*: the repair and maintenance of the elements present within the site (fencing, panels, dyke sluice gate, elements to prevent undesired passage, fallen trees, etc.) will be carried out by the DFG.
    - The DFA will be responsible for actions at the *Lake of Caicedo Yuso - Arreo*. This line of work includes the maintenance of structures created as part of TREMEDAL and those developed within the AFTER-LIFE framework (M6).
    - URA will take charge of elements related to water monitoring (flow gauging, piezometer) and water quality in the Lake of Caicedo Yuso – Arreo.
- **Navarre**: the work included in this measure will consist of inspecting the existing structures at each of the peatlands and, if required, proceed to repair any damage. The peatlands have dykes (54), fencing (2,650 m), gates (12), stiles, livestock crossings (2), drinking troughs (3), panels (10) and plinths (7); most of the structures are the result of work performed as part of TREMEDAL, but others were created in 2008 and 2011 through the Social Programme of the La Caixa savings bank.

  New work on infrastructure to manage these sites is planned for 2016 through a project funded by the La Caixa Social Programme. Once completed, these elements will also be included in this maintenance measure. All the structures installed at the sites in Navarre will be inspected once a year.

Deliverables

- Annual report on the work carried out and analysis of the evolution of the habitats and species (state of infrastructure, impacts, non-native species, etc.) (M3-M7).

Complementary guidelines

- *To disseminate the TREMEDAL Manual of Good Practices.*

M5. Control of non-native, invasive and competing species	Period:	2016-2020
	Budget/year	€17,500

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	**USC**		**DFA · DFG**	
Sites	*Wetland of Cospeito* *Island of San Roque* *Pozos do ollo*		*Jaizkibel* *Usabelartza* *Lake of Caicedo Yuso - Arreo*	

Target habitats		3110 · 3190 · 4020* · 6410 · 7140 · 7210* · 91E0*
Target species	**Flora**	*Eryngium viviparum** · *Pilularia globulifera* · *Luronium natans*

Current situation

Specific actions were implemented at the TREMEDAL sites Jaizkibel, Usabelartza, Lake of Caicedo and Wetland of Cospeito to control non-native and invasive species which were creating problems for the conservation of these wetlands.

In each case, action was taken on different plant species (*Baccharis halimifolia, Alnus cordata, Chamaecyparis lawsoniana, Pinus radiata, Eucaliptus spp)* and at the Lake of Caicedo, work was also carried out to control fish and crayfish populations.

In general, the populations of these species have been reduced at the sites. TREMEDAL allowed conclusions to be drawn regarding the different methodologies employed, the reaction of the species and habitats to the different treatments and their evolution, and also highlighted to need to continue implementing control and eradication actions.

AFTER-LIFE actions

This measure contains work designed to continue with the control of exotic species affecting the target species and habitats in the peatlands and wet environments.

By territory:

- **Galicia**: the work to eradicate *Eucaliptus spp* and *Pinus radiata* in the Wetland of Cospeito and on the Island of San Roque will be continued.
- **Basque Country**: the work at Jaizkibel will be performed by the DFG. The plan is to continue with the regular controls of non-native plants using the same methodology as that employed during TREMEDAL (mechanical and chemical processes), although thanks to the progress made during the project, such control work will not have to be so intense. Control measures will also be taken if invasive non-native species are detected at Usabelartza during the monitoring carried out in the AFTER-LIFE period.

  The DFA will perform the actions at the Lake of Caicedo Yuso - Arreo. In this case, the actions centre on animal species, chiefly well established, hard-to-control populations (as seen in TREMEDAL). Consequently, some changes will be made to the strategy and technique applied, which will take into consideration:

  - the proposals made by the companies providing external technical assistance during TREMEDAL, as discussed in technical meetings and described in specific reports. Such

is the case of the TRINVADER technique (for fish species) and shrimp traps without bait (for crayfish);

- techniques used and tested during TREMEDAL, less frequently and as a complement to or in combination with other techniques;
- other existing techniques, which need to be evaluated both individually and as compatible techniques. These include the creation of physical barriers between the reedbed and the area of free water, the reintroduction of native predators (eels, turtles, trout, minks, otters), the non-removal of non-native predators (Black Bass), the use of biocides, drying out the reedbed, the application of harmful electric fields in the reedbed, the use of seine nets or the reintroduction of sterilised male crayfish.

- **Navarre**: Action for the Lawson Cypress is included in M6, which, although the tree is exotic, is considered more in line with the action required.

Deliverables

- Annual report on the work carried out and analysis of the evolution of the habitats and species (M3-M7).
- General conclusions of the actions included in this measure at the end of the AFTER-LIFE period.

Complementary guidelines

- *To disseminate the TREMEDAL Manual of Good Practices.*

M6. New actions and structures for the management of peatlands and wet environments	Period:	2016-2020
	Budget/year	*variable**

*see details in the budget section

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities			**DFA · DFG**	**GN · GAN**
Sites			*Jaizkibel* *Lake of Caicedo Yuso - Arreo*	*Autrin, Belate, Jauregiarotegi, Xuriain*

Target habitats		4020* · 6410 · 7140 · 7150
Target species	**Flora**	*Arnica montana · Carex hostiana. · Drosera intermedia · Hydrocotyle vulgaris · Illecebrum verticillatum · Lycopodiella inundata · Pinguicula lusitanica · Rhynchospora fusca · Sanguisorba officinalis · Soldanella villosa · Spiranthes aestivalis*
	Fauna	*Coenagrion mercuriale · Coenagrion caerulescens · Coenagrion scitulum · Sympetrum flaveolum · Maculinea alcon*

Current situation

Some of the peatlands where actions were implemented in TREMEDAL and others where they were not need work of different kinds to be performed in order to achieve a suitable state of conservation.

AFTER-LIFE actions

This measure contains different types of work additional to the work carried out as part of the TREMEDAL Conservation actions which needs to be performed at sites within the project and in other nearby areas.

By territory:

- **Basque Country**: at some Jaizkibel sites (Jaizkibel 1, 3 and 4), it is probably going to be necessary to perform scrub clearance maintenance work to make the peatlands more attractive to livestock. Following the TREMEDAL guideline, both the areas around the peatlands and the peatlands themselves will be cleared. Within the peatlands themselves, the work will be selective and supervised by specialised staff. These actions are expected to be carried out in 2016 and 2017.

  Certain additional work is also foreseen at the Lake of Caicedo Yuso - Arreo:

  - Purchase the western sector of parcel 130 in order to complete the protection of the salt spring and be able to complete a circular footpath around the lake.
  - Form the eastern stretch of the circular path around the lake.
  - Finish the archaeological work at the *Lacus* settlement, cover and protect the findings according to the decisions of the experts and make a car park to dissuade car access at the Chapel of Our Lady of the Lake.
  - Relocate the information panel in the new car park.
  - Complete promotion of the lake with paths linking it with Peña La Uña, with the remains of mines built around the diapir, and a circular route between the lake and Salinas de Añana.

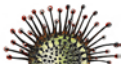
- **Navarre**: work will continue to reintroduce peatland species in areas where the population has dropped significantly (chiefly on the mires of Belate and Xuriain). The reintroduction will be performed by transplanting examples from the same areas and if the work to collect germplasm and reproduce the plants in nurseries is successful (particularly with the orchid S*pirantes aestivalis*), then they will also be applied at these sites.

  The installation of new structures is also planned:

  - Installation of 6 small wooden dykes in the area of the Belate mire in the municipal district of Ultzama.
  - Installation of natural-fibre mesh (around 500m^2) in Xuriain in areas impacted by erosion where actions were not implemented within the framework of the LIFE TREMEDAL project.
  - Installation of two livestock crossings in Jauregiaroztegi to facilitate the passage of livestock between the different areas of the peatland, reducing the impact on vegetation.
  - Clearance of competing vegetation in Autrin (0.3 ha) and Belate (0.7 ha); work planned for 2016 and 2020.
  - Felling of *Chamaecyparis lawsoniana* and stump removal in areas with potential for the development of peatland vegetation in the zone around Belate. The idea is to cut up to 100 examples in those areas with most potential and use the material to create wooden dykes.

Deliverables

- Annual report on the work carried out and analysis of the evolution of the habitats and species (M3-M7).



O2.2 To manage the density of livestock appropriately		
M7. Actions to manage livestock density and grazing periods	**Period:**	**2016-2020**
	Budget/year	**€7,000**

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities			**DFG**	**GN · GAN**
Sites			*Jaizkibel Usabelartza*	*Alkurruntz, Arxuri, Belate, Jauregiaroztegi, Mendaur, Xuriain*

Target habitats		4020* · 6410 · 7140 · 7150
Target species	**Flora**	*Angelica razulii · Arnica montana · Carex hostiana · Drosera intermedia · Hydrocotyle vulgaris · Illecebrum verticillatum · Lycopodiella inundata· Lycopodium clavatum · Pinguicula lusitanica · Rhynchospora fusca · Sanguisorba officinalis · Soldanella villosa · Spiranthes aestivalis*
	Fauna	*Coenagrion mercuriale · Coenagrion caerulescens · Coenagrion scitulum · Sympetrum flaveolum · Maculinea alcon*

Current situation

TREMEDAL confirmed the benefits of managing livestock density properly at sites of this kind, in some cases limiting and in others favouring or recovering the presence of more animals. Whichever the case, this activity requires specific control and monitoring.

Actions of this kind also require significant work to ensure the collaboration of and placate local livestock farmers, and secure the involvement and support of public entities and administrations.

AFTER-LIFE actions

This measure covers different actions related to the impact of the presence or absence of livestock at the project sites. Given the different situation in each territory and site, the measures are different in each case.

By territory:

- **Basque Country**: only the sites in Gipuzkoa need livestock control. In Usabelartza, no problems are posed as a result of too much or too little livestock, and so the only work planned is verification of no change in the situation. This monitoring will be carried out by means of the work to monitor and protect the state of conservation (M3).

  In Jaizkibel (1, 3 and 4), a greater density of livestock is required, so scrub will be cleared to make the area more attractive to livestock (M7) and work will continue to encourage local livestock farmers to use the pastures in the area.

  No specific monitoring is considered necessary in this regard, so it will form part of the normal forestry protection work performed at these sites. Progress will be measured by registering the development of the plant formations.

- **Navarre**: the management plan is different at each site according to the state of conservation of the peatland and the livestock density to which it is subjected:

  1. **Livestock access control according to the development of the vegetation:** In Arxuri, livestock access has been closed off in order to analyse the effect which it may be

having on the development of the peatland habitats and their characteristic species (particularly *Spiranthes aestivalis*). In this case, the opening or closing of the fencing will depend on the development of the vegetation and species within the two fenced-off areas. Livestock is also excluded from Xuriain to allow the habitats within the sites to recover. In this case, the total exclusion of livestock is proposed for at least the next 5 years. Visits to evaluate the state of the vegetation will be made every year.

2. **Calendars and pre-established livestock densities**: continuing the line of work initiated in 2008, annual calendars and livestock densities adapted to the objective of conserving habitats and species in the mire's two management areas in Belate (Baztan and Ultzama) have been established. 2 field trips will be made to this site every year to decide when to open and close the interior fences (those which include the most sensitive vegetation and habitats).
3. **Open access with impact monitoring**: in Alkurruntz and Mendaur, the livestock management plan establishes that the gate into the fenced area should remain open all year round unless impacts resulting from the presence of livestock are detected in the wetland as a result of regular monitoring work. These sites will be visited every summer to see if it is necessary to close the fences.

In addition to the above, livestock management proposals will be prepared for other areas which require them and their implementation will be coordinated with the relevant entities, if considered necessary.

This livestock management work requires previous preparatory work to design the proposed calendars and livestock densities, offering the local entities and livestock farmers involved different alternatives. It also requires good coordination with the regional authorities, the relevant local entities, the technical staff attached to the project, the environmental protection service and the farmers to guarantee compliance with the livestock management plan. The management proposal for each site will be reviewed each year.

Deliverables

- Annual report on the work carried out and analysis of the evolution of the habitats and species (M3-M7).
- General conclusions of the actions included in this measure at the end of the AFTER-LIFE period.

Other complementary actions

- *To establish and maintain relationships with local livestock farmers.*

O3. TO GUARANTEE THE AVAILABILITY OF PROPAGULES AND LIVING PLANTS OF THE STRUCTURAL AND ENDANGERED PEATLAND AND WET ENVIRONMENT SPECIES

O3.1 To have propagules and living plants for reintroduction and population reinforcement work

O3.2 To promote the inclusion of target species in existing Germplasm Banks and Nurseries

M8. Germplasm bank	**Period:**	**2016-2020**
	Budget/year	**€2,500**

	GALICIA	**ASTURIAS CASTILE & LEON**	**BASQUE COUNTRY**	**NAVARRE**
Entities	**USC**	**JBA · INDUROT**	**HAZI**	**GN · GAN**
Sites	*Wetland of Cospeito* *Island of San Roque* *Pozos do Ollo*	*Vega de Comeya* *Vega de Liordes* *Other Asturias and Castile & Leon sites*	*Jaizkibel* *Usabelartza*	*Alkurruntz, Anué, Argintzu, Arxuri, Autrin, Azaldegi, Azpilleta, Baigura, Esteribar, Belate, Gesaleta, Jauregiaroztegi, Lixketa, Maulitx, Mendaur, Okolin, Xuriain, Zentinel*

Target habitats		3110 · 7110* · 7130* · 7140 · 7150 · 7230*
Target species	**Flora** **Fauna**	*Carex davalliana · Carex echinata · Carex hostiana · Carex lepidocarpa · Drosera intermedia · Drosera rotundifolia · Equisetum variegatum · Eriophorum angustifolium · Eryngium viviparum · Juncus balticus subsp. cantabricus · Narcissus pseudonarcissus* subsp*. nobilis · Narthecium ossifragum · Parnassia palustris · Pedicularis mixta · Potentilla fruticosa · Rhynchospora fusca · Salix hastata* subsp*. picoeuropeana · Spiranthes aestivalis · Swertia perennis · Triglochin palustris*

Current situation

TREMEDAL action C10 led to the development of germination and cultivation protocols for 20 species, and collections of seeds belonging to 18 structural peatland habitat species are available (*Carex davalliana, Carex echinata, Carex hostiana, Carex lepidocarpa, Drosera intermedia, Drosera rotundifolia, Eriophorum angustifolium, Eryngium viviparum, Juncus balticus* subsp*. cantabricus, Narcissus pseudonarcissus* subsp*. nobilis, Narthecium ossifragum, Parnassia palustris, Pedicularis mixta, Potentilla fruticosa, Rhynchospora fusca, Spiranthes aestivalis, Swertia perennis* and *Triglochin palustris*).

Of all the batches of seeds conserved, it should be acknowledged that the *Carex hostiana, Rhynchospora fusca* and *Spiranthes aestivalis* seeds are unlikely to prosper in possible future germinations. *Carex hostiana* and *Spiranthes aestivalis* need to be collected again, in the first case to secure mature seeds and, in the second, to obtain tubers for vegetative propagation, while living examples of *Rhynchospora fusca* need to be collected for propagation by root ball or rhizome division.

AFTER-LIFE actions

This measure lends continuity to TREMEDAL action C10. The action will be led by the JBA (attached to INDUROT-UNIOVI) although it will require the collaboration of technical staff from all the territories in which actions belonging to the AFTER-LIFE Plan are implemented.

The JBA/UNIOVI team will:

- continue with the collection campaigns in order to maintain and increase the Germplasm Bank collections;
- continue with the treatment and conservation of the seeds included in the Germplasm Bank (during and after the project).

All this in order to have batches of reproductive material for use in future reintroduction or population strengthening work at the work sites.

A set of indicators to measure compliance with this action (number of target species kept in the Bank, number of species treated, number of seeds conserved, number of germination tests, etc.) will be evaluated every year.

This measure also includes the maintenance and creation of collaboration agreements with other Germplasm Banks. Within the framework of the Spanish and Portuguese Network of Germplasm Banks (REDBAG), which is devoted to the conservation of seeds belonging to wild plants and functions as a work group of the Ibero-Macaronesic Association of Botanic Gardens (AIMJB), the JBA is reaching collaboration agreements with other Banks in the northern peninsula to exchange duplicate samples.

The mid-term objective is to have duplicates of these accessions of seeds belonging to peatland plants, especially the more structural and characteristic species from these habitats, at different institutions in order to guarantee the long-term conservation of germplasm.

Deliverables

- Final report on the work performed in the period 2016-2020 and list of species available at the Seed Banks and Nurseries attached to the project and those of other collaborators (M8-M9).

Complementary guidelines

- *To encourage the performance of germination tests.*
- *To encourage the application of the germination and cultivation protocols developed in TREMEDAL.*

M9. Cultivation of plants in nurseries	Period:	2016-2020
	Budget/year	€550

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities		JBA/UNIOVI	DFA · DFG	

Target habitats		3110 · 7110* · 7130* · 7140 · 7150 · 7210* · 7230*
Target species	Flora	*Carex davalliana · Carex echinata · Carex hostiana · Carex lepidocarpa · Drosera intermedia · Drosera rotundifolia · Equisetum variegatum · Eriophorum angustifolium · Eryngium viviparum · Juncus balticus* subsp*. cantabricus · Narcissus pseudonarcissus* subsp*. nobilis · Narthecium ossifragum · Parnassia palustris · Pedicularis mixta · Potentilla fruticosa · Rhynchospora fusca · Salix hastata* subsp*. picoeuropeana · Spiranthes aestivalis · Swertia perennis · Triglochin palustris · Cladium mariscus · Thelypteris palustris · Quercus pyrenaica*

Current situation

Within the framework of TREMEDAL, cultivation tests were carried out for 18 target species (*Carex davalliana, Carex echinata, Carex lepidocarpa, Drosera intermedia, Drosera rotundifolia, Equisetum variegatum, Eriophorum angustifolium, Eryngium viviparum, Juncus balticus* subsp*. cantabricus, Narcissus pseudonarcissus* subsp*. nobilis, Narthecium ossifragum, Parnassia palustris, Pedicularis mixta, Potentilla fruticosa, Rhynchospora fusca, Salix hastata* subsp*. picoeuropeana, Swertia perennis* and *Triglochin palustris)*, of which examples of living plants are available in the JBA.

Cultivation tests were not performed for *Carex hostiana* or *Spiranthes aestivalis* because their seeds did not germinate and no vegetative material belonging to these species was available.

AFTER-LIFE actions

In connection with the previous measure and in order to make living plants available for use in future reintroductions and/or population strengthening activities, the JBA will also cultivate the collections of living plants belonging to the target species of TREMEDAL obtained from the seeds in the Germplasm Bank and keep them in nursery conditions. The number of species and examples cultivated will be reviewed annually.

Plants will also be cultivated in nursery conditions in the Basque Country. The DFG has included the species *Cladium mariscus, Thelypteris palustris, Quercus pyrenaica* and several species of the genus *Erica* in the production lines at the Arizmendi nursery; all the donor populations from Jaizkibel and production for plantations in the area. These production lines will be maintained beyond 2020, since the DFG is in charge of the management of the SAC Jaizkibel and the conservation measures there include the plantation of these species.

The DFA also has its own nurseries, where it will keep wild grapevines (*Vitis vinifera sylvestris)* and plants belonging to other species or varieties local to the Lake of Caicedo Yuso – Arreo in order to continue to recover populations both in the SAC and outside it so as to recover endangered plants.

Deliverables

- Final report on the work performed in the period 2016-2020 and list of species available at the Seed Banks and Nurseries attached to the project and those of other collaborators (M8-M9).

Complementary guidelines

- *To encourage the performance of germination tests in the field.*
- *To enhance knowledge of the specific nursery and field cultivation techniques for the target species.*

O4. TO GUARANTEE ACCESS TO THE INFORMATION AND FAVOUR AWARENESS AND ENGAGEMENT REGARDING THE CONSERVATION OF WETLANDS IN GENERAL AND PEATLANDS IN PARTICULAR

O4.1 To guarantee access to the information

M10. Maintenance of the LIFE TREMEDAL website	Period:	2016-2020
	Budget/year	€2,250

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	USC	PNPE · JBA/UNIOVI	DFA · DFG · HAZI	GN · GAN

Current situation

The website www.lifetremedal.eu was created within the framework of the TREMEDAL project. It remained active over the five years that the project lasted and will remain so for a further 5 years. On the date of completion of the project (October 2015), it had registered 7,600 visitors, with almost 41,500 pages viewed.

The website has several sections: the wetlands where the actions are implemented, progress of the actions, structure of the project, consultation documents, photo archive, news section, etc., as well as specific sections on the LIFE Programme and the Natura 2000 network.

AFTER-LIFE actions

Over the AFTER-LIFE period, the site will remain active to allow users to consult the information and documentation generated during TREMEDAL and several project partners will help to update its contents.

In addition to serving as a means of disseminating the specific results of the TREMEDAL project, the website is a tool providing information on and raising awareness about the importance of these habitats from an environmental, cultural and social perspective.

The costs associated with this action refer to the renewal of the domain and the web hosting service for the next 5 years, which will be met by the GN (through GAN) as the project's Coordinating Beneficiary.

M11. Access to the information generated by TREMEDAL through other channels/media	Period:	2016-2020
	Budget/year	€2,650

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	USC	PNPE · JBA · UNIOVI	DFA · DFG · HAZI	GN · GAN

Current situation

A great deal of information and reference documentation on peatland and inland wetland management was generated within the framework of TREMEDAL. Most of this documentation is technical and specialised, but simpler, more visual, summarised material was also produced (such as the Layman's Report) which is more accessible to anyone interested.

AFTER-LIFE actions

The objective of this AFTER-LIFE measure is to disseminate all the documentation/information generated so that it can be of use to and serve as a source of reference for other management teams, local entities, farmers, local populations, etc.

Both the information generated during the project and that produced as a result of the measures of the AFTER-LIFE Plan will be made available via different channels for its dissemination and consultation. In addition to the specific TREMEDAL website (M11), the plan is to use other local and regional structures to publicise the project and reach different types of audience: visitor centres attached to the natural spaces, nature interpretation centres, environmental education classrooms, tourist information offices, libraries (local and specialised), etc.

The partners collaborating with this Measure will distribute the material generated during the project (Layman's Report, Manual of Good Practices, promotional material, etc.) and publicise the website.

This action includes allocations estimated on the basis of the work needed to keep these information actions active.

Deliverables

- Annual report on information, communication and dissemination actions (M10-M14).

Complementary guidelines

- *To encourage attendance at seminars and conferences related to the conservation and management of wetlands in general and peatland habitats in particular.*
- *To encourage visits to other related projects and receive visits to the TREMEDAL project sites, as an example of Good Practices in the management and conservation of habitats of this type.*

M12. Actions to disseminate the results	Period:	2016-2020
	Budget/year	€4,500

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	USC	PNPE · JBA · UNIOVI	DFA · DFG · URA · HAZI	GN · GAN

Current situation

The results of TREMEDAL has been disseminated in the technical-scientific sphere by publishing articles, taking part in seminars and conferences related to the subjects involved in the project, the presentation of posters, the production of the Manual of Good Practices and the Final Project Seminar.

This activity is closely tied in with the work of the Work Group on Peatlands.

AFTER-LIFE actions

Continuing with the specific dissemination actions carried out in TREMEDAL (actions E5 and E6), several entities undertake to actively disseminate the results of the project in the AFTER-LIFE period by means of:

- participation in conferences and seminars (national and international). Minimum per year: 3 (between all the entities).
- the publication of results in scientific-technical journals. Minimum per year: 2 (between all the entities).

  A number of articles written during TREMEDAL are expected to be published in 2016:

  - ***Removal of exotic fish species from Lake Caicedo Yuso y Arreo***. José Augusto Monteoliva, Agustín Pedro Monteoliva, Tamara Santiago and Alberto Criado. Journal: Limnetica.
  - ***Conservación de turberas y medios higroturbosos en Guipúzcoa a través del proyecto LIFE TREMEDAL***. Patxi Heras and Marta Infante. Journal: Conservación vegetal.
- visits to other sites or projects related to the subjects involved in TREMEDAL, establishing contact with the entities associated with them. Minimum per year: 1 (see M1);
- receiving technical visits to the TREMEDAL sites. Minimum per year: 1;
- the generation of fresh news items and articles in the general press (local and national) related to the actions implemented in the AFTER-LIFE period. Minimum per year: 8 (between all the entities).

It is difficult to specify and plan these actions because they do not depend solely on the entities taking part in the AFTER-LIFE Plan, so it has been decided to set annual “minimums”, which will be evaluated at the end of the year and provide a basis for the objectives to be set for the following year.

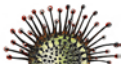
Likewise, the costs associated with these actions are difficult to estimate. The budget includes an allocation to cover the expenses incurred as a result of attendance, travel, the preparation of papers for presentation, publication, the logistics involved in the visits, etc.

Deliverables

- Annual report on information, communication and dissemination actions (M10-M14).

Complementary guidelines

- *To encourage attendance at seminars and conferences related to the conservation and management of wetlands in general and peatland habitats in particular.*
- *To encourage visits to other related projects and receive visits to the TREMEDAL project sites, as an example of Good Practices in the management and conservation of habitats of this type.*



O4.2 To develop specific awareness-raising and engagement actions

M13. Information and awareness activities	**Period:**	**2016-2020**
	Budget/year	**€3,800**

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	**USC**	**JBA · UNIOVI**		**GN · GAN**

Current situation

The information and awareness-raising activities aimed at the local populations and the general public (non-technical) played an important role in TREMEDAL, one of the chief problems faced by the conservation of the target habitats being that they are not very well known and little appreciated. Consequently, the plan is to continue with activities of this kind during the AFTER-LIFE period.

AFTER-LIFE actions

The plan is to continue with activities of this kind during the AFTER-LIFE period.

- **Celebration of World Wetlands Day**: an event celebrated every year during TREMEDAL (2013-2015) to publicise these habitats as Wetlands with an important ecosystem function. This Day will continue to be celebrated in coming years in several of the project territories: Galicia (organised by the USC), Asturias (organised by the JBA and UNIOVI) and Navarre (organised by the GAN). In some cases, the event will be celebrated every two years instead of annually.
- **Travelling exhibition**: on peatlands and their biodiversity, created during TREMEDAL by GAN. Over the next few years, this exhibition will be made available to other local and national facilities (nature centres, libraries, schools, etc.) for temporary display.
- **Guided tours of the sites**: either organised by the entities themselves (to publicise progress, new structures created, etc.) or at the request of groups interested in the subject (locals, schoolchildren).

Every year, each entity will schedule specific activities for the TREMEDAL AFTER-LIFE period. In general, the proposed activities are:

- Annual celebration of World Wetlands Day at one TREMEDAL site at minimum.
- The Travelling Exhibition will be exhibited at 5 different venues in the AFTER-LIFE period at minimum.
- Attendance at a minimum of one seminar/conference per year by one of the partners taking part in LIFE TREMEDAL.
- At least one guided tour a year by one of the partners taking part in LIFE TREMEDAL.

There is a general allocation to cover the implementation of all the awareness and engagement activities for the period 2016-2020.

Deliverables

- Annual report on information, communication and dissemination actions (M10-M14).

Complementary guidelines

- *To encourage guided tours and specific activities for the local populations and specific groups involved in the management of the sites.*

M14. Development of Ibérica voluntary work programmes	Period:	2016-2020
	Budget/year	€2,700

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	USC			GN · GAN

Current situation

Some of the partners implemented voluntary work actions during the project:

- The Galician Natural History Society (SGHN) took part in the monitoring of the populations of *Eryngium viviparum.*
- In 2015, GAN organised a volunteer day in Belate to install systems to protect birds on all the fencing around the Belate mire. After fitting this equipment, a guided tour of the mire was conducted to inform about the project and the work done.

Several of the project partners have experience in this area, particularly the JBA, which has a number of voluntary work programmes focusing on different areas.

AFTER-LIFE actions

For the period 2016-2020, the USC and GAN intend to run voluntary work activities in their respective territories related to the action sites and peatlands to help to maintain or re-establish a favourable state of conservation for the target habitats and species.

At least one voluntary work action a year is proposed within the scope of the TREMEDAL project.

Results.

- Annual report on information, communication and dissemination actions (M10-M14).

M15. Participation in shared land management pilot actions	Period:	2016-2020
	Budget/year	€2,300

	GALICIA	ASTURIAS CASTILE & LEON	BASQUE COUNTRY	NAVARRE
Entities	USC			GN · GAN

Current situation

A Land Custody experience was initiated on the Island of San Roque within the framework of TREMEDAL and through the Provincial Council of Lugo which will involve local livestock farmers in the conservation of the Island via an NGO which specialises in processes of this kind.

AFTER-LIFE actions

The intention is to promote shared management actions in the period 2016-2020 in order to reach formal Land Custody agreements within some of the action sites. Initially, these actions are planned in Galicia (organised by the USC) and Navarre (organised by the GN and GAN).

In order to do this, contact will be made with different actors and entities which may become involved (local authorities, owners, local groups) and attempts will be made to establish specific agreements. Informative meetings aimed at different actors are expected to be held.

Each entity will design a work plan in this direction each year, detailing the specific activities to be carried out and identifying the target groups with which it could be interesting to work.

Deliverables

- Specific reports on the Custody processes worked on.

OVERALL BUDGET

An **annual investment of approximately €86,000** is anticipated for the execution of the actions in the TREMEDAL AFTER-LIFE Plan.

It should be pointed out that, as indicated in the descriptions of the Measures, some of the actions have no associated budget because they are considered part of the everyday work carried out by the regular teams which manage the sites.

This is an estimate and a budget of "minimums" (to ensure the execution of the basic actions) because it is difficult to define the budget five years into the future in any detail. A good indication of this is the difference between the budget envisaged for 2016 compared to those for the following years (see table below). Consequently, the budget for the following year will be defined and the expected sources of funding will be specified in each case annually at the evaluation and planning meeting (see section on Monitoring).

		GALICIA		ASTURIAS / CASTILE & LEON			BASQUE COUNTRY			NAVARRE	
	YEAR	USC	Dir. Gen. of Nature Conservation	PNPE	JBA	UNIOVI	DFA	DFG	URA	GN	
***TREMEDAL* AFTER-LIFE**	2016	€8,800	€3,000	€4,500	€4,000	€1,000	€113,000	€11,500	-	€63,300	**€209,100**
	2017	€8,800	€3,000	€4,500	€4,000	€1,000	€10,000	€11,500	-	€44,400	**€87,200**
	2018	€8,800	€3,000	€4,500	€4,000	€1,000	€10,000	€11,500	-	€43,200	**€86,000**
	2019	€8,800	€3,000	€4,500	€4,000	€1,000	€10,000	€11,500	-	€44,400	**€87,200**
	2020	€8,800	€3,000	€4,500	€4,000	€1,000	€10,000	€11,500	-	€43,200	**€86,000**

See the detailed budget for each measure / year / entity below.

Regarding the **sources of funding**, the entities involved undertake to provide for the annual budget required in order to implement the planned actions from their **own funds**. Nevertheless, other additional sources of funding will also be sought (e.g. funding from the Social Programme of the La Caixa savings bank in Navarre in 2016).

		GALICIA		ASTURIAS / CASTILE & LEON			BASQUE COUNTRY			NAVARRE
MEASURE	**YEAR**	**USC**	**Dir. Gen. of Nature Conservation**	**PNPE**	**JBA**	**UNIOVI**	**DFA**	**DFG**	**URA**	**GN**
M1	2016					€550.00				
Work Group on Peatlands	2017					€550.00				
	2018					€550.00				
	2019					€550.00				
	2020					€550.00				
M2	2016									€6,000.00
Identification of new peatlands and update of database	2017									€6,000.00
	2018									€6,000.00
	2019									€6,000.00
	2020									€6,000.00
M3	2016	€3,500.00	€3,000.00	€2,000.00	€200.00			€4,000.00		€10,200.00
Technical-scientific monitoring	2017	€3,500.00	€3,000.00	€2,000.00	€200.00			€4,000.00		€16,200.00
	2018	€3,500.00	€3,000.00	€2,000.00	€200.00			€4,000.00		€16,200.00
	2019	€3,500.00	€3,000.00	€2,000.00	€200.00			€4,000.00		€16,200.00
	2020	€3,500.00	€3,000.00	€2,000.00	€200.00			€4,000.00		€16,200.00
M4	2016	€500.00		€2,500.00						€6,900.00
Maintenance of structures	2017	€500.00		€2,500.00						€6,900.00
	2018	€500.00		€2,500.00						€6,900.00
	2019	€500.00		€2,500.00						€6,900.00
	2020	€500.00		€2,500.00						€6,900.00
M5	2016	€500.00					€10,000.00	€7,000.00		
Control of reappearance of non-native and invasive species	2017	€500.00					€10,000.00	€7,000.00		
	2018	€500.00					€10,000.00	€7,000.00		
	2019	€500.00					€10,000.00	€7,000.00		
	2020	€500.00					€10,000.00	€7,000.00		

		GALICIA		ASTURIAS / CASTILE & LEON			BASQUE COUNTRY			NAVARRE
M6	2016						€103,000.00	€500.00		€26,100.00
New actions for peatland management	2017							€500.00		
	2018							€500.00		
	2019							€500.00		
	2020							€500.00		
M7	2016									€2,000.00
Management of livestock density	2017									€2,000.00
	2018									€2,000.00
	2019									€2,000.00
	2020									€2,000.00
M8	2016				€2,500.00					
Germplasm bank	2017				€2,500.00					
	2018				€2,500.00					
	2019				€2,500.00					
	2020				€2,500.00					
M9	2016				€550.00					
Cultivation of plants in nurseries	2017				€550.00					
	2018				€550.00					
	2019				€550.00					
	2020				€550.00					
M10-15	2016	€4,300.00			€750.00	€450.00				€12,100.00
Information, awareness and engagement measures	2017	€4,300.00			€750.00	€450.00				€13,300.00
	2018	€4,300.00			€750.00	€450.00				€12,100.00
	2019	€4,300.00			€750.00	€450.00				€13,300.00
	2020	€4,300.00			€750.00	€450.00				€12,100.00

A single joint budget allocation has been specified for all the measures to disseminate results and raise awareness regarding the importance of peatlands (M10-M15) given that many are interrelated and involve the same costs, and, save specific aspects, chiefly consist of hours put in by the staff who work for the entities implementing the actions. Each measure refers to the specific costs involved in execution.

MONITORING

At least one **monitoring, evaluation and planning meeting** will be held each year.

These meetings may be virtual, using video-conference systems, although the possibility of face-to-face meetings and making the most of the journeys involved to see the actions carried out in each territory *in situ* will be looked into.

Given that the aim of the meetings is to evaluate and plan the actions, the plan is to hold them in the last quarter of each year.

These monitoring meetings will address:

- Summary and evaluation of the actions implemented.
- Annual deliverables.
- Overall analysis of results and conclusions.
- Proposed actions for the following year, including budget and funding.
- Analysis of the extent to which the objectives of the Plan are achieved and fulfilment of the Progress Indicators established.

As a result of each monitoring meeting, a short progress report on the implementation of the Measures in the Plan and a document containing the proposals for the following year will be produced.

As Coordinator of TREMEDAL, GAN will call and direct these meetings, and issue the documents summarising them.

In addition to this overall monitoring, the Plan also requires more detailed and continuous monitoring. Specific coordinators have been named to **monitor progress by each Final Objective**. Each territory is in charge of coordinating one objective:

• **O1. TO CHARACTERISE THE WET AND PEATLAND HABITATS ADEQUATELY, HAVE UP-TO-DATE INFORMATION ON THEIR DISTRIBUTION AND CONSERVATION STATUS AND ENSURE A SUITABLE MONITORING SYSTEM**	GALICIA (USC)
• **O2. TO ARRIVE AT A FAVOURABLE CONSERVATION STATUS AT THE SITES OF ACTION**	BASQUE COUNTRY (HAZI)
• **O3. TO GUARANTEE THE AVAILABILITY OF PROPAGULES AND LIVING PLANTS OF THE STRUCTURAL AND ENDANGERED PEATLAND AND WET ENVIRONMENT SPECIES**	ASTURIAS (JBA-UNIOVI)
• **O4. TO GUARANTEE ACCESS TO THE INFORMATION AND FAVOUR AWARENESS AND ENGAGEMENT REGARDING THE CONSERVATION OF WETLANDS IN GENERAL AND PEATLANDS IN PARTICULAR**	NAVARRE (GAN)

Each coordinator is responsible for the specific monitoring involved over the year: contact with technical staff in each territory, progress of the work, collection of information for annual evaluation and conclusions, etc.

List of proposed deliverables:

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	Frequency / year of delivery
1	Annual report summarising the activities of the Work Group on Peatlands	●															Annual (2016-2020)
2	Report on database updating work		●														Every two years: 2017 · 2019
3	Report on work focusing on habitats and species, and analysis of their evolution			●													Annual (2016-2020)
4	Report on the monitoring of permanent quadrats			●													2018 · 2020
5	Report on the monitoring of evolution of the surface area covered by habitats			●													2020
6	Report on the monitoring of the piezometer, multi-parameter probe and weather station in Arreo			●													Annual (2016-2020)
7	General conclusions on the actions to control non-native, invasive and competing species in the AFTER LIFE period					●											2020
8	General conclusions on the actions to manage livestock density in the AFTER LIFE period							●									2020
9	Final report on the work performed in the Germplasm Bank and list of species available at the Seed Banks and Nurseries								●								2020
10	Report on information, communication and dissemination actions												●				Annual (2016-2020)
11	Specific reports on the Custody processes initiated															●	2016-2020 (when they occur)