2023

After-Life Plan

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LIFE ALNUS

Co-funded by the European Union

LIFE ALNUS

Contents

1. Introduction

LIFE ALNUS is a project for the conservation, restoration, and governance of alder forests and other related riparian forests, such as willow, poplar, ash, and mixed formations of alder, willow, ash, elm, and poplar. It is co-funded by the European Union's LIFE Nature and Biodiversity Program, which includes the improvement of habitats and species of the Natura 2000 Network.

The Natura 2000 Network protects the most important natural areas in the European Union, which contain habitats and species of flora and fauna of community interest due to their precarious conservation status.

Despite the scientific, social, and political challenges associated with the conservation of riparian forests, it has only been addressed to date through isolated and local restoration experiences in the European context. In other words, no European project has been launched to date that focuses on addressing river forest conservation comprehensively and transversally at the regional or national level. This situation would not be critical if the habitat's evolution had been favourable after 30 years of the Habitats Directive's enforcement. However, this is not the case: for the entire European Mediterranean region, the ecological status of riparian forests deteriorated from inadequate to poor between 2007 and 2018, according to the European Commission.

This is the challenge of LIFE ALNUS. Besòs, Ter, and Segre are the three pilot basins where the project has been carried out, covering over 1000 kilometres in total. These three basins encompass more than 50.5% of the geographical distribution of alder forests in Catalonia. It should be noted that the Natura 2000 Network in Spanish territory contains 48% of the alder forest area in the Mediterranean region, so Spain (which hosts almost 15% of this in Catalonia) bears a significant responsibility for habitat conservation in Mediterranean Europe.

Catalonia boasts a great diversity of riparian forests, from headwater alder forests to riparian alder, willow, and poplar forests in alluvial terrains. It is precisely in large valleys and plains where these habitats are most degraded and fragmented, to the extent that it is estimated that more than 80% of riparian forests in European alluvial plains have been lost. Due to their critical situation throughout Europe, alder forests and other riparian forests are habitats of community interest for conservation, included within the European Union's Habitats Directive.

Catalonia is likely one of the European biogeographic regions that can make the most progress in improving the habitat's situation, but it also faces some of the most challenging conservation issues. Therefore, the acquired experience has valuable demonstrative characteristics that can be transferred to other basins. Furthermore, it forms part of the Mediterranean front where alder forests will need to adapt to more intense and recurring periods of drought as a result of climate change.

2. Objectives and Main Project Actions

2.1 Preparatory Actions

To strategically address the conservation of alder forests at the watershed scale, it was essential to understand the health status of river forests in the three ALNUS basins (Segre, Ter, and Besòs). From the beginning of the project, efforts were made to diagnose and comprehend the causes of habitat loss, enabling systematic planning of where it was most crucial to act. In other words, since economic and human resources are typically limited, decisions had to be made regarding which river sections (divided into units of approximately 500 linear meters) conservation or recovery actions could be most efficient in:

1. Sections where the habitat was fragmented, and continuity of the forest could be restored.
2. Sections where the habitat had disappeared and had good potential for reintroduction.
3. Immature sections with many sprouting trees, where silvicultural treatments could improve tree vigour and heterogeneity.
4. Sections with the presence of non-native plant species, especially invasive ones. Non-natives should not be the majority but should be scattered throughout communities dominated by native species. This way, results could be optimized (cost-effectiveness).
5. Sections and river courses with alder forests and other river habitats of community interest were outside the Natura 2000 Network. Priority was given to alluvial plain alder forests, which have been disappearing for a long time.

These sections presented various challenges, were not highly degraded, and had great recovery potential, resulting in better benefits for nature and lower costs.

Across the ALNUS basins, over 1000 kilometres of rivers were analysed among the three basins. Only 316 hectares of alder forests were mapped (184 hectares in Segre, 106 in Ter, and 26 hectares in Besòs), well below expectations based on previous data. An additional 2043 hectares of riparian forests with alder presence and 432 hectares of willow forests and mixed forests without alder were included.

2.2 Habitat Restoration and Conservation Plans

The diagnosis enabled the development of riparian forest conservation plans for each basin. These plans prioritized action sections based on different issues. The actions in the most critical sections were implemented by LIFE ALNUS, while others are earmarked for the near future through new projects.

A comprehensive vision of riparian habitat recovery, understood as the river and riparian forest together, involves the re-naturalization of the dynamics, processes, and flows that govern them. It also includes the removal of barriers, disconnections, and hydro-morphological or chemical discontinuities that prevent maintaining the integrity of the watershed continuum.

2.3 Agreements with Property Owners

In order to protect, enhance, and conserve riparian forests, it has been necessary to reach agreements, known as riverbank custodial agreements, with various types of property owners, including individuals, businesses, and public entities. Throughout the project, agreements have been reached with 17 private properties and 3 public properties, including a hydroelectric company.

2.4 Conservation Actions

The project started with the premise that the best option for restoring riverine spaces is the recovery of natural dynamics. In other words, it is the river itself that is regulated through the restoration of flow rates, sediment dynamics, and flood regimes. This passive restoration is possible when the impact factors have disappeared or significantly decreased. However, this is not always possible. Therefore, the project aimed to implement active restoration actions to help restore natural processes. We assisted the river system by removing dikes, barriers, restoring flow rates, removing invasive species, and improving forest structure through silvicultural work and planting, with the goal of ultimately allowing the river to self-organize and recover.

2.5 Increased Protection of Riparian Forests

The LIFE ALNUS project complements the Catalan strategy for the conservation of riparian forests by strengthening and expanding the Natura 2000 network. Despite the significant effort made in Catalonia to cover 31% of the territory within the Natura 2000 network, there were still river courses and/or riparian habitats of community interest in the ALNUS basins that were underrepresented and not covered by the legal framework provided by the network. To address this, close collaboration took place with the Directorate General of Environmental Policies and Natural Environment (DGPA) of the Government of Catalonia, which is the competent authority responsible for planning the Natura 2000 network in the region.

The selection of areas began in the preparatory actions and concluded with the administrative procedures undertaken by the DGPA. As an innovative part of the action, a participatory process involving relevant authorities and local social stakeholders was included. The goal was to achieve maximum consensus among the local population. As a final result, an expansion of the Natura

2000 network to include riverine spaces in the Segre, Ter, and Besòs basins, totalling approximately 600 hectares, is planned.

2.6 Riparian Vegetation Restoration

In the case of riparian forests, it is essential to restore the lost habitat continuity, which enables improved ecological connectivity. The LIFE ALNUS project has implemented riparian forest restoration actions in degraded sections that still have optimal potential for recovery. These sections were identified as priorities in the conservation plans. The actions focused on four aspects:

1. Reconnecting the riverine continuum (habitat defragmentation).
2. Reintroducing the habitat in sub-basins and extensive stretches where it has disappeared.
3. Controlling exotic species.
4. Improving the complexity of the forest structure, its maturity, and biodiversity.

Habitat reconnection and reintroduction were achieved through the planting of native woody species, either from seeds or cuttings, collected from the same basin. Control of exotic species involved using the best possible practices, prioritizing the felling and endotherapy of invasive vegetation where native woody vegetation could easily recolonize and recover the space. Good forest management practices were applied, including the selection of standing deadwood, selective logging, and the creation of deadwood through ring barking or tree felling, where it was lacking. Occasionally, hydromorphological restoration was carried out to recover former river channels that had disappeared. Finally, the leftover wood from logging was utilized to build otter holts.

2.7 Demonstrative Projects

In each of the ALNUS river basins, ecosystem restoration projects were carried out. These actions aimed to be innovative and serve as learning experiences, both from successes and mistakes, for future projects in Catalan basins and across the entire Mediterranean region of Europe.

The actions were focused on restoring and facilitating natural dynamics. Within each basin, specific sections were chosen to represent different issues affecting Mediterranean riparian forests in alluvial plains. These sections were complex and required new and particularly intricate technical trials. They included areas strongly impacted, heavily degraded, or subject to intense regulation of the hydrological regime.

The pilot projects were as follows:

1. Elimination and relocation of barriers and habitat restoration in the urban stretch of the Congost River (Besòs basin) in the Granollers conurbation, covering 72 hectares.
2. Restoration of the hydromorphological sediment dynamics and removal of barriers on two river islands in the middle Ter River (covering 19.2 hectares).
3. Hydromorphological and riparian restoration in the alluvial plain of the Segre River (covering 4.5 hectares).
4. Flow restoration in two hydroelectric power plants on the Ter River, a river subject to extensive hydrological regulation.

2.8 Regulating Public Use

Enjoying the river is and should be a normal activity and we encourage it. However, we often encounter situations that require regulation and intervention to improve the quality of rivers, streams and their woodlands. Therefore, guidelines and recommendations have been developed in collaboration with various groups, including hikers, fishermen and naturalists, to make the use of riparian forests more environmentally friendly.

Fishing spots have been organised in cooperation with local fishing associations.

2.9 Management Guidelines

Throughout these years of developing the LIFE ALNUS project, it has been able to generate several documents, such as prescriptions for the treatment of plant remains after floods. A manual has been published with the experiences of conservation and restoration of riverine environments, which can serve as a model for various conservation issues related to river ecosystems. It includes technical guidelines for sustainable forest management of riparian forests.

2.10 Governance

The participatory approach involving various stakeholders in the conservation, management, and use of riverine areas has been one of the pillars of the project. Through the methodology of debate forums, a process to improve governance at different levels was initiated, with the aim of discussing and reaching consensus that reconciles environmental values, economic activities, and social uses of riverine areas. From this perspective, contacts have been maintained with all the stakeholders in the region, including managers of natural spaces, forestry and hydraulic engineers, owners of rural properties with riverbanks, municipalities, hydroelectric and mining companies, nature conservation organizations, environmentalists, land stewardship groups, and recreational activities organizations in riverine areas.

2.11 Ecological Monitoring

The project has carried out monitoring of various hydromorphological indicators (flows, topography, sediments) and biological indicators (aquatic macroinvertebrates, fish, riverbank flora and vegetation, riverbank and semi-aquatic mammals, and riverine birds). The biological monitoring, in its initial extensive sampling, has helped establish relationships between bioindicators and the complexity of riverbank forest structure. As a second objective, the monitoring allows for the short-term and long-term assessment of the response of hydromorphological and biological indicators to habitat improvement and restoration actions. Finally, the results and conclusions derived from previous studies, as well as the bioindicator monitoring, have provided essential information to be integrated into the planning of LIFE ALNUS project actions and subsequent adaptive management for replicability in other river basins.

3. Main Results Obtained

As a brief overview of the project's successes, it's important to note that the initial diagnosis allowed us to understand the current state of alder forests in Catalonia through fieldwork covering nearly 1,000 linear kilometres of the study basins. Thanks to the diagnosis, it became evident that the distribution area of alder forests was much smaller than previously mapped, representing a reduction to approximately one-fifth of the original 1,504.6 hectares, now reduced to 316 hectares. Thus, legal protection of this habitat became a priority that the Department of Climate Action undertook in collaboration with the LIFE ALNUS project. This led to the initiation of the "Modification of the Natura 2000 Spaces in Catalonia" in river spaces within the distribution area of alder forests (and other riparian forests), totalling 2,157.08 hectares. Of these, around 970.57 hectares are directly affected, with 81.09 hectares expanding the existing Natura 2000 network, and the remaining 889.48 hectares newly created. This action will protect the few alder forest elements and their potential areas remaining along the three project basins.

A Permanent Fishing Reserve has also been declared in the Ter basin, which is also located within the scope of the future new SCI "Meandres del Ter."

Regarding Action C2, Silvicultural Measures for the Restoration of Habitat Continuity and Ecological Quality, work has been carried out on a total of 254.5 hectares, distributed as follows: 1) Ter: 140.2 hectares, 2) Besòs: 109.8 hectares, and 3) Segre: 4.5 hectares. It should be noted that within these hectares, Action C3, Pilot Projects and Experiences for the Resolution of Unique Problems, has also been developed. Across the three basins, the following actions were carried out: 1) Segre: Restoration of riparian forests in alluvial plains in Balsas de Gallissà de Bellver de Cerdanya, 2) Besòs: Restoration of habitat in highly modified urban sections in the Congost River as it passes through Granollers, 3) Ter: Habitat improvement in heavily hydrologically regulated sections, at the Salt del Mariner and Salt de Gallifa weirs, owned by Estabanell and Pahisa Energia, SA, and 4) Ter: Restoration of rivers heavily impacted or geomorphologically modified on the islands of Les Gambires and El Sorral in Les Masies de Voltregà.

Prior to all these interventions, 98 samplings of aquatic communities, 42 mammal transects (along 41.58 linear kilometres), 72 botanical transects, 52 forest inventories, 58 bird and bat monitoring stations, including 229 bat roosting boxes, and 5 samplings for morphological evolution monitoring were conducted. Special piezometers were installed for continuous data collection for the Restoration of Rivers Heavily Impacted or Geomorphologically Modified on the islands of Les Gambires and El Sorral.

These elements have been used to establish periodic monitoring to assess the previous state and the impact of actions on the fauna and flora communities in the intervention areas.

In terms of project products, we can mention the Technical Manual for the Conservation and Restoration of Riverbanks, which contains various technical recommendations, experiences, and results obtained over the five years of the LIFE ALNUS project. We also want to highlight the

creation of the Deadwood Monitoring Protocol, a protocol that will continue beyond the project and will allow for the observation of the disposition, distribution, and impacts of 100 deadwood pieces in the Ter River basin.

We would also like to emphasize the Conclusions of the final workshop of the project, held on December 12 and 13, 2022, in Solsona. You can access the videos and presentations on the project's website (www.lifealnus.eu).

In terms of technical-social products, we are pleased to share the positive outcome, represented by five Decalogues from the Debate Sessions. These were the result of a knowledge-sharing process with each sector involved, the contribution of proposals, and deliberation, resulting in five valuable documents. You can also find them on our website.

Another social aspect of the project was the Survey on the Perception of Riparian Forests, which revealed that the survey sample is quite knowledgeable about riparian forests. The surveyed individuals (292 people) showed a majority viewpoint on the issues and management of riparian forests, favouring non-intervention to re naturalize watercourses and reduce anthropogenic pressure.

The participation and organization of several Transfer Workshops were crucial in promoting the project in various contexts and among target audiences. Another channel for disseminating the project was the creation of various promotional materials (educational dossier, booklet, etc.), generated throughout the project, and properly located on our website. This, together with other Communication Materials (website, social media, newsletters, promotional videos, etc.), has also contributed to the general public's awareness of all the advancements and news from the LIFE ALNUS project over the years.

3.1 Overall results in numbers

Table 1. Overall results in number of the Life Alnus project.

HIGHLIGHTS of the LIFE ALNUS						
			Sample number	**Year of sampling**	**Results**	**Tendences**
C1	1.1	Expansion of Existing SACs (Special Areas of Conservation) (ha)	-	-	Segre: 23ha Ter: 58,09ha	
	1.2	Creation of New SACs (ha):	-	-	Segre: 171,88ha Ter: 671,61ha Besòs: 45,99ha	

	1.3	Other Legal Figures:	-	-	Establishment of a Permanent Fishing Reserve (from the Riba Dam in Torelló to the beginning of Farga de Lacambra in Montesquiu)	
	1.4	Increase in Reconnection (%)	-	-	Besòs: 0,59% Segre: 0,49% Ter: 1,91%	
C2 y C3	2.1	Transects for Flora	72	2018	Botanical reports.	
	2.2	Forest Inventories	52	2019-2020	Expert inventories for each stand.	
	2.3	Plant Survival	2 Segre 2 Besòs 1 Ter	2020-2021 2020-2021 2022	Deficient (<20% success) Good (>40% success) Very good (>70% success)	
	2.4	Hydric stress	-	2020	Article on decay in 2020	
	2.5	Sampling of Aquatic Communities	98 = 13x2 (v/i) 13x2 (v/i) 13x2 (v/i) 5x2 (v/i) 5x2 (v/i)	 2018 2019 2020 2021 2022	Progress report 2018-2020	
	2.6	Mammal sampling	42	2018 2020	41,58 linear kilometres	
D	2.7	Monitoring Stations (Birds and Bats)	58	2020	229 bat nest boxes installed	
	2.8	Improvement of Hydrological Regime (C3.3)	1	2020	41.24 ha downstream of the Gallifa damp, 12.30 ha at the Mariner weir in Sant Pau de Segúries	Regulated. The regime respects the

						ecological flows
	2.9	Morphological Evolution Monitoring	5	2018 2019 2020	Technical reports	-
	2.10	Piezometric Data	10	2018 (2x) 2019 (2x) 2020 (2x) 2021 (2x) 2022 (2x)	Final reports	-
	2.11	Riparian Connectivity Index (A1.3)	-	2018 2019 2020 2022	Measures added at the reports of C2.5	Ter: Moderate quality Besòs: Significant signs of degradation Segre: Good quality
	3.1	Vegetation Status	1	2019	Preliminary monitoring	
	3.2	Path and Erosion Inventory	8	2019	Management and regulation proposals	Declaration of fishing exclosure DOGC 8084 (Gencat)
	3.3	Integrity of Aquatic Communities	-	2018-2020	Measures added at the reports of C2.5	

3.2 Improvement of Riparian Habitat Structure (Alder and Ash Alluvial Forests)

As previously mentioned, Actions C2 and C3 have worked on a total of 254.5 hectares (140.2 hectares in Ter, 109.8 hectares in Besòs, and 4.5 hectares in Segre). Habitat improvement has been structured as follows:

C2.1 Elimination of exotic plant species

C2.2 Silvicultural measures for structural improvement

C2.3 Implementation of habitat fragmentation cores

C2.4 Implementation of habitat reintroduction cores where it has disappeared

C.3.1. Restoration of alluvial alder forests

C.3.2. Habitat restoration in highly modified urban sections

C.3.3. Improvement of habitat in heavily hydrologically regulated sections

C.3.4. Restoration of rivers heavily impacted or modified geomorphologically.

With these defined sub-actions from the beginning of the LIFE ALNUS project, there has been a direct influence on the structural improvement of the entire habitat.

The active habitat restoration (or rehabilitation) of LIFE ALNUS consisted of the following actions:

1. Silvicultural treatment of vegetation.
    a. Regulation of competition through low-intensity selective cutting and sprout selection.
    b. Treatment of non-native and invasive species.
2. Restoration of riparian forest (habitat defragmentation or reintroduction) or reinforcement of existing vegetation through the planting of native species.
3. Hydromorphological improvement.
4. Restoration of water flow to the river in hydropower facilities.

The monitoring of hydromorphological and biological indicators is planned for actions C2 and C3. Its objective is to assess the restoration actions in the medium (and long) term. These data will be used for adaptive management to be applied in the future improvement and maintenance of the restored sections. Likewise, the results of the monitoring will provide valuable data for a deeper understanding of the relationships between habitat conservation status, hydromorphological dynamics, bioindicator organisms, and multifunctional management of riverine areas. This information is very useful for integrating it into the adaptive habitat management and transferring the results to environmental managers and the general

public. It includes the maintenance and monitoring of bat roost boxes installed for and during the project, as well as otter refuges built with the remnants of the C2 action.

3.3 Ecologic monitoring of the works

The specific objectives of this ecological monitoring are as follows:

1. Evaluate the impact of conservation and habitat restoration actions on communities and bioindicator organisms in relation to: i) Establishment of environmental flow regimes in the Ter River and the Congost River. ii) Hydromorphological restoration of the river and riparian forest in the Segre, Ter, and Congost basins.
2. Understand the habitat-scale and sector-wide variables that influence the richness and abundance of taxonomic groups and aquatic and riparian bioindicator organisms.
3. Integrate the information provided by the bioindicator study into the planning of the LIFE ALNUS project actions, subsequent adaptive management, and its potential replication in other river basins.

For the maintenance of this monitoring, the following plans are anticipated:

a) CTFC and ACA have a joint project (until 2025) that focuses on blue water provisioning through forest management. Within this project, specifically in WP5, there are plans to study and monitor the fluvial dynamics, vegetation, and deadwood in different river stretches, some of which are directly related to the areas of intervention in the LIFE ALNUS project.
b) CERM is actively seeking funding to sustain the monitoring of aquatic communities in the areas of Illa de les Gambires and Illa del Sorral (in Osona, Ter basin).
c) CTFC and CERM commit to processing the data obtained in the coming years. This data should provide valuable insights into the response of aquatic and plant communities in these river environments, which have already undergone positive transformations, becoming more natural after the project interventions.
d) Leveraging CTFC funding opportunities, such as the program contract with the Department of Climate Action of the Generalitat de Cataluña.
e) Participating in competitive R&D calls, for example, Biodiversa, or other programs like Interreg.
f) Pre and postdoctoral contracts at CTFC. Currently, the Conservation Biology Group is building a database with all the data from LIFE ALNUS and other projects (e.g., other completed or ongoing LIFE projects). This database will support doctoral theses or scientific articles by personnel with predoctoral scholarships or postdoctoral contracts.

3.4 Outreach Efforts

Project outreach has been an element that has expanded throughout the project. You can find a small repository at the following link: https://lifealnus.eu/en/radio-and-tv/. Below, we list appearances in various media and the project's impact on social media.

- National media appearances:
  - Corporació Catalana de Mitjans Audiovisuals:
    - https://www.ccma.cat/324/un-projecte-europeu-destinara-2-5-meur-per-protegir-les-vernedes-de-les-conques-del-besos-lalt-ter-i-lalt-segre/noticia/2859415/
    - https://www.ccma.cat/324/laca-granollers-les-franqueses-i-canovelles-arriben-a-un-acord-per-preservar-el-congost/noticia/2937411/
    - https://www.ccma.cat/324/un-projecte-europeu-permet-recuperar-a-la-cerdanya-les-condicions-ecologiques-dun-entorn-on-hi-havia-un-bosc-de-ribera/noticia/2965831/
    - https://www.ccma.cat/324/laca-treu-a-informacio-publica-el-projecte-per-a-la-restauracio-hidromorfologica-de-mes-de-4-km-del-riu-ter-a-osona/noticia/3050276/
    - https://www.ccma.cat/tv3/alacarta/telenoticies-comarques/recuperacio-del-riu-congost-amb-el-projecte-life-alnus/video/6148198/
    - https://www.ccma.cat/324/finalitza-un-projecte-per-recuperar-els-boscos-de-ribera-a-catalunya-nomes-queden-300-hectarees-de-verneda/noticia/3201478/
  - El Punt AVUI:
    - https://www.elpuntavui.cat/societat/article/11-mediambient/1409025-el-bosc-de-ribera-esmorteeix-els-efectes-de-les-inundacions.html
    - https://www.elpuntavui.cat/societat/article/11-mediambient/2229991-un-habitat-en-risc-de-desaparicio.html
    - https://www.elpuntavui.cat/societat/article/11-mediambient/2229991-acaba-el-projecte-per-salvar-els-boscos-de-ribera.html
  - La Vanguardia:
    - https://www.lavanguardia.com/local/valles-oriental/20190213/46436088440/laca-installa-cinc-nou-punts-de-control-a-les-conques-del-ter-i-el-besos-en-el-marc-del-projecte-life-alnus.html
    - https://www.lavanguardia.com/local/catalunya/20221214/8644279/objetivo-recuperar-bosques-ribera-cataluna.html
  - Nació Digital:
    - https://www.naciodigital.cat/ecodiari/noticia/10135/comenca/projecte/recuperacio/vernedes/zona/mediterrania

- 20Minutos:
  - https://www.20minutos.es/noticia/3652085/0/ocicat-pilar-maurell-ruta-la-riquesa-del-segre/
- iAgua:
  - https://www.iagua.es/noticias/agencia-catalana-agua/life-alnus-protegiendo-y-potenciando-bosques-alisos-cursos-altos-rios

- Local media appearances:
  - Vallés Oriental TV (VOTV):
    - https://votv.alacarta.cat/valles-oriental/noticia/arrenca-el-projecte-life-alnus-per-millorar-la-riera-de-vallforners
  - El9nou:
    - https://el9nou.cat/valles-oriental/actualitat/granollers-participa-en-un-projecte-europeu-per-recuperar-les-vernedes-al-congost/
    - https://el9nou.cat/valles-oriental/actualitat/granollers-invertira-125-000-euros-per-millorar-la-biodiversitat-al-riu-congost/
    - https://el9nou.cat/valles-oriental/actualitat/laca-installara-un-nou-punt-de-control-al-riu-congost-a-les-franqueses/
    - https://el9nou.cat/valles-oriental/actualitat/acord-entre-laca-granollers-les-franqueses-i-canovelles-per-la-preservacio-del-riu-congost/
    - https://el9nou.cat/valles-oriental/actualitat/granollers-inicia-unes-obres-de-millora-de-la-llera-del-congost-a-tocar-de-la-depuradora/
    - https://el9nou.cat/valles-oriental/actualitat/un-projecte-europeu-installara-caus-prefabricats-per-a-lludrigues-a-la-conca-del-besos/
    - https://el9nou.cat/valles-oriental/actualitat/bioenginyeria-resistent-a-la-riuada/
    - https://el9nou.cat/valles-oriental/actualitat/construeixen-refugis-experimentals-per-a-lludrigues-al-riu-congost/
  - Segre.com:
    - https://www.segre.com/es/noticias/comarcas/2018/06/04/un_nuevo_proyecto_europeo_protegera_bosques_ribera_alto_segre_48097_1091.html
    - https://www.segre.com/es/noticias/comarcas/2022/08/16/ampliaran_red_natura_por_primera_vez_13_anos_con_bosques_ribera_180586_1091.html
  - RàdioSeu:
    - https://www.radioseu.cat/noticies/un-projecte-permet-recuperar-lentorn-de-les-basses-de-gallissa-a-bellver-de-cerdanya
    - https://www.radioseu.cat/noticies/les-vernedes-de-la-conca-de-lalt-segre-incloses-al-programa-de-proteccio-life-alnus
  - Regió7:
    - https://www.regio7.cat/cerdanya/2018/06/10/ribera-segre-cerdanya-les-millors-50193041.html

- Workshops LIFE INVASAQUA + LIFE ALNUS:

- https://apunt.uvic.cat/les-jornades-life-invasaqua-i-life-alnus-revisen-lestat-de-les-riberes-i-de-les-especies-invasores
- https://mon.uvic.cat/udivulga/event/jornada-life-alnus-life-invasaqua-ecosistemes-fluvials-funcionals-mes-resistents-a-les-invasions-i-mes-resilients-als-seus-impactes/
- https://www.buscaciencia.cat/esdeveniments/jornada-life-alnus-life-invasaqua-ecosistemes-fluvials-funcionals-mes-resistents-a-les-invasions-i-mes-resilients-als-seus-impactes/
- https://xcn.cat/event/ecosistemes-fluvials-funcionals-jornada-life-invasaqua-i-life-alnus/
- https://www.oxigenats.cat/agenda/activitat/1105
- https://www.invasara.es/category/noticias/page/2/
- https://lifealnus.eu/jornada-conjunta-life-invasaqua-i-life-alnus-sobre-especies-invasores/
- https://blogs.iec.cat/ichn/wp-content/uploads/sites/33/2022/07/N162_web.pdf (pag. 9)
- https://votv.alacarta.cat/valles-oriental/noticia/dos-projectes-europeus-destinats-a-millorar-la-biodiversitat-dels-habitats-fluvials

- LIFE ALNUS social media impact:
    - Twitter: 790 followers. 18 groups.

4. Objectives of the Post-LIFE Conservation Plan

Beyond all the work carried out, the main long-term objective is to maintain the conservation status of the alder and riparian forests included in the project. To achieve this, the following specific objectives are established:

a) Ensure legal protection and conservation objectives for the restored river sections.
b) Evaluate the conservation status of the stands that are part of the project through monitoring of floristic elements, fauna, vulnerability to flow disconnection, regeneration progress, etc.
c) Monitor the evolution of public use of the riparian stands where this service has been regulated.
d) Maintain the demonstrative value of riparian stands with the highest potential.
e) Enhance the replicability of the solutions proposed in the project.
f) Promote the implementation of new management models for riparian forests and areas of plantations near watercourses, integrating multifunctionality in public and private forests.
g) Expand the dissemination and transfer of results.

5. Exploitation strategy of the project results.

Action	Results	Exploitation Strategy
A1	Mapping of alder forests in three river basins (A1.2) and pressures and impacts on pilot ZEC (A1.3) (map)	Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO…)
	Report and cartographic layers for "Determination of habitat potential and ecological variability at the regional geographical scale" (A1.1) (doc)	Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO…)
A2	Agreements and authorizations from public administrations (doc)	Non-exploitation. Internal use
	Custody agreements with public and private owners (doc)	Non-exploitation. Internal use
A3	3 basin plans (doc)	Open Access. Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO…)
C1	Definitive proposal for the "Meanders of the Ter" ZEC project (limits and management guidelines (C1.1 and C1.2) (doc + map)	Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO…)

Action	Results	Exploitation Strategy
C2	Management proposals by stands (doc)	Non-exploitation. Internal use
	C2 Cartography (map)	Non-exploitation. Internal use
	Silvicultural management techniques (tech)	Open Access
C3	C3 technical projects (doc)	Non-exploitation. Internal use
	C3 technical projects (tech)	Open Access
	C3 Cartography (map)	Non-exploitation. Internal use
C4	Proposal for fishing point regulation (doc)	Open Access
D1	Ecological indicators database (db)	Non-exploitation. Internal use
	Evaluation report of indicators (doc)	Non-exploitation. Internal use
D2	Final report on the socio-economic and environmental impact of the project (doc)	Non-exploitation. Internal use
D3	Technical report on the impact on ecosystem functions (doc)	Non-exploitation. Internal use
D4	Specific technical reports and opinions (doc)	Non-exploitation. Internal use
D5	Table of project progress indicators and LIFE impact indicator table final version (db)	Non-exploitation. Internal use
E1	Project website (com)	Open Access
	Promotional brochures and other project dissemination materials (com)	Open Access
	Audiovisual materials (com)	Open Access
	Clipping (com)	Non-exploitation. Internal use
	Layman's Report (doc)	Open Access
	Educational dossier (doc)	Open Access
	Popular science book (doc)	Open Access
E2	Transfer Plan (doc)	Non-exploitation. Internal use

Action	Results	Exploitation Strategy
E2	Scientific-Technical Publications (sci)	Open Access
	Technical manual with guidelines (doc)	Open Access
	International Workshop Conclusions (doc)	Non-exploitation. Internal use
	Debate Classroom Decalogs (doc)	Open Access
F1	External Audit Report (doc)	Non-exploitation. Internal use
F2	Minutes of the Coordination Committee meetings (doc)	Non-exploitation. Internal use
F3	After-LIFE Plan (doc)	Open Access

6. Human and technical resources needed.

Action	Results	Exploitation Strategy	Human Resources	Technical Resources
A1	Mapping of alder forests in three river basins (A1.2) and pressures and impacts on pilot ZEC (A1.3) (map)	Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO...)	1 technician	Drive
	Report and cartographic layers for "Determination of habitat potential and ecological variability at the regional geographical scale" (A1.1) (doc)	Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO...)	1 technician	Drive
A2	Agreements and authorizations from public administrations (doc)	Non-exploitation. Internal use	-	Drive

Action	Results	Exploitation Strategy	Human Resources	Technical Resources
A2	Custody agreements with public and private owners (doc)	Non-exploitation. Internal use	-	Drive
A3	3 basin plans (doc)	Open Access. Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO...)	1 technician	Web
C1	Definitive proposal for the "Meanders of the Ter" ZEC project (limits and management guidelines (C1.1 and C1.2) (doc + map)	Transfer to competent bodies in river matters (ACA-CHE-DACC-MITECO...)	1 technician	Drive
C2	Management proposals by stands (doc)	Non-exploitation. Internal use	-	Drive
	C2 Cartography (map)	Non-exploitation. Internal use	-	Drive
	Silvicultural management techniques (tech)	Open Access.	-	Web

Action	Results	Exploitation Strategy	Human Resources	Technical Resources
C3	C3 technical projects (doc)	Non-exploitation. Internal use	-	Drive
	C3 technical projects (tech)	Open Access.	1 technician	-
	C3 Cartography (map)	Non-exploitation. Internal use	-	Drive
C4	Proposal for fishing point regulation (doc)	Open Access.	-	Web
D1	Ecological indicators database (db)	Non-exploitation. Internal use	-	Drive
	Evaluation report of indicators (doc)	Non-exploitation. Internal use	-	Drive
D2	Final report on the socio-economic and environmental impact of the project (doc)	Non-exploitation. Internal use	-	Drive

Action	Results	Exploitation Strategy	Human Resources	Technical Resources
D3	Technical report on the impact on ecosystem functions (doc)	Non-exploitation. Internal use	-	Drive
D4	Specific technical reports and opinions (doc)	Non-exploitation. Internal use	-	Drive
D5	Table of project progress indicators and LIFE impact indicator table final version (db)	Non-exploitation. Internal use	-	Drive
E1	Project website (com)	Open Access.	-	Web
	Promotional brochures and other project dissemination materials (com)	Open Access.	-	Web
	Audiovisual materials (com)	Open Access.	-	Web
	Clipping (com)	Non-exploitation. Internal use	-	Drive

Action	Results	Exploitation Strategy	Human Resources	Technical Resources
E1	Layman's Report (doc)	Open Access.	-	Web
	Educational dossier (doc)	Open Access.	-	Web
	Popular science book (doc)	Open Access.	-	Web
E2	Transfer Plan (doc)	Non-exploitation. Internal use	-	Drive
	Scientific-Technical Publications (sci)	Open Access.	-	Web
	Technical manual with guidelines (doc)	Open Access.	-	Web
	International Workshop Conclusions (doc)	Non-exploitation. Internal use	-	Drive
	Debate Classroom Decalogs (doc)	Open Access.	-	Web

Action	Results	Exploitation Strategy	Human Resources	Technical Resources
F1	External Audit Report (doc)	Non-exploitation. Internal use	-	Drive
F2	Minutes of the Coordination Committee meetings (doc)	Non-exploitation. Internal use	-	Drive
F3	After-LIFE Plan (doc)	Open Access.	-	Web

7. Objective groups

Regarding the most relevant target groups for the methodologies, tools, and concepts of LIFE ALNUS, the following are mentioned:

- Administrations (local, regional, national, and European)
- Companies:
  - Forestry sector
  - Recreational sector
  - Hydropower sector
  - Environmental/conservation sector
- NGOs related to river environments
- Universities
- Fishing organizations
- School groups

These target groups represent key stakeholders and beneficiaries of the LIFE ALNUS project, and the project's methodologies and concepts are likely to have an impact on these groups or involve their active participation or cooperation.

8. Exploitable products.

Acción	Productos explotables (Exploitable Products)
A1	Cartography of alder forests in three basins (A1.2) and pressures and impacts on the pilot SAC (A1.3) (maps)
	Report and cartographic layers of "Determination of the ecological potential and variability of the habitat on a regional geographical scale" (A1.1) (document)
A3	3 river basin plans (document)
C1	Definitive proposal of the new SAC project "Meanders of the Ter" (limits and management guidelines (C1.1 and C1.2) (document + maps)
C4	Proposal for the regulation of fishing points (document)
E1	Project website (com)
	Advertising brochures and other project promotional materials (com)
	Audiovisual materials (com)
	Layman's Report (document)
	Educational dossier (document)
	Divulgative book (document)
E2	Scientific and Technical Publications (sci)

Acción	Productos explotables (Exploitable Products)
	Technical manual with guidelines (document)
	Debate classroom guides (document)
F3	After-LIFE Plan (document)

9. Exploitable activities.

Action	Exploitable Activities	Type of Activity
C2	Silvicultural Management Techniques (tech)	Transfer Workshops
C3	Technical Projects C3 (tech)	Transfer Workshops
E1	Educational Dossier (doc) and Divulgative book	Activities with schools and educational centers

10. Exploitable tools.

Action	Exploitable Tools
A1	Mapping of alder groves in three basins (A1.2) and pressures and impacts on the pilot ZEC (A1.3) (cart)
	Report and cartographic layers of "Determination of the potential and ecological variability of habitat at a regional geographic scale" (A1.1) (doc)
A3	3 river basin plans (doc)

Action	Exploitable Tools
C1	Final proposal of the project for the new SAC "Meanders of the Ter" (limits and management guidelines (C1.1 and C1.2) (doc + cart)
C2	Silvicultural management techniques (tech)
C3	Technical projects C3 (tech)
E2	Technical manual with guidelines (doc)
	Debate classroom guides (doc)
F3	After-LIFE Plan (doc)

11. Proposed actions for the After-Life plan

To ensure the maintenance of the results achieved with the LIFE ALNUS project, the following types of actions are proposed:

- Monitoring actions: These actions aim to ensure the conservation of the state of alder habitat by controlling the evolution of biodiversity, maintaining regulation of public use, and evaluating the development of the stands, all while considering potential replicability actions. The specific actions to achieve these objectives are further elaborated below.
- Communication and dissemination actions: Given the wealth of information obtained during the project and that which can be generated through monitoring actions, it is essential to maintain a series of actions to disseminate this knowledge. The proposed applications focus on creating new publications, participating in conferences and congresses (such as the Iberian Congress on River Restoration held in Toledo in June 2023), and online dissemination. Manuals and educational books printed in three languages (Catalan, Spanish, and English) will be distributed at conferences and sent to selected stakeholders (public administrations, including river basin authorities, forest owner associations, etc.). The online versions will be disseminated through the Life Alnus website and the websites of CTFC and other project partners.

- Coordination actions: Once the project is completed, it is considered necessary to ensure the maintenance of the network of contacts that has been created. Expert knowledge can be of great assistance in both monitoring and communication and dissemination actions. The goal of coordination actions is to ensure the continuity of open communication among project partners, members of the expert committee, and networking contacts whenever necessary.

The following tables contain the summary, by action, of the planned After-LIFE actions.

Action A1: Previous Work for the Design of the (Regional) Restoration Strategy
Objectives: a) Maintain the demonstrative value of riparian stands with the highest potential. b) Enhance the replicability of the solutions proposed in the project. c) Promote the implementation of new management models for riverside forests and plantation areas near watercourses that integrate biodiversity conservation and production in public and private forests. d) Expand the dissemination of results.
Description of the Action: - Transfer cartographic information and environmental databases to the river basin authorities (ACA for internal basins and CHE for the Segre basin) and the environmental administration (Directorate General of Environmental Policies and Natural Environment of the DACC) for future legal protection proposals (Natura 2000 network) and future river restoration projects. The role of CHE is supervision and authorization, with ACA being the organization that typically implements projects in the Segre basin.
Budget: 1.500€ (meetings, travels, allowances).
Responsible: CTFC, ACA, DACC (DGPA)

Action A2: Custody agreements with public and private landowners of riparian areas.
Objectives: a) Ensure the conservation of the stands included in the project through the monitoring of floristic elements, fauna, vulnerability to flow disconnection, regrowth evolution, etc. b) Monitor the evolution of public use in the riparian stands where this service has been regulated. c) Maintain the demonstrative value of riparian stands with higher potential. d) Enhance the replicability of the solutions proposed in the project. e) Promote the implementation of new management models for riparian forests and plantation areas near watercourses that integrate biodiversity maintenance and production in both public and private forests. f) Expand the dissemination of results.
Description of the action: - Maintenance and renewal of custodial agreements.

- Long-term monitoring of river custodial agreements, with annual on-site visits with property owners. - Elevating an agreement to high legal security (in progress by CERM). - Maintenance of agreements and technical prescriptions resulting from the project.
Budget: 2.500€ (agreement renovation, land ownerships visit, high level of juridic protection agreements).
Responsible: ACA: public / CERM: public and private.

Action A3: Preparation of Habitat Restoration and Conservation Plans for Each Watershed
Objectives: a) Ensure the legal protection and conservation objectives of the restored river stretches. b) Assess the conservation status of the stands included in the project through monitoring floristic elements, fauna, vulnerability to flow disconnection, regeneration evolution, etc. c) Monitor the evolution of public use in the riparian stands where this service has been regulated. d) Enhance the replicability of the solutions proposed in the project. e) Promote the implementation of new management models for riparian forests and areas of plantations near river courses that integrate multifunctionality in both public and private forests.
Description of the action: - Integrate the proposals of the Restoration and Conservation Plans for the Segre, Ter, and Besòs into the management plans of the Natura 2000 Network. - The plans are transferred to the Catalan Water Agency (ACA) and the Directorate-General for Environmental Policies and Natural Environment of the Department of Climate Action (DAAC) of the Catalan government. Their purpose is to serve as reference documents for prioritizing river stretches and restoration actions in the Action Plan of the River Basin District of Catalonia 2022-2027 (ACA), in public calls for riverbank custody and restoration (ACA), and in management plans for Special Areas of Conservation (SACs) (DACC).
Budget: 1.500€ (meetings, travels, allowances).
Responsible: ACA, DACC (DGPA)

Action C1: Actions to increase the physical and legal protection of the habitat
Objectives: a) Ensure the legal protection and conservation objectives of the restored river sections. b) Maintain the demonstrative value of riparian stands with greater potential. c) Enhance the replicability of the solutions proposed in the project. d) Promote the implementation of new management models for riparian forests and areas of plantations near river courses that integrate multifunctionality in both public and private forests. e) Expand the dissemination and transfer of results.

Description of the action: - The Directorate General for Environmental Policies and Natural Environment of the Government of Catalonia (DGPA-DAAC) is committed to the approval of new SACs (Action C1) in the short term. Once the new SACs are approved, management plans will be developed to ensure the conservation of these areas integrated into the Natura 2000 network. - Monitoring of the physical and legal protection of the habitat generated by the project. It is planned to monitor the adoption of regulatory tools for the declaration and expansion of Natura 2000 by the Directorate General for Environmental Policies and Natural Environment of the Government of Catalonia, promoting the application of knowledge generated throughout the project. - Monitoring of the management plans for SACs by the Directorate General for Environmental Policies and Natural Environment of the Government of Catalonia.
Budget: 3.000€ (meetings, travels, allowances). Financing resources for support technicians of CTFC and MN will come directly from DACC and financed projects (at national and at EU level).
Responsible: DACC

Action C2: Silvicultural measures to restore habitat continuity and ecological quality
Objectives: a) Ensure the legal protection and conservation objectives of the restored river sections. b) Evaluate the conservation status of the stands included in the project, through monitoring of floristic elements, fauna, vulnerability to flow disconnection, regeneration evolution, etc. c) Maintain the demonstrative value of riparian stands with the highest potential. d) Enhance the replicability of the proposed solutions in the project. e) Promote the implementation of new management models for riparian forests and nearby plantation areas near river courses, integrating multifunctionality in public and private forests. f) Expand the dissemination and transfer of results.
Description of the action: - Post-Life implementation of the river restoration project in the Ter River (ACA) and its monitoring by ACA with its own funds. - Maintenance of river restoration actions in the Besòs River basin by the partner AjGra and the municipalities involved in each river section (Congost River, Tenes River, and Cànoves Stream). - Supervision of actions in both river basins (Ter and Besòs) by the coordinating partner (CTFC), in coordination with the partners responsible for each basin (ACA and AjGra). - Through the Program of Measures of the Catalonia River Basin District Management Plan 2022-2027, ACA can implement a second phase of restoration in the river sections of action C2 in the short to medium term, subject to an evaluation of the results of the executed restoration projects.
Budget: financing sources will come from competitive projects to achieve an average of 20.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: ACA, AjGra

Action C3: Projects and Pilot Experiences to Address Specific Threats
Objectives: a) Ensure the legal protection and conservation objectives of the restored river sections. b) Evaluate the conservation status of the stands included in the project by monitoring floristic elements, fauna, vulnerability to flow disconnection, regrowth evolution, etc. c) Monitor the evolution of public use of the riparian stands where this service has been regulated. d) Maintain the demonstrative value of riparian stands with the highest potential. e) Enhance the replicability of the solutions proposed in the project. f) Expand the dissemination and transfer of results.
Desription of the action: - ACA commits to maintaining the monitoring of pilot experiences in the Ter basin: a) hydromorphological restoration in the river islands of Les Gambires and El Sorral (Torelló-Masies de Voltregà); b) ecological flow monitoring in two hydroelectric power plants in the Ter basin (Camprodon and Masies de Voltregà). - AjGra commits to maintaining the project actions in the Congost River stretch passing through the municipality of Granollers, as well as promoting improvement actions in adjacent sections in the Besòs basin. - FCLP commits to maintaining the project actions in Gallissà (Segre River, Bellver de Cerdanya) and continuing to promote riparian habitat improvements in the Segre basin. - Supervision of the actions in the three basins (Segre, Ter, and Besòs) by the coordinating partner (CTFC), in coordination with the partners responsible for each basin (FCLP, ACA, and AjGra). - Through the Program of Measures of the Catalonia River Basin District Management Plan 2022-2027, ACA can implement a second phase of restoration in the river sections of action C3 in the short to medium term, subject to the evaluation of the results of the executed restoration projects.
Budget: financing sources will come from competitive projects to achieve an average of 20.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: ACA, AjGra, FCLP

Action C4: Regulation of Public Use of Riparian Areas
Objectives: a) Monitor the evolution of public use in the riparian stands where this service has been regulated. b) Maintain the demonstrative value of riparian stands with greater potential. c) Enhance the replicability of proposed solutions in the project. d) Expand the dissemination and transfer of results.
Description of the action: - Maintain the physical elements for regulating public use (fishing points and trails) in the implemented sections (Municipalities of Torelló, Masies de Voltregà, Masies de Roda, and Roda de Ter, as well as the partner CERM in the Ter basin). - Maintain the legal elements for regulating public use in the implemented sections (DACC).

- Renewal of the Fishing Reserve in the Ter River (including the pilot area C3 in the Ter River (Les Gambires and El Sorral river islands in the municipalities of Torelló and Masies de Voltregà). General subdirectorate of Hunting and Continental Fishing Activities of the Catalan Government
Budget: 15.000€ needed. Financing source will come from public funds when municipalities and subdirectorates will be able to include this on their budgets for maintenance purposes.
Responsible: DACC (ACA) and municipalities (+ CERM)

Action D1: Assessment of the ecological status and biodiversity of the restored riparian areas.
Objectives: a) Assessment of the ecological status and biodiversity of the restored riparian areas to ensure the conservation of the stands included in the project through the monitoring of floristic elements, fauna, vulnerability to flow disconnection, regrowth evolution, etc. b) Maintenance of the demonstrative value of riparian stands with higher potential. c) Expansion of the dissemination of results.
Description of the action: - CTFC: Maintenance of short-term (2023) and medium-term (2024-2027) monitoring of vegetation evolution (including plantations) in the C2, C3, and C4 intervention areas. Funding through internal resources and new projects. - CTFC: Maintenance of deadwood monitoring based on flow regimes in the short term (2023) and medium term (2024-2027) in the pilot project C3 in the Ter River (Illes de les Gambires and del Sorral). - CTFC and ACA have a joint project (until 2025) studying blue water provision through forest management. Within this project, specifically in WP5, there is a plan to study and monitor river dynamics, vegetation, and deadwood in various river sections, some of which are directly related to the LIFE ALNUS intervention areas. - CERM and CTFC will seek funding for the medium-term monitoring of hydromorphological indicators, vegetation, and aquatic and riparian organisms in the pilot projects (action C3). - CTFC: Construction and maintenance of a database (Access software) with the results of ecological monitoring (vegetation structure, flora, and fauna). Data processing in the coming years through pre and postdoc contracts. The results will provide valuable information on the response of aquatic and riparian communities based on restoration projects (C2 and C3) and the relationship between indicator organisms and habitat structure and management. Publication in technical-scientific journals and presentation at technical workshops and conferences in the medium term.
Budget: financing sources will come from competitive projects to reach an average of 30.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: CTFC, CERM

Action D2: Evaluation of the socio-economic and environmental impact of the project.
Objectives:

a) Monitor the evolution of public use in the riparian stands where this service has been regulated.
b) Maintain the demonstrative value of riparian stands with higher potential.
c) Enhance the replicability of the proposed solutions in the project.
d) Promote the implementation of new management models for riparian forests and plantation areas near rivers, integrating multifunctionality in both public and private forests.
e) Expand the dissemination and transfer of the results.

Description of the action:

- Monitoring of public use and the impact of socioeconomic activities in the medium term with field visits to river sections with conservation actions (actions C2, C3, and C4). Dissemination by project partners to entities and municipalities in the debate forum "Recreational Activities in Riparian Forests."
- Maintain agreements with public and private entities. CERM has an agreement with the municipalities in the middle Ter (project "Riberes del Ter"). This agreement is based on collaboration in conservation and environmental education projects along the middle Ter river. The results (decalogues) of the debate forums "Governance of Riparian Areas at the Municipal Level" and "Riparian Custody in the Private and Public Sectors" will serve as a guide to advance in improving the conservation of river spaces in the intervened sections and across the river spaces in the municipalities of the 3 basins of the Life Alnus project.
- ACA will carry out inspections by its technicians and agents throughout the 3 basins of the project. Special emphasis will be placed on the restored sections (actions C2, C3, and C4).
- ACA will ensure compliance with environmental flow rates in the two pilot tests at two hydroelectric power plants on the Ter River (action C3). It will work with hydroelectric companies to advance the objectives and actions derived from the decalogue of the debate forum on "Environmental Flows and Vegetation Management around Mini-Hydroelectric Plants." According to the Decree on Environmental Flow Rates, ACA will extend the application of maintenance flows to other hydroelectric power plants in the 3 basins of the Life Alnus project.
- ACA, DACC, and CTFC will work together to reach a consensus on forest management measures in accordance with the guidelines of the Best Practices Manual of Life Alnus and the decalogue of the debate forum on "Forest and Agroforestry Management in Riparian Areas."
- AjGra will ensure the sustainable management of public use and socioeconomic activities and public services in the Congost River. It has agreements with neighboring municipalities of Les Franqueses del Vallès and Canovelles to coordinate the conservation of the Congost River.
- FCLP will oversee the proper management of the river space of the Segre River in Bellver de Cerdanya (action C3). Additionally, based on Life Alnus, the Foundation is promoting a conservation and sustainable public use project for the banks of the Segre River in the Cerdanya region, in collaboration with the Cerdanya Regional Council (project "Segre-Cerdanya," described in the technical manual of Life Alnus).
- The Directorate General for Environmental Policies and Natural Environment of the Government of Catalonia (DGPA-DAAC) commits to the approval of new SACs (action C1) in the short term. Once the new SCIs are approved, management plans will be

developed to ensure the conservation of these areas integrated into the Natura 2000 network.
Budget: financing sources will come from competitive projects to reach an average of 30.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: CTFC, CERM, ACA, AjGra, FCLP, DGPA-DAAC

Action D3: Assessment of the Impact on Ecosystem Functions
Objectives: a) Ensure the legal protection and conservation objectives of the restored river stretches. b) Evaluate the conservation status of the stands included in the project by monitoring floristic elements, fauna, vulnerability to flow disconnection, regeneration evolution, etc. c) Monitor the evolution of public use in the riparian stands where this service has been regulated. d) Maintain the demonstrative value of riparian stands with the highest potential. e) Enhance the replicability of the proposed solutions in the project. f) Promote the implementation of new management models for riparian forests and areas of plantations near river courses, integrating multifunctionality in public and private forests.
Description of the action: - CERM and CTFC will seek funding to maintain the medium-term monitoring of hydromorphological indicators, vegetation, aquatic organisms, and riparian projects (C2 and C3 actions). - Medium-term monitoring of public use and the impact of socioeconomic activities with field visits in river stretches with conservation actions (C2, C3, and C4 actions). Dissemination by project partners to entities and municipalities in the "Recreational Activities in Riparian Forests" debate forum. - Maintain agreements with public and private entities. CERM has an agreement with the municipalities in the middle Ter ("Riberes del Ter" project). This agreement is based on collaboration in conservation and environmental education projects along the middle Ter river stretches. The results (decalogues) of the "Governance of Riverbanks in the Municipal Sphere" and "Riparian Stewardship in Private and Public Spheres" debate forums will serve as a guide to improve the conservation of river spaces in the treated stretches and throughout the river spaces of the municipalities in the 3 basins of the Life Alnus project. - ACA will conduct inspections on its own initiative through its technicians and agents in the 3 basins of the project. Special emphasis will be placed on the restored stretches (C2, C3, and C4 actions). - ACA assumes compliance with environmental flow rates in the two pilot tests at two hydroelectric power plants on the Ter river (C3 action). It will work with hydroelectric companies to advance the objectives and actions derived from the "Environmental Flows and Vegetation Management around Small Hydroelectric Plants" debate forum's decalogue. According to the Environmental Flow Decree, ACA will extend the application of maintenance flows to other hydroelectric power plants in the 3 basins of the Life Alnus project.

- ACA, DACC, and CTFC will work together to reach a consensus on forest management measures, following the guidelines of the Good Practices Manual of Life Alnus and the decalogue of the "Forest and Agroforestry Management in Riparian Areas" debate forum. - AjGra will ensure sustainable management of public use, socioeconomic activities, and public service activities in the Congost river. It has agreements with neighboring municipalities of Les Franqueses del Vallès and Canovelles to coordinate the conservation of the Congost river. - FCLP will oversee the proper management of the river space of the Segre river in Bellver de Cerdanya (C3 action). Furthermore, the Foundation, based on Life Alnus, is promoting a sustainable conservation and public use project for the banks of the Segre river in the Cerdanya region, in accordance with the Cerdanya County Council ("Segre-Cerdanya" project, described in the technical manual of Life Alnus). - The Directorate-General for Environmental and Natural Policy of the Government of Catalonia (DGPA-DAAC) commits to the approval of new SCI (C1 action) in the short term. Once the new SACs are approved, management plans will be developed to ensure the conservation of these areas integrated into the Natura 2000 network. -
Budget: financing sources will come from competitive projects to reach an average of 30.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: CTFC, CERM, ACA, AjGra, FCLP, DGPA-DAAC

Action D4: Advisory Board of Experts for Technical Monitoring of Actions
Objectives: a) Enhance the replicability of the proposed solutions in the project. b) Promote the implementation of new management models for riparian forests and areas near river courses that integrate multifunctionality in both public and private forests. c) Expand the dissemination and transfer of results.
Description of the action: - Presentation of the project's technical manual to the CAE as part of the project transfer. - Sending the printed technical manual to the CAE contacts and their institutions, many of which have direct involvement in the management of riparian habitats. - Consultations with the CAE regarding the treatment of project monitoring data and results.
Budget: 2.000€ (meetings, travels and allowances).
Responsible: CTFC

Action D5: Monitoring project progress and LIFE impact indicators.
Objectives: a) Ensure the legal protection and conservation objectives of the restored river stretches.

b) Evaluate the conservation status of the stands included in the project, through monitoring of floristic elements, fauna, vulnerability to flow disconnection, evolution of regeneration, etc.
c) Monitor the evolution of public use of the riparian stands where this service has been regulated.
d) Maintain the demonstrative value of the riparian stands with the highest potential.
e) Enhance the replicability of the proposed solutions in the project.
f) Promote the implementation of new management models for riparian forests and plantation areas near watercourses, integrating multifunctionality in public and private forests.
g) Expand the dissemination and transfer of the results.

Description of the action:

- CERM and CTFC will seek funding to maintain medium-term monitoring of hydromorphological indicators, vegetation, and aquatic and riparian organisms in pilot projects (actions C2 and C3).
- Medium-term monitoring of public use and the impact of socio-economic activities with field visits in river stretches with conservation actions (actions C2, C3, and C4). Dissemination by project partners to entities and municipalities through the discussion forum "Recreational Activities in Riparian Forests."
- Maintain agreements with public and private entities. CERM has an agreement with the municipalities of the Ter River area (project "Riberes del Ter"). This agreement is based on collaboration in conservation and environmental education projects in river stretches along the middle Ter. The results (decalogues) of the discussion forums on Governance of Riverbanks at the municipal level and Fluvial Custody in private and public areas will serve as a guide to improve the conservation of river spaces in the stretches where actions have been taken and in the entire river spaces of the municipalities in the 3 basins of the Life Alnus project.
- ACA will conduct inspections as a matter of course by its technicians and agents throughout the 3 basins of the project. Special emphasis will be placed on the restored stretches (actions C2, C3, and C4).
- ACA assumes compliance with environmental flow rates in the two pilot tests in two hydroelectric power plants on the Ter River (action C3). It will work with hydroelectric companies to advance the objectives and actions derived from the discussion forum's decalogue on Environmental Flow Rates and Vegetation Management around mini-hydroelectric power plants. According to the Decree on ecological flow rates, ACA will extend the application of maintenance flow rates to other hydroelectric power plants in the 3 basins of the Life Alnus project.
- ACA, DACC, and CTFC will work together to reach a consensus on forest management measures, following the guidelines of the Best Practices Manual of Life Alnus and the decalogue of the discussion forum on Forest and Agroforestry Management in Riparian Areas.
- AjGra will ensure the sustainable management of public use, socio-economic activities, and public service activities on the Congost River. It has agreements with neighboring municipalities of Les Franqueses del Vallès and Canovelles to coordinate the conservation of the Congost River.
- FCLP will oversee the good management of the river space of the Segre River in Bellver de Cerdanya (action C3). Likewise, the Foundation, based on the Life Alnus project, is promoting a sustainable conservation and public use project for the

riverbanks of the Segre River in the region of Cerdanya, in accordance with the Comarcal Council of Cerdanya (project "Segre-Cerdanya," described in the technical manual of the Life Alnus). - The Directorate General of Environmental and Natural Policy of the Government of Catalonia (DGPA-DAAC) commits to the approval of new SCI (action C1) in the short term. Once the new SACs are approved, management plans will be developed to ensure the conservation of these areas integrated into the Natura 2000 network.
Budget: financing sources will come from competitive projects to reach an average of 30.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: CTFC + CERM

The project partners will continue to carry out communication and dissemination tasks even after the project has ended, for a period of at least five years (January 2023 - December 2027), as described below. The objective is to continue to disseminate and highlight the results obtained during the project, as well as to increase awareness of the importance and current issues related to riparian forests, specifically alder forests, at the local, regional, national, and European levels. The target audience has been grouped into four categories: Society in general, Forest ownership (individuals and entities that own forests), Technical personnel (technicians and researchers from companies, NGOs, and government agencies), and Administration (public entities related to river management, forestry, and environmental administration).

Action E1: Planning and implementation of project dissemination and communication
Objectives: - Expand the dissemination of the results.
Description of the action: - Website maintenance: The project's website is the primary communication tool for LIFE ALNUS and will continue to be so even after the project concludes. At the end of the project, the structure and content of the website will be reviewed to ensure that it has a final format that highlights the most relevant products generated at the end of the project. In addition, occasional updates will be made as the After-LIFE communication plan progresses. The domain www.lifealnus.eu will remain active for at least 5 years (until 2027). Estimated resources: €3,000 (CTFC). - Dissemination of project materials: The dissemination of publications and materials generated during the project will continue. Special emphasis will be placed on those created in the last few months, which include the final results, especially the informative book "El bosque del rio" and the "Layman report." Technical articles and videos will also be highlighted. The channels used for dissemination include: o The project's website.

○ Sending printed copies to project collaborators, public administrations, companies in the river sector, environmental associations, landowner associations, and civil society organizations, etc. ○ Websites and social media accounts of the different partners. ○ Presentations at seminars and conferences. ○ Technical meetings and networking activities. ○ Technical transfer workshops and other training activities. On the other hand, CERM will specifically disseminate the material designed for schoolchildren, integrated into the environmental education activities regularly carried out by CERM, together with the Museu del Ter. This dissemination will be targeted at primary and secondary schools in Catalonia. - Travelling exhibition "The River Forest": The itinerant exhibition of the project will remain as a permanent exhibition at the Museu del Ter. It will continue to tour upon request from project partners, organizations, and interested municipalities. - Media Appearances: The aim is to produce at least three press releases covering various aspects related to river habitat and riparian forests, as well as other communication activities (articles, seminars, etc.) conducted during the after-LIFE period. These press releases should result in appearances in various local, regional, and national media outlets.
Budget: financing sources will come from competitive projects to reach an average of 10.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: CTFC + partners

Action E2: Planning and execution of the project results transfer
Objectives: a) Ensure the conservation of stands that are part of the project through monitoring of floristic elements, fauna, vulnerability to flow disconnection, regrowth evolution, etc. b) Monitor the evolution of public use in the riparian stands where this service has been regulated. c) Maintain the demonstrative value of riparian stands with the highest potential. d) Enhance the replicability of the proposed solutions in the project. e) Promote the implementation of new management models for riparian forests and areas of plantations near watercourses that integrate biodiversity conservation and production in both public and private forests. f) Expand the dissemination of the results.
Description of the action: - Transfer Days: The transfer days held throughout the project have proven to be a very effective tool for disseminating its results, and this activity will continue in the future. It is expected to organize at least 3 technical seminars, either initiated by the partners themselves

or taking advantage of established transfer platforms. Two of the activities already scheduled for the post-Life period are:

- Cafè Prismàtic: Hydromorphological restoration of river environments in the Ter River (online - 2023).
- Technical field trips: Naturalistic outings (Museu del Ter-CERM and Naturalistes d'Osona) (2024).

- Participation in technical-scientific seminars and congresses:
  The regular activities of the various project partners include participation in technical and scientific seminars, congresses, and working groups. These events provide a good opportunity to share previous experiences and ongoing work. It is expected that the results of the Life Alnus project will be presented at regional, national, or European-level seminars or working groups. The results of river restoration projects will be presented post-Life at the VI Iberian Congress on River Restoration-RESTAURARÍOS (Toledo - June 2023). During this congress, materials edited by Life Alnus, such as the informative book, Layman report, and technical manual, will be distributed.

- Technical and scientific publications:
  The final results of the project, as well as any new results generated after its completion, will be disseminated through publications in technical and scientific journals. The following publications are expected:
  - 1 technical article on the proposed forest management for improving habitat continuity and quality in the project (CTFC).
  - 1 technical article on the decision support methods used in the project (MN).
  - 1 scientific article on the influence of forest management actions implemented in the project on the dynamics of alder forests and their response and vitality (CTFC).
  - 1 technical-scientific article on the influence of hydromorphological actions carried out in the project on the dynamics of subaquatic populations and their response and vitality (ACA and Grup Rius UdL).

- Dissemination of project materials:
  The dissemination of publications and materials generated during the project will continue. Special emphasis will be placed on those produced in the last few months, including the final results, especially the Life Alnus Technical Manual. Technical articles and videos will also be highlighted. The channels used for dissemination include:
  - Project website.
  - Sending printed copies to project collaborators, public administrations, companies in the river sector, environmental associations, property owner associations, and civil society organizations, etc.
  - Websites and social media platforms of the various project partners.
  - Presentations at seminars and conferences.
  - Technical meetings and networking activities.
  - Technical transfer workshops and other training activities.

- Dissemination of debate sessions:

The decalogs created through debate sessions, which have been consensus-based with stakeholders from each sector, are the primary tools produced by Life Alnus to improve governance. They are being disseminated among the various stakeholders involved. ○ Debate session and decalog on Forest and Agroforestry Management in Riparian Areas. ○ Debate session and decalog on Environmental Flows and Vegetation Management around Mini-Hydroelectric Power Plants. ○ Debate session and decalog on Governance of Riverbanks at the Municipal Level. ○ Debate session and decalog on Riverbank Stewardship in Private and Public Areas. ○ Debate session and decalog on Recreational Activities and Riparian Conservation. The project partners will ensure the dissemination and encourage the implementation of the objectives and actions proposed by the decalogs. To achieve this, they will participate in working meetings and technical workshops with the relevant authorities (Generalitat de Catalunya, regional councils, and municipalities) and the stakeholders invited to these meetings. These events may not necessarily be promoted by the project coordinator, as a scientific and transfer center, as it will be the responsibility of the authorities. Partners ACA and AjGra, as public administrations, will promote working meetings and participatory processes with stakeholders in their respective areas of competence.
Budget: financing sources will come from competitive projects to reach an average of 10.000€/year aiming at the maintenance of the monitoring works for this action.
Responsible: CTFC, CERM y MN

12. Description of the expected budget for the implementation of the After-LIFE communication plan (2023-2027)

The following table summarises the estimated cost of each planned action during the After-Life period.

Acción	Presupuesto anual (€)
A1	1.500
A2	2.500
A3	1.500
C1	3.000
C2	20.000
C3	20.000
C4	15.000
D1	30.000
D2	30.000
D3	30.000
D4	2.000
D5	30.000
E1	10.000
E2	10.000
TOTAL	**205.500€**