(Projects funded under the Call 2014 onwards must use this format)

LIFE Project Number

< LIFE18 NAT/ES/000930>

Final Report

Covering the project activities from 15/10/2019[1] to 30/06/2024

Reporting Date[2]

<30/10/2024>

LIFE PROJECT NAME or Acronym

<LIFE CAÑADAS>

Data Project

Project location:	Spain
Project start date:	<15/10/2019>
Project end date:	<30/06/2024>
Total budget:	1,848,211 €
EU contribution:	1,108,925 €
(%) of eligible costs:	60

Data Beneficiary

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[1] Project start date

[2] Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

Package completeness and correctness check	
Obligatory elements	**✓ or N/A**
Technical report	
The correct latest template for the type of project (e.g. traditional) has been followed and all sections have been filled in, in English *In electronic version only*	✓
Index of deliverables with short description annexed, in English *In electronic version only*	✓
Mid-term report: Deliverables due in the reporting period (from project start) annexed Final report: Deliverables not already submitted with the MTR annexed including the Layman's report and after-LIFE plan Deliverables in language(s) other than English include a summary in English *In electronic version only*	✓
Financial report	
The reporting period in the financial report (consolidated financial statement **and** financial statement of each Individual Beneficiary) is the same as in the technical report with the exception of any terminated beneficiary for which the end period should be the date of the termination.	✓
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets + full Excel file)*	✓
Financial Statement(s) of the Coordinating Beneficiary, of each Associated Beneficiary and of each affiliate (if involved), with all forms duly filled in (signed and dated). The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. *In electronic version (pdfs of signed sheets + full Excel files) + in the case of the Final report the overall summary forms of each beneficiary electronically Q-signed or if paper submission, signed and dated originals**	✓
Amounts, names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement)	✓
Mid-term report (for all projects except IPs): the threshold for the second pre-financing payment has been reached	
Beneficiary's certificate for Durable Goods included (if required, i.e. beneficiaries claiming 100% cost for durable goods) *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets)*	✓
Certificate on financial statements (if required, i.e. for beneficiaries with EU contribution ≥750,000 € in the budget) *Electronically Q-signed or if paper submission signed original and in electronic version (pdf)*	
Other checks	
Additional information / clarifications and supporting documents requested in previous letters from the Agency (unless already submitted or not yet due) *In electronic version only*	✓
This table, page 2 of the Mid-term / Final report, is completed - each tick box is filled in *In electronic version only*	✓

**signature by a legal or statutory representative of the beneficiary / affiliate concerned*

Instructions:

Please refer to the General Conditions annexed to your grant agreement for the contractual requirements concerning a Mid-term/Final Report.

Both Mid-term and Final Technical Reports shall report on progress from the project start-date. The Final Report must be submitted to the Agency no later than 3 months after the project end date.

Please follow the reporting instructions concerning your technical report, deliverables and financial report that are described in the document Guidance on how to report on your LIFE 2014-2020 project, available on the LIFE website. Please check if you have the latest version of the guidance as it is regularly updated. Additional guidance concerning deliverables, including the layman's report and after-LIFE plan, are given at the end of this reporting template.

Regarding the length of your report, try to adhere to the suggested number of pages while providing all the required information as described in the guidance per section within this template.

1. Table of contents

2. List of key-words and abbreviations

Key-words:

Ecological connectivity, ecological corridor, ecological restoration, ecosystem services, grazing, green infrastructure, multifunctionality, Natura 2000 network, transhumance.

Abbreviations:

UAM	Universidad Autónoma de Madrid
DGAGA	Dirección General de Agricultura, Ganadería y Alimentación de la Comunidad de Madrid
DGMNB	Dirección General de Medio Natural y Biodiversidad de la Junta de Comunidades de Castilla La Mancha.
SEO/BirdLife	Sociedad Española de Ornitología
CA	Association “Campo Adentro”
DRs	Drove roads
CDR	Conquense Drove Road

3. Executive Summary

Project Objectives

The general goal of LIFE CAÑADAS is to enhance the role of the Spanish network of drove roads as Green Infrastructure that provides connectivity between Natura 2000 sites, by means of improving their conservation status and their associated ecosystem services, restoring their multi-functionality and assuring their adequate and sustainable management.

This general objective was addressed through the following specific objectives:

- To evaluate the conservation status of one of the major DRs still in use by transhumant herders (national scale) and the whole network of livestock DRs of the Autonomous Community of Madrid (regional scale) in order to identify priority areas for restoring connectivity among Natura 2000 sites.
- To restore the connectivity and functionality of selected DRs to enhance their role as biodiversity reservoirs and ecological corridors within and between Natura 2000 sites.
- To recover the traditional extensive livestock grazing of the DRs, preferably through transhumant flocks, in areas where herbivore management is critical for maintaining the DR biodiversity and functionality.
- To define the criteria and management priorities to be incorporated into a future Spanish Green Infrastructure Strategy that includes the network of DRs and an adequate institutional framework for its sustainable management.
- To improve the level of social awareness and local stakeholders' perceptions on the important role of DRs in biodiversity conservation and landscape connectivity.

Key deliverables and Outputs

The LIFE CAÑADAS project includes 63 deliverables. Main outputs are related with the following key deliverables:

- Conservation status of the DRs network in the Autonomous Community of Madrid and the CDR at the beginning of the project, and monitoring of conservation actions (deliverables A1.1, A1.2, A3.1, A.4.1, D1.1, D1.2, D1.3, D1.4, D1.5, D2.1, D2.2, D2.3, D2.4, D2.5).
- Design of Restoration Plans for the DRs network in the Autonomous Community of Madrid and the CDR (deliverable A4.2).
- Implementation of the conservation actions proposed in the restoration plans of the DRs (deliverables C1.1, C2.1, C3.1, C3.2, C3.3, C4.1, C4.2).
- State of art and monitoring of local awareness and social valorisation of the ecological and cultural role of DRs (deliverables A2.1, D3.1, D3.2, D3.3).
- Design and implementation of a strategy for public awareness and dissemination of LIFE CAÑADAS results (deliverables E1.1, E2.1, E2.2, E2.3, E2.4, E2.5, E3.1, E3.2, E3.3, E3.4, E3.5, E3.6, E3.7, E4.1, E4.2, E4.3, E4.4).

Achievements, deviations and difficulties met during the project implementation.

All project objectives were successfully achieved, despite some delays in the first half due to COVID-19 pandemic restrictions. These delays primarily impacted the preparatory actions (A1-A5) and certain conservation actions (C1-C4) dependent on them, especially in the CDR. The comprehensive diagnosis of the conservation status of the DRs in both intervention areas was completed without significant issues, although work in the CDR concluded over a year late due to lockdowns. Similarly, participatory processes with social actors, particularly the

focus group with transhumant shepherds in the CDR, were delayed to July 2021, one year later than planned, due to the necessity of in-person meetings. Despite these delays, the intervention area maps were available on time, as only detailed maps for the Community of Madrid were needed, where preliminary work proceeded more normally.

The primary product of the preparatory actions was Deliverable A4.2 (Restoration plans for selected drove road stretches), which included detailed intervention designs and monitoring plans to evaluate outcomes. This document was completed in November 2021, over a year late, although the section for the Community of Madrid was on time, allowing work to commence in that area. Concurrently, the communication plan was designed and launched, including the creation of the project logo and image, activation of social media, and production of two videos. The foundations for effective conservation and restoration actions were solidified with the signing of collaboration agreements with shepherds (Action B1).

The conservation actions (C1-C4) commenced with the issuance of work commencement certificates for each intervention area (Deliverable C1.1) and the restoration of the physical integrity of the intervention stretches, protecting DR spaces from new intrusions. In the Community of Madrid, vehicle traffic regulation measures were necessary before restoration activities began. Various blockades (earth cordons, stone block alignments, wooden fences) were installed to prevent motor vehicle intrusion into natural habitats, while improving the main track for usability. Subsequent habitat restoration interventions included geomorphological recovery, land smoothing, and soil decompaction in 10 DR stretches; construction of 75 dry stone walls along 26 drove road sections; grazing treatments in 20 stretches to reestablish biodiverse plant communities; sowing of hedgerows in 26 DR sections; installation of nesting boxes for wild bees in 16 sections; and construction of twelve raptor perches along selected DR stretch boundaries. In the CDR, three shepherds' shelters were restored, two livestock corrals built, nine water troughs repaired, and four temporary ponds restored to provide high-quality habitats for aquatic flora and fauna, focusing on amphibians.

Parallel to these activities, LIFE CAÑADAS promoted transhumance in the CDR, supporting 14 pastoral families in maintaining this practice, and reactivated the transhumant use of 200 km of DRs in the Community of Madrid. Thirteen novel transhumant movements were carried out from 2021-2024, contributing to the reconnection of five Natura 2000 areas. Success monitoring was conducted through a comprehensive plan that included numerous structural, functional, and biodiversity indicators (actions D1-D2). The results were very positive, clearly indicating significant improvements in the restored stretches, which closely approached the reference stretch values. D.3 completed the monitoring with a socio-ecosystem approach, utilizing perception surveys, semi-structured interviews (Q-method), and an expert workshop.

Public awareness and dissemination actions (E1-E4) centered around the project's website, which functioned normally throughout the project, hosting resources, news, and deliverables. An ambitious outreach, education, and public participation plan was implemented, including numerous visits to secondary education centers and other institutions, as well as many volunteer activities. A high number of scientific and technical articles and documents were published, accompanied by participation in numerous conferences, seminars, and workshops. Notably, a Handbook with recommendations for the management of drove roads was published, specifically targeting technical professionals.

The project was managed through actions F1 to F4, supported by a scientific-technical advisory committee that met annually, and an external audit that thoroughly reviewed the LIFE CAÑADAS accounts. The post-LIFE conservation and communication plan has been drafted and presented, ensuring the consolidation and continuation of the project's achievements for the next five years.

4. Introduction

The LIFE CAÑADAS project arises from the need to increase the presence of green infrastructures and ecological corridors in the territory to counteract the loss of connectivity and spatial homogenization derived from changes in land use. In Spain, the network of DRs constitutes a great opportunity in this regard, given its extension (125,000 km, 421,000 ha) and its legal protection (Law 3/1995 of March 23). However, a considerable part of the network presents severe deterioration problems, and transhumance on foot, which is the main guarantee of conservation, persists in only a few DRs.

The overall objective of LIFE CAÑADAS has been to enhance the role of the Spanish network of DRs as Green Infrastructure that provides connectivity between Natura 2000 sites by improving their conservation status and their associated ecosystem services, restoring their multi-functionality, and ensuring their adequate and sustainable management. To achieve this goal, the following specific objectives have been addressed:

- To evaluate the conservation status of one of the major DRs still in use by transhumant herders (national scale) and the whole network of livestock DRs of the Autonomous Community of Madrid (regional scale) in order to identify priority areas for restoring connectivity among Natura 2000 sites.
- To restore the connectivity and functionality of selected DRs to enhance their role as biodiversity reservoirs and ecological corridors within and between Natura 2000 sites.
- To recover the traditional extensive livestock grazing of the DRs, preferably through transhumant flocks, in areas where herbivore management is critical for maintaining the DR biodiversity and functionality.
- To define the criteria and management priorities to be incorporated into a future Spanish Green Infrastructure Strategy that includes the network of DRs and an adequate institutional framework for its sustainable management.
- To improve the level of social awareness and local stakeholders' perceptions on the important role of DRs in biodiversity conservation and landscape connectivity.

The project LIFE CAÑADAS has worked in two areas: the autonomous community of Madrid, where it operates in the whole network, and the CDR, in the autonomous community of Castilla-La Mancha. In both intervention areas, the DRs connect many Natura 2000 sites. Although various habitats can occur within the DRs depending on the region and management, the main ones are Mediterranean grasslands dominated by annual species, which are included in the priority habitat 6220, Thero-Brachypodietea.

LIFE CAÑADAS has addressed conservation issues and threats at several spatial scales. The loss of transhumance in many DRs has meant the disappearance of an ecological vector that, over the centuries, has been connecting natural areas that are several hundred kilometres apart. Transhumant livestock not only disperses seeds and propagules but also maintains the good ecological condition of the corridor, facilitating the movement and genetic exchange of other organisms. For this reason, LIFE CAÑADAS has supported the conservation of transhumance in the CDR through different actions aimed at solving the problems currently faced by shepherds and herds. In the Community of Madrid, the project has worked on smaller spatial scales. The aim has been to revitalise the network of DRs by reinstating regional transhumance movements, which have improved the connection of several Natura 2000 areas separated by distances of tens of kilometres. Additionally, work has been carried out on a more detailed scale through actions on the ground aimed at restoring soil, grasslands, or hedges on sections

of DRs that had been severely degraded due to the abandonment of grazing and the emergence of new uses that cause considerable negative impacts on the habitats of the DRs.

The socio-economic context of the project originates from the ancestral co-evolution of the natural and social systems, adapting to the marked seasonality of the Mediterranean climate, which gave rise to transhumance as a highly adaptive practice. Transhumant livestock farming associated with the network of drovers' roads constitutes an economic activity of enormous importance, especially in high mountain areas where other types of livestock farming are neither profitable nor sustainable. This significantly contributes to maintaining population levels in rural areas, one of the most severe territorial issues currently facing Spain. Along with other functions and services of great interest, transhumance holds immense value as cultural heritage and as a factor attracting tourism, as evidenced by the number of visitors interested in these topics and the growing number of people using the drovers' roads for recreational and leisure activities compatible with traditional livestock farming.

The actions of LIFE CAÑADAS were designed to achieve the following results:

- An adequate prioritization of the actions to be developed in the intervention areas, agreed upon by scientists, technicians, DRs users, and local stakeholders.
- A Management Plan for the DRs network in the Autonomous Community of Madrid and in the CDR, prepared by the Project's Technical Team based on a comprehensive diagnosis work and a participatory process with shepherds, and approved by the regional authorities.
- The restoration of at least 150 km of DRs in highly fragmented priority areas that connect Natura 2000 sites in the Autonomous Community of Madrid, after the removal of physical obstacles and the ecological restoration of natural grasslands.
- The promotion and recovery of traditional pastoral use in at least 200 km of the DRs in the Autonomous Community of Madrid.
- The elimination of the main obstacles and limitations that hinder the maintenance of transhumance along the CDR, thus ensuring that at least 15 livestock herders use the DRs for seasonally moving their sheep and cattle on foot every year.
- The testing and monitoring of the role of restored DRs as biodiversity reservoirs and ecological corridors between Natura 2000 sites through indicators of plant and animal diversity, seed dispersal, and wildlife movements.
- A comprehensive communication campaign will reach at least 400,000 people, raising awareness of the role of livestock DRs and their importance for biodiversity conservation and landscape connectivity.
- An educational program engaging school, high school, and university students, to be developed in the Autonomous Community of Madrid and Castilla-La Mancha.

5. Administrative part

UAM, the coordinating partner of the project, has led its management. All UAM staff directly involved in LIFE CAÑADAS are part of the Ecology Department. A dedicated person was hired to specialize in the administrative and economic management of the project. This individual has been in constant contact with the project coordinator, Francisco Martín Azcárate, and Violeta Hevia Martín, initially hired as a full-time researcher and later employed by the Ecology Department, thus becoming a non-additional employee of the coordinating partner. This core team of three (the coordinating team) has held weekly meetings to review project progress and make key management decisions. The coordinating team also maintained regular and frequent communication with the external monitor.

One of the challenges faced by the project coordination was replacing the initial manager, Alejandro González, who resigned in June 2021. This resulted in a transition period until Laura dos Santos was hired and adequately trained. During this period, Violeta Hevia Martín and Francisco Martín Azcárate took over the administrative management of the project.

The coordinating team maintained a close relationship with the other project partners. During the first two years, the collaboration was particularly intense with the DGAGA, as a significant part of the restoration activities were carried out in the Community of Madrid, primarily executed by this public administration, a beneficiary partner of LIFE CAÑADAS. The DGAGA's involvement in the project was managed through the 'Area de Vías Pecuarias,' responsible for the direct management of Madrid's DRs. In the case of the CDR, actions began later, in October 2021, and intensified in the latter half of the project, during which we worked closely with the DGMNB, the administration responsible for the DRs in this region. The DGMNB has a delegation in Cuenca, directly overseeing the actions. Interaction with the associations CA and SEO/BirdLife, the two remaining beneficiary partners, was direct and smooth. Each association had designated contact persons for communication with the UAM coordinating team.

There have been no amendments to the Grant Agreement. However, any minor modifications were communicated to the monitor and the Agency. Following the regional elections in Castilla-La Mancha in 2020, the governmental structure of the autonomous community was reshuffled, and the responsibilities of the former Dirección General de Política Forestal y Espacios Naturales de Castilla-La Mancha, the original partner of LIFE CAÑADAS, were taken over by the DGMNB, which is the current name of the project partner.

6. Technical part

6.1. Technical progress, per Action

Action A1. Diagnosis of the conservation status of the drove roads

Foreseen start date: October 2019	Actual start date: October 2019
Foreseen end date: March 2020	Actual (or anticipated) end date: June 2021

Action A1 finished successfully.

A comprehensive diagnosis of the ecological condition of the DRs in the two project areas was conducted. In the **Community of Madrid**, a **sample of 160 sections** was assessed through **photointerpretation and fieldwork**, using a set of informative indicators based on criteria of multifunctionality, resilience, and sustainability (annex: fig A1-1, fig A1-3). More than 40% of the network exhibited loss of integrity (annex: fig A1-2). The primary conservation challenges included encroachment by agricultural, urban, or industrial activities, soil erosion due to excessive motor vehicle traffic, and changes in vegetation resulting from the abandonment of livestock grazing. The area known as the '*campiña silícea*' (arkosic or siliceous countryside) was identified as the most suitable for the implementation of the project's actions, given its restoration potential and the ecological role that the DRs in this area can play as ecological corridors and green infrastructure (annex: fig. A1-4).

In the **CDR**, the diagnosis was first carried out on the section that traverses the **province of Cuenca**, which was surveyed in its entirety (annex: fig. A1-5), and later in the **province of Ciudad Real** (annex, fig. A1-6). For **each kilometer**, the condition of various conservation indicators was recorded, including the width of the drove road, the state of its habitats, the degree of erosion, the presence of intrusions, and the condition of the transhumance infrastructure. Several **priority actions were identified** to improve this drove road, including the restoration of several water points, the removal of intrusions, and the recovery of the legal width.

There have been some deviations from the anticipated dates for the following deliverables and milestones:

- **Deliverable A1.1** was completed three months late due to the complexity of the cartographic information involved.
- **Deliverable A1.2 and the milestone "database elaborated with variables indicating the state of conservation of the drove roads…"** were significantly delayed due to the emergency situation caused by the COVID-19 pandemic. This led to a revision of the project schedule and priorities. Consequently, when the ban on fieldwork was lifted, efforts were redirected to other activities (Actions A4 and C1-C3) that, if not carried out, would have delayed the entire project by one year.

The two deliverables included in Action A1 contributed directly to the achievement of Actions A2, A3, and A4 of the project.

Deliverable name	**Deadline**	
	Scheduled	Actual
A1.1 Diagnosis of the conservation status of the drove road network in the Community of Madrid.	03/2020	06/2020
A1.2 Diagnosis of the conservation status of the Conquense Drove Road.	03/2020	06/2021

Action A2. Participatory processes with social actors

Foreseen start date: December 2019	Actual start date: December 2019
Foreseen end date: June 2020	Actual (or anticipated) end date: December 2021

Action A2 finished successfully.

The UAM team led the conducting of **four semi-structured interviews** with key stakeholders related to the use and management of DRs (shepherds, local development associations, managers of regional administrations) in both project intervention areas. Based on the information collected from these interviews, we developed a **list of "statements"** encompassing **eight categories** linked to the main compatible uses of the DRs. Additionally, **perception questionnaires** were conducted in the study area linked to the CDR (**n=284**) and in the study area linked to the network of DRs in the Community of Madrid (**n=269**). The UAM team also organized a **focus group with eleven transhumant shepherds** who have traveled the CDR on foot in recent years, with participation from partners CA and DGMNB (annex: fig. A2-1). This participatory process allowed shepherds to prioritize the most critical actions for maintaining transhumance in the CDR, which helped achieve consensus with technicians and managers, thereby guiding the conservation actions of LIFE CAÑADAS (annex: fig. A2-2). Furthermore, the UAM team organized two online meetings with environmental NGOs and associations, and forest agents of the Community of Madrid. The objective was to share the project's goals and establish a communication network among groups interested in the conservation of DRs. In accordance with the provisions of the grant agreement, partner CA hired external assistances to facilitate the participatory processes included in this action.

There have been some deviations from the anticipated dates for the following deliverables and milestones:

- **Deliverable A2.1 and the milestone 'perception questionnaires' for the Autonomous Community of Madrid**. A delay was due to the COVID-19 pandemic emergency. In March 2020, we interrupted the sampling campaign in Madrid, which was in progress. Fortunately, we were able to resume fieldwork and complete the sample in November 2021, allowing us to complete the milestone and deliverable.
- **Deliverable A2.2 and the milestone 'focus group with stakeholders'** Due to the COVID-19 crisis, the focus group with transhumant shepherds was delayed until health recommendations permitted safe execution in June 2021.

The two deliverables included in Action A2 contributed directly to the achievement of Actions A4 and D3 of the project.

Deliverable name	**Deadline**	
	Scheduled	Actual
A2.1 Diagnosis of social perception and existing discourses on the drove roads and their role in the conservation of biodiversity and the connectivity of the territory.	04/2020	12/2021
A2.2 Social proposal for intervention and prioritization of conservation and restoration actions.	06/2020	07/2021

Action A3. Identification of the drove road stretches for priority actions

Foreseen start date: December 2019	Actual start date: December 2019
Foreseen end date: March 2020	Actual (or anticipated) end date: December 2021

Action A3 finished successfully.

We have conducted a **detailed mapping of the 30 drove road stretches** selected for priority actions in the **Community of Madrid**. Although this detailed map is shown in the **deliverable A3.1**, the figure A3-2 in the annex presents a schematic map with the locations of the selected stretches. The selection of these sections was based on the diagnostic work of Deliverable A1.1, which included an exhaustive field survey. The 30 selected sections of DRs were divided into three groups of 10: (1) **reference stretches** (in a good state of conservation), (2) **abandoned stretches** (lacking livestock use, with pastures transformed into communities dominated by large herbaceous plants), and (3) **eroded stretches** (with serious problems of soil loss and degradation). The actions carried out in these sections are detailed in the restoration plan of Action C4. On the other hand, actions in the **CDR** were decided to be carried out mainly in the **province of Cuenca** (annex: fig. A3-1) and were decided based on the priorities expressed by the shepherds (Action A2). The detailed map is included in **deliverable A3.1.**

There has been no delay in the anticipated dates for the milestones and deliverables for this action. Both the '*In situ verification of the sections of the drove roads selected as priority'* and the *'Cartographic analysis of the drove road network and selection of the priority sections for the conservation/restoration actions'* were completed in March 2020, allowing the deliverable to be finalized in the same month.

The deliverable included in Action A3 contributed directly to the achievement of Actions A4 and B1 of the project.

Deliverable name	**Deadline**	
	Scheduled	Actual
A3.1 Detailed mapping of the sections identified as key in the restoration of drove roads in the Community of Madrid and in the Conquense Drove Road.	03/2020	03/2020

Action A4. Design of restoration plans for selected drove road stretches

Foreseen start date: January 2020	Actual start date: January 2020
Foreseen end date: June 2020	Actual (or anticipated) end date: November 2021

Action A4 finished successfully.

Action A4 has been primarily executed by UAM, the project's coordinating partner, with involvement from the public administrations DGAGA and DGMNB, who are also project partners. The main task of this action has been the development of **restoration plans** for the DRs in the Community of Madrid and the CDR. These plans were based on the diagnostic work carried out for both areas (Action A1), incorporating results from the social research performed in Action A2, particularly those obtained from the participatory process with the CDR shepherds. In addition, this action also included a general study on the state of biodiversity conservation in the areas of intervention (annex: fig. A4-1, A4-2).

For Madrid, a set of 12 measures has been designed for the restoration of pastures and boundaries of the DRs and the recovery of connectivity (annex: fig A4-3, A4-4, A4-5). The plan foresees actions on 62 stretches and the restoration of livestock movements in at least 150 km of DRs, reconnecting areas of the Natura 2000 network. Additionally, a comprehensive monitoring plan has been developed, featuring early, medium-term, and long-term indicators,

covering structural, functional, and social perception aspects. **In total, 22 indicators** are included for monitoring Actions D1-D3.

For the CDR, a plan has been created focusing on the recovery of **refuges, resting places, water points, ponds, and adequate passages** in difficult areas. This plan was mainly based on the priorities set by the shepherds during the participatory process conducted in Action A2 and includes a monitoring plan to be implemented in collaboration with the transhumant shepherds who use this drove road. Additionally, as part of Action A4, a general **report on the state of conservation of biodiversity** has been prepared, including data on the value of the DRs as reservoirs for various fauna groups. This report, prior to the interventions, should not be confused with the pre-treatment measurements of the monitoring plan, which are included in Actions D1-D3.

The main difficulties encountered in this action were due to the COVID-19 health emergency:

- **Deliverable A4.1 and the milestone 'Initiation of biodiversity studies'** were delayed by more than one year because of the suspension of fieldwork imposed by university authorities in 2020. Once fieldwork resumed, the milestone was achieved, and the deliverable finalized.
- **Deliverable A4.2 (Restoration plans)** could not be developed until the focus group with the shepherds (Action A2) was conducted, which was postponed to July 2021. Consequently, the deliverable was delayed until November 2021.

Despite these delays, both deliverables included in Action A4 have been completed, enabling the execution of Actions C1-C4 and D1-D3.

Deliverable name	**Deadline**	
	Scheduled	Actual
A4.1 Report on the conservation status of biodiversity.	05/2020	09/2021
A4.2 Restoration plans for selected drove road stretches.	06/2020	11/2021

Action A5. Design of an Integral Communication Plan and the image of the project

Foreseen start date: November 2019	Actual start date: November 2019
Foreseen end date: March 2020	Actual (or anticipated) end date: November 2023

Action A5 finished successfully.

The three partners involved in this action (CA, SEO/BirdLife, and UAM) met several times in the first months of the project, in line with the milestone "Start of meetings of the partners of the LIFE CAÑADAS project," to design and develop sub-action A.5.1 (Integral Communication Plan). During these meetings, the partners agreed on the key messages, the institutional description of the project, and the target audience. CA contracted external assistance for the design and development of the **Integral Communication Plan**, which serves as a fundamental guide for all partners to effectively disseminate the project's objectives, actions, and results at local, national, and international levels.

Additionally, since 2019, we have established accounts on the following social networks: **Twitter** (@LifeCanadas) **with 1302 followers**, **Facebook** with **886 followers**, and **Instagram** (@lifecanadas) with **692 followers**. We periodically publish posts on the project's status and main results. For more information, see Action E2.

Regarding sub-action A.5.2 (Design of the project image), UAM contracted external assistance for the design of the **project's image** (annex: fig. A5-1, A5-2**, Deliverable A5.1)**, including the creation of a **basic manual** with the logo guidelines (**Deliverable A5.2**). Additionally, UAM commissioned the production of a promotional video for the project (**Deliverable A5.3**; annex: fig. A5-3), which was disseminated through all the project's social networks and website.

As part of this action, SEO/BirdLife also contracted external assistance to create an infographic and produced a **documentary video** with "Into the Wild Productions", a film production company specializing in natural history and factual programs (annex: fig. A5-4). Additionally, CA led a workshop with artists "Método Móvil," held in Cuenca in the summer of 2023. For this reason, the actual completion date of the action was postponed to July 2023, although the work strictly related to the design of the communication plan was carried out in the early months of the project and according to the planned schedule. In accordance with the provisions of the grant agreement, CA hired several external assistances to develop the communication plan. Due to the most suitable opportunities for the development of the communication plan arising after the pandemic, the effective closure date for this action was extended to November 2023. This adjustment did not affect the delivery dates of the project deliverables.

Deliverable name	**Deadline**	
	Scheduled	Actual
A5.1 Project logo.	11/2019	11/2019
A5.2 Basic manual with the rules of use of the logo.	01/2020	01/2020
A5.3 Project dissemination video.	09/2021	09/2021

Action B1. Collaboration agreements with local and transhumant shepherds

Foreseen start date: December 2019	Actual start date: December 2019
Foreseen end date: June 2020	Actual (or anticipated) end date: February 2022

Action B1 is successfully finished.

Action B1 aimed to sign specific collaboration agreements between interested shepherds and UAM, the coordinating partner of the project. These agreements included a formal commitment from the shepherds or groups of shepherds to maintain livestock activity in the DRs selected after the implementation of the restoration and conservation actions.

To achieve this goal, we identified a list of shepherds and groups interested in collaborating with the project (**Deliverable B1.1**) and held several meetings with local and transhumant shepherds in both project areas. We initiated the negotiation and consensus phases with the shepherds interested in the restoration practices of the project and their future maintenance, in accordance with both milestones of Action B1. To facilitate these negotiations, several external assistances were hired by partner CA.

The collaboration agreements were made with shepherds whose livestock activity is forecasted to continue in the medium and long term, promoting and prioritizing the continuity and incorporation of new generations of shepherds. We have formalized seven collaboration agreements (**Deliverable B1.2**; annex: fig. B1-1) with the following:

- **Association "Trashumancia y Naturaleza"**: This association has a transhumant herd of more than a thousand sheep. The agreement allows their herd to graze on several selected DRs in Madrid.

- **Cooperative "Los Apisquillos"**: This cooperative also has a transhumant herd. The collaboration covers the grazing of several sections of DRs in Madrid where the LIFE CAÑADAS project operates.
- **Five transhumant shepherds of the CDR**: These shepherds have been practicing transhumance for more than 12 years with herds of sheep, goats, and cows. Their commitment to continue these livestock movements twice a year is essential to ensuring the ecological role played by this drove road.

Due to the difficulties in holding face-to-face meetings during the COVID-19 pandemic restrictions, the effective signing of some agreements was delayed by about a year, which explains why Deliverable B1.1 was completed in February 2022. This did not prevent satisfactory collaboration with the shepherds throughout all phases of the project.

Deliverable name	**Deadline**	
	Scheduled	Actual
B1.1 List of shepherds and groups interested in collaborating in the project	11/2019	12/2019
B1.1 Agreements signed with the shepherds.	06/2020	02/2022

Action C1. Recovery of the physical integrity of the drove roads

Foreseen start date: April 2020	Actual start date: November 2020
Foreseen end date: March 2022	Actual (or anticipated) end date: April 2024

Action C1 is successfully finished.

This action involved executing preliminary actions necessary to ensure the **spatial integrity of the areas designated for restoration** (annex: fig.C1-1). The specific interventions were based on the restoration plans established in Action A.4. In the Community of Madrid, it was determined that the protection of the DRs would be carried out through two main strategies: First, **regulating motor vehicle traffic**, which included establishing barriers and improvements to prevent vehicles from leaving the main trail; and second, **protecting boundaries**, which involved constructing stone walls to safeguard the borders of the DRs.

These actions were implemented as part of Actions **C.2 and C.3**. In contrast, no specific protection actions were established for the CDR, as the LIFE CAÑADAS project focused on restoring livestock infrastructures, rehabilitating water points, and eliminating obstacles for livestock passage, following the priorities set by the shepherds in Action A.2.

Given that the initial actions were assumed to be area protection measures, the deliverables included **certificates of the start of works** issued by the two competent administrations: DGAGA (Community of Madrid) (annex: fig. C1-2) and DGMNB (Castilla-La Mancha) (annex: fig. C1-3). The duration of the action extended until the completion of the interventions planned for the protection of the drove road sections. Additionally, as part of the adaptive management strategy of the LIFE CAÑADAS project, complementary actions were undertaken in the last two years. These included installing posts for raptors and additional dry-stone walls along the edges of some restored DR sections in the Community of Madrid, contributing to their protection against potential expansion of adjacent agricultural fields. In the CDR, additional actions for debris and waste removal were undertaken by partner CA through external consultants. The need to carry out these adaptive management tasks extended the effective closure date of the action to April 2024.

The main difficulties encountered in this action were due to the COVID-19 health emergency:

- **Deliverable C1.1** and the milestone **"start of the first works"** suffered delays in both the Community of Madrid and the CDR. In Madrid, the suspension of most activities by the Government between March and June 2020 postponed the start of work to November 2020. In the CDR, delays in the participatory process with the shepherds, which was essential for designing the restoration actions, pushed the start of the works to September 2021.

Deliverable name	**Deadline**	
	Scheduled	Actual
C1.1 Certificate of start of works.	06/2020	09/2021

Action C2. Removing of motor traffic to foster herding and transhumance

Foreseen start date: April 2020	Actual start date: November 2020
Foreseen end date: September 2021	Actual (or anticipated) end date: September 2021

Action C2 is successfully finished.

The restoration plans developed in Action A.4 included measures for regulating motorized traffic only in the intervention area of the **Community of Madrid**. DGAGA, a partner of LIFE CAÑADAS and the administration responsible for the DRs in the Madrid region, has successfully executed the planned actions in the **10 sections selected for grassland restoration**. Prior to the traffic management actions, **manual cleaning** was conducted, and all sections were **signposted** with official LIFE CAÑADAS project signs (annex: fig. C2-1). These activities involved UAM, the project's coordinating partner, and the beneficiary partner SEO/BirdLife through their volunteer programs.

Following these preparatory steps, geomorphological recovery, land smoothing, and soil decompaction works, as documented in Deliverable C.3, were completed. **Traffic was then blocked** in the restoration areas using **three types of barriers**: (1) Earth cordons; (2) Stone block alignments; and (3) Wooden fences (annex: fig C2-2).

Generally, earth cordons and stone block alignments were used where the main risk was the passage of four-wheeled vehicles, while wooden fences were employed to prevent the passage of bicyclists and motorcyclists. In total, **31 earth cordons, 43 stone alignments, and 7 wooden fences were installed**. The work was carried out throughout 2020 and the early months of 2021. All barriers were installed satisfactorily and in accordance with the restoration plan.

Subsequently, the main track was remodeled to ensure that future vehicle traffic would be confined to it. **Eight sections of track**, each between 3 and 4 meters wide and generally having a gravel surface with gabled side slopes, were remodeled between November 2020 and the first half of 2021.

There were only slight deviations from the initial plan:

- **The milestone "start of the first works"** was delayed from July 2020 to November 2020 due to the COVID-19 pandemic. Despite this, the works were completed on schedule.

Thus, the action was completed in time, allowing for the continuation of the habitat restoration works planned in Action C.4.

Deliverable name	**Deadline**	
	Scheduled	Actual

C2.1 Final report on the regulation of motorized traffic on drove roads.	09/2021	09/2021

Action C3. Structural restoration of habitats within the selected drove roads

Foreseen start date: April 2020	Actual start date: November 2020
Foreseen end date: September 2021	Actual (or anticipated) end date: December 2023

Action C3 is successfully finished.

Following the restoration plan (Action A.4), several actions were undertaken in the Community of Madrid. Between November 2020 and March 2021, the DGAGA carried out **geomorphological recovery, land smoothing, and soil decompaction works in 10 sections of DRs** (annex: fig. C3-1), preceding the traffic management tasks included in Action C.2. In some instances, an excavator shovel was used for initial land smoothing, followed by primary decompaction with tractors equipped with share ploughs. UAM personnel then conducted superficial tillage using a motor hoe, sometimes completing the task with hand tools (annex: fig. C3-2).

A total of **75 dry stone walls**, each approximately **6 meters long (450 meters cumulative)**, were constructed across **26 drove road sections** using granite stone sourced from demolitions in the neighboring Sierra de Guadarrama region (annex: fig. C3-3). **Livestock exclusion fences** were installed in 20 stretches to establish control plots for evaluating the success of **grazing treatments**. Grazing was practiced to regenerate abandoned pastures in 10 sections (annex: fig. 3-8), while more intense treatments (***majadeos***), where herds spent the night in the areas to be regenerated to contribute nutrients and seeds to the soil, were carried out in another 10 sections (annex: fig. 3-9).

Hedgerows of tall shrubs were planted alongside stone walls and other structures installed by the project, such as road traffic blockades. In 16 sections selected to address the interaction between the drove road and the surrounding matrix, **low shrub hedges** were sown, some associated with stone walls, and others directly on the boundary between the drove road and adjacent fields (annex: fig. 3-10). Additionally, **nesting boxes for wild bees** were installed in another 16 sections (annex: fig. 3-11). **Twelve perches for raptors** were also placed along the boundaries of the selected DR stretches (annex: fig. E2-9).

In the CDR, three shepherds' shelters were restored: *La Vereda Shelter*, in Villalba de la Sierra municipality; *Las Majadas Shelter*, in Las Majadas and *San Isidro Shelter*, in Las Pedroñeras (annex: fig. C3-5, C3-6). Additionally, **two livestock corrals** were constructed at the "San Isidro" and "Molino Blanco" sites (annex: fig. C3-4). **Nine water troughs** were repaired or built in the CDR, all in Cuenca province (annex: fig. C3-7). **Four temporary ponds** were also restored to provide high-quality habitats for aquatic flora and fauna, with a special focus on amphibians (annex: fig. 3-12, 3-13). These actions in the CDR were carried out by the DGMNB.

In general, the study and design work for these actions was undertaken by the technical staff of DGMNB and DGAGA, which meant that only one external assistance was required to be contracted by DGMNB.

Due to the need to extend certain adaptive management tasks to address discrepancies in the actions and implement some improvements, the effective closure date for this action was extended to December 2023. Throughout the action, partner CA contributed by contracting various external assistances with workers who participated in the restoration efforts.

The main deviations from the schedule occurred in the CDR due to delays in Action A.2 caused by the pandemic, resulting in subsequent delays:

- The **milestone "Start of actions of recovery…"** was delayed by 2 months in the Community of Madrid due to the pandemic. However, all planned actions were satisfactorily completed.
- A first version of **Deliverables C.3.2 and C.3.3** was produced, including all works in the Community of Madrid and some interventions in the CDR. These deliverables were **updated upon the completion of actions in the CDR**.

Thus, Action C3 was completed within the project's activity period.

Deliverable name	**Deadline**	
	Scheduled	Actual
C3.1 Recovery of the geomorphology, decompaction and (...)	09/2021	09/2021
C3.2 Restoration of traditional anthropic elements.	09/2021	V1 11/2021 V2 11/2023
C3.3 Recovery of the structure and functionality of the habitats (…).	09/2021	V1 11/2021 V2 03/2024

Action C4. Functional restoration of ecological connectivity within the selected drove roads

Foreseen start date: April 2020	Actual start date: November 2019
Foreseen end date: September 2023	Actual (or anticipated) end date: April 2024

Action C4 is successfully finished.

The action started in autumn 2019 with the **transhumant movement in the CDR**, where LIFE CAÑADAS collaborated with shepherds. LIFE CAÑADAS' efforts provided crucial support to the **14 livestock farms** maintaining transhumant use of this major corridor (annex: fig. C4-2, C4-4). This ensured the continuity of use throughout the project period, despite initial doubts and discouragement from several farms about the feasibility of on-foot transhumance. The **improvement of refuges, livestock enclosures, and water troughs** significantly facilitated the use of the drove road, and several families are now considering undertaking the May-June transhumance on foot, a particularly challenging time due to the limited availability of water.

In 2020, UAM researchers meticulously designed several **transhumant routes in the Community of Madrid** to connect various Natura 2000 sites in the region while revitalizing the DRs. A total of three routes, totaling 130 km, were planned that year. These movements were carried out for the first time in spring 2021, involving UAM, CA (a beneficiary partner of the project), and several collaborating herds. The movements were coordinated with the conservation and restoration actions outlined in action C.3 and adhered to the restoration plan of action A.4. Over the remaining project period, these movements were increased and repeated annually. By the project's end in the Community of Madrid, after **13 livestock movements**, approximately **200 km of drove roads were significantly reactivated**, with a **cumulative project distance nearing 400 km**. This reconnection linked **five Natura 2000 areas** (ZEPA Soto de Viñuelas, ZEPA Monte de El Pardo, LIC/ZEC Cuenca del Río Manzanares, LIC/ZEC Cuenca del Río Guadarrama) (annex: fig. C4-1, C4-3, C4-5).

Since the transhumance movements supported by the project extended into the spring of 2024, the effective closure date for this action was set to April of that year. Throughout the action, and as planned, both UAM and CA contributed by contracting several external services that

supported the activities involved in this action, much of which was related to hiring shepherds and livestock services for the care and grazing of the herds.

The action encountered only minor deviations from the initial plan:

- The milestone "Beginning of transhumance on foot of 10 herds along Cañada Real Conquense" was met according to schedule, but **the milestone "First movement of the flock of sheep (...)** in the Community of Madrid" was delayed by a year (to April 2021) due to the COVID-19 pandemic.
- Deliverable C4.1 was completed on time. **Deliverable C4.2** was delayed four months to include the transhumance carried out in Madrid in 2024.

Thus, the action was fully completed within the project's activity period and directly contributed to the achievement of the project goals.

Deliverable name	**Deadline**	
	Scheduled	Actual
C4.1 Livestock movements in the action areas.	10/2020	12/2021
C4.2 Detailed and geo-referenced final report of seasonal livestock movements in the areas of action.	09/2023	03/2024

Action D1. Monitoring of drove roads' structure and biodiversity

Foreseen start date: March 2020	Actual start date: May 2020
Foreseen end date: June 2024	Actual (or anticipated) end date: June 2024

Action D1 is successfully finished.

The monitoring of the structural indicators began in June 2020 with the measurement of the first descriptive variables of the condition of the DRs selected for restoration actions (annex: fig. D1-14). According to the monitoring plan (Action A.4), the following structural indicators were measured in 2020: (1) **bare soil surface**, (2) **herbaceous biomass**, (3) **physical-chemical properties of the soil**, (4) **density of ant nests**, (5) **grassland communities: taxonomic composition**, (6) **epigean invertebrate communities: family composition**, (7) **ant communities: taxonomic composition**, and (8) **wild bee communities: taxonomic composition**. In 2021, other indicators associated with the monitoring of hedges and walls were added: (1) **number of germinations in woody hedges** and (2) **reptile communities in stone walls**.

All indicators were measured before implementing the restoration actions to assess their effects. After the treatments began, these variables were measured with varying frequencies, depending on whether they were considered **short-term, medium-term, or long-term** indicators. These long-term indicators will also be measured as part of the post-Life plan. The indicators have been measured in **control and reference** plots to obtain a complete picture of the intervention results. For certain flora and fauna surveys (which included structural and functional variables) and laboratory analyses (e.g., soil analyses, also encompassing structural and functional components), it was necessary for UAM to contract external assistances, as outlined in the grant agreement.

The ecological restoration actions carried out within the framework of the LIFE CAÑADAS project **have proven effective in restoring grasslands** (annex: fig. D1-1 to D1-11, D1-17) **and hedgerows** (annex: fig. D1-12, D1-13) in the DRs of the Community of Madrid. The installation of dry-stone walls to provide shelter for reptiles has also been a very successful measure (annex: fig. D1-18, D1-19). Additionally, monitoring invertebrate communities such

as ants and beetles showed that the restoration treatments carried out in the project had positive effects on these groups (annex: fig. D15, D16). In summary, the results obtained throughout the project demonstrate **solid and lasting effects of the interventions** on numerous structural and biodiversity indicators.

The action experienced only slight deviations from the initial plan:

- The **milestone "Beginning of field samplings 2020"** was met in May 2020, two months behind schedule due to the COVID-19 pandemic. However, Deliverable D1.1 was completed on time.
- The rest of milestones and deliverables were met according to schedule.

Thus, Action D1 has been successfully finished and has adequately contributed to the monitoring of actions C1 – C4 of the project.

Deliverable name	**Deadline**	
	Scheduled	Actual
D1.1 Monitoring of the structure and biodiversity indicators of the drove roads in 2020.	10/2020	10/2020
D1.2 Monitoring of the structure and biodiversity indicators of the drove roads in 2021.	10/2021	10/2021
D1.3 Monitoring of the structure and biodiversity indicators of the drove roads in 2022.	10/2022	10/2022
D1.4 Monitoring of the structure and biodiversity indicators of the drove roads in 2023.	10/2023	10/2023
D1.5 Evaluation of the structure and biodiversity indicators of the drove roads.	06/2024	06/2024

Action D2. Monitoring of drove roads' functionality

Foreseen start date: March 2020	Actual start date: May 2020
Foreseen end date: June 2024	Actual (or anticipated) end date: June 2024

Action D2 is successfully finished.

Action D2 is similar to Action D1 but focused on functional indicators rather than structural ones. Monitoring began in June 2020 with the measurement of initial descriptive variables for the condition of the DRs selected for restoration actions. According to the monitoring plan (Action A.4), the following functional indicators were measured in 2020: (1) **soil temperature**, (2) **density of herbivore excrements**, (3) **tea bag index**, (4) **soil enzymatic activity**, (5) **grassland communities: functional composition**, (6) **ant communities: functional composition**, and (8) **wild bee communities: functional composition**.

All indicators were measured before implementing the restoration actions to assess their effects. After the treatments began, these variables were measured at varying frequencies depending on whether they were considered **short-term, medium-term, or long-term indicators**. Long-term indicators will also be measured as part of the post-Life plan. Indicators were measured in **control and reference** plots to obtain a complete picture of the intervention results. For certain flora and fauna surveys (which included structural and functional variables) and laboratory analyses (e.g., soil analyses, also encompassing structural and functional components), it was necessary for UAM to contract external assistances, as outlined in the grant agreement.

The restoration actions carried out by the LIFE CAÑADAS project have proven **effective for functional indicators** (annex: fig. D2-1 to D2-6). Values moved from those indicative of strong soil degradation and loss of functional diversity towards values similar to reference plots, revealing a sound improvement in ecosystem quality.

The action experienced only slight deviations from the initial plan:

- **The milestone "Beginning of field samplings 2020"** was met in May 2020, two months behind schedule due to the pandemic. **Deliverable D2.2** was delayed by two months to include the complete sampling campaign for the indicator "nest occupation."
- The rest of the milestones and deliverables were met according to schedule.

Thus, Action D2 has been successfully finished and has adequately contributed to the monitoring of actions C1 – C4 of the project.

Deliverable name	**Deadline**	
	Scheduled	Actual
D2.1 Monitoring of the functional indicators of the drove roads in 2020.	10/2020	10/2020
D2.2 Monitoring of the functional indicators of the drove roads in 2021.	10/2021	12/2021
D2.3 Monitoring of the functional indicators of the drove roads in 2022.	10/2022	10/2022
D2.4 Monitoring of the functional indicators of the drove roads in 2023.	10/2023	10/2023
D2.5 Evaluation of the functional indicators of the drove roads.	06/2024	06/2024

Action D3. Monitoring of social perceptions

Foreseen start date: January 2021	Actual start date: January 2023
Foreseen end date: April 2024	Actual (or anticipated) end date: April 2024

Action D3 is successfully finished.

This action is based on three pillars. First, a **sociological study** was conducted using perception surveys to **evaluate changes** in views regarding the conservation status of drove roads in the two intervention areas (annex: fig. D3-1, D3-2, D3-3). Second, a **discourse analysis** was carried out using the '**Q method**,' which included a series of semi-structured interviews with key stakeholders (annex: fig. D3-4, D3-5). Finally, an **expert workshop** was held to share and discuss the outcomes of the LIFE CAÑADAS actions and future management proposals with a diverse group of technicians and specialists (annex: fig. D3-6, D3-7).

The sociological study was conducted at the end of 2023, using surveys similar to those used in Action A2. This approach allowed us to gather **pre- and post-treatment perceptions** on a broad set of questions. We concluded that the general population's knowledge about drove roads is very limited, highlighting the need for continued education and awareness efforts in future actions. The discourse analysis using the Q methodology revealed the existence of **three distinct groups** based on their perceptions of drove roads: those focused on rural equity, traditional livestock farming, and conservationism. The expert workshop provided a crucial **platform for discussion and reflection**, gathering opinions and recommendations from specialists to enhance and improve conservation and restoration strategies for the drove roads. For the execution of these participatory processes, as stipulated in the grant agreement, UAM relied on the engagement of several external services.

The action experienced the following deviations from the initial plan:

- Due to the limited time since the completion of the diagnostic surveys for the Conquense Drove Road, caused by the COVID-19 pandemic, it was deemed more

efficient to conduct a **single post-treatment survey** wave in 2023 with a larger sample size. The deliverable initially planned as D3.1 (First report on the social perception evolution) was merged with deliverable A2.1. As part of the diagnostic phase, this deliverable included a detailed report on social perceptions and the stakeholders' opinions, allowing the establishment of a baseline diagnosis of the social perception of Drove Roads within the project area. Consequently, a single deliverable (D3-1-2) was the central document for post-treatment monitoring. This decision was communicated to and approved by the CINEA team (Letter Fourth monitoring visit - Joint Mission, 3 June 2024, issue 24).

- The remaining milestones and deliverables were met according to schedule.

Thus, Action D3 has been successfully completed and has adequately contributed to the monitoring of Actions C1 – C4 of the project.

Deliverable name	**Deadline**	
	Scheduled	Actual
D3.1-2 Report on the evolution of the social perception of drove roads and their role in biodiversity conservation and territorial connectivity.	10/2022 06/2023	02/2024
D3.3 Report on expert workshops	04/2024	06/2024

Action E1. Development of the LIFE CAÑADAS project website

Foreseen start date: December 2019	Actual start date: April 2020
Foreseen end date: June 2028	Actual (or anticipated) end date: June 2029

Action E1 is successfully finished.

Action E1 aimed to design the **project's website** and continuously updating its content throughout the project's development.

In the initial months of the project, the three partners involved in this action (UAM, SEO/BirdLife, and CA) held several meetings to define the website's structure and the type of content it would feature. This process took several months, resulting in a slight delay, with the website being published four months later than planned. In April 2020, CA, through external assistance, managed the preparation, design and maintenance of the LIFE CAÑADAS project website (Deliverable E1.1, achieving the Milestone "Start-up of the website").

The website has functioned smoothly throughout the project's activity period (annex: fig. E1-1), hosting deliverables, news, maps, and other project-related resources. It will remain active for at least another five years (until September 2029) and will be maintained with resources allocated to the post-LIFE plan.

Deliverable name	**Deadline**	
	Scheduled	Actual
E1.1 Website of the LIFE CAÑADAS project	12/2019	06/2021

Action E2. Development of the Divulgation, Education, and Public Participation Plan

Foreseen start date: November 2020	Actual start date: November 2020
Foreseen end date: March 2024	Actual (or anticipated) end date: March 2024

Action E2 is successfully finished.

Action E2 aimed to raise public awareness about the network of DRs, emphasizing their ecological role, particularly in terms of ecological connectivity, and to help people recognize and enjoy the ecosystem services that DRs provide to rural areas. This was achieved through a variety of activities and dissemination products, developed based on the Integral Communication Plan of the LIFE CAÑADAS project (Action A5):

- **Press Engagement**: We (1) issued six press releases; (2) secured over 30 press reports in various media outlets such as *La Vanguardia, Madrid Norte, Aula Magna, Cadena Ser, Sociedad Caminera del Real, Las Noticias de Cuenca, GEO, El Solidario, El Día Digital, Humanidad y Medio, VN Explorer, Econoticias, Mas Vive, ABC, BBC, Traveler, eldiario.es, El Guadarramista, ASHA, EL DÍA Digital.es, and La Sociedad Caminera del Real Manzanares*; and (3) conducted several radio interviews (*Cope, SER, RNE*) and appearances on regional (*TeleMadrid*) and national television channels (*Antena 3*) (annex: fig. E2-4).
- **Informational and Promotional Materials**: We (1) created a roll-up informative panel summarizing the project objectives, action areas, and including a link to the project website and the logos of involved partners, the Life program, and Red Natura 2000; (2) installed over 100 exterior panels at all project intervention points; (3) printed four magnets with the logos of the LIFE CAÑADAS project, all partners, the LIFE program, and Natura 2000 Network, to be placed on cars used for field trips (annex: fig. E2-5).
- **Volunteer and Public Engagement:** We (1) organized 16 volunteer days through SEO/BirdLife, with around 200 participants; (2) created a cycling route along the Conquense Drove Road; (3) participated in three Agroecological Fairs at UAM (annex: fig. E2-11) and the Transhumance Festival; and (4) maintained an active presence on three social media platforms: **Twitter** (@LifeCanadas) **with 1302 followers**, **Facebook** with **886 followers**, and **Instagram** (@lifecanadas) with **692 followers** (annex: fig. E2-1, E2-2, E2-3).
- **Educational Outreach:** We (1) conducted 160 sessions in 20 secondary and high schools (annex: fig. E2-8), culminating in the creation of a large mural at C.E.B.I.P. Príncipes de Asturias in Quijorna (Madrid) (annex: fig. E2-6); and (2) held the "Mobile Method" workshop in Cuenca with 30 young artists (annex: fig. E2-9, E2-10).

The high success of the communication strategies mentioned has allowed us to greatly exceed the project's dissemination objectives, reaching a broad and diverse audience. Overall, the public's reaction has been very positive, showing great interest in the project's actions and the future of transhumance and drove roads. This success suggests that the dissemination of LIFE CAÑADAS will be further amplified through the involvement of a significant portion of the people reached by our dissemination activities.

As stipulated in the grant agreement, partner SEO/BirdLife contracted various external assistances for the design and creation of illustrations, graphic resources, posters, and other educational materials, as well as for the development and presentation of the educational unit in schools.

Acording to the established schedule, we have completed five **deliverables** explaining all the above dissemination products and activities.

Deliverable name	**Deadline**	
	Scheduled	Actual
E2.1 Report on communication, education and participation activities	12/2020	12/2020

E2.2 Report on communication, education and participation activities	12/2021	12/2021
E2.3 Report on communication, education and participation activities	12/2022	12/2022
E2.4 Report on communication, education and participation activities	12/2023	12/2023
E2.5 Final report on communication, education and participation activities	06/2024	06/2024

Action E3. Scientific-technical publications of the project

Foreseen start date: January 2022	Actual start date: January 2022
Foreseen end date: June 2024	Actual (or anticipated) end date: June 2024

Action E3 is successfully finished.

Action E3 aimed to disseminate information and results of the project to sectors related to the management of biodiversity, DRs, and extensive livestock in public administrations at regional, national, and European levels (Sub-action E.3.1), as well as to the scientific community (Sub-action E.3.2).

As part of Sub-action E3.1, we published 6 dissemination and technical articles (annex: fig. E3-4), which helped bring the project's actions to a broad and non-specialized audience. The main deliverable of this sub-action was the publication of a **Handbook of Good Practices for the Conservation and Restoration of Drove Roads** (annex: fig. E3-1, E3-2), one of the most significant outcomes of the LIFE CAÑADAS project. Developed in collaboration with all project partners, this handbook serves as an essential resource due to its high potential for national applicability. Its primary objective is to provide clear and practical guidelines for the restoration of drove roads, highlighting their function as ecological corridors. The handbook's importance lies in its ability to transfer the knowledge gained during the project's development to a broader geographical context, benefiting all autonomous communities in Spain. By offering a solid foundation, the handbook facilitates the development of local strategies that align with the guidelines of the State Strategy for Green Infrastructure and Ecological Connectivity and Restoration. This technical document is invaluable for promoting the effective conservation and restoration of drove roads throughout Spain. To increase the dissemination and replicability of the project and, following the recommendations from CINEA (Fourth monitoring visit - Joint Mission, letter 3 June 2024, issue 25), the manual is available in both Spanish and English.

As part of Sub-action E3.2, we have published 5 scientific articles (annex: fig. E3-3). These publications have allowed us to share valuable data with the scientific community about the role of drove roads as biodiversity reservoirs, along with several detailed analyses of the causes and consequences of the abandonment, degradation, and misuse of these drove roads.

Finally, partner CA has produced several artistic materials with technical information to accompany the development of the project's Communication Plan. As anticipated in the grant agreement, the production of these materials required the engagement of various external assistances.

Deliverable name	**Deadline**	
	Scheduled	Actual
E3.1 Publication of the manual of Guidelines for the ecological restoration of drove roads	12/2023	05/2024

Action E4. Participation in international conferences, seminars and expert workshops

Foreseen start date: July 2020	Actual start date: July 2020
Foreseen end date: March 2024	Actual (or anticipated) end date: March 2024

Action E4 is successfully finished.

The objective of Action E4 was to share and present the main results of the project at national and international conferences and seminars.

This action proceeded normally throughout the project, although during 2020, due to the COVID-19 pandemic, most of the planned conferences, seminars, and expert workshops were postponed to 2021.

In total, the LIFE CAÑADAS partners participated in 8 conferences and seminars, where they presented a total of 12 communications (annex: fig. E4-1, E4-2). All deliverables related to these presentations were submitted on time and as scheduled. Since no specific deliverable was planned for this action in 2024, the conferences and seminars attended in that year have been included in deliverable E2.5.

In conclusion, Action E4 was carried out as planned, which allowed for the effective dissemination of the project's actions to experts involved in the research and management of drove roads and transhumance, as well as to the scientific and technical community focused on ecological restoration. Consequently, LIFE CAÑADAS has become a widely recognized and highly valued project within these circles.

Deliverable name	**Deadline**	
	Scheduled	Actual
E4.1 Summary of communication in congress/seminar/conference	12/2021	12/2021
E4.2 Summary of communication in congress/seminar/conference	12/2022	12/2022
E4.3 Summary of communication in congress/seminar/conference	12/2023	12/2023

Action F1. Coordination activities of the LIFE CAÑADAS project

Foreseen start date: October 2019	Actual start date: October 2019
Foreseen end date: June 2024	Actual (or anticipated) end date: June 2024

Action F1 is successfully finished.

Action F1 ensured the coordination and integration of all project actions, maintaining effective communication among all partners and guaranteeing adherence to the schedule and planned milestones (annex: fig. F1-1, F1-2, F1-3).

The project management team comprised the General Project Coordinator, Francisco Martín Azcárate; Technical Management, initially led by Alejandro González until June 2021 and subsequently by Laura Dos Santos Pinto; the Project Scientific Committee (see deliverables of Action F2); and Management Coordinators from each partner. Additionally, Violeta Hevia worked as a full-time researcher until January 2023, participating as a member of the coordination team. In February 2023, she transitioned to a faculty position at UAM, reducing her project involvement to part-time. Despite this change, she continued to contribute to the coordination team due to her commitment and knowledge of the project. The coordinators for each partner were Fernando García Dory (CA), José Alberto Millán (DGAGA), Carmen Frontaura (DGMNB), and Asunción Ruiz (SEO/BirdLife).

This action spanned the entire duration of the LIFE CAÑADAS project. Both deliverables for Action F1 were completed in the first half of the project. **Deliverable F1.1**, the Report of the Initial Meeting, includes all documents from the first project meeting held at UAM (coordinating beneficiary) on November 28, 2019. **Deliverable F1.2**, the Handbook of Economic Management of the Project, served as a guide to beneficiaries on the management procedures involved, particularly those related to controlling the execution of expenditures in each category.

Deliverable name	**Deadline**	
	Scheduled	Actual
F1.1 Report of the initial meeting of the project	11/2019	11/2019
F1.2 Handbook of economic management of the project	12/2019	12/2019

Action F2. Scientific-technical Advisory Committee

Foreseen start date: January 2020	Actual start date: January 2020
Foreseen end date: June 2024	Actual (or anticipated) end date: June 2024

Action F2 is successfully finished.

The creation of the **Scientific-Technical Advisory Committee** for the monitoring of the LIFE CAÑADAS project stemmed from the need for objective, independent, and critical support from scientific-technical professionals. This committee was tasked with aiding the project consortium in achieving optimal results for the restoration of the DRs identified as priorities and conserving their use for livestock. Additionally, the committee aimed to strengthen and guarantee medium- and long-term connectivity between Natura 2000 Network areas.

The Scientific-Technical Advisory Committee was constituted in June 2020 (Deliverable F2.1) and included the following members:

- Octavio Infante: SEO/Birdlife.
- Maria Dolores Jiménez Escobar: Complutense University of Madrid.
- Elisa Oteros Rozas. University of Vic.
- Pablo Manzano: Basque Center for Climate Change (BC3)
- José Antonio González Nóvoa: Autonomous University of Madrid
- The coordination team of the project was represented in the committee by Francisco Martín Azcárate, Violeta Hevia and Alejandro González (later replaced by Laura dos Santos).

The committee met annually as planned. All meetings were held virtually (annex: fig. F2-1) except for the final meeting, which took place in person in May 2024 (annex: fig. F2-2). **Deliverables F2.1 to F2.5** document the progress and conclusions of each of these meetings.

Deliverable name	**Deadline**	
	Scheduled	Actual
F2.1 Annual report of the Scientific-Technical Advisory Committee of the project (2020)	04/2020	07/2020
F2.2 Annual report of the Scientific-Technical Advisory Committee of the project (2021)	09/2021	10/2021
F2.3 Annual report of the Scientific-Technical Advisory Committee of the project (2022)	09/2022	12/2022
F2.4 Annual report of the Scientific-Technical Advisory Committee of the project (2023)	09/2023	10/2023

F2.5 Final report of the Scientific-Technical Advisory Committee of the project (2024)	06/2024	05/2024

Action F3. External audit

Foreseen start date: January 2022	Actual start date: January 2022
Foreseen end date: June 2024	Actual (or anticipated) end date: September 2024

Action F3 is successfully finished.

Action F3 aimed to adhere to the principle of transparency, ensuring meticulous evaluation of the project's execution. To this end, the LIFE CAÑADAS team included an external audit in the original proposal, which was incorporated into the grant agreement. This has allowed for better control of project expenses and has resulted in a more rigorous and reliable final financial report. UAM, responsible for this action, contracted external assistance to conduct an external audit, as specified in Milestone F3.1. UAM, through its Technical Manager, served as the liaison between all partners and the auditing firm Audalia Nexia to collect documentation.

The external audit was divided into two reports. The first report covered the period from October 15, 2019 (project start) to December 31, 2021. The result of this first phase was **Deliverable F3.1** (**Mid-term Audit Report**; annex: fig. F3-1), which was submitted in February 2023 due to some delays in receiving documentation from certain partners.

The second report, **Deliverable F3.2** (**Final Audit Report**), covered the period from January 2022 to June 30, 2024, and was submitted in October 2024.

Deliverable name	**Deadline**	
	Scheduled	Actual
F3.1 Mid-term audit report	03/2022	02/2023
F3.2 Final audit report	06/2024	10/2024

Action F4. Post-Life Conservation and Communication Plan

Foreseen start date: December 2023	Actual start date: December 2023
Foreseen end date: June 2024	Actual (or anticipated) end date: June 2024

Action F4 is successfully finished.

This action aimed to extend the temporal scope of disseminating the results of the LIFE CAÑADAS project beyond June 2024. A **Post-Life Plan** (**Deliverable F4.1**; annex: fig. F4-1) was submitted on June 30, 2024, which included an overview of the project, an assessment of the situation at the project's conclusion, and a definition of several after-LIFE objectives, accompanied by the corresponding methodology and identification of needs and funding sources.

The Post-Life Plan is structured around two main pillars: the **Communication Plan** and the **Conservation Plan**. The Communication Plan is designed to strengthen the dissemination of the project's results and raise awareness about the importance of drove roads after the LIFE CAÑADAS project concludes. This includes actions such as maintaining the project's website and social media, publishing results in scientific and technical journals, and participating in conferences and seminars.

On the other hand, the Conservation Plan aims to ensure the sustainability of the interventions carried out during the project, guaranteeing the long-term conservation and improvement of

drove roads. This involves maintaining physical structures, controlling vehicular traffic, and collaborating with relevant authorities to ensure the protection of these areas.

The post-Life plan has adhered to the recommendations of CINEA (Fourth monitoring visit - Joint Mission, letter 3 June 2024, issues 26-28), with special attention given to defining the roles of the two public bodies responsible for the Drove Roads in the intervention areas (DGAGA and DGMNB). This approach aligns with their roles under current legislation and outlines how the project's results can contribute to the preparation of the Management Plan for Drove Roads in the Community of Madrid and, in the longer term, to a similar Management Plan in Castilla – La Mancha. Additionally, the plan addresses how to ensure the continuity of new transhumant movements through agreements with shepherds and the maintenance of livestock infrastructure. It also details the ongoing interactions that LIFE CAÑADAS should maintain with national environmental authorities to contribute to the development of a Green Infrastructure Strategy in Spain.

Deliverable name	**Deadline**	
	Scheduled	Actual
F4.1 Document of the Post-Life Conservation and Communication Plan	06/2024	06/2024

6.2. Main deviations, problems and corrective actions implemented

Actions A1-A5 (Preparatory Actions & Elaboration of Management Plans)

Diagnosis of the conservation status of the Conquense Drove Road was significantly delayed due to the emergency situation caused by the COVID-19 pandemic. This was mainly due to the need to postpone the participatory processes of Action A.2 by a year, particularly the focus group with stakeholders. These delays were managed by revising the project schedule and priorities, which allowed the initiation of restoration and conservation actions in the Community of Madrid to proceed while completing the diagnosis in the CDR once the health measures were relaxed. To work this way, the restoration plan outlined in Action A4 was developed in two phases, so the planned actions for the Community of Madrid were designed first and initiated while awaiting the resumption of the diagnosis in the CDR. Ultimately, the complete restoration plan for both study areas (Deliverable A4.2) was submitted in November 2021. The last preparatory action (A5: Design of an Integral Communication Plan and the image of the project) also extended somewhat longer than initially planned because some products included in this action, such as the informational video and the participatory workshop with artists "Método Móvil," were carried out between 2022 and 2023. Nevertheless, the work strictly related to the design of the communication plan was carried out in the early months of the project and according to the planned schedule.

Action B1 (Purchase/Lease of Land and/or Compensation Payments for Use Rights):

In this section, LIFE CAÑADAS only had one planned action (B1: Collaboration agreements with local and transhumant shepherds). The action was carried out normally, although due to the COVID-19 pandemic restrictions, the effective signing of some agreements was delayed by about a year, which did not prevent satisfactory collaboration with the shepherds throughout all phases of the project.

Actions C1-C4 (Conservation Actions)

The execution of the restoration actions depended on the completion of the design work for the preparatory actions, which, as explained, accumulated uneven delays in Madrid and the CDR due to the pandemic. In Madrid, the delays were minor, resulting in the postponement of the start of actions to November 2020. Additionally, as part of the adaptive management strategy of the LIFE CAÑADAS project, complementary actions were undertaken in the last two years of the project to correct or improve some initial actions. In any case, the bulk of the actions in Madrid were completed on time, allowing for over three years to monitor their effects. In the CDR, the delays were more significant, leading to the completion of the last actions, consisting of the restoration of several temporary ponds, in March 2024. Nevertheless, it should be noted that all actions planned in the restoration plans were carried out in full within the project timeframe, so we can affirm that, thanks to an effective capacity to adapt schedules and a commendable effort from all LIFE partners, the initial delays caused by COVID-19 did not impact the achievement of the project's objectives.

Actions D1-D3 (Monitoring the Impact of the Project Actions)

The monitoring of the project actions included structural and biodiversity indicators (D1), functional indicators (D2), and social indicators (D3). Due to the different nature of the actions in Madrid and the CDR, the biodiversity, structural, and functional indicators were primarily applied to the first of the two intervention zones. The measurements for these indicators were carried out on schedule, with monitoring reports issued annually and as planned. The social indicators were applied to both intervention zones and were based on the baseline described

through Action A2. Regarding this social monitoring, a modification to the originally planned project was introduced, whereby instead of issuing two post-treatment monitoring reports, only one was produced in 2024. This decision was made upon realizing that to conduct two social sampling campaigns after implementing the main restoration actions in both intervention zones, the time separation between them would be very small and thus insufficient to observe differences in the social actors' perceptions. It should be remembered that some of the main restoration measures in the CDR had to be postponed due to the COVID-19 pandemic. On the other hand, concentrating the material and personnel effort into a single campaign allowed for a more robust and precise fieldwork adjusted to the sample size requirements needed by the high number of municipalities affected by our actions. This modification was communicated to the external monitor and to CINEA, and it was approved in the letter corresponding to the visit by the project advisor in April 2024 (issue 24, letter dated June 3, 2024).

Actions E1-E4 (Public Awareness and Dissemination of Results)

These actions were carried out in their entirety, on time, and without noteworthy problems.

Actions F1-F4 (Project Management)

These actions were carried out in their entirety, on time, and without noteworthy problems. The only significant issue was that the first Technical Manager (Alejandro González) left the position in June 2021, necessitating a new hire (Laura Dos Santos Pinto), who remained in the position from September 2021 to May 2024, when she resigned. During the brief periods when a full-time technical manager was unavailable, Violeta Hevia and Francisco Martín Azcárate took over these responsibilities.

6.3. Evaluation of Project Implementation

Methodology

The LIFE CAÑADAS project has followed the methodology of Ecological Restoration. Therefore, before executing the conservation actions, it carried out a detailed diagnosis of the intervention areas, which included not only biophysical data but also the perceptions and viewpoints of stakeholders and the general public. The condition of the intervention areas revealed by the diagnosis was compared to the desired state of the drove roads (reference), characterized by multifunctionality and compatibility between livestock use, public use, ecosystem service production, and the conservation of habitats and biodiversity.

Based on the clear definition of the diagnosis and the reference, a meticulous design for the restoration actions was created, documented in the restoration plan developed in Action A4. This same restoration plan included a clear design of the monitoring plan, with short-, medium-, and long-term indicators. The conservation actions (C1 to C4) and monitoring actions (D1 to D3) implemented the restoration activities and monitoring as designed in the aforementioned plan.

Adhering to the principles of ecosystem restoration has ensured that the actions were not very costly economically, as minimal intervention and process management were prioritized, using livestock as a primary tool for restoration. The results, according to the monitoring plan, have been very positive, restoring multifunctionality to most of the drove road sections where we have worked. Consequently, the cost-efficiency of the LIFE CAÑADAS project can only be described as highly favorable.

Achievement of Objectives and Results

The LIFE CAÑADAS project has successfully met the four specific objectives initially outlined in the proposal, as follows:

- Complete Evaluation of Conservation Status: A comprehensive evaluation of the conservation status of the Conquense Drove Road (CDR) and the entire network of drove roads (DRs) in the Autonomous Community of Madrid has been conducted. This evaluation identified priority areas for restoring connectivity among Natura 2000 sites.
- Improvement of Ecological Functionality: In the selected DR segments, ecological functionality has been significantly enhanced. This improvement has led to the recovery of roles as biodiversity reservoirs and ecological corridors, resulting in the effective reconnection of the Natura 2000 sites associated with these DRs. In particular, the restoration activities in the Community of Madrid and the new transhumant movements have contributed to the reconnection of five Natura 2000 sites and, more partially, to the reconnection of three additional sites. In the CDR, the consolidation of transhumance achieved by the project ensures the maintenance of the connection between the 14 natural areas linked to this Drove Road.
- Restoration of Transhumant Livestock Use: Transhumant livestock use has been restored over approximately 200 km of DRs in the Community of Madrid. Additionally, existing transhumance in the CDR has been consolidated through the construction of key infrastructures for shepherds. This has facilitated the necessary herbivory for the conservation of biodiversity and functionality of the DRs.
- Definition of Criteria for Future Strategies: Criteria and management priorities have been defined for incorporation into the Spanish Green Infrastructure Strategy. This

strategy includes the network of DRs and an adequate institutional framework for its sustainable management.

- Enhanced Social Awareness: The level of social awareness and local stakeholders' perceptions of the important role of DRs in biodiversity conservation and landscape connectivity has been improved.

To achieve these objectives, 21 actions were carefully planned, each addressing specific objectives and expected outcomes. The following table illustrates these actions and their corresponding goals:

Action	Foreseen in the revised proposal	Achieved	Evaluation
A1	**Objective**: Evaluation of the ecological status of the DRs of the Community of Madrid and the CDR. **Expected results**: Diagnosis of the state of conservation of the network of DRs in the Community of Madrid and the CDR.	• Analyzed regional cartography of the network of DRs of the Community of Madrid and the CDR. • Database completed with variables indicating the conservation status of the DRs of the Community of Madrid and the CDR, at the different scales of analysis.	Objective and expected results have been successfully achieved.
A2	**Objective**: Increase the level of social awareness about the benefits provided by DRs, facilitating the identification of new opportunities for sustainable rural development linked to the conservation and restoration of DRs. **Expected results**: • Diagnosis of social perception and existing discourses on drove roads and their role in the conservation of biodiversity and connectivity of the territory. • Social proposal for intervention and prioritization of conservation and restoration actions in the CDR.	• Four in-depth interviews with key actors linked to DRs. • 284 perception surveys in the study area linked to the CDR. • 269 perception surveys in the study area linked to the DRs of Madrid. • One focus group carried out with key stakeholders linked to the CDR.	Objective and expected results have been successfully achieved.
A3.	**Objectives**: Evaluation of the DRs located in the intervention areas of the project. **Expected results**: Identification and prioritization of the most suitable sections to develop the conservation actions.	• Detailed cartography of the sections identified as key in the restoration of DRs in the Community of Madrid and in the CDR.	Objective and expected results have been successfully achieved.
A4	**Objectives**: Develop restoration plans for all sections of DRs selected as priorities in the actions A1, A2 and A3. **Expected results**: Restoration and improvement plans for selected sections of DRs. and survey of the state of conservation of biodiversity in DRs	• Two restoration plans to be implemented in the two areas of action of LIFE CAÑADAS: the network of DRs of the Community of Madrid and the CDR, in Castilla-La Mancha. • Survey of the state of conservation of biodiversity in DRs in both intervention zones.	Objective and expected results have been successfully achieved.

A5	**Objectives**: Disseminate the content and actions of the LIFE CAÑADAS project to the target audiences. **Expected results**: A comprehensive communication campaign will reach at least 400,000 people, raising awareness on the role of livestock DRs and their importance for biodiversity conservation and landscape connectivity.	• Project logo design. • Elaboration of the basic manual of use of the logo. • Design of an Integral Communication Plan for the project. • Twitter, Facebook and Instagram accounts. • Creation of a YouTube channel of the project. • Creation of an animated promotional video. • Creation of a dissemination documentary about the actions of the project. • Creation of an infographic.	Objective and expected results have been successfully achieved.
B1	**Objectives**: Establish or strengthen collaborative links with local and transhumant herders. **Expected results**: Obtain several collaboration agreements with shepherds or groups of shepherds to maintain livestock activity in the DRs where the project operates.	• Seven collaboration agreements with: i) Association "Trashumancia y Naturaleza"; ii) Cooperative "Los Apisquillos"; and iii) Five transhumant shepherds of the CDR.	Objective and expected results have been successfully achieved.
C1	**Objectives**: Recover the physical integrity of the sections of DRs selected as critical and priority according to action A3. **Expected results**: Protection of the DRs' boundaries through the construction of stone walls.	• 30 DR stretches in the Autonomous Community of Madrid delimitated to recover and protect physical integrity. • LIFE CAÑADAS restoration works started in the two intervention zones.	Objective and expected results have been successfully achieved.
C2	**Objectives**: Develop a regulation strategy for road traffic in the sections of DRs selected in the preparatory action A3. **Expected results**: Organize the road traffic of motorized vehicles that hinder the priority use of livestock.	• Traffic regulated in 30 DR sections in Madrid. • Installation of 31 earth cordons; 43 stone block alignments; and 7 wooden fences. • 8 Kms of DRs' tracks were remodelled.	Objective and expected results have been successfully achieved.
C3	**Objectives**: Recovery of the geomorphology, land smoothing, soil decompaction, and anthropic elements of the DRs selected in the preparatory action A3. **Expected results**: Restoration and recovery of the habitats in the sections of the selected DRs.	• 75 dry stone walls (450 meters cumulative) in 26 DR stretches. • 20 fenced plots (each 10 m x 20 m) to act as controls. • Grazing with 5 collaborating herds along the selected DRs in Madrid. • Two types of hedgerows (with up to 8 species each) were sown in the selected DRs in Madrid. • Installation of 96 nests for wild bees in the selected DRs in Madrid. • Installation of 12 perches for raptors. • Restoration of three refuges for shepherds in the CDR. • Installation of 2 livestock corrals in the DCR. • Recovery of 9 water troughs in the CDR. • Recovery of 4 temporary ponds in the CDR.	Objective and expected results have been successfully achieved.

C4	**Objectives**: Maintenance or recovery of livestock movements on DRs to restore ecological functionality. **Expected results**: • Maintain at least 10 transhumant herds (with 600-700 sheep each) using the CDR throughout the project period. • Incorporate the periodic movement of a herd of around 400 sheep in total along the selected DRs in Madrid.	• 13 new transhumant routes with a cumulative distance of 400 km in DRs of Madrid. • 200 km of DRS in Madrid reactivated. • Reconnection of 5 Natura sites in Madrid. • 14 livestock farms consolidated transhumance in the CDR.	Objective and expected results have been successfully achieved.
D1	**Objectives**: Monitoring the structural and biodiversity indicators of the DRs' restoration status. **Expected results**: A complete list of indicators to measure before the implementation of the restoration actions, which will allow understanding their effects.	• 5 field samplings (2020 to 2024) for monitoring the effect of interventions on DRs structure and biodiversity. • 10 general indicators of DRs structure and biodiversity: (1) bare soil surface, (2) herbaceous biomass, (3) physical-chemical properties of the soil, (4) density of ant nests, (5) grassland communities: taxonomic composition, (6) epigean invertebrate communities: family composition, (7) ant communities: taxonomic composition, (8) wild bee communities: taxonomic composition, (9) number of germinations in woody hedges and (10) reptile communities in stone walls. • Analysis of these 10 indicators using a larger number of specific indicators.	Objective and expected results have been successfully achieved.
D2	**Objectives**: Monitoring the functional indicators of the DRs' restoration status. **Expected results**: A complete list of indicators to measure before the implementation of the restoration actions, which will allow understanding their effects.	• 5 field samplings (2020 to 2024) for monitoring the effect of interventions on DRs functionality. • 8 generalindicators of DRs functionality: (1) soil temperature, (2) density of herbivore excrements, (3) tea bag index, (4) soil enzymatic activity, (5) grassland communities: functional composition, (6) ant communities: functional composition, and (8) wild bee communities: functional composition. • Analysis of these 8 indicators using a larger number of specific indicators.	Objective and expected results have been successfully achieved.
D3	**Objectives**: To understand the evolution of the perception and attitudes of the local populations regarding the improvement in the functionality of the DRs as green infrastructure. **Expected results**: Obtain an evaluation of the social impact of both conservation actions and communication and dissemination actions on the perception and attitudes of the local population.	• A post-treatment sociological study was conducted through perception surveys to assess the evolution of views on the conservation status of drove roads in the two intervention areas, following the same design as the pre-treatment diagnosis (action A2). • A discourse analysis was carried out using the 'Q method,' which involved conducting a series of semi-structured interviews with key stakeholders. • An expert workshop was held to share and discuss the outcomes of the LIFE CAÑADAS actions and future management proposals with a diverse group of technicians and specialists	Objective and expected results have been successfully achieved.

E1	**Objectives**: Dissemination of the objectives and results of the project, both during its development and after its completion. **Expected results**: Development and maintenance of the project website as the main communication channel.	• Creation of the project website, which has been in operation since April 2020. • Measures have been taken to keep the website active until the year 2029.	Objective and expected results have been successfully achieved.
E2	**Objectives**: Ensure the public is knowledgeable about the network of DRs, values their ecological role, and is able to identify and enjoy the cultural services that the DRs provide to the rural environment. **Expected results**: Increase the willingness of local actors and users to participate in the conservation and restoration of DRs, and to respect and promote the fundamental role played by their livestock use.	• Six press releases. • 30 press reports • Three radio interviews • Two TV appearances • A roll-up informative panel. • Over 100 panels at project intervention points. • Printing of four magnets for cars with the logos of the LIFE CAÑADAS project. • Development of 16 volunteer days organized by SEO/BirdLife (in March, April and May 2021). • A cycling route along the CDR. • Participation in 3 agroecological fairs and the Transhumance Festival. • Activity on thre social media and channel in Youtube. • 160 sessions in 20 secondary and high schools. • Creation of transhumance mural in Quijorna. • Mobile Method workshop in Cuenca.	Objective and expected results have been successfully achieved.
E3	**Objectives**: Disseminate information and results of the project to the sectors related to the management of biodiversity, DRs and extensive livestock in public administrations, as well as to the scientific community. **Expected results**: Production of technical publications, an ecological restoration manual, and scientific publications.	• Handbook of Good Practices for the Conservation and Restoration of Drove Roads • 6 dissemination and technical articles. • 5 scientific articles.	Objective and expected results have been successfully achieved.
E4	**Objectives**: Present the main results of the project at national and international conferences and seminars. **Expected results**: Attendance at (at least) four technical-scientific events between 2020 and 2023.	• Participation in 8 conferences and seminars. • 12 communications in conferences and seminars.	Objective and expected results have been successfully achieved.

F1	**Objectives**: Coordination and integration of all the actions of the project, maintaining adequate and efficient communication between all the partners, as well as guaranteeing the correct fulfillment of the schedule and planned milestones. **Expected results**: • Coordination and administration of the project. • Financial monitoring.	• Creation of a Handbook of economic management of the project • Information management of the project available via Cloud resources (Dropbox). • Agile and effective project coordination and management throughout the entire period of activity. • Appropriate financial management throughout the entire project activity period. • Smooth communication among the five partners throughout the project's activity period. • Production of deliverables well-aligned with the development of actions.	Objective and expected results have been successfully achieved.
F2	**Objectives**: Provide advice and scientific-technical follow-up to the project and equip it with scientific surveillance tools. **Expected results**: Annual meetings of the Scientific-technical Advisory Committee.	• Five meetings held to date (June 2020 and May 2024). • Abundant and productive feedback from the committee, which has enriched and improved the project's actions.	Objective and expected results have been successfully achieved.
F3	**Objectives**: Verify that the project complies with the applicable legislation, standards and national accounting, and certify that all expenses incurred comply with the common provisions for the LIFE Program. **Expected results**: • Management and hiring of the company responsible of the external audit. • Production of a mid-term audit report and a final audit report.	• Mid-term audit report covering the period 2019-2021. • Final audit report covering the entire project activity period.	Objective and expected results have been successfully achieved.
F4	**Objectives**: To extend the temporal scope of the actions of the project and the diffusion of the results beyond its duration. **Expected results**: • Creation of a Post-Life Communication and Conservation Plan. • Elaboration of scientific papers. • Maintenance of the project website during at least 5 years after the project finish.	• A Post-Life Plan, including a Communication Plan and a Conservation Plan • Prevision of five additional scientific papers reporting the results of the project. • Measures have been taken to keep the website active until the year 2029	Objective and expected results have been successfully achieved.

Visibility of project results

Most of the on-the-ground actions of the LIFE CAÑADAS project have had immediate visibility. The sections of DRs restored in the Community of Madrid are easily recognizable due to the presence of new protective elements and the official width delimitation of the livestock drove roads, such as dry-stone walls or perches for raptors. Additionally, profound changes have occurred within the habitats. Where there used to be highly degraded grassland communities with abundant bare soil due to erosion or overgrown vegetation from lack of grazing, we now observe greatly improved pastures that have regained the floristic composition and species richness characteristic of grazed environments. There has also been the

reappearance of various reptile species associated with the dry-stone walls, and the nesting of wild bees in these same walls. Other restoration actions, such as the planting of hedgerows, have also yielded very visible and recognizable results, contributing to the contrast between pre- and post-treatment situations. These structural changes are complemented by the functional changes experienced by the treated livestock drove roads. Notably, the reappearance of sheep herds along about 200 km of the livestock trail network in Madrid has garnered significant attention from locals and visitors. In some sections, vehicular traffic has been regulated, with physical barriers protecting the areas designated for natural habitats.

In the (CDR), changes have also been highly visible due to the rehabilitation or incorporation of various essential infrastructure elements of the livestock trail. The three shepherd shelters that have been repaired were in a very degraded state, and their reconstruction has made a significant impact. Similarly, the nine water troughs that have been rehabilitated, most of which lacked water flow and were in poor condition, now present a stark contrast. The temporary ponds—two of which were existing but deteriorated and two of which are newly constructed—show even more visible changes. Additional actions include the construction of two corrals and other minor infrastructures. These structural actions have been accompanied by increased use of the livestock trail by shepherds, with some now using it not only for autumn movement but also for spring transhumance.

While the majority of the project's actions have already been very visible in the short term, we expect even more substantial changes in the long term, affecting other ecosystem variables with slower response times. For example, epigeal invertebrate communities are expected to show more pronounced responses in the coming years as soil and vegetation conditions stabilize in the treated drove roads. Similarly, wild bee communities may respond to changes in vegetation cover and the reappearance of high-value floral woody species used in hedgerows. In the temporary ponds, we also expect a gradual colonization of helophyte vegetation and the reappearance of diverse amphibian communities.

On the other hand, the project's visibility has been reinforced by the ambitious communication and dissemination plan carried out during the project's active years, which will continue into the post-Life period. Efforts have been made to engage with the mass media through several press releases, participation in journalistic reports, and appearances on radio and TV. Informational and promotional materials have been developed, and an active volunteer campaign has been conducted, along with numerous educational sessions in primary and secondary schools. All these efforts have brought the actions of LIFE CAÑADAS closer to a wide audience. This visibility work has also been supported by the LIFE CAÑADAS website, the project's three social media platforms, the YouTube channel and the videos hosted there, as well as the high number of scientific, technical, and outreach publications.

Replication efforts

The actions of LIFE CAÑADAS have a clear demonstrative intent, and the real objective is for them to serve as a model for implementing a more ambitious ecological restoration strategy for DRs within the context of Spanish and European Green Infrastructure strategies. This replicability purpose has been reflected in three major lines of action.

Firstly, the project has worked closely with public administrations responsible for the management of DRs, that is, the autonomous communities. In fact, both the Community of Madrid and the Junta de Comunidades de Castilla-La Mancha are project partners and have executed a considerable part of the infrastructures contemplated in the restoration actions.

Secondly, to extend the project's action models to the rest of Spanish territory, we have also collaborated with the central government, through the Ministry for the Ecological Transition.

We have met periodically with them, and they have had a permanent seat on the project's scientific-technical advisory committee.

The third line of action has been through the creation and publication of a **Handbook of Good Practices for the Conservation and Restoration of Drove Roads**, which has been meticulously crafted in terms of both content and design. The book is available in both English and Spanish and is presented in a digital PDF version and 200 physical copies. These copies are being distributed among administrations, associations, and various groups involved in the use and management of drove roads. This book addresses the main conservation issues of the DRs and provides very concrete action proposals, in line with those successfully developed within the framework of the LIFE CAÑADAS project.

Policy impact

The strong involvement of public administrations responsible for DRs in the LIFE CAÑADAS project (the Community of Madrid through DGAGA and the Junta de Comunidades de Castilla-La Mancha through DGMNB) has allowed for a productive and fluid dialogue with politicians, managers, and decision-makers since the project's preparatory stages. The design of the actions entailed a fruitful exchange of information between academics and technicians, and their execution has been a great example of collaboration between both fields.

However, the impact of LIFE CAÑADAS on environmental policies goes beyond the project's activities, as several legislative and regulatory measures have drawn inspiration from it and received advice from the project team for their drafting. Among them, at least the following should be mentioned:

At the national level, the drafters of the **National Strategy for Green Infrastructure and Ecological Connectivity** consulted members of the UAM, in their capacity as participants in the LIFE CAÑADAS project, as part of the preparation work for the Strategy. Thanks to this, drove roads have been expressly included in the strategy as models of ecological corridors with great potential to increase connectivity between natural spaces, and transhumant use has been identified as one of the uses to promote to achieve this connectivity. The Strategy was approved in 2021.

At the regional level, the Junta of Communities of Castilla-La Mancha undertook the modification of its **Drove Roads Law** during the last legislature, a process that culminated in the approval of the new Law in 2023. During this legislative process, UAM members participating in LIFE CAÑADAS were invited to contribute ideas, allowing numerous aspects related to the protection of transhumance and the promotion of the role of DRs as ecological connectors to be included in the Law. The regional minister himself acknowledged the decisive role of LIFE CAÑADAS from the podium of the Castilla-La Mancha Parliament in the session in which the Law was approved. One of the main innovations of this law is that the regional administration will have an annual earmarked budget for investment in Drove Roads (something that has not been the case until now). This will enable the routine performance of conservation and restoration tasks, thereby facilitating the continuation of the work initiated by LIFE CAÑADAS. On the other hand, the Community of Madrid is in the final stages of drafting the **Management and Use Plan for the region's Drove Roads**, for which they are incorporating the contributions and experience accumulated by the LIFE CAÑADAS project.

Additionally, we must add that the LIFE CAÑADAS project is contributing to achieving the objectives of Article 11 of the LIFE Regulation, focused on supporting the **development, application, and management of the Natura 2000 Network**. The results of this project also contribute to the achievement of some objectives set by the **EU Agricultural and Rural Development Policy**. Specifically, this EU policy supports rural areas in meeting the

economic, environmental, and social challenges of the 21st century. Thus, the actions of LIFE CAÑADAS will nurture some of the strategic objectives related to ensuring the sustainable management of natural resources and achieving balanced territorial development of rural economies and communities, especially through the incorporation of young generations. In addition, priority 4 established in the **Rural Development Policy** focuses on the restoration, conservation, and improvement of ecosystems in the EU. In this sense, the conservation actions proposed in this project, consisting mainly of developing an ecological and functional restoration of the DRs, will make it possible to improve the conservation status of the ecosystems linked to them, as well as those existing in the connected Natura 2000 network areas.

EU added value of the project and its actions

The LIFE CAÑADAS project has successfully fulfilled the objectives outlined in the initial proposal, demonstrating significant EU added value across several key areas.

Firstly, the project has effectively contributed to the goals of Article 11 of the LIFE Regulation, which focuses on supporting the development, implementation, and management of the Natura 2000 Network. The actions undertaken by LIFE CAÑADAS were ultimately driven by the consortium's interest in reconnecting five Natura 2000 sites in the Community of Madrid (ZEPA Soto de Viñuelas, ZEPA Monte de El Pardo, LIC/ZEC Cuenca del Río Manzanares, LIC/ZEC Cuenca del Río Guadarrama) and protecting the connectivity represented by the Conquense Drove Road (CDR) between Sierra Morena and the Montes Universales, which crosses up to 11 Special Protection Areas (SPAs). These objectives have been met, making the contribution to the connectivity of the Natura 2000 network evident.

In alignment with the EU Biodiversity Strategy, the project has made substantial progress toward halting biodiversity loss and restoring ecosystems where possible. Specifically, LIFE CAÑADAS has significantly advanced Objective 2 of the EU Biodiversity Strategy, which aims to maintain and enhance ecosystem services and restore degraded ecosystems. By developing Green Infrastructure in two regions of Spain particularly fragmented, the project has strengthened ecological connectivity, enhancing both structural and functional connectivity between fragmented Natura 2000 areas. Additionally, the project has implemented numerous actions specifically designed to restore biodiversity, such as the restoration of grasslands, woody hedges, reptile refuges, and bird perches in the Community of Madrid, as well as the restoration of temporary ponds of interest for amphibians and other aquatic biodiversity along the Conquense Drove Road (CDR). Apart from the recovery of various functions and services directly related to the rehabilitation of these habitats, the improvement of transhumant use of the drove roads has also enhanced several services associated with this use. These include provisioning services (production of livestock-derived food and animal feed, harvested products, etc.), cultural services (cultural identity, scenic beauty, recreational activities in rural and natural environments, local ecological knowledge, etc.), and regulatory services (fire prevention through grazing, biodiversity reservoirs, soil fertilization, erosion control, ecological connectivity, etc.).

Moreover, the project's outcomes have contributed to several objectives of the EU Agricultural and Rural Development Policy. This policy aims to support rural areas in addressing the substantial economic, environmental, and social challenges of the 21st century. The actions of LIFE CAÑADAS have supported the sustainable management of natural resources and promoted balanced territorial development of rural economies and communities. This includes fostering employment opportunities, especially for younger generations. The project has addressed Priority 4 of the Rural Development Policy, which focuses on the restoration,

conservation, and enhancement of ecosystems within the EU. Through ecological and functional restoration of drove roads, the project has improved the conservation status of ecosystems associated with these roads and the connected Natura 2000 areas.

Additionally, LIFE CAÑADAS has contributed to the EU's Thematic Strategy for Soil Protection. This strategy aims to protect and sustainably use soils by preventing degradation and restoring degraded soils. The project’s use of transhumant livestock to manage drove roads has mitigated soil erosion and degradation caused by runoff and overuse by motor vehicles and bicycles. Appropriate livestock grazing has enhanced soil fertilization and seed dispersal, leading to increased vegetation cover and density, improved soil infiltration capacity, and aggregate stability, ultimately reducing runoff and soil erosion.

A significant added value of the project lies in the future applicability of its results, greatly facilitated by the consortium's composition, which includes academic institutions, NGOs, and regional public administrations. The explicit support from national public administrations responsible for the National Network of Drove Roads, along with associations of extensive and transhumant livestock farmers, has ensured the widespread dissemination of the project's main results and lessons learned on a national and European scale. The active participation of officially competent public bodies in managing drove roads in the two study areas has further ensured the long-term maintenance of the conservation actions implemented by LIFE CAÑADAS.

6.4. Analysis of benefits

1. Environmental benefits

Direct / quantitative environmental benefits:

The LIFE CAÑADAS project has produced evident benefits for both the Natura 2000 network and priority habitats. In the Community of Madrid, the project actions facilitated the direct reconnection of five Natura 2000 sites (SPA Soto de Viñuelas ES0000012, SPA Monte de El Pardo ES0000012, SCI/SPA Cuenca del Río Manzanares ES3110004, SCI/SPA Cuenca del Río Guadarrama ES3110005). This was achieved through intensive ecological restoration work on 150 km of the Madrid network, focused on 62 sections of drove roads (DRs) using transhumant livestock grazing as the primary tool, alongside other active restoration strategies. Additionally, three other regional sites benefitted from more partial reconnection (SCI Cuencas de los ríos Jarama y Manzanares ES3110001, SCI Cuenca del río Guadalix ES3110003, SCI/SPA Cuencas de los ríos Alberche y Cofio ES3110007) as renewed transhumant movements reached other sections of the network, totaling 200 km. In the CDR, the number of connected SCI/SPA sites is significantly higher (up to 14), and the project's actions ensured the continuity of an existing connection that was at risk due to the degradation of the CDR. Here, the project focused on 150 km, although the benefitted transhumant movements connect sites separated by about 400 km.

Regarding habitats, the most benefited ones are the Mediterranean grasslands dominated by therophytes, part of the priority habitat 6220, Thero-Brachypodietea, which is the dominant habitat in the grazed drove roads. Specifically, 20 hectares of grasslands have been restored in the Community of Madrid, with 10 hectares being highly degraded due to soil erosion and compaction from unauthorized motor vehicle use. The other 10 hectares were less degraded, with the main issue being the loss of livestock grazing and the overgrowth of vegetation, which was addressed by introducing moderate and managed grazing. However, improvements have also been achieved in various types of woody hedgerows, aquatic habitats, and other complementary environments or elements present in the drove roads, including nesting sites for bees, dry-stone walls for reptiles, and perches for birds of prey. In all cases, the initial situation was very unfavorable/inadequate, with a declining trend, which has now turned favorable. In the Community of Madrid, we have restored 30 grassland stretches, 75 dry stone walls, 690 meters of hedgerows, 15 bird perches, and 32 nesting sites for bees. Additionally, we have installed 81 barriers to prevent further vehicle use and control erosion (31 earth cordons, 43 stone alignments, and 7 wooden fences). In the CDR, we have rehabilitated 9 drinking troughs, 4 semi-natural ponds, 3 shepherd refuges, and 3 livestock enclosures. It is worth highlighting the value of using livestock grazing as a central restoration tool, an innovative strategy with great potential to replace or complement other techniques such as clearing or the use of machinery, whose effects on biodiversity and habitat conservation are much more limited, if not counterproductive.

Qualitative environmental benefits

The grasslands of the priority habitat 6220, Thero-Brachypodietea, have regained a richer and more diverse species composition than before the treatments, as well as more balanced functional variables that provide greater ecological resilience to the drove roads. Thus, soil physical-chemical properties have improved, the accumulated dry biomass in summer is much lower (reducing fire risk), and improvements have also been observed in arthropod communities, bringing them closer to the ecological references used.

One of the main causes of degradation of the drove roads in Madrid, uncontrolled motor vehicle use, has been addressed in the intervention area by installing permanent barriers to prevent vehicle access and protect natural and semi-natural habitats. Numerous protective elements have also been installed in the treated sections, including dry-stone walls, mounds, and bird perches, to deter encroachment. In both intervention areas, the main threat to the conservation of the drove roads is the weakening of transhumant livestock use. The actions carried out in the CDR, prioritized in close contact with the livestock farmers using this drove road, have had a very positive impact on the conditions under which shepherds practice transhumance, helping to consolidate and increase livestock use. In Madrid, the restoration of 150 km of drove roads will facilitate use by extensive livestock farmers in the area, including local movements (transterminance), which are crucial for the conservation of the secondary drove road network.

A post-Life plan has been drafted to ensure that livestock grazing treatments will continue for the next five years, during which additional measures will be taken to ensure long-term livestock use. This post-Life plan includes specific measures to (1) maintain the physical integrity and control of motor traffic on the restored drove roads; (2) conserve the structural restoration carried out on drove roads in the Community of Madrid; (3) maintain the functionality of the drove roads by promoting transhumant livestock use, and (4) conduct long-term monitoring of the selected indicators to assess the success of the restorations after the project's completion. Resources will be mobilized from the two regional administrations (DGAGA and DGMNB), including forest rangers and technical staff, as well as human resources from UAM.

2. Economic benefits

The principal economic benefits of the LIFE CAÑADAS Project must be analyzed in the long term and in the context of extensive livestock farming and its contribution to land management. Livestock raising is an important sector in rural Spain, contributing over 14,000 million euros to the country’s economy, which represents almost 1.2% of the Gross Domestic Product. Among the different livestock raising management models that coexist in Spain, the model of transhumance on foot is the most economically efficient and sustainable in ecological terms. Transhumant herders reduce the use of concentrated feed by optimizing the use of natural pasturelands in northern and southern latitudes (they adjust their movements to take advantage of peaks in net primary production). Thus, transhumant herders significantly reduce the economic costs of buying concentrated feed, which is particularly critical in the current situation of rapidly increasing prices due to the Ukraine war.

Furthermore, compared to transhumant herders who move their herds by truck, transhumance on foot also reduces the costs associated with hiring trucks twice a year to move herds from one site to another. Finally, recent advances have been made in promoting the use of transhumance drove roads (DRs) as potential “green routes” for ecotourism (walking, cycling, horse riding, etc.). It is expected that the development of this type of tourism industry associated with transhumance will benefit the municipalities crossed by DRs.

In more immediate terms, it should be noted that LIFE CAÑADAS has created four FTE direct jobs throughout its duration, although a total of five individuals have been employed. All these positions should be considered qualified staff.

3. Social benefits

<u>Long-term Social Benefits</u>

The main social benefits of the LIFE CAÑADAS Project should also be viewed in the long term and in the context of rural depopulation and the need to stabilize populations in a country like Spain, where a significant percentage of the national territory is almost deserted, leading to severe land management problems. Transhumance livestock associated with the DRs' network constitutes an activity of great importance, especially in high mountain areas where other types of livestock farming are not profitable or sustainable. This contributes significantly to population retention in rural areas, addressing one of Spain's most pressing territorial issues.

Cultural and Recreational Value

The value of transhumance as cultural heritage and a tourism attraction should be emphasized, alongside the growing number of people who use DRs for recreational activities compatible with traditional livestock farming. The project's dissemination activities, as well as the news and information published on its social networks and website, highlight these cultural services offered by the DRs. Moreover, SEO/BirdLife, in collaboration with the UAM team, has organized several volunteering days in the DRs under restoration. These events aim to raise awareness among participants about the crucial role played by DRs as biodiversity reservoirs and connectors between Natura 2000 sites. These volunteering days have been very successful and will continue throughout the project.

Future Prospects for Transhumant Shepherds

The LIFE CAÑADAS project, through the proposed restoration and conservation actions in the CDR, contributes to generating positive future prospects for transhumant shepherds. These perspectives can lead to the incorporation of new shepherds into the activity. Specifically, during the years the project has been underway, three new young shepherds have joined the transhumance activity by the CDR, showing positive effects on employment, health, ethnic integration, equality, and other socio-economic impacts.

Employment and Gender Equality

In more immediate terms, regarding the three FTE jobs created by the project, it should be noted that careful attention was given to maintaining a proper gender ratio, ensuring that women occupied more than 50% of these positions. This effort helps counteract the severe issue in the Spanish labor market, where female unemployment is significantly higher than male unemployment. The Technical Manager position was held by two people: initially by a male until approximately halfway through the project, and subsequently by a female. The Research Technician role was consistently filled by a female throughout the project. The Researcher position was occupied by a female for three-quarters of the project's duration and then by a male. In all cases, the focus on gender balance was meticulously managed while strictly adhering to merit-based and objective criteria in candidate selection.

4. Replicability, transferability, cooperation

The LIFE CAÑADAS project presents a high replication potential. The lessons learned from the project can be applied not only to other drove roads (DRs) connecting Natura 2000 sites with similar habitats and conditions but also to similar structures across Europe. To maximize the transferability and replicability of our efforts, one of our main deliverables is the Handbook of Good Practices for the Conservation and Restoration of Drove Roads. This handbook enables the knowledge acquired during the project's development to be transferred to a broader audience, providing clear and practical guidelines for the restoration of DRs and enhancing their role as ecological corridors. This technical document aims to be very useful for authorities

and decision-makers at the national, regional, and municipal levels, providing them with a solid foundation to develop their own strategies based on the guidelines of the National Strategy for Green Infrastructure and Ecological Connectivity and Restoration. The Consortium has actively participated in national and international congresses related to DRs and pastoralism, as well as forums that periodically bring together stakeholders linked to the use or management of DRs. Through these activities, the LIFE CAÑADAS project has gained significant visibility in scientific and conservation forums, facilitating future collaborations to strengthen conservation measures and improve DRs as green infrastructure.

Additionally, within the framework of action E2, partners SEO/BirdLife and UAM have developed a didactic unit for primary and secondary schoolchildren (available on the project website). This unit focuses on the role of DRs as ecological and cultural connectors and the importance of grazing for maintaining their functionality and ecosystem services. The proposed activities involve direct field experiences for schoolchildren and can be implemented in any interested school nationwide.

Since LIFE CAÑADAS has worked on DRs, which are public land, the replication possibilities are mainly policy-dependent. Significant efforts have been made to involve the Spanish Ministry for Ecological Transition and Demographic Challenge (MITECO), as well as regional governments, which hold the competencies for the on-ground management of DRs. Nevertheless, given that DRs also support economic activities such as extensive livestock farming, future market-driven stimuli are plausible. For instance, LIFE CAÑADAS advocates for the implementation of a transhumant label for lamb meat, which has been promoted in various forums. This label could contribute to the revitalization of DRs and, consequently, to better conservation efforts. Such a label would provide clear economic benefits to stakeholders, particularly transhumant shepherds, and the rural economic fabric that may depend directly or indirectly on extensive livestock farming.

5. Best Practice Lessons

The LIFE CAÑADAS project has implemented several best practice measures that have proven highly effective in achieving its conservation and restoration goals. These measures, grounded in extensive ecological research and practical fieldwork, can serve as valuable guidelines for similar initiatives. Below, we outline the key best practices and consider potential adjustments to enhance their effectiveness.

Integration of Transhumant Livestock Grazing

One of the most innovative and effective strategies employed by LIFE CAÑADAS was the integration of transhumant livestock grazing as a central tool for ecological restoration. This approach leveraged the natural behavior of grazing animals to manage vegetation, improve soil quality, and maintain biodiversity along the drove roads (DRs). By reintroducing controlled grazing, the project successfully controlled biomass accumulation, reduced the risk of wildfires, and promoted the growth of native grassland habitats. This method not only enhanced ecological resilience but also supported traditional pastoral practices, contributing to the cultural and economic vitality of rural communities.

To optimize this practice further, it may be beneficial to develop more detailed grazing management plans tailored to specific sections of the DRs. This could involve adjusting grazing intensity and timing based on real-time ecological monitoring data to maximize positive impacts on biodiversity and soil health.

Active Ecological Restoration Techniques

The project employed a range of active restoration techniques, including the sowing of hedgerows, installation of traffic control barriers, and construction of dry-stone walls, nesting sites and perches for raptors. These measures were crucial in stabilizing soils, enhancing habitat structure, and providing shelter for wildlife. The combination of physical structures and biological interventions created a multifaceted approach to habitat restoration that addressed multiple ecological challenges simultaneously.

Enhancing community involvement in these activities could improve outcomes. Training local volunteers to assist with the construction and maintenance of these structures could foster greater community ownership and ensure the sustainability of the interventions.

Engagement with Stakeholders and Local Communities

LIFE CAÑADAS placed a strong emphasis on engaging with stakeholders, including local communities, pastoralists, conservation organizations, and governmental bodies. Regular meetings, workshops, and participatory planning sessions ensured that the project was well-aligned with the needs and expectations of those directly impacted. This inclusive approach helped to build trust, secure buy-in, and facilitate the effective implementation of project activities.

Expanding the scope of stakeholder engagement to include more diverse groups, such as eco-tourism operators and educational institutions, could open new avenues for support and collaboration. Additionally, establishing long-term partnerships with these groups could provide sustained momentum for ongoing conservation efforts.

Development and Dissemination of Knowledge Resources

A key deliverable of the project was the creation of the Handbook of Good Practices for the Conservation and Restoration of Drove Roads. This handbook compiles the knowledge gained throughout the project and provides practical guidelines for replication and adaptation in other regions. By sharing these insights widely, LIFE CAÑADAS has contributed to the broader field of ecological restoration and conservation.

Regular updates to the handbook based on new findings and feedback from other projects using these guidelines could ensure that it remains a relevant and valuable resource. Establishing an online platform for practitioners to share experiences and updates could further enhance knowledge exchange.

Monitoring and Adaptive Management

Continuous monitoring of ecological indicators such as soil health, vegetation cover, and biodiversity was integral to the project's success. This data-driven approach allowed the team to adapt management practices in response to observed changes and emerging challenges. Adaptive management ensured that the project could respond dynamically to environmental conditions and optimize its interventions over time.

Implementing more sophisticated monitoring technologies, such as remote sensing and automated data collection tools, could improve the precision and efficiency of monitoring efforts. Additionally, developing a more robust adaptive management framework that incorporates predictive modeling could enhance the project's ability to anticipate and mitigate potential issues.

6. Innovation and demonstration value

The LIFE CAÑADAS project has introduced several innovative practices and demonstrated significant value at both national and international levels. Below, we outline some aspects of the project with a high demonstration value:

Process and Methodological Innovations

The project's core methodology of using transhumant livestock grazing as a primary ecological restoration tool represents a significant innovation. By leveraging traditional pastoral practices, LIFE CAÑADAS demonstrated a sustainable and cost-effective method to manage vegetation, reduce wildfire risks, and promote biodiversity. This approach contrasts with more conventional, mechanized restoration techniques, highlighting the ecological benefits and cultural value of traditional knowledge and practices.

Nature Management Methods

LIFE CAÑADAS introduced innovative nature management methods by combining passive and active restoration techniques. The project utilized a mix of natural regeneration, targeted re-vegetation, and physical structures like dry-stone walls, erosion barriers, and nesting sites. This holistic approach addressed various ecological challenges, such as soil erosion, habitat degradation, and biodiversity loss, in an integrated manner.

Models for Stakeholder Involvement

The project excelled in creating models for stakeholder involvement that can be replicated elsewhere. LIFE CAÑADAS actively engaged a wide range of stakeholders, including local communities, pastoralists, conservation organizations, and governmental bodies. This inclusive approach ensured that the project's activities were aligned with the needs and expectations of those directly impacted. Regular meetings, workshops, and participatory planning sessions fostered a sense of ownership and collaboration among stakeholders.

Land Stewardship Models

LIFE CAÑADAS developed innovative land stewardship models that emphasized the sustainable use and management of DRs. By promoting transhumant grazing, the project ensured that these public lands remained productive and ecologically viable. This approach provided a viable model for land stewardship that balances ecological health with economic viability, offering a blueprint for other regions facing similar challenges.

Organizational and Co-operational Aspects

The project's organizational structure and cooperative strategies were also innovative. The consortium, which included entities such as SEO/BirdLife and Campo Adentro, along with regional administrations, and also collaborated with various local and regional stakeholders, exemplified a successful multi-actor partnership. This collaboration facilitated knowledge exchange, resource sharing, and coordinated action, enhancing the project's overall effectiveness. The active involvement of both scientific and local communities ensured that the interventions were scientifically sound and culturally appropriate.

Demonstration Value Added by EU Funding

EU funding significantly amplified the demonstration value of LIFE CAÑADAS. It enabled the implementation of large-scale restoration activities across extensive DR networks, ensuring a broader impact. The project's success demonstrated the viability and effectiveness of its

innovative approaches, providing a model that can be replicated both nationally and internationally. The funding also supported the dissemination of knowledge through the *Handbook of Good Practices for the Conservation and Restoration of Drove Roads*, which serves as a valuable resource for other conservation projects.

At the national level, the project's impact is evident in the improved ecological connectivity and enhanced habitat quality across the DRs. Internationally, LIFE CAÑADAS has set a precedent for integrating traditional pastoral practices with modern conservation techniques, offering a replicable model for other regions and countries.

7. Policy implications

The LIFE CAÑADAS project has yielded several important outcomes that contribute to the future implementation, design, and take-up of regional, national, and European legislation. By addressing ecological restoration, sustainable land management, and stakeholder engagement, the project has set a precedent for legislative frameworks aimed at preserving and enhancing biodiversity across Europe. Below, we show some achieved targets and contributions to legislation:

Enhancement of Ecological Connectivity

The reconnection of Natura 2000 sites through the restoration of drove roads (DRs) directly supports the objectives of the EU's Habitats Directive and the Birds Directive. By improving habitat connectivity and quality, the project contributes to the conservation of important species and habitats at a landscape scale.

Promotion of Sustainable Agricultural Practices

The project's emphasis on transhumant grazing as a tool for ecological restoration aligns with the goals of the Common Agricultural Policy (CAP), which promotes sustainable agricultural practices and rural development. The successful integration of traditional pastoral practices with modern conservation techniques provides a model for sustainable land use that can inform CAP policies and subsidy programs.

Support for the EU Green Infrastructure Strategy

LIFE CAÑADAS has demonstrated the importance of DRs as components of green infrastructure, contributing to ecological connectivity and resilience. The project's outcomes support the EU Green Infrastructure Strategy by providing practical examples of how linear landscape elements can function as ecological corridors.

Development of Best Practice Guidelines

The *Handbook of Good Practices for the Conservation and Restoration of Drove Roads* serves as a valuable resource for policymakers at all levels. It provides clear guidelines for the restoration and management of DRs, facilitating the adoption of similar measures across Europe. This handbook can inform the development of regional and national policies aimed at enhancing green infrastructure and biodiversity conservation.

We also faced some unintended impacts, bottlenecks, and barriers:

Land Use Conflicts

Conflicts between extensive grazing and other land uses, such as agriculture and motor vehicle traffic on DRs, posed challenges to the project. The installation of barriers to prevent vehicle access was necessary to protect restored habitats. Future policies should incorporate clear guidelines for resolving land use conflicts and ensuring the protection of ecological restoration sites. Additionally, some ecological associations and the administration itself carried out tree planting activities in DRs, which, despite being well-received by a segment of the population, can be incompatible with the goals of grassland restoration and grazing use in DRs. This required careful mediation to ensure that tree planting initiatives did not undermine the restoration objectives of the project. Future policies should incorporate clear guidelines for resolving land use conflicts and ensuring the protection of restored habitats.

Funding and Resource Allocation

Securing long-term funding for the maintenance and monitoring of restored DRs remains a challenge. While the project has secured resources for the next five years, sustainable financing mechanisms are needed to ensure the longevity of conservation efforts. Policymakers should consider creating dedicated funding streams or incentives for landowners and managers who engage in ecological restoration and sustainable land use practices.

Public Awareness and Engagement

Increasing public awareness and engagement in conservation activities is essential for the success of long-term ecological restoration projects. LIFE CAÑADAS has demonstrated the value of involving local communities and stakeholders in project activities. Future policies should emphasize the importance of public participation and provide support for educational and outreach programs to foster a culture of conservation.

7. Key Project-level Indicators

The LIFE CAÑADAS project has satisfactorily achieved the Key Project-level Indicator (KPI) targets, as we will analyze below. For each KPI, we first provide the indicator name and the first level descriptor (both underlined). On the next line, in *italics*, we include the *compound context*. Following that, we add a comment explaining the achieved values

1.5. Project area/length - Partial reduction of specific pressures/threats affecting the spatial extent of the project in comparison to the present level

Conquense Drove Road

The initial value of 0 km is based on the findings from the diagnostic study of the Conquense Drove Road, as outlined in Deliverable A1.2. This report confirms that, at the start of the project, significant threats to the conservation of the drove road and its habitats existed. These were mainly caused by the decline in transhumant livestock activity, which had led to encroachments, habitat degradation, and challenges in maintaining the corridor for grazing. No substantial measures had been implemented to mitigate these pressures, justifying the initial value of 0 km.

By the end of the project, the indicator reached 150 km, representing the entire length of the Conquense Drove Road within the province of Cuenca. This figure is corroborated by the comprehensive mapping found in Deliverables A3.1 and A4.2, which show the 150 km section of the drove road selected by LIFE CAÑADAS to undergone interventions aimed at improving its conservation status and significantly reducing the pressures affecting its integrity.

These interventions were prioritized through consultations with local transhumant shepherds, as documented in Deliverable A2.2, where the consensus was to concentrate efforts on reducing threats in this section of the drove road. The specific interventions are further detailed in Deliverable A4.2. Deliverables C3.2 and C3.3 provide evidence that these actions were successfully implemented, resulting in a reduction of pressures, particularly with respect to water and shelter availability—two critical threats identified by the shepherds (Deliverable A2.2). While the full impact of these actions may take time to fully materialize, it is highly encouraging to note that some shepherds have resumed using the Drove Road for spring transhumance, signifying a decisive improvement in its functionality (Deliverable C4.2). This reactivation not only enhances the conservation of the grassland habitats but also reinforces the physical integrity of the corridor, as occupation and encroachment issues have been shown to stem from the abandonment of transhumance (Deliverable A1.2).

For the value beyond five years, an additional 50 km is projected, bringing the total to 200 km. This estimate is grounded in the Post-Life Plan, which envisions the consolidation of LIFE CAÑADAS' actions and their continuation by the Regional Government of Castilla-La Mancha. The plan includes monitoring measures to provide concrete evidence of the long-term effects in reducing pressures. A conservative estimate of 50 km has been established, based on continued efforts in the Ciudad Real section, where livestock movements have already indicated some reactivation of the network..

Drove Roads of the Community of Madrid

The initial value of 0 km reflects the findings from the diagnostic work on the drove road network in the Comunidad de Madrid, as detailed in Deliverable A1.1. This document highlights serious threats to the conservation of the entire network and its associated habitats, with particularly severe pressures in the southern half of the region, where grazing use has declined significantly, and no substantial conservation efforts had been made. In the Campiña

Silícea area, reduced livestock activity has led to encroachments, habitat degradation, and other obstacles to using the drove roads for grazing. Despite the concerning situation in this area, the presence of some herds suggests potential for recovery, though no restoration actions had been taken before the start of LIFE CAÑADAS.

By the end of the project, the indicator has reached 130 km, corresponding to the additive length of the selected portion of the drove road network in the Campiña Silícea. This length is shown by the detailed mapping found in Deliverables A3.1 and A4.2, which show that the targeted area for interventions spans 130 km. Deliverable C4.2 further supports this, showing that while nearly 200 km of drove roads were reactivated through livestock movements, the combined restoration and grazing activities were limited to the 130 km originally planned.

Deliverables C2.1, C3.1, C3.2, and C3.3 provide detailed information on the main ecological restoration actions carried out in the intervention area. In most cases, the positive effects in terms of reducing pressures and threats are both clear and immediate. For instance, the construction of barriers to restrict motor vehicles, along with the regulation of paths where these vehicles are allowed or prohibited, has led to an immediate reduction in the pressure on soil and vegetation caused by unregulated vehicle traffic. Additionally, the construction of dry stone walls along the borders of the drove roads has significantly reduced the risk of land occupation by neighboring properties. The success of interventions aimed at restoring soil, grassland, and vegetation quality, as well as other ecosystem properties, is thoroughly documented in Deliverables D1.1 to D1.4 and D2.1 to D2.4. Finally, the successful reactivation of livestock movement along the entire 130 km length of the intervention area (and beyond, as we ultimately reactivated a total of 200 km of the Madrid network), as documented in Deliverable C4.2, stands as clear evidence of the effectiveness of our measures.

For the value beyond five years, the estimate increases to 160 km, based on the anticipated continuation of restoration efforts. This is expected to occur beyond the project timeline, as the regional government and stakeholders further consolidate the LIFE CAÑADAS actions. Given the reactivation of grazing in some additional areas of the network, it is reasonable to project a conservative extension of 30 km, with future efforts likely building on the success achieved in the Campiña Silícea (see Post-Life Plan).

1.6. Humans (to be) influenced by the project - Persons who may have been influenced via dissemination or awareness raising project-actions (reaching)

LIFE CAÑADAS Awareness and management

At the outset of the project, the indicator was set at 0, as no substantial dissemination or awareness-raising activities had been undertaken before the launch of LIFE CAÑADAS. There had been no structured efforts to engage the public or create awareness around the project's goals.

By the project's conclusion, the estimated reach is 5,300 individuals, based on a range of measurable dissemination efforts and outreach activities:

(1) SEO-BirdLife conducted 15 educational sessions in schools in Cuenca and Madrid, reaching at least 450 students and indirectly their families (Deliverables E2.3 to E2.5).

(2) The Good Practices Manual was distributed to 60 regional administrations and municipalities, potentially reaching 180 officials.

(3) The "Método Móvil" workshop, involving 30 young artists and attended by 300 people, brought attention to the project within the local community (in total, 30+300= 330 people).

(4) Informational signage placed along the Conquense and Madrid drove roads was estimated to be seen by at least 100 people.

(5) The successful transhumance activities along the Conquense Drove Road engaged 15 livestock farms, raising awareness among approximately 100 new individuals (Deliverable C4.2).

(6) Transhumance activities in Madrid, covering 400 km over four years, directly reached an estimated 400 locals.

(7) A mural on the Segoviana Drove Road, involving 191 volunteers, was inaugurated with an audience of at least 200 people (Deliverable E2.4) (in total, 191 + 200 =391 people).

(8) Volunteer events in Madrid further engaged 200 participants (Deliverables E2.1 – E2.4).

(9) Participation in three agroecological fairs in Madrid reached an estimated 60 new people.

(10) An article published in Quercus magazine, with a circulation of 15,000 copies, is conservatively estimated to have informed 1% of its readership, or 150 additional individuals.

(11) Additionally, the project's presence on social media platforms has grown significantly, boasting 1,302 Twitter followers, 886 Facebook followers, and 692 Instagram followers (Deliverables E2.1 to E2.5). We conservatively estimate that 2,000 social media users were influenced (considering that a significant proportion of followers across different platforms are likely the same individuals).

(12) As of September 30, 2024, the project's YouTube videos on the LIFE CAÑADAS and SEO-BirdLife channels amassed 5,600 views. We conservatively estimate that at least 1,000 viewers of the YouTube videos (approximately one-sixth of the total views) were not reached through other means.

These figures result in a conservative total of more than 5,300 people who were influenced.

Looking ahead to five years post-project, the number of people influenced is projected to rise to 8,000. This anticipated increase is based on the continued availability of online resources, the lasting effects of educational programs, and the partnerships established during the project. The Post-Life Plan aims to keep engaging local communities, ensuring the project's long-term impact on awareness-raising in the region.

1.6. Humans (to be) influenced by the project - Persons who changed their behaviour or practices due to the project actions

Drove roads in the Community of Madrid

At the beginning of the project, the indicator value was 0, as no significant actions specifically targeted the improvement of shepherding and livestock farming practices along the Drove Road network in Madrid.

By the end of the project, the indicator reached 20 individuals, based on a conservative estimation from the transhumant movements carried out to reactivate the Drove Road network in the Community of Madrid (Deliverable C4.2). More than 20 people, including shepherds, farmers, and other professionals, were directly involved in these transhumance efforts. The reactivation of these drove roads, along with infrastructure improvements, positively impacted the shepherds' practices.

Looking five years ahead, the indicator is projected to increase to 25 individuals. This estimate is based on the expectation that, due to the ongoing improvements in the drove roads and the continued reactivation of transhumance practices, additional shepherds and their families will

be encouraged to participate in future transhumance activities, benefiting from the improved infrastructure. The strong engagement of the shepherding community, as well as the positive outcomes observed during the project, provide a solid foundation for this projection. Notably, several farmers' associations based fully or partially in the Community of Madrid—such as Trashumancia y Naturaleza, Los Apisquillos, Suerte Ampanera, and Ganaderas en Red—have expressed explicit interest in the project's environmental actions (Deliverable B1.1).

Conquense Drove Road

At the start of the project, the indicator value was 0, as no prior initiatives had specifically addressed the improvement of practices for shepherds and livestock farmers along the Conquense Drove Road.

By the project's conclusion, the indicator reached at least 25 individuals. This figure, conservatively estimated, reflects the direct participation of shepherds and their families in the project's initiatives and the infrastructure improvements that have enhanced their working conditions. As outlined in Deliverable A2.2, 11 shepherds participated in a focus group where they provided important recommendations for improving their work, many of which were integrated into the project. While the group itself consisted of 11 people, they represented a broader network of family-run farms, where typically two to four members contribute to the farm's operations and livestock care. Additionally, several shepherds signed formal agreements supporting the project's activities (Deliverable B1.2). Notably, 15 livestock farms undertook transhumance on foot along the Conquense Drove Road during the project (Deliverable C4.2). The upgrades made to shelters, pens, and watering points significantly eased their journeys and improved working conditions. These enhancements have not only reduced the challenges of long transhumance routes but also encouraged several families to consider extending their herding activities into the more difficult months of May and June, when water scarcity is common.

Looking forward to the next five years, the indicator is projected to grow to 30 individuals as more families are expected to adopt or expand their transhumance practices, motivated by the improved infrastructure and conditions established during the project. The continued strong involvement of the shepherding community, coupled with the improvements in their working environments, forms a robust basis for this forecast. Several farmers' associations from the grasslands connected by the Conquense Drove Road (Deliverable B1.1) have already demonstrated interest in continuing these efforts.

4.3. Resource efficiency – Soil compaction

Drove roads in the Community of Madrid

At the beginning of the project, soil compaction was a major issue across 10 ha of the Drove Roads in the Comunidad de Madrid, particularly in degraded sections suffering from intense vehicle traffic and lack of vegetation (Deliverable A4.2). Bulk density values in the most compacted areas were measured at nearly 2 g/cm³, which is consistent with severely compacted soils in degraded regions.

As part of the restoration efforts, actions included clearing waste, rebuilding tracks, and installing barriers to prevent vehicles from damaging the restored areas (Deliverable C2.1). In addition, descompaction, superficial tilling, and sheep grazing were employed to introduce organic matter and facilitate soil recovery (Deliverables C3.1 and C3.3). These interventions contributed to a significant reduction in soil bulk density, with monitoring showing that the bulk density in the most affected areas decreased to 1.5 g/cm³ by the end of the project (Deliverable D2.4). This is a notable improvement toward healthier soil structures.

By the end of the project, the areas experiencing serious soil compaction had been reduced from 10 ha to 2 ha. Beyond five years, it is expected that no significant areas of the drove roads under restoration will face soil compaction issues due to the sustained restoration efforts, promoting better soil structure and functionality across the landscape.

4.3. Resource efficiency – Soil organic matter

Drove roads in the Community of Madrid

At the beginning of the project, 10 ha of the selected sections of the Drove Roads in the Comunidad de Madrid were experiencing significant soil loss issues. This is documented in Deliverable A4.2, which identifies 10 sections of the drove road network suffering from severe soil degradation.

Throughout the project, several restoration actions were implemented to address these issues. According to Deliverable C2.1, these actions included debris removal, reconstruction of vehicle tracks, and installation of barriers to prevent vehicles from straying off the path, allowing the habitat soil to recover. Deliverable C3.1 reports that in the most degraded areas, geomorphological restoration actions were carried out, including soil decompaction and surface tilling. Furthermore, Deliverable C3.3 details the use of sheep grazing to restore organic matter and fertilize the soil through manure deposits and seed dispersal in the affected sections.

As a result of these actions, the project significantly reduced the extent of areas with soil degradation problems. By the end of the project, the extent of affected areas had decreased to 2 ha. Monitoring data collected during the project period, as outlined in Deliverable D2.4, show a remarkable increase in soil organic carbon in restored areas. Over three years, the average organic carbon content in the soil increased from 0.2% to 0.8%, translating to an approximate increase of 450 t/ha of carbon. These improvements reflect the effectiveness of the restoration efforts in enhancing soil quality and organic matter content.

Looking beyond the five-year mark, it is expected that with continued recovery and management, the area affected by soil degradation will further decrease to 0 ha. The trend toward complete recovery is based on the success of the project’s actions, which have already shown significant positive impacts on soil restoration and organic matter accumulation.

4.3. Resource efficiency – Soil erosion

Drove roads in the Community of Madrid

The indicator ""Soil erosion"" shows a significant reduction in the area affected by soil loss throughout the project. At the beginning, 10 ha of the Drove Road network in the Comunidad de Madrid were identified as having severe soil erosion problems (Deliverable A4.2). These sections exhibited a high percentage of bare soil, lacking vegetation cover, which increased their vulnerability to runoff-induced erosion.

As part of the project's restoration activities, several key actions were implemented. These included cleaning debris from the affected areas, rebuilding vehicle tracks, and installing barriers to prevent further off-road traffic damage, which facilitated soil recovery (Deliverable C2.1). Additionally, geomorphological restoration measures were applied in the most degraded sections, including soil decompaction and surface tilling (Deliverable C3.1). Sheep grazing was reintroduced to these areas, enhancing organic matter input through manure and helping with seed dispersal (Deliverable C3.3).

Monitoring efforts revealed substantial improvements in the targeted areas. Most notably, the percentage of bare soil was reduced from 70% to 25%, significantly lowering the risk of erosion

(Deliverable D2.4). Based on erosion rates of up to 25 t/ha/year for bare soils in Mediterranean climates like Madrid's (*), this reduction equates to a drop in erosion from 17.5 t/ha/year to 6.25 t/ha/year. Consequently, by the end of the project, soil erosion concerns were limited to only 2 ha, and it is expected that these issues will be fully mitigated in five years, reducing the affected area to 0 ha.

(*): AEMET, 2013:

https://www.miteco.gob.es/content/dam/miteco/es/biodiversidad/temas/desertificacion-restauracion/analisis_desert_cc_texto_completo_2015_12_tcm30-479143.pdf

7.1. Ecosystem assessment - Ecosystem assesment

Conquense Drove Road

The ecosystem assessment of the Conquense Drove Road at the beginning of the project covered 150 km, which were shown to be experiencing some degradation, due to factors like reduced water availability, diminished transitability for livestock, and increased intrusions (Deliverable A.2.1). The project's actions, including the installation of three shepherd refuges, nine water troughs, and four temporary ponds (Deliverables C3.2 and C3.3), significantly enhanced the functionality and monitoring capabilities of the ecosystem. By the end of the project, the ecosystem assessment still covers 150 km, but the tools and knowledge gained have set the groundwork for expanding this to 200 km in the next five years, further supporting sustainable management practices.

In terms of ecosystem condition, the Drove Road was classified as moderate at the project's outset. Over the decade before the project, three segments (a total of 77 km) had shown signs of deterioration due to environmental and human pressures (Deliverable A.2.1). However, as the project progressed, the restoration and infrastructure improvements, such as water access and shelter facilities for transhumant herders, increased the road's capacity to support livestock and biodiversity. As a result, by the project's conclusion, the ecosystem condition improved to good/favourable, and it is expected to remain at this level in the long term due to the continued maintenance of these improvements.

Regarding the ecosystem trend, the Drove Road had been on a path of deterioration prior to LIFE CAÑADAS, mainly because of declining water availability and reduced livestock movement (Deliverable A.2.1). The project successfully reversed this trend through strategic actions, and by the end of the project, the ecosystem was classified as improving. The continued engagement of 15 livestock farms conducting transhumance, along with better infrastructure and water management (Deliverable C4.2), ensures that the improving trend will continue beyond five years, promoting the long-term resilience and sustainability of the Conquense Drove Road.

7.1. Ecosystem assessment - Ecosystem assesment

Drove roads in the Community of Madrid

At the outset of the LIFE CAÑADAS project, the ecosystem assessment covered 130 km of drove roads in the Comunidad de Madrid (Deliverable A1.1). These areas were diagnosed as needing restoration actions, as detailed in Deliverable A4.2, which provided extensive mapping and baseline data for these sections. By the end of the project, the same 130 km were continuously monitored, with a focus on 30 sections and 32 specific points where intensive restoration efforts were conducted (Deliverables D1.1 to D1.5 and D2.1 to D2.5). These efforts included geomorphological recovery, waste removal, soil decompaction, surface tilling, and livestock management through grazing and hedgerow planting (Deliverables C.1, C2.1, C3.1,

and C3.3). Looking beyond the project, the ecosystem assessment will expand to 160 km in the next five years, driven by ongoing management actions and greater connectivity between areas of ecological significance.

In terms of ecosystem condition, the initial state was classified as moderate, reflecting degradation in various sections of the drove roads network (Deliverable A1.1). The project's restoration measures, including rebuilding roads, reducing soil compaction, and enhancing pasture availability through *redileos*, led to significant improvements. By the end of the project, the ecosystem condition had shifted to good/favourable, with the restored areas showing enhanced capacity to support ecological functions and livestock. It is expected that this favourable status will be sustained over the next five years, thanks to continued active management and monitoring (Deliverables D1.1 to D1.5 and D2.1 to D2.5).

For the ecosystem trend, the situation at the start of the project showed clear deterioration across many of the 130 km of the drove roads due to various pressures, such as reduced grazing activity and physical degradation (Deliverable A1.1). However, the restoration efforts and the increased use of drove roads by transhumant herders (Deliverables C4.1 and C4.2) resulted in improving conditions in many areas. That said, not all sections have recovered uniformly, with some showing mixed trends of improving and/or continued deterioration by the project's end. This mixed trend is expected to persist beyond five years, with ongoing improvements in some sections and slower recovery or further deterioration in others, depending on specific local pressures and continued management efforts.

7.1. Ecosystem assessment - Ecosystem condition

Conquense Drove Road

The ecosystem assessment of the Conquense Drove Road at the beginning of the project covered 150 km, which were shown to be experiencing some degradation, due to factors like reduced water availability, diminished transitability for livestock, and increased intrusions (Deliverable A.2.1). The project's actions, including the installation of three shepherd refuges, nine water troughs, and four temporary ponds (Deliverables C3.2 and C3.3), significantly enhanced the functionality and monitoring capabilities of the ecosystem. By the end of the project, the ecosystem assessment still covers 150 km, but the tools and knowledge gained have set the groundwork for expanding this to 200 km in the next five years, further supporting sustainable management practices.

In terms of ecosystem condition, the Drove Road was classified as moderate at the project's outset. Over the decade before the project, three segments (a total of 77 km) had shown signs of deterioration due to environmental and human pressures (Deliverable A.2.1). However, as the project progressed, the restoration and infrastructure improvements, such as water access and shelter facilities for transhumant herders, increased the road's capacity to support livestock and biodiversity. As a result, by the project's conclusion, the ecosystem condition improved to good/favourable, and it is expected to remain at this level in the long term due to the continued maintenance of these improvements.

Regarding the ecosystem trend, the Drove Road had been on a path of deterioration prior to LIFE CAÑADAS, mainly because of declining water availability and reduced livestock movement (Deliverable A.2.1). The project successfully reversed this trend through strategic actions, and by the end of the project, the ecosystem was classified as improving. The continued engagement of 15 livestock farms conducting transhumance, along with better infrastructure and water management (Deliverable C4.2), ensures that the improving trend will continue beyond five years, promoting the long-term resilience and sustainability of the Conquense Drove Road.

7.1. Ecosystem assessment - Ecosystem condition

Drove roads in the Community of Madrid

At the outset of the LIFE CAÑADAS project, the ecosystem assessment covered 130 km of drove roads in the Comunidad de Madrid (Deliverable A1.1). These areas were diagnosed as needing restoration actions, as detailed in Deliverable A4.2, which provided extensive mapping and baseline data for these sections. By the end of the project, the same 130 km were continuously monitored, with a focus on 30 sections and 32 specific points where intensive restoration efforts were conducted (Deliverables D1.1 to D1.5 and D2.1 to D2.5). These efforts included geomorphological recovery, waste removal, soil decompaction, surface tilling, and livestock management through grazing and hedgerow planting (Deliverables C.1, C2.1, C3.1, and C3.3). Looking beyond the project, the ecosystem assessment will expand to 160 km in the next five years, driven by ongoing management actions and greater connectivity between areas of ecological significance.

In terms of ecosystem condition, the initial state was classified as moderate, reflecting degradation in various sections of the drove roads network (Deliverable A1.1). The project's restoration measures, including rebuilding roads, reducing soil compaction, and enhancing pasture availability through *redileos*, led to significant improvements. By the end of the project, the ecosystem condition had shifted to good/favourable, with the restored areas showing enhanced capacity to support ecological functions and livestock. It is expected that this favourable status will be sustained over the next five years, thanks to continued active management and monitoring (Deliverables D1.1 to D1.5 and D2.1 to D2.5).

For the ecosystem trend, the situation at the start of the project showed clear deterioration across many of the 130 km of the drove roads due to various pressures, such as reduced grazing activity and physical degradation (Deliverable A1.1). However, the restoration efforts and the increased use of drove roads by transhumant herders (Deliverables C4.1 and C4.2) resulted in improving conditions in many areas. That said, not all sections have recovered uniformly, with some showing mixed trends of improving and/or continued deterioration by the project's end. This mixed trend is expected to persist beyond five years, with ongoing improvements in some sections and slower recovery or further deterioration in others, depending on specific local pressures and continued management efforts.

7.1. Ecosystem assessment - Ecosystem trend

Conquense Drove Road

The ecosystem assessment of the Conquense Drove Road at the beginning of the project covered 150 km, which were shown to be experiencing some degradation, due to factors like reduced water availability, diminished transitability for livestock, and increased intrusions (Deliverable A.2.1). The project's actions, including the installation of three shepherd refuges, nine water troughs, and four temporary ponds (Deliverables C3.2 and C3.3), significantly enhanced the functionality and monitoring capabilities of the ecosystem. By the end of the project, the ecosystem assessment still covers 150 km, but the tools and knowledge gained have set the groundwork for expanding this to 200 km in the next five years, further supporting sustainable management practices.

In terms of ecosystem condition, the Drove Road was classified as moderate at the project's outset. Over the decade before the project, three segments (a total of 77 km) had shown signs of deterioration due to environmental and human pressures (Deliverable A.2.1). However, as the project progressed, the restoration and infrastructure improvements, such as water access and shelter facilities for transhumant herders, increased the road's capacity to support livestock

and biodiversity. As a result, by the project's conclusion, the ecosystem condition improved to good/favourable, and it is expected to remain at this level in the long term due to the continued maintenance of these improvements.

Regarding the ecosystem trend, the Drove Road had been on a path of deterioration prior to LIFE CAÑADAS, mainly because of declining water availability and reduced livestock movement (Deliverable A.2.1). The project successfully reversed this trend through strategic actions, and by the end of the project, the ecosystem was classified as improving. The continued engagement of 15 livestock farms conducting transhumance, along with better infrastructure and water management (Deliverable C4.2), ensures that the improving trend will continue beyond five years, promoting the long-term resilience and sustainability of the Conquense Drove Road.

7.1. Ecosystem assessment - Ecosystem trend

Drove roads in the Community of Madrid

At the outset of the LIFE CAÑADAS project, the ecosystem assessment covered 130 km of drove roads in the Comunidad de Madrid (Deliverable A1.1). These areas were diagnosed as needing restoration actions, as detailed in Deliverable A4.2, which provided extensive mapping and baseline data for these sections. By the end of the project, the same 130 km were continuously monitored, with a focus on 30 sections and 32 specific points where intensive restoration efforts were conducted (Deliverables D1.1 to D1.5 and D2.1 to D2.5). These efforts included geomorphological recovery, waste removal, soil decompaction, surface tilling, and livestock management through grazing and hedgerow planting (Deliverables C.1, C2.1, C3.1, and C3.3). Looking beyond the project, the ecosystem assessment will expand to 160 km in the next five years, driven by ongoing management actions and greater connectivity between areas of ecological significance.

In terms of ecosystem condition, the initial state was classified as moderate, reflecting degradation in various sections of the drove roads network (Deliverable A1.1). The project's restoration measures, including rebuilding roads, reducing soil compaction, and enhancing pasture availability through *redileos*, led to significant improvements. By the end of the project, the ecosystem condition had shifted to good/favourable, with the restored areas showing enhanced capacity to support ecological functions and livestock. It is expected that this favourable status will be sustained over the next five years, thanks to continued active management and monitoring (Deliverables D1.1 to D1.5 and D2.1 to D2.5).

For the ecosystem trend, the situation at the start of the project showed clear deterioration across many of the 130 km of the drove roads due to various pressures, such as reduced grazing activity and physical degradation (Deliverable A1.1). However, the restoration efforts and the increased use of drove roads by transhumant herders (Deliverables C4.1 and C4.2) resulted in improving conditions in many areas. That said, not all sections have recovered uniformly, with some showing mixed trends of improving and/or continued deterioration by the project's end. This mixed trend is expected to persist beyond five years, with ongoing improvements in some sections and slower recovery or further deterioration in others, depending on specific local pressures and continued management efforts.

7.2. Ecosystem services assessment – Ecosystem service condition

Conquense Drove road

At the beginning of the project, the ecosystem service condition of the Conquense Drove Road was assessed as moderate. This evaluation was supported by findings from a survey of 284

people (Deliverable A2.1), where 95% of respondents agreed that the drove roads were underused due to the absence of livestock. The survey also highlighted a general perception that overgrazing was not a major issue, with 70% of respondents disagreeing that the drove roads were degraded from excessive use. These results indicated that while the ecosystem services of the drove roads were functioning, they were not being fully utilized to their potential. By the end of the project, targeted restoration actions—such as building three shelters, nine watering points, and four temporary ponds (Deliverables C3.2 and C3.3)—significantly improved conditions. As a result, the ecosystem service condition improved to good/favourable, as evidenced by the revitalized use of the drove road for livestock transhumance, with 15 herds now regularly using it (Deliverable C4.2). Looking ahead, these improvements are expected to be sustained beyond five years, maintaining a good/favourable condition with ongoing management and infrastructure.

Regarding the ecosystem service trend, at the start of the project, there were signs of both improvement and deterioration in different locations, depending on local factors such as water availability, the state of infrastructure, and the extent of livestock use. As the project progressed, there was an overall improving trend, particularly in sections where transhumance had resumed and where infrastructure, such as watering points and shelters, had been improved (Deliverables C4.2). However, some areas still showed varying levels of recovery due to site-specific challenges. This mixed trend is expected to continue beyond five years, with ongoing improvement in some sections and slower recovery or deterioration in others, depending on environmental conditions and the continuation of management efforts.

7.2. Ecosystem services assessment – Ecosystem service condition

Drove roads of the Community of Madrid

At the start of the project, the ecosystem service condition of the Drove Roads in the Comunidad de Madrid was evaluated as moderate. A survey conducted among 269 people in the intervention area (Deliverable A2.1) indicated that 74% of respondents believed the drove roads were abandoned due to the absence of livestock, while 77% disagreed that the roads were deteriorating due to overgrazing. This suggests that the ecosystem services, while functioning, were underutilized, leading to only moderate delivery of their potential benefits. However, significant restoration efforts undertaken during the project—such as cleaning, road reconstruction, and reactivation of livestock usage across 200 km of drove roads (Deliverables C.1, C2.1, C3.1, and C3.3)—resulted in a marked improvement by the project's end. The ecosystem service condition thus progressed to good/favourable, as supported by the renewed transhumance and improved livestock routes reconnecting five zones of the Red Natura 2000 network (Deliverables C4.1 and C4.2). These improvements are expected to be sustained beyond five years, with continued favourable conditions and the enduring impact of the restoration efforts.

Regarding the ecosystem service trend, at the beginning of the project, there was a mix of improvement and deterioration in different locations. Some areas showed recovery due to localized efforts, while others continued to decline due to neglect or lack of livestock passage. By the end of the project, this trend persisted in some sections, with restoration efforts leading to improvements in many areas, although others still showed varying levels of recovery (Deliverables C4.1 and C4.2). This uneven trend of improvement and/or deterioration is expected to continue beyond five years, with improvements likely in areas where restoration efforts are ongoing, but with possible deterioration in sections still facing challenges related to livestock management and environmental factors.

7.2. Ecosystem services assessment – Ecosystem service trend

Conquense Drove road

At the beginning of the project, the ecosystem service condition of the Conquense Drove Road was assessed as moderate. This evaluation was supported by findings from a survey of 284 people (Deliverable A2.1), where 95% of respondents agreed that the drove roads were underused due to the absence of livestock. The survey also highlighted a general perception that overgrazing was not a major issue, with 70% of respondents disagreeing that the drove roads were degraded from excessive use. These results indicated that while the ecosystem services of the drove roads were functioning, they were not being fully utilized to their potential. By the end of the project, targeted restoration actions—such as building three shelters, nine watering points, and four temporary ponds (Deliverables C3.2 and C3.3)—significantly improved conditions. As a result, the ecosystem service condition improved to good/favourable, as evidenced by the revitalized use of the drove road for livestock transhumance, with 15 herds now regularly using it (Deliverable C4.2). Looking ahead, these improvements are expected to be sustained beyond five years, maintaining a good/favourable condition with ongoing management and infrastructure.

Regarding the ecosystem service trend, at the start of the project, there were signs of both improvement and deterioration in different locations, depending on local factors such as water availability, the state of infrastructure, and the extent of livestock use. As the project progressed, there was an overall improving trend, particularly in sections where transhumance had resumed and where infrastructure, such as watering points and shelters, had been improved (Deliverables C4.2). However, some areas still showed varying levels of recovery due to site-specific challenges. This mixed trend is expected to continue beyond five years, with ongoing improvement in some sections and slower recovery or deterioration in others, depending on environmental conditions and the continuation of management efforts.

7.2. Ecosystem services assessment – Ecosystem service trend

Drove roads of the Community of Madrid

At the start of the project, the ecosystem service condition of the Drove Roads in the Comunidad de Madrid was evaluated as moderate. A survey conducted among 269 people in the intervention area (Deliverable A2.1) indicated that 74% of respondents believed the drove roads were abandoned due to the absence of livestock, while 77% disagreed that the roads were deteriorating due to overgrazing. This suggests that the ecosystem services, while functioning, were underutilized, leading to only moderate delivery of their potential benefits. However, significant restoration efforts undertaken during the project—such as cleaning, road reconstruction, and reactivation of livestock usage across 200 km of drove roads (Deliverables C.1, C2.1, C3.1, and C3.3)—resulted in a marked improvement by the project's end. The ecosystem service condition thus progressed to good/favourable, as supported by the renewed transhumance and improved livestock routes reconnecting five zones of the Red Natura 2000 network (Deliverables C4.1 and C4.2). These improvements are expected to be sustained beyond five years, with continued favourable conditions and the enduring impact of the restoration efforts.

Regarding the ecosystem service trend, at the beginning of the project, there was a mix of improvement and deterioration in different locations. Some areas showed recovery due to localized efforts, while others continued to decline due to neglect or lack of livestock passage. By the end of the project, this trend persisted in some sections, with restoration efforts leading to improvements in many areas, although others still showed varying levels of recovery (Deliverables C4.1 and C4.2). This uneven trend of improvement and/or deterioration is expected to continue beyond five years, with improvements likely in areas where restoration

efforts are ongoing, but with possible deterioration in sections still facing challenges related to livestock management and environmental factors.

7.3. Natural and semi-natural habitats – Annex I Habitats Directive

Conquense Drove Road

At the beginning of the project, the Annex Habitats Directive indicator covered 150 km of habitats along the Conquense Drove Road (Deliverable A.2.1). These habitats, particularly the Thero-Brachypodietea grasslands (habitat type 6220), were in unfavourable-inadequate condition, primarily due to the decreased availability of water, reduced accessibility for livestock, and increased human intrusions, which led to habitat degradation in certain sections (Deliverable A1.2). By the end of the project, the indicator value remained at 150 km, but significant restoration efforts—including the construction of three shelters, nine drinking troughs (C3.2), and four temporary ponds (C3.3)—have stabilized and improved habitat quality, promoting better grazing conditions and habitat resilience. Looking forward beyond five years, the project's impact is expected to expand the coverage of these Annex habitats to 200 km, ensuring the long-term conservation of these natural areas.

The habitat condition has markedly improved. Initially rated as unfavourable-inadequate, the Thero-Brachypodietea habitats had been in decline due to lack of sustainable grazing management and external pressures (Deliverables A1.2 and A.2.1). However, through actions that reactivated traditional transhumance and strengthened habitat infrastructure, the condition at the end of the project is classified as favourable, with consistent grazing by 15 livestock herds (Deliverables C4.1, C4.2) helping maintain habitat balance and species richness. This improvement is expected to persist beyond five years, with the habitat condition remaining favourable if these practices are continued.

In terms of the habitat trend, the Conquense Drove Road showed signs of decline at the beginning, with degradation across 77 km of the intervention area (Deliverable A.1.2). By the end of the project, the trend has been stabilized thanks to intensive restoration efforts, resulting in a stable trend. Beyond five years, this stability is likely to continue, although ongoing monitoring and management will be necessary to address any localized challenges and maintain habitat quality across the entire drove road.

7.3. Natural and semi-natural habitats – Annex I Habitats Directive

Drove roads in the Community of Madrid

At the start of the project, the Annex Habitats Directive indicator for the Drove Roads of Comunidad de Madrid covered 130 km of habitats, particularly focusing on the Thero-Brachypodietea grasslands (habitat 6220: Mediterranean xerophytic grasslands) which were undergoing degradation (Deliverable A1.1). Throughout the project, no additional kilometres were added to the coverage of these Annex habitats, but restoration activities were intensively focused on the existing 130 km (Deliverables C.1, C2.1, C3.1, C3.3). These efforts, including habitat restoration and reconnection of sections of the drove roads to key areas of the Red Natura 2000, are expected to result in an expansion of the habitat coverage to 160 km beyond five years, reflecting long-term habitat recovery and preservation efforts (C4.1, C4.2).

In terms of habitat condition, the initial state was unfavourable-inadequate due to the significant degradation caused by neglect and reduced grazing activities. This was confirmed by the detailed habitat diagnosis provided in Deliverable A1.1. However, the project's intervention, which included geomorphological restoration, reseeding of native species, installation of grazing enclosures, and the reactivation of livestock use, has led to an

improvement. By the end of the project, the habitat condition is classified as favourable. It is anticipated that this improvement will persist beyond five years if management practices, such as sustainable grazing and ongoing monitoring, are maintained (Deliverables C4.1, C4.2).

Regarding the habitat trend, the Drove Roads in Comunidad de Madrid were declining at the outset of the project due to factors like reduced livestock passage and habitat fragmentation (Deliverable A1.1). Restoration efforts have managed to stabilize the trend by the project's conclusion. Measures such as descompaction, surface tilling, and the re-establishment of native vegetation have contributed to halting further degradation. Looking forward beyond five years, it is expected that the habitat trend will remain stable, assuming the continuation of these ecological interventions and grazing practices.

7.3. Natural and semi-natural habitats – Habitat condition

Conquense Drove Road

At the beginning of the project, the Annex Habitats Directive indicator covered 150 km of habitats along the Conquense Drove Road (Deliverable A.2.1). These habitats, particularly the Thero-Brachypodietea grasslands (habitat type 6220), were in unfavourable-inadequate condition, primarily due to the decreased availability of water, reduced accessibility for livestock, and increased human intrusions, which led to habitat degradation in certain sections (Deliverable A1.2). By the end of the project, the indicator value remained at 150 km, but significant restoration efforts—including the construction of three shelters, nine drinking troughs (C3.2), and four temporary ponds (C3.3)—have stabilized and improved habitat quality, promoting better grazing conditions and habitat resilience. Looking forward beyond five years, the project's impact is expected to expand the coverage of these Annex habitats to 200 km, ensuring the long-term conservation of these natural areas.

The habitat condition has markedly improved. Initially rated as unfavourable-inadequate, the Thero-Brachypodietea habitats had been in decline due to lack of sustainable grazing management and external pressures (Deliverables A1.2 and A.2.1). However, through actions that reactivated traditional transhumance and strengthened habitat infrastructure, the condition at the end of the project is classified as favourable, with consistent grazing by 15 livestock herds (Deliverables C4.1, C4.2) helping maintain habitat balance and species richness. This improvement is expected to persist beyond five years, with the habitat condition remaining favourable if these practices are continued.

In terms of the habitat trend, the Conquense Drove Road showed signs of decline at the beginning, with degradation across 77 km of the intervention area (Deliverable A.1.2). By the end of the project, the trend has been stabilized thanks to intensive restoration efforts, resulting in a stable trend. Beyond five years, this stability is likely to continue, although ongoing monitoring and management will be necessary to address any localized challenges and maintain habitat quality across the entire drove road.

7.3. Natural and semi-natural habitats – Habitat condition

Drove roads in the Community of Madrid

At the start of the project, the Annex Habitats Directive indicator for the Drove Roads of Comunidad de Madrid covered 130 km of habitats, particularly focusing on the Thero-Brachypodietea grasslands (habitat 6220: Mediterranean xerophytic grasslands) which were undergoing degradation (Deliverable A1.1). Throughout the project, no additional kilometres were added to the coverage of these Annex habitats, but restoration activities were intensively focused on the existing 130 km (Deliverables C.1, C2.1, C3.1, C3.3). These efforts, including

habitat restoration and reconnection of sections of the drove roads to key areas of the Red Natura 2000, are expected to result in an expansion of the habitat coverage to 160 km beyond five years, reflecting long-term habitat recovery and preservation efforts (C4.1, C4.2).

In terms of habitat condition, the initial state was unfavourable-inadequate due to the significant degradation caused by neglect and reduced grazing activities. This was confirmed by the detailed habitat diagnosis provided in Deliverable A1.1. However, the project's intervention, which included geomorphological restoration, reseeding of native species, installation of grazing enclosures, and the reactivation of livestock use, has led to an improvement. By the end of the project, the habitat condition is classified as favourable. It is anticipated that this improvement will persist beyond five years if management practices, such as sustainable grazing and ongoing monitoring, are maintained (Deliverables C4.1, C4.2).

Regarding the habitat trend, the Drove Roads in Comunidad de Madrid were declining at the outset of the project due to factors like reduced livestock passage and habitat fragmentation (Deliverable A1.1). Restoration efforts have managed to stabilize the trend by the project's conclusion. Measures such as decompaction, surface tilling, and the re-establishment of native vegetation have contributed to halting further degradation. Looking forward beyond five years, it is expected that the habitat trend will remain stable, assuming the continuation of these ecological interventions and grazing practices.

7.3. Natural and semi-natural habitats – Habitat trend

Conquense Drove Road

At the beginning of the project, the Annex Habitats Directive indicator covered 150 km of habitats along the Conquense Drove Road (Deliverable A.2.1). These habitats, particularly the Thero-Brachypodietea grasslands (habitat type 6220), were in unfavourable-inadequate condition, primarily due to the decreased availability of water, reduced accessibility for livestock, and increased human intrusions, which led to habitat degradation in certain sections (Deliverable A1.2). By the end of the project, the indicator value remained at 150 km, but significant restoration efforts—including the construction of three shelters, nine drinking troughs (C3.2), and four temporary ponds (C3.3)—have stabilized and improved habitat quality, promoting better grazing conditions and habitat resilience. Looking forward beyond five years, the project's impact is expected to expand the coverage of these Annex habitats to 200 km, ensuring the long-term conservation of these natural areas.

The habitat condition has markedly improved. Initially rated as unfavourable-inadequate, the Thero-Brachypodietea habitats had been in decline due to lack of sustainable grazing management and external pressures (Deliverables A1.2 and A.2.1). However, through actions that reactivated traditional transhumance and strengthened habitat infrastructure, the condition at the end of the project is classified as favourable, with consistent grazing by 15 livestock herds (Deliverables C4.1, C4.2) helping maintain habitat balance and species richness. This improvement is expected to persist beyond five years, with the habitat condition remaining favourable if these practices are continued.

In terms of the habitat trend, the Conquense Drove Road showed signs of decline at the beginning, with degradation across 77 km of the intervention area (Deliverable A.1.2). By the end of the project, the trend has been stabilized thanks to intensive restoration efforts, resulting in a stable trend. Beyond five years, this stability is likely to continue, although ongoing monitoring and management will be necessary to address any localized challenges and maintain habitat quality across the entire drove road.

7.3. Natural and semi-natural habitats – Habitat trend

Drove roads in the Community of Madrid

At the start of the project, the Annex Habitats Directive indicator for the Drove Roads of Comunidad de Madrid covered 130 km of habitats, particularly focusing on the Thero-Brachypodietea grasslands (habitat 6220: Mediterranean xerophytic grasslands) which were undergoing degradation (Deliverable A1.1). Throughout the project, no additional kilometres were added to the coverage of these Annex habitats, but restoration activities were intensively focused on the existing 130 km (Deliverables C.1, C2.1, C3.1, C3.3). These efforts, including habitat restoration and reconnection of sections of the drove roads to key areas of the Red Natura 2000, are expected to result in an expansion of the habitat coverage to 160 km beyond five years, reflecting long-term habitat recovery and preservation efforts (C4.1, C4.2).

In terms of habitat condition, the initial state was unfavourable-inadequate due to the significant degradation caused by neglect and reduced grazing activities. This was confirmed by the detailed habitat diagnosis provided in Deliverable A1.1. However, the project's intervention, which included geomorphological restoration, reseeding of native species, installation of grazing enclosures, and the reactivation of livestock use, has led to an improvement. By the end of the project, the habitat condition is classified as favourable. It is anticipated that this improvement will persist beyond five years if management practices, such as sustainable grazing and ongoing monitoring, are maintained (Deliverables C4.1, C4.2).

Regarding the habitat trend, the Drove Roads in Comunidad de Madrid were declining at the outset of the project due to factors like reduced livestock passage and habitat fragmentation (Deliverable A1.1). Restoration efforts have managed to stabilize the trend by the project's conclusion. Measures such as decompaction, surface tilling, and the re-establishment of native vegetation have contributed to halting further degradation. Looking forward beyond five years, it is expected that the habitat trend will remain stable, assuming the continuation of these ecological interventions and grazing practices.

10.2. Involvement of non-governmental organisations (NGOs) and other stakeholders in project activities - NGO

LIFE CAÑADAS Awareness and management

At the start of the project, no NGOs were involved in LIFE CAÑADAS activities (indicator value 0). By the end of the project, three NGOs had actively participated, reflecting the project's focus on collaboration with stakeholders to ensure the success of its objectives.

The NGO SEO/BirdLife, the Spanish branch of BirdLife International, is one of the five partners of the LIFE CAÑADAS project, and has contributed significantly to educational and volunteer activities carried out by the project (Deliverables E2.1 to E2.5). As a global network active in over 100 countries, SEO/BirdLife's involvement helped ensure the project aligned with broader biodiversity conservation goals.

Another vital participant was *Trashumancia y Naturaleza*, a Spanish NGO that promotes the traditional practice of transhumance. This organization played a critical role in organizing sheep grazing and transhumance activities in the Comunidad de Madrid and the Conquense Drove Road, and providing essential cartography and technical advice, contributing to the ecological restoration of the drove roads. Their collaboration included providing several herds of sheep to facilitate grazing, as detailed in deliverables C4.1 and C4.2.

Additionally, *Ecologistas en Acción* a Spanish NGO focused on the fight against the ecological crisis, supported the project by providing expert input during a workshop (Deliverable D3.3), contributing two members to the scientific advisory committee (Deliverables F2.1 to F2.5) and

supporting the shepherds involved in the trashumance movements in the Community of Madrid (Deliverables C4.1 and C4.2).

The participation of these three NGOs by the project's end solidifies the indicator value of 3. Given the strong relationships built during the project, it is anticipated that these three NGOs will continue their involvement beyond five years, maintaining the indicator value of 3 and supporting the long-term sustainability of the project's achievements.

10.2. Involvement of non-governmental organisations (NGOs) and other stakeholders in project activities - Other civil society organisations

Conquense Drove Road

At the start of the project, no civil society organizations were formally involved, setting the initial indicator value at 0. By the end of the project, three civil society organizations had become active participants, raising the indicator value to 3. These organizations played pivotal roles in supporting the restoration and transhumance efforts along the Conquense Drove Road, significantly contributing to the project's success.

The *Asociación Campo Adentro*, a key project partner, aims to foster connections between rural and urban areas, with a focus on promoting sustainability. Through LIFE CAÑADAS, Campo Adentro led crucial ecological restoration initiatives and played a central role in organizing educational and communicative activities on the Conquense Drove Road, ensuring the continuation of these traditional practices in a modern, sustainable framework.

The *Asociación "Además de ti La Parrilla"* (Deliverable B1.1), a local community association from the Conquense Drove Road region, was also involved in the project. This association, focused on revitalizing rural community life, provided vital support to the transhumant shepherds, helping to maintain the cultural and ecological integrity of the Drove Road.

Lastly, *Asociación "Nueva Mesta"*, which advocates for transhumance and extensive livestock farming across Spain, had several members directly contribute to the project. Their flocks participated in transhumance activities along the Conquense Drove Road, adding practical and symbolic support to the preservation of these age-old traditions (Deliverables B1.2 and C4.2).

Given the sustained involvement of these three organizations, the indicator value is expected to remain at 3 beyond the project's conclusion. Their ongoing participation will continue to bolster efforts in restoring and preserving the Drove Road's ecological and cultural heritage in the coming years.

10.2. Involvement of non-governmental organisations (NGOs) and other stakeholders in project activities - Other civil society organisations

Drove roads in the Community of Madrid

At the beginning of the project, there were no civil society organizations directly involved in project activities, resulting in an initial indicator value of 0. By the end of the project, three key civil society organizations were actively participating, thus raising the indicator value to 3.

The *Asociación Campo Adentro*, one of the project's partners, bridges the gap between rural and urban communities by promoting sustainability and fostering projects that connect these two worlds. As part of LIFE CAÑADAS, Campo Adentro contributed significantly to ecological restoration activities, communication efforts, and the organization of transhumance routes in Madrid, amplifying the project's reach and visibility.

Additionally, the agroforestry cooperative *Los Apisquillos* played an important role in the project. Their agroecological model, which combines sustainable livestock practices with

extensive grazing, was crucial in supporting transhumance activities. *Los Apisquillos* contributed their flock for several transhumance routes carried out in the Comunidad de Madrid (Deliverables B1.2, C4.1, and C4.2), helping to reinvigorate traditional pastoral practices.

Another civil society organization involved was *Ganaderas en Red* (Deliverable B1.1), a network of female extensive livestock farmers from across Spain. Several of its members, based in Madrid, provided valuable advisory support during the initial stages of the project. Their expertise in extensive livestock farming helped to shape early project decisions and ensured alignment with sustainable grazing practices.

Given the positive outcomes and strong collaboration with these three civil society organizations, it is expected that their involvement will continue beyond the project's duration, maintaining the indicator value at 3 for the foreseeable future. Their continued engagement will further support the long-term sustainability of the project's achievements and foster ongoing restoration and conservation efforts.

11.1. Website: Nº of unique visits

LIFE CAÑADAS Awareness and management

At the start of the project, the website did not exist, so the initial value for this indicator is set at 0. The website became active in April 2020 and has remained operational until now, with plans to keep it active for at least another five years (see Post-Life Plan).

When the website was created, Google Analytics was not integrated, making it impossible to precisely determine the total number of unique visits (the only metric considered valid for this indicator). However, we do have data on total visits, provided by the hosting platform one.com, which tracks the domain lifecanadas.es. According to this counter, a total of 515,675 visits were recorded by October 2024.

Using this data, we proceed with a very conservative estimate of the number of unique visitors. According to a survey of 6,000 websites reported by Toucan Toco (https://www.toucantoco.com/en/glossary/sessions-per-user), the average number of sessions per user is 1.4 (monthly), a figure that tends to increase for more well-known websites, such as media outlets or online stores. While a LIFE project website does not fit into these categories, to maintain a conservative approach, we will use an average of 3 sessions per unique visitor.

Given that the website has been active for 53 months, a unique visitor who remained active throughout this period would have visited the site 53 * 3 = 159 times. However, it's unrealistic to assume that all users were active for the entire 53-month period. Many would likely be one-time visitors, while others might have visited the site during a shorter period. To keep our estimate conservative, we assume that the average visitor was active for one-third of the time (though the actual active period is likely even shorter), which results in an estimate of 159/3= 53 visits per user. Therefore, dividing 515,675 total visits by 53 visits per user, we estimate approximately 9,729 unique visitors, which we round down to 9,000 to maintain our conservative approach.

To further validate this estimate, we observe that during the months of highest project activity, total visits per month ranged between 12,000 and 15,000. Assuming our conservative estimate of 3 sessions per visitor on a monthly basis, this would equate to between 4,000 and 5,000 unique users per month. Thus, if we accept that the total number of unique visitors over the entire period is 9,000, we are suggesting that nearly half of these visitors may have visited in just one month. This scenario is unlikely, suggesting that the actual number of unique visitors is probably much higher than 9,000. However, in the absence of more precise data, we consider it more prudent to stick to the conservative estimate of 9,000.

As a result of the project's continued activities, accompanied by the ongoing maintenance of the website (as outlined in the Post-Life Plan), and following our conservative approach, we project a moderate increase in the number of unique visitors over the next five years, potentially bringing the final value to 10,000.

12.1. Networking - Professional: experts in the field.

LIFE CAÑADAS Awareness and management

At the start of the project, no formal network of professional experts existed for the conservation and sustainable management of the Conquense Drove Roads and the Madrid drove road network, setting the initial indicator value at 0. Through a series of targeted actions, the project established a robust network, reaching a total of 56 professional experts by the end of the project. This value is expected to remain stable beyond five years, as these connections have been formalized through various collaborative efforts.

Several key activities contributed to this networking achievement. A Focus Group with Transhumant Shepherds (Action A.2), held on July 14, 2021, gathered 15 participants, including shepherds from multiple communities and representatives from the Regional Government of Castilla-La Mancha. This session strengthened the relationship between local stakeholders and project partners, resulting in 15 new professional contacts (Deliverable A2.1).

Additionally, two Meetings with Environmental NGOs and Associations (Action E.3) in the Community of Madrid involved 20 new contacts. These meetings focused on building a communication network and promoting collaboration among groups involved in drove road conservation (Final Report, Section 6.1).

The project also established a Technical-Scientific Advisory Committee (Action F.2), which included six initial experts and expanded to eight as the project progressed. This committee, composed of professionals from different fields, met annually and facilitated the exchange of expertise on ecological restoration, transhumance, and biodiversity. The advisory committee added 8 new contacts to the network (Deliverables F2.1–F2.5).

Finally, the Expert Workshop (Action D.3) brought together 13 professionals from public administrations, civil society organizations, and academia. This workshop, held online, facilitated discussions on project results and future conservation strategies, adding 13 additional expert contacts (Deliverable D3.3).

In total, these actions resulted in 56 new professional contacts, a significant accomplishment that exceeded the initial target of 30. This includes 15 participants from the Focus Group with Transhumant Shepherds, 20 new contacts established with NGOs, 8 members of the Technical-Scientific Advisory Committee, and 13 participants in the Expert Workshop. The project has effectively established a long-lasting network of experts, which is expected to remain at 56 beyond five years due to the formal and sustained nature of these relationships. All figures were verified through participant lists and post-event reports, as detailed in the final project report and respective deliverables.

13. Jobs

LIFE CAÑADAS Awareness and management

At the start of the LIFE CAÑADAS project, no new full-time equivalent (FTE) positions were created, setting the initial indicator value at 0. Throughout the project’s duration, a total of 2.43 FTE positions were generated, reflecting the contribution of several individuals who were hired specifically for project-related activities. However, no new jobs are expected to be maintained

beyond the project's conclusion, as detailed in the Post-Life Plan, which sets the indicator value at 0 for the period beyond five years.

The calculation of 2.43 FTE is based on the total of 19,337 hours worked by the following project staff:

• Project Manager Alejandro González Fernández de Castro worked full-time from January 16, 2020, until June 14, 2021.

• Project Manager Laura dos Santos Pinto Vázquez took over the position from September 2, 2021, and worked until May 31, 2024.

• Project Technician Paula Solascasas Cazorla started on July 1, 2020, and continued in her role until the project's completion on June 30, 2024.

• Researcher Violeta Hevia Martín was employed from October 15, 2020, until February 6, 2023.

• Project Technician Juan Castro Rivadeneyra joined the project on April 12, 2023, and worked until June 30, 2024.

Together, their total hours of work were calculated based on the standard annual workload of 1,720 hours, over the project's 4.625 years duration. Dividing the total hours worked (19,337) by the annual full-time equivalent results in the final figure of 2.43 FTE for the project period.

14.1. Running cost/operating costs during the project and expected in case of continuation/replication/transfer after the project period

LIFE CAÑADAS Awareness and management

At the start of the LIFE CAÑADAS project, there were no running or operating costs, setting the initial indicator value at 0. By the end of the project, the total expenditure reached €1,848,211, as this was the full project budget that was executed during the implementation period. Looking beyond the project's completion, the estimated running costs for the next five years are projected to be €2,028,211, accounting for additional post-project activities as outlined in the Post-Life Plan (see the next indicator).

14.3. Future funding – Beneficiary own contribution

LIFE CAÑADAS Awareness and management

The Post-Life Plan is divided into two main components: a Communication Plan and a Conservation Plan.

• The Communication Plan includes:

1. Maintaining the project's website,

2. Managing the project's social media accounts,

3. Publishing technical and scientific articles,

4. Participating in conferences, workshops, and seminars,

5. Organizing volunteer activities to disseminate long-term results from the restoration of the drove roads.

These activities will be carried out primarily by UAM and SEO-BirdLife using their own resources, with most of the costs being absorbed through the dedication of internal staff.

• The Conservation Plan focuses on:

1. Monitoring the physical integrity and controlling vehicle traffic on the restored drove roads,

2. Preserving the structural restoration of the drove roads within the Community of Madrid,

3. Maintaining the functionality of the roads, encouraging the continued use of transhumant livestock,

4. Conducting long-term monitoring of the selected indicators to evaluate the success of the restoration efforts.

These tasks will largely be handled by two public administrations: the Directorate General of Agriculture, Livestock, and Food of the Community of Madrid and the Directorate General of Natural Environment and Biodiversity of the Junta de Comunidades de Castilla-La Mancha, with support from UAM and SEO-BirdLife. Similar to the Communication Plan, the majority of these efforts will be covered by the allocation of internal staff hours.

While it is challenging to provide an exact calculation of the working hours required for post-Life activities, an estimated 1,200 hours per year will be needed over the next five years. This amounts to 6,000 hours in total, which, at an estimated rate of €30/hour, results in an additional cost of €180,000 over five years.

8. Comments on the financial report

8.1. Summary of Costs Incurred

Table 8.1.1 presents the budgeted costs, incurred costs, and the percentage of incurred costs relative to budgeted amounts. The project's total costs exceeded the budget by 9%, with this increase fully covered by beneficiaries' own contributions (Table 8.1.2). The largest cost increases were seen in personnel and consumables. Personnel costs rose 28% above initial estimates, mainly because DGMNB had to allocate more hours to Action C restoration tasks than initially planned and employ senior engineers instead of technical ones. This adjustment arose from DGMNB's internal restructuring, prompted by retirements and changes in the political appointments responsible for staffing. An additional factor contributing to increased personnel hours was the decision by UAM, DGAGA, and DGMNB to assign certain tasks originally intended for external assistance to project staff instead. This decision was made selectively, based on assessments indicating that direct involvement from these partners could produce more efficient and higher-quality results than available external service providers. In terms of consumables, the increase appears significant because the initial budget for this item was very low. However, in practical terms, the added cost to consumables remained modest, representing less than 1% of the project's initial budget. The rise in consumables costs was largely due to UAM's assumption of tasks that were not outsourced.

Table 8.1.1. Summary table showing the budgeted costs, incurred costs, and the percentage of incurred costs relative to the budgeted amounts.

PROJECT COSTS INCURRED				
	Cost category	Budget according to the grant agreement in €*	Costs incurred within the reporting period in €	%**
1.	Personnel	870,477	1,110,357	128%
2.	Travel and subsistence	65,356	55,237	85%
3.	External assistance	157,200	102,584	65%
4.	Durables goods: total non-depreciated cost	616,500	604,047	98%
	- *Infrastructure sub-tot.*	606,200	589,567	97%
	- *Equipment sub-tot.*	10,300	14,480	141%
	- *Prototype sub-tot.*	-	-	-
5.	Consumables	5,160	22,744	441%
6.	Other costs	12,610	15,408	122%
7.	Overheads	**120,908**	**108,834**	90%
	TOTAL	**1,848,211**	**2,019,211**	109%

*) If the Agency has officially approved a budget modification through an amendment, indicate the breakdown of the revised budget. Otherwise this should be the budget in the original grant agreement.

**) Calculate the percentages by budget lines: e.g. the % of the budgeted personnel costs that were actually incurred

On the other hand, certain categories, including "Travel and Subsistence," "Durable Goods: Total Non-depreciated Costs," and "Overheads," saw slightly lower-than-expected expenses,

although the differences were not substantial. For “Durable Goods: Total Non-depreciated Costs,” nearly all expenses were associated with “Infrastructure,” which cost 97% of the projected amount. The “Equipment” subcategory exceeded its budget slightly due to UAM’s additional work contracted out to external services, resulting in a 41% increase. Nevertheless, this overage represents only 0.23% of the project’s total cost.

Despite these internal changes, project objectives were met successfully, and the European Union incurred no additional expenses. Table 8.1.2 presents a breakdown of the incurred costs by partner, alongside the initially planned budget for each partner, allowing for straightforward comparison. All partners exceeded their initial budget expectations, except for the association ‘Campo Adentro,’ which fell slightly below. The partner with the largest increase in expenditure relative to the initial forecast is DGMNB, due to the previously explained reasons related to rising personnel costs.

It is important to note that any budget overruns are absorbed by each beneficiary partner, ensuring that each partner's contribution remains above the minimum threshold of 40%. Additionally, the total contribution from the Union remains as initially budgeted; however, it will now constitute 55% of the total budget rather than the original 60%, which still keeps it below the maximum threshold of 60%.

Table 8.1.2. Comparison of the initial budget and incurred expenses for each partner, in euros. The distribution of the Union's contribution among the partners is also indicated, including the amounts required in the balance.

Partner	Budgeted costs			Actual costs				
	Total	Beneficiary’s own contribution (%)	Union contribution (%)	Total	Beneficiary’s own contribution (%)	Union contribution		
						Total (%)	Received	Requested
UAM	984,060	393,624 (40%)	590,436 (60%)	1,058,245	465,116 (44%)	593,129 (55%)	408,381	184,748
DGAGA	299,355	119,742 (40%)	179,613 (60%)	308,482	128,870 (42%)	179,612 (58%)	125,728	53,884
DGMNB	301,504	120,601 (40%)	180,903 (60%)	391,934	211,031 (54%)	180,903 (46%)	126,632	54,271
SEO/BirdLife	125,479	50,192 (40%)	75,287 (60%)	127,221	51,936 (41%)	75,286 (59%)	26,350	22,586
CA	137,816	55,126 (40%)	82,690 (60%)	133,330	53,332 (40%)	79,998 (60%)	62,806	17,191
TOTAL	1,848,214	739,286 (40%)	1,108,928 (60%)	2,019,212	910,284 (45%)	1,108,928 (55%)	776,247	332,680

As of the preparation of this report, we can confirm that all outstanding financial issues referenced in CINEA's letter dated July 3, 2024, concerning the site visit by the project advisor and monitor on April 24 and 25, 2024, have been resolved. Specifically:

- Issue 14: *Please review in depth the costs included in some cost categories that could be erroneous, i.e., some external assistance costs should be considered as infrastructure costs. Moreover, some travel costs, such as the costs of buses with*

volunteering should be included as other costs. We have conducted a thorough review of the costs reported as external assistance, and several have been reclassified under infrastructure, as they pertain to permanent facilities necessary for the proper functioning of the drove roads. This change has notably affected the Campo Adentro partner, resulting in some corrections in their financial statement compared to what was presented during the last monitor visit. Volunteer transportation expenses, incurred by the SEO/BirdLife partner, have also been corrected and classified under 'Other costs'.

- Issue 15: *Please justify the use of own-personnel as external assistance within the Final Report*. There are no personnel now categorized as external assistance in Campo Adentro's financial statement. This issue arose from a misinterpretation of the 'Personnel: employees,' 'Personnel: non-employees,' and 'External Assistance' sheets.
- Issue 16: *it has been detected that UAM and JCCLM declared several excessive daily rates without any justification. Please justify these rates at the FR stage*. We have carefully reviewed the hours reported by UAM and DGMNB. For UAM, the daily rates align reasonably with the budget. However, the discrepancy for DGMNB is more pronounced. As previously mentioned, additional work hours were necessary due to complications associated with the activities carried out on the Conquense Drove Road. Furthermore, due to adjustments in DGMNB and the nature of the work, the tasks were primarily carried out by senior engineers, who have higher salary rates than the initially planned technical engineers. This did not impact the Union's accounts, as it merely resulted in an increase in the partner's contribution.
- Issue 17: *CA: The supervisor countersigning the timesheets is not identified. Please indicate name (and position) of the supervisor.* The name and position of the CA supervisor have been included on all timesheets.

8.2. Accounting system

Presentation of the Accounting System and Codes Identifying Project Costs:

In December 2019, two months after the project began, the administrative and financial coordinator prepared the economic management guidelines (Deliverable F1.2: 'Project Economic Management Manual'), which were distributed to all beneficiary partners. This manual was designed to guide partners through the project's management procedures, with a focus on expense control. It also included essential information on all budget categories, with particular emphasis on staff costs.

All partners employ an analytical accounting system. Public partners (UAM, DGAGA, and DGMNB) manage their accounts through their respective accounting departments, while private partners (SEO/BirdLife and CA) do so through their financial officers. All partners' accounting systems comply with the Spanish General Accounting Plan (Royal Decree 1514/2007).

Codes identifying project expenses used in the analytical accounting system of each partner are:

- UAM: 10.01.17.00.77. LIFE18 NAT/ES/000930
- DGAGA:
    - Management centre: 16040000
    - Economic Classification: 61104
    - Functional Classification: 411A
    - Investment project: 2020/000289
    - Funds: 2020/00022
- DGMNB: This partner uses the official accounting system known as TAREA to generate all accounting documents in compliance with regional legislation on budgeting and taxes. Each document related to LIFE CAÑADAS includes the project name and a unique identifier assigned by the official responsible for entering the information into TAREA. This identifier is displayed in the 'CONCEPT' section of the accounting document, for example: SSCC.SF/011/21 LIFE CAÑADAS
- SEO/BirdLife: 202005
- CA: LIFE18 NAT/ES/000930 LIFE CAÑADAS

Procedure for approving costs:

All procedures follow the applicable legislation on Public Sector contracting. For each beneficiary, the process for approving expenses, equipment and supply purchases, and contracting external services is structured as follows:

- UAM: The cost approval procedure adheres to the current legislation for Public Sector contracting. The system is as follows:
    - Expenses below €5,000: Direct purchase is authorized.
    - Expenses between €5,000 and €50,000: Requires a comparison of at least three offers.
    - Expenses above €50,000: Subject to public bidding with advertisement.
- DGAGA: The accounting process adheres to the standard budgetary cycle in Spanish public administrations, as regulated by Law 9/2017 of November 8th, on Public Sector Contracts, which transposes the European Parliament and Council Directives 2014/23/EU and 2014/24/EU of February 26th, 2014 into Spanish law. Specifically, Article 118 governs procurement records for minor contracts, as the construction works

under LIFE CAÑADAS fall below the €40,000 threshold. For minor contracts, the procedure requires a report from the contracting authority justifying the need for the contract. Once the expenditure is approved, it is processed and documented in the relevant bill, which must comply with the legal requirements established by the law.

- DGMNB: The accounting process follows the standard budgetary cycle used in Spanish public administrations. The key steps involved in processing the expenses were as follows:
    - A descriptive project is first drafted by the Local (Provincial) Delegation.
    - Three offers are solicited from local forestry companies, and the most economically favorable offer is selected.
    - Based on the chosen company's budget, the necessary accounting documents are approved by the General Directorate of Environment, Nature, and Biodiversity (Central Services) through the TAREA system. These documents are signed by the General Director.
    - The project document, the three offers, and a separate 'necessity document' are then sent to the Intervention Service for approval.
    - Once approved, the selected company is notified.
    - Forestry engineers at the Local Delegation issue a certificate to initiate the works.
    - After the work is completed, an 'Act of Delivery of Works' document is signed to confirm that the materials and execution met the required standards.
    - The company then submits an electronic invoice, containing the LIFE project code, to the Local Delegation. Using this information, a bank transfer is processed by the Tributes Service, finalizing the payment.
- SEO/BirdLife: All procedures are conducted in accordance with the LIFE+ project contracting manual (European Commission), the agreement signed between the European Commission and the Coordinating Beneficiary of the LIFE CAÑADAS project, as well as the Law on Public Sector Contracts. For contracts exceeding a total budget of €12,000, at least three bids are obtained. The final selection is based on the budget that best meets the project's needs, along with the offer providing the best technical and economic advantages.
- CA: Costs are first approved by the project manager. After the actions have been implemented, they are processed and verified by the financial officer to ensure compliance and accuracy.

Procedure for Registration, Submission, and Approval of the Time Registration System:

All beneficiary partners manually complete timesheets using the official LIFE timesheet model. Each worker fills out their timesheet daily. During the first week of the following month, these timesheets are signed by both the worker and the responsible person for each beneficiary, who verifies the recorded days and hours before granting approval. Each partner retains their timesheets and submits them quarterly to the Administrative and Financial Coordinator.

All partners utilize a manual time recording system.

Reference to LIFE CAÑADAS Project in Invoices

The economic management guidelines provided to each partner (Deliverable F1.2: Manual of Economic Management of the Project) include specific instructions for referencing invoices related to the LIFE CAÑADAS project.

All suppliers are required to include the following information on their invoices: i) date; ii) tax identification numbers for both parties (partner and supplier); iii) a detailed description of the service provided; and iv) a reference to the LIFE project (LIFE CAÑADAS, LIFE18 NAT/ES/000930). In some instances, this information is incorporated via a stamp on the invoice, which includes the project number and acronym. A standard template has been provided for partners to apply to invoices, if necessary:

The project Coordinator reviews all invoices and requests amendments for those that do not comply with the aforementioned requirements.

8.3. Partnership arrangements

Partnership agreements between the Coordinating Beneficiary (UAM) and the Associated Beneficiaries (DGAGA, SEO/BirdLife, CA) were signed before the end of March 2020

The first pre-financing payment was distributed in 2020, and the second in 2022. The amounts allocated during both distributions were agreed upon with the partners and were adjusted according to the pace of action implementation (see Table 8.3.1).

Table 8.3.1. Distribution of first and second pre-financing payments between the five beneficiaries.

Beneficiary	First payment	Date First payment	Second payment	Date Second payment	TOTAL Pre-financing payment
UAM	73,029.5 €		335,351.3€		408,380.8
DGAGA	80,014 €	29/01/2020	45,714.4	13/09/2022	125,728.4
DGMNB	80,589 €	25/10/2021	46,043.1€	13/09/2022	126,632.1€
SEO/BirdLife	36,239 €	29/01/2020	16,461.2	13/09/2022	52,700.2€
CA	62,806 €	29/01/2020	-		62,806 €
TOTAL	**332,677.5 €**		**443,570€**		**776,247.5**

Each partner is responsible for preparing its own financial statements, which are reviewed every six months by the project coordinator (UAM). Each partner also safeguards all financial documentation, including payroll records, bank receipts, timesheets, and invoices. Based on the financial statements from each partner, UAM compiles a Consolidated Cost Statement for the entire project every year.

8.4. Certificate on the financial statement

None of the project partners received LIFE funds exceeding €750,000; therefore, **an external audit is not mandatory**.

However, UAM, as the coordinating partner, included in its initial budget the contracting of external assistance for the development of an overall external audit for the project (see Action F3). The details of the auditing company responsible for this task are as follows:

Audalia Nexia Auditores S.L.

B-78048097
Calle José Lázaro Galdiano, 4, 2
28036 Madrid
ROAC Number: S0274

Since this audit was not mandatory, the reports are not included in the final report, but are provided as Deliverables F3.1 and F3.2.

8.5. Estimation of person-days used per action

The project concluded with a slight increase in person-days investment, surpassing the initial budget by 8% (see Table 8.5.1). This increase in work hours affected all groups of actions, but it was particularly noticeable in the Preparatory Actions (A) and the Concrete Conservation Actions (C). In both cases, the rise in work hours can be attributed to the greater need for staff time from DGMNB, due to the unexpected challenges in developing intervention plans for the Conquense Drove Road (see 8.1).

Table 8.5.1. Budgeted and actual person-days spent per group of actions.

Action type	Budgeted person-days	Estimated % of person-days spent
Action A: Preparatory actions	416	479 (+15%)
Action B: Purchase/lease of land and/or compensation payment for payment rights	30	32 (+9%)
Action C – Concrete conservation actions	842	1060 (+26%)
Action D: Monitoring and impact assessment	1,528	1563 (+2%)
Action E: Communication and Dissemination of results	1,298	1371 (+6%)
Action F: Project management (and progress)	1,328	1290 (+4%)
TOTAL	**5,352**	**5,796 (+8%)**