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Authors:

Jakub Skorupski (ed.), Jörg Hacker, Ondřej Volf, Michala Mariňáková, Mateja Korošec, Bojana Lipej, Tomáš Dvořák, Julian Haider, Stefan Fuchs

Review:

Hana Skokanová

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RESTORING DEGRADED ECOSYSTEMS ALONG THE CENTRAL EUROPEAN GREEN BELT TO IMPROVE AND ENHANCE BIODIVERSITY AND ECOLOGICAL CONNECTIVITY

The European Green Belt initiative (www.europeangreenbelt.org) is an ambitious project aimed at preserving and promoting ecological connectivity and biodiversity along the former Iron Curtain, which once divided Eastern and Western Europe during the Cold War. Spanning over 12,500 km, the Green Belt stretches across 24 countries, from the Barents Sea in the north to the Black Sea in the south.

The European Green Belt (Author: The European Green Belt Association)

The Central European section of the European Green Belt holds particular significance due to its rich natural and cultural heritage. It encompasses diverse landscapes, ranging from lush forests and rolling hills to wetlands and meandering rivers. The countries involved in this section, including Poland, Germany, Czech Republic, Slovakia, Austria, Hungary, Slovenia, Croatia and Italy, have been actively engaged in preserving this ecological corridor.

One of the primary objectives of the Central European Green Belt is to protect and restore habitats for a wide range of plant and animal species. It serves as a vital migratory route for many bird species, making it crucial for bird conservation efforts. The wetlands along the belt are essential breeding grounds for waterfowl and support numerous endangered species. The initiative fosters international cooperation, bringing together neighbouring countries to work jointly on conservation projects and sustainable development. It encourages the establishment of protected areas, ecological corridors, and green infrastructure, all of which enhance ecological connectivity and support the free movement of wildlife.

In addition to its ecological significance, the Central European Green Belt is a symbol of unity and reconciliation. It serves as a living monument of the continent's history, reminding us of the division that once existed and the subsequent efforts to unite Europe. By transforming a former symbol of separation into a symbol of cooperation, the Green Belt promotes peace, understanding, and solidarity among European nations. Local communities are actively involved in the initiative, participating in conservation projects, ecotourism ventures, and educational programs. The Green Belt helps raise environmental awareness, fostering a sense of pride and responsibility among residents, and nurturing a culture of sustainable living. As the initiative continues to evolve, the European Green Belt stands as a testament to the transformative power of unity and nature's ability to heal the scars of the past.

The ReCo project, financed under the EU Interreg Central Europe programme, aims to address the challenges facing the Central European Green Belt (CE EGB). This unique network of ecologically important habitats and protected areas is under threat due to increasing land use pressure, habitat fragmentation, and climate change, leading to biodiversity decline and habitat degradation.

To improve the protection and conservation of habitats along the CE EGB, ReCo focuses on transnational cooperation, recognizing that ecological interconnectivity extends beyond national borders. Restoration measures are crucial to enhance ecological connectivity and support the EU's biodiversity strategy. The project will employ innovative geo-information and data processing systems to devise solutions. Additionally, ReCo will adopt a community-based development approach, encouraging communities to contribute funds and activities towards habitat restoration.

Key outcomes of the project include: (1) a Joint Transnational Restoration Strategy targeting disturbed or degraded ecosystems along the European Green Belt’s Central European section, promoting nature, biodiversity, and EU Green Infrastructure through improved habitat interconnectivity, (2) the development of six Joint Regional Restoration and Connectivity Plans, (3) enhanced transnational and cross-border cooperation among

stakeholders along the Central European section of the European Green Belt, (4) creation of two practitioner guides to aid in the implementation of restoration efforts.

Beneficiaries of the project include local, regional, and national public authorities, sectoral agencies, infrastructure and service providers, NGOs, higher education, and research organizations. These stakeholders will gain expertise in promoting biodiversity and connectivity of valuable habitats.

The project's work is organized into three work packages, devoted to elaboration of a Joint Transnational Strategy, practical implementation of pilot actions and political mainstreaming and upscaling of achieved results. As the ReCo project progresses, it will significantly contribute to preserving the ecological integrity and biodiversity of the Central European Green Belt. By combining the strength of transnational cooperation with innovative approaches and community involvement, the project exemplifies a united effort to protect one of Europe's most valuable natural treasures, ensuring its conservation for generations to come.

The ReCo project involves three key definitions:

- Joint Pilot Action, which refers to the restoration and connectivity plan implemented in the Pilot Regions of the ReCo project. This action aims to test or demonstrate innovative ecological restoration approaches, enhance ecological interconnectivity, and protect biodiversity. It specifically targets ecologically valuable habitats, including NATURA 2000 areas, that are endangered by climate change. Additionally, it focuses on priority species. The main objective of Joint Pilot Actions is to achieve community-based leverage effects.
- Pilot Investment represents a conservation measure with a demonstration, model, or pilot character, implemented on a small scale to ensure the successful implementation of Joint Pilot Actions. Examples of such investments include revitalization efforts for creeks, grasslands, and wetlands, as well as the planting of hedges or forest stripes in degraded areas. Innovative GPS collars may also be utilized as part of these investments.
- Pilot Region refers to one of the six designated areas within the ReCo project. These regions, including regions dedicated to habitats protection (Fichtelgebirge Mountains/Smrčiny Mountains, Gorenjska region, Isonzo Plain, Škocjanski zatok Nature Reserve) and regions dedicated to species protection (Ińsko Lakeland, Podyjí National Park/Thayatal National Park), are facing specific ecological problems that will be addressed through the implementation of Joint Pilot Actions.

This comprehensive report serves as a detailed overview of the Joint Pilot Actions slated for implementation by the ReCo project within six distinct Pilot Regions situated along the Central European Green Belt. Within the pages of this document, readers will find an intricate exploration of the innovative ecological restoration endeavours planned for deployment across these regions. This report not only outlines the overarching goals of the Joint Pilot Actions but also provides a contextualized understanding of the specific ecological contexts, challenges, and restoration methodologies tailored to each Pilot Region. It stands as a testament to ReCo's commitment to fostering biodiversity, ecological connectivity, and community-based leverage effects across the diverse landscapes of the Central European Green Belt.

Key features of the ReCo Pilot Regions

Pilot Region		Country	Responsible Partner of the ReCo project	Targeted habitat or species		Main stakeholders
1.	Fichtelgebirge Mountains	Germany	Bavarian Branch of Friends of the Earth Germany & Hof county branch of Friends of the Earth Germany	Habitats	Wet meadows and moor	municipalities, water and soil protection associations, farmers, Bavarian State Forestry, nature conservation authorities (e.g. Lower Nature Conservancies of the rural districts Hof and Wunsiedel, Higher Nature Conservancy of Upper Franconia), nature and landscape conservation associations, spatial planning authorities
	Smrčiny Mountains	Czechia	Ametyst		Mountain streams and pools, Mountain mowed meadows	local government (i.e. regional authority of the Karlovy Vary Region, regional association of municipalities and towns Euregio Egrensis, Aš Region Association, municipalities of Cheb, Františkovy Lázně, Aš, Hranice, Skalná, Plesná, Luby, Hazlov), the Nature Conservation Agency of the Czech Republic, state enterprise Povodí Ohře and Lesy ČR, administrators of church, municipal (e.g. Forestry of the City of Cheb) and private forests, farms (e.g. Farma Trojmezí a.s.)
2.	Gorenjska region	Slovenia	BSC – Business support organisation ltd., Kranj		Mountain hay meadows	Institute of the Republic of Slovenia for Nature Conservation (Unit Kranj), Public institution Triglav National Park, Municipalities of Gorenjska, Chamber of Agriculture and Forestry of Slovenia, Slovenia Forest Service, farmers, NGOs, general public
3.	Isonzo Plain	Italy	Municipality of Staranzano		Shallow marine tidal areas, salt & brackish marshes, mudflats, riverine woods, plain wood	farmers, port of Monfalcone, the territorial management authorities (i.e. Consortium for the „bonifica" of the Isontina Plain), villages neighbouring protected areas, tourists, nature photographers and birdwatchers
4.	Škocjanski zatok Nature Reserve	Slovenia	DOPPS – BirdLife Slovenia		Annual plants colonizing mud and sand, Mediterranean salt meadows, Mediterranean and thermo-Atlantic halophilus scrub, Mudflats and sandflats not covered by sea water at low tide, Coastal Lagoons	Municipality of Koper, Port of Koper d.d., University of Primorska – Faculty of Tourism, Tourism Cooperative "Treasures of Istria" and Primary school of Ankaran, tourists, bidrwatchers, NGOs and general public
5.	Ińsko Lakeland	Poland	Green Federation „GAIA"	Species	European bison	local governments, eNGOs, local communities, institutions responsible for nature protection, State Forests Service, hunting clubs, farmers' associations and managers of transport infrastructure in the region
6.	Podyjí National Park	Czechia	Podyjí National Park Administration		European wildcat	Podyji National Park administration, local communities, tourists, farmers, wine growers, foresters, administrative authorities, NGOs, political groups
	Thayatal National-Park	Austria	Thayatal National Park & University of Vienna			Thaytal National Park administration & Podyji National Park, the department of nature conservation of Lower Austria, legal representatives of the surrounding communities, local communities, academia, NGOs taking care of landscape & tourism

JOINT PILOT RESTORATION ACTIONS IN THE RECO PROJECT

In the dynamic landscape of environmental conservation, the ReCo (Restoring degraded ecosystems along the Green Belt to improve and enhance biodiversity and ecological connectivity) project emerges as a beacon of transformative change. ReCo undertakes an ambitious journey to rejuvenate and fortify ecosystems along the Central European Green Belt. The heart of the project beats with innovation, focusing on community-based leverage effects through the establishment of local stakeholder alliances, meticulously cultivated in workshops within the pilot regions.

The project unfolds through two thoughtfully designed Joint Pilot Actions, strategically crafted to bring about tangible ecological impact while fostering collaborative community engagement:

- Joint Pilot Action 1 “Habitats”: This action unfolds across four ReCo pilot regions – Fichtelgebirge-Smrčiny Mountains (Germany-Czech Republic), Gorenjska region (Slovenia), Isonzo Plain (Italy), and Škocjanski zatok Nature Reserve (Slovenia). It serves as a testing ground for innovative ecological restoration approaches with a primary focus on achieving community-based leverage effects. The specific restoration activities encompass the revitalization of creeks, grasslands, and wetlands, supporting habitats typical of the Central European Green Belt and amplifying their ecological value, including the provisioning of essential ecosystem services and enhancing green infrastructure.
- Joint Pilot Action 2 “Species”: This action delves into flagship species conservation, specifically targeting the European wild cat *Felis silvestris* and European bison *Bison bonasus*. Implemented in the Thaya and Podyji National Parks (Austria and Czech Republic) and Ińsko Lakeland (Poland), this action aims to foster improved migration routes for these species and extend their habitats. Innovative measures include the strategic planting of hedges and forest strips in degraded areas to directly improve living conditions and migration routes for the wild cat. Additionally, the utilization of radio collar monitoring for bison aids in understanding their specific needs, identifying migration routes, and determining potential areas for future restoration efforts.

In the ReCo Project, the responsibility for the Fichtelgebirge Mountains lies with BUND Department Green Belt & BUND Kreisgruppe Hof, while the coordination for the ecological initiatives in the Smrčiny Mountains is overseen by Ametyst (Pilot Region 1). BSC Kranj takes charge of the Gorenjska region in Slovenia (Pilot Region 2), and the Municipality of Staranzano in Italy is responsible for the Isonzo Plain (Pilot Region 3). Škocjanski zatok Nature Reserve in Slovenia is managed by DOPPS - BirdLife Slovenia (Pilot Region 4). The European Bison – Ińsko Lakeland initiative falls under the purview of Green Federation "GAIA" in Poland (Pilot Region 5), and the European Wild Cat – Thayatal National Park in Austria National Park Podyjí in Czech Republic (Pilot Region 6) is jointly managed by

these national parks. Each partner is committed to implementing joint pilot actions in their respective regions as part of the overarching ReCo Project.

The rich tapestry of the ReCo project is woven together in a detailed publication titled “ReCo project in action! Six Pilot Regions along European Green Bel” (Deliverable D.2.1.1). This publication serves as a compendium, categorizing common challenges through comprehensive pilot region fiches, offering a nuanced understanding of the distinctive characteristics that define each region.

To ensure the efficacy and success of the Joint Pilot Actions, a structured framework is laid out. This framework serves as a guiding beacon, articulating essential components such as goal clarification, background justification, ecological restoration approaches, monitoring strategies, community engagement, budgeting, timelines, risk assessment, and more.

The methodology of Joint Pilot Action development is a collaborative effort, involving a series of steps undertaken by various stakeholders. These steps include data collection, analysis of the conservation/ecological context, identification of conservation problems and threats, stakeholder involvement, goal and objective setting, defining area-based conservation measures, identifying monitoring indicators, and finally, developing a common form for Joint Pilot Actions. The involvement of Joint Pilot Teams, Associated Partners, Project Advisory Board members, and Local Stakeholders is intricately integrated into the developmental framework of this process.

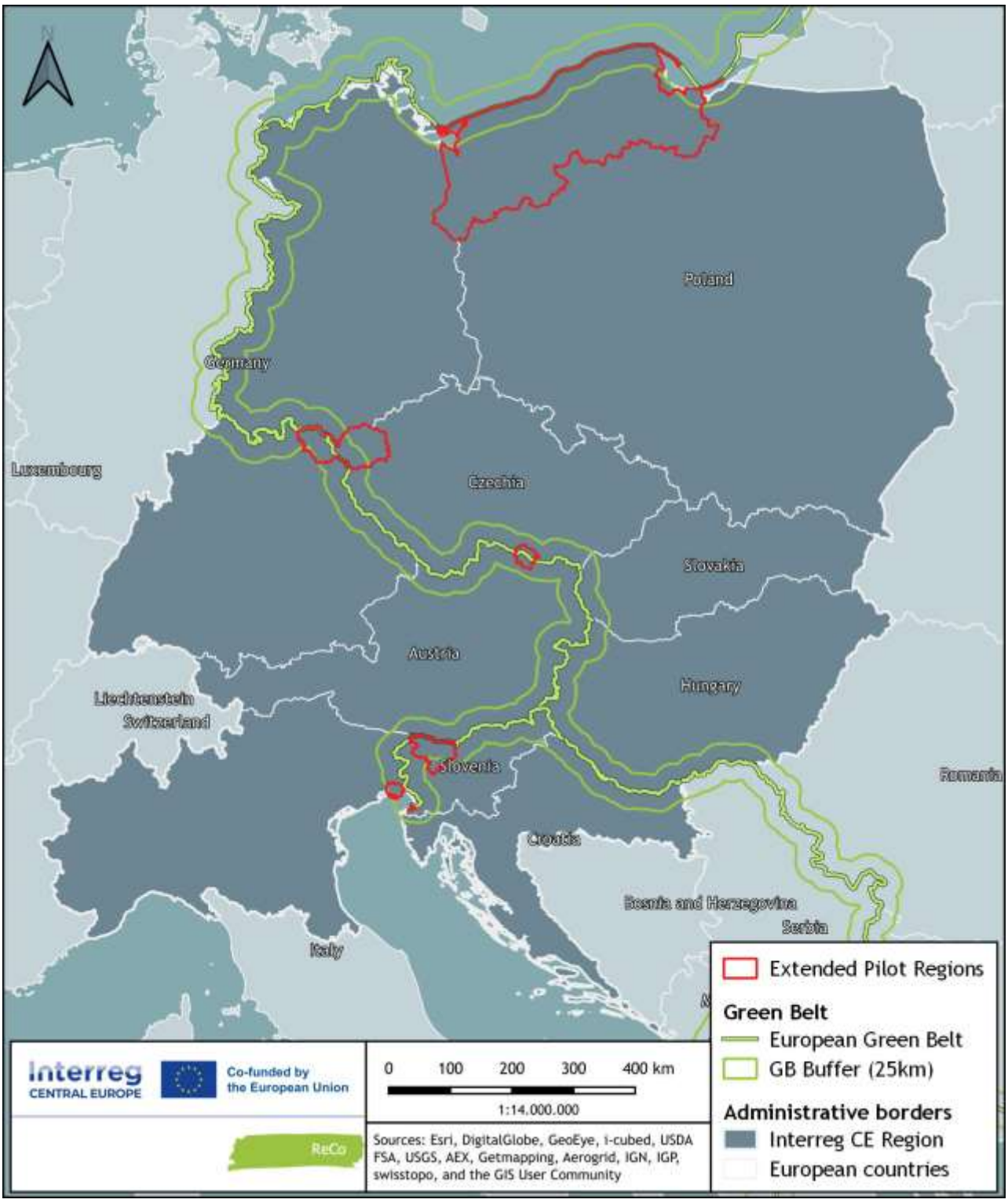
Monitoring and evaluation are pivotal aspects of the Joint Pilot Actions implementation, involving a systematic process of collecting and analysing data to measure progress toward achieving the specific goals and objectives of the Joint Pilot Actions. The monitoring approach is streamlined, focusing on essential questions such as the implementation of conservation measures, the achievement of outlined goals, and the assessment of ecological trade-offs or unintended consequences.

A peer-review mechanism is seamlessly integrated into the project's structure. In the second year of the project, each pilot region implementing Joint Pilot Actions undergoes scrutiny by an international peer review team. This team, comprising Joint Pilot Team members, Associated Partners, Project Advisory Board members, and stakeholders in nature protection, conducts in-depth analyses of selected restoration measures. The outcomes of these reviews, along with recommendations for policy improvement, will be documented in written peer review reports.

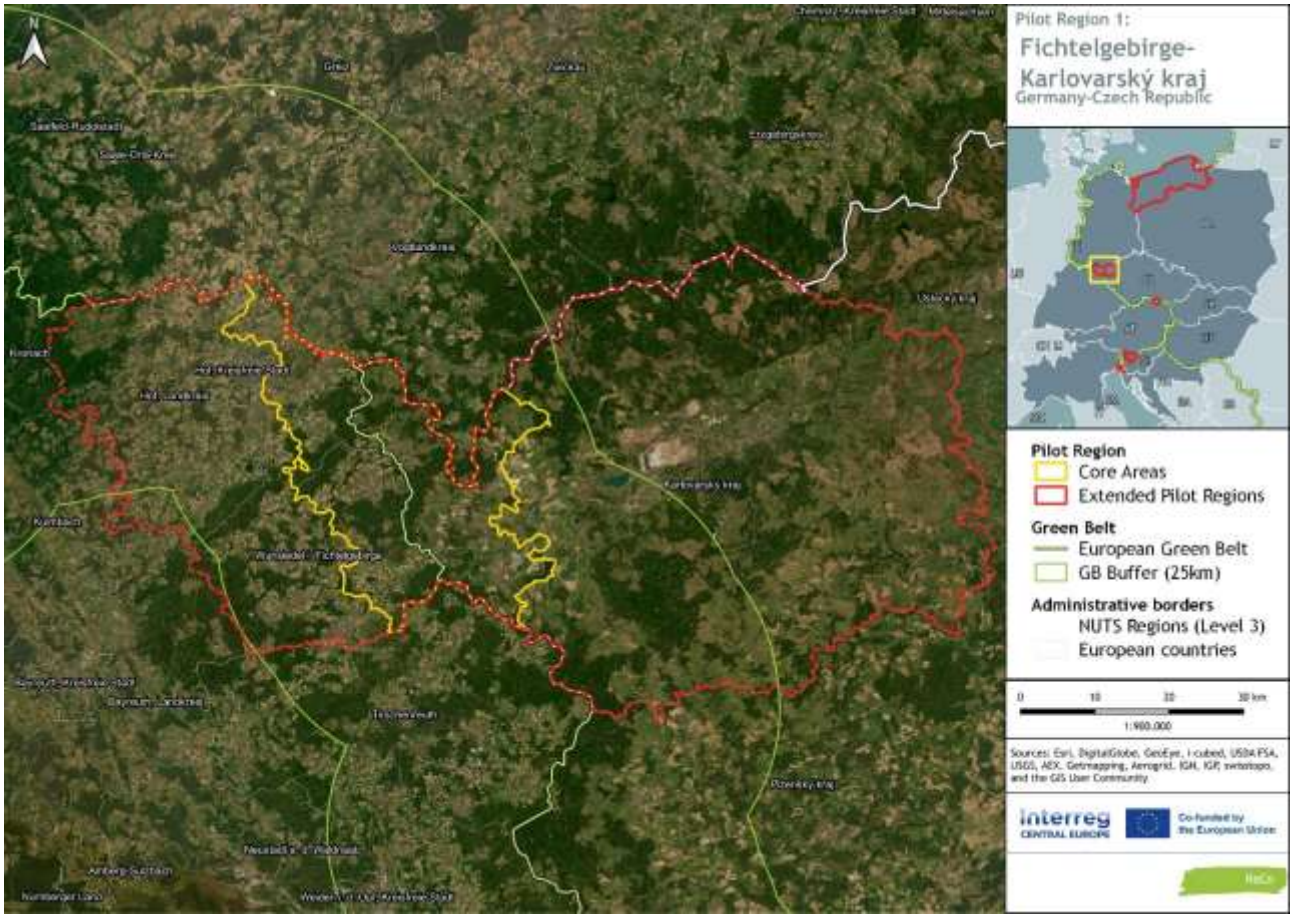
In essence, ReCo transcends the conventional boundaries of a project, emerging as a transformative force propelling collaborative and innovative approaches toward a sustainable future for the European Green Belt. The journey of ecological restoration, community engagement, and scientific advancement within ReCo not only enriches the biodiversity and resilience of ecosystems but also lays the foundation for transnational solutions and practices in ecological restoration.

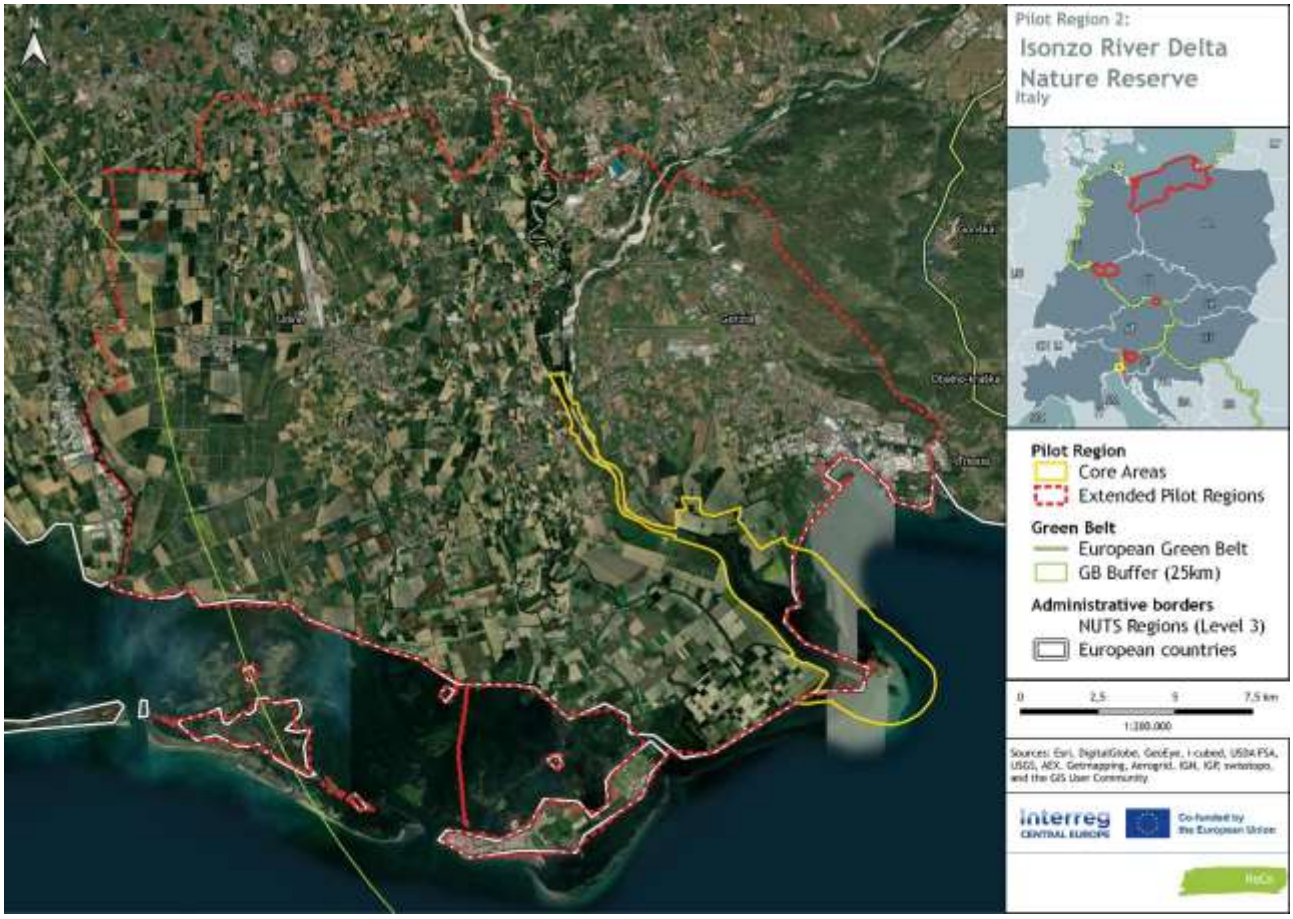
PILOT REGIONS – MAPS

Here are the maps depicting the ReCo Pilot Regions, providing details about the Project Partners who are responsible for coordinating Joint Pilot Actions to be executed in these designated areas:

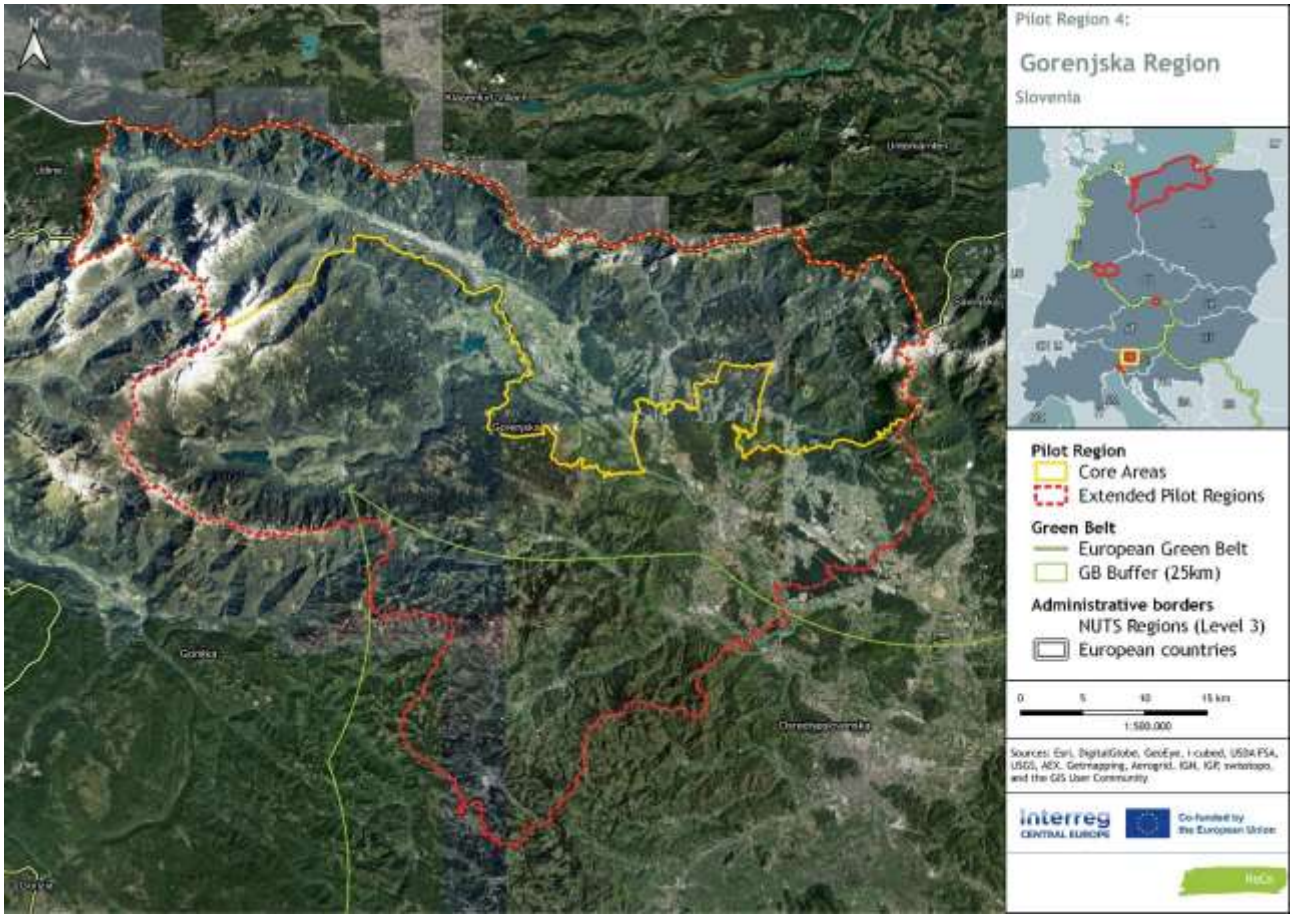


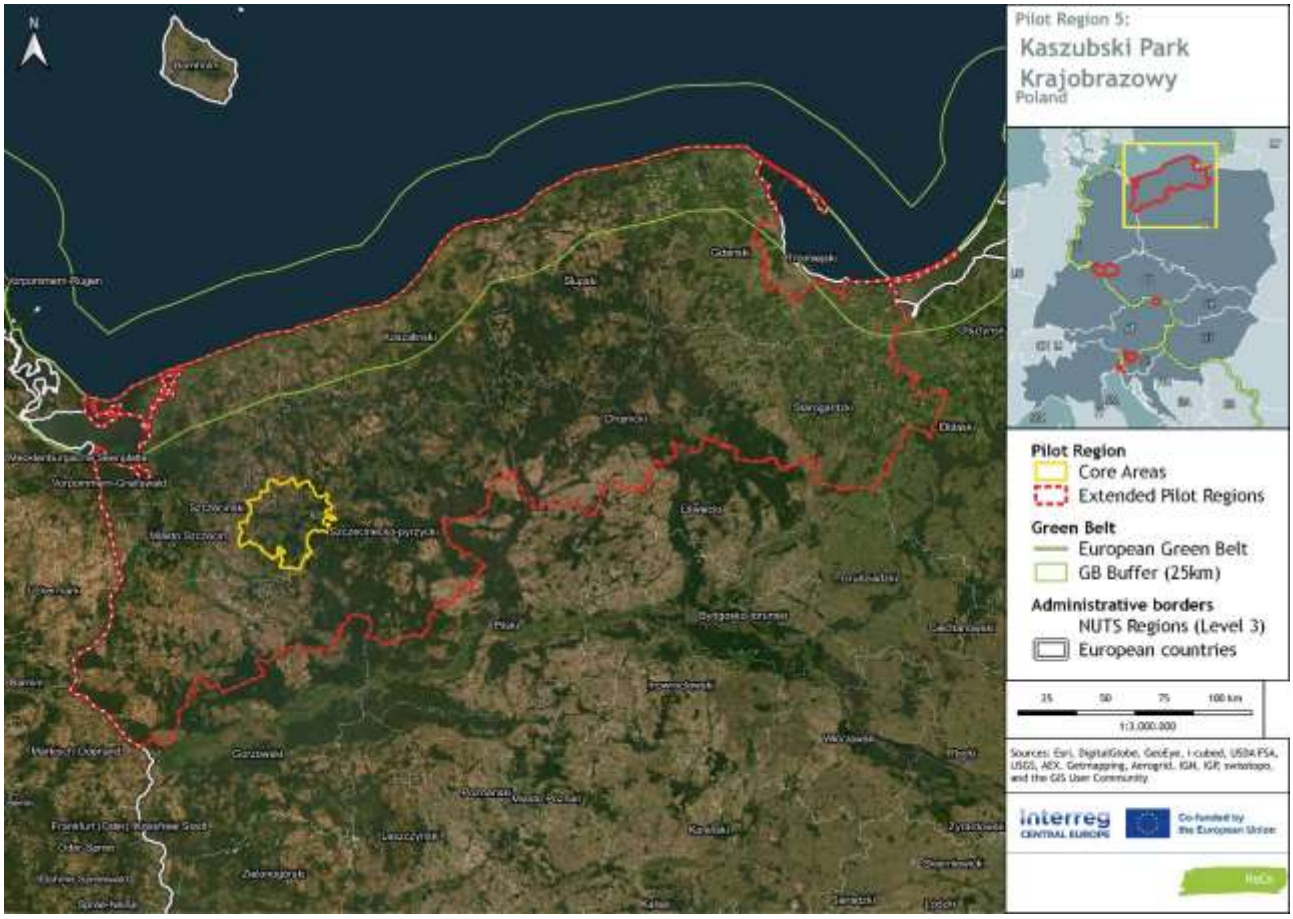
Pilot Regions of the ReCo project – an overview (Author: Stefan Fuchs)

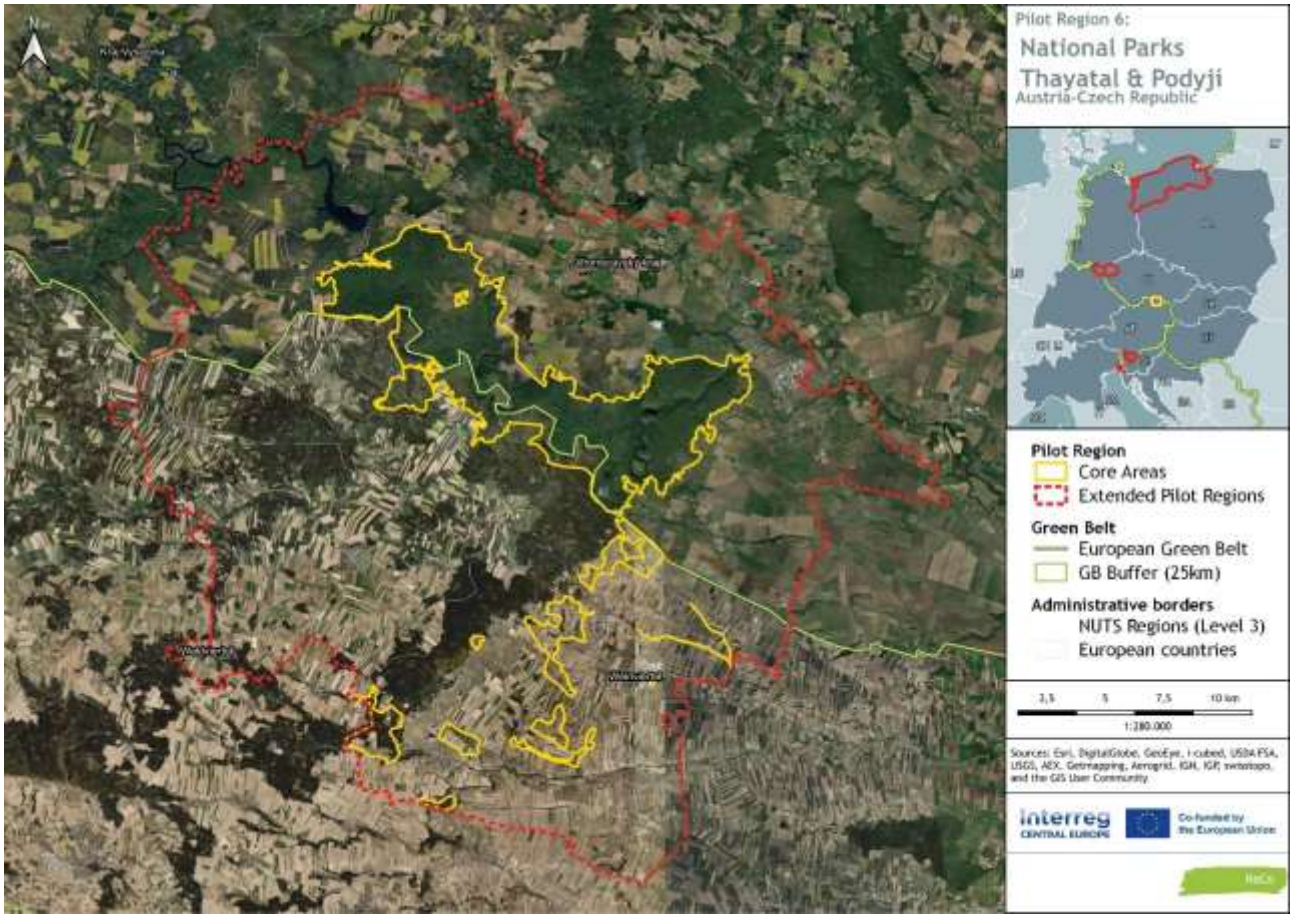

Pilot Region 1:
Fichtelgebirge-
Karlovarský kraj
Germany-Czech Republic
Pilot Region
Core Areas
Extended Pilot Regions
Green Belt
European Green Belt
GB Buffer (25km)
Administrative borders
NUTS Regions (Level 3)
European countries
1:900.000


Pilot Region 2:
Isonzo River Delta
Nature Reserve
Italy
Pilot Region
Core Areas
Extended Pilot Regions
Green Belt
European Green Belt
GB Buffer (25km)
Administrative borders
NUTS Regions (Level 3)
European countries
1:300.000


Pilot Region 3:
Škocjanski zatok
Nature Reserve
Slovenia
Pilot Region
Core Areas
Extended Pilot Regions
Green Belt
European Green Belt
GB Buffer (25km)
Administrative borders
NUTS Regions (Level 3)
European countries


Pilot Region 4:
Gorenjska Region
Slovenia
Pilot Region
Core Areas
Extended Pilot Regions
Green Belt
European Green Belt
GB Buffer (25km)
Administrative borders
NUTS Regions (Level 3)
European countries


Pilot Region 5:
Kaszubski Park Krajobrazowy
Poland
Pilot Region
Core Areas
Extended Pilot Regions
Green Belt
European Green Belt
GB Buffer (25km)
Administrative borders
NUTS Regions (Level 3)
European countries
1:3.000.000


Pilot Region 6:
National Parks Thayatal & Podyji
Austria-Czech Republic
Pilot Region
Core Areas
Extended Pilot Regions
Green Belt
European Green Belt
GB Buffer (25km)
Administrative borders
NUTS Regions (Level 3)
European countries
1:280.000

PILOT REGION 1: FICHTELGEBIRGE AND SMRČINY MOUNTAINS (GERMANY & CZECH REPUBLIC)

Joint Pilot Action: Nature Conservation and Ecological Connectivity in the Erlenbächlein Area (Rehauer Forest), Renaturation of the Humboldtgraben as Part of Watercourse Maintenance & Enhancing Pearl Mussel Habitat in the Lužní Brook Catchment Area

BUND Department Green Belt & BUND KreisgruppeHof, & Ametyst

The Joint Pilot Action in Pilot Region 1, encompassing Fichtelgebirge and Smrčiny Mountains in Germany and the Czech Republic, focuses on ecological restoration to enhance biodiversity and ecological equilibrium. The initiative, rooted in principles of connectivity and water retention, specifically targets the freshwater pearl mussel habitat in the Lužní Brook catchment area. Proven restoration methods include creating ecological corridors, dismantling drainage systems, and removing non-native afforestations. The comprehensive plan involves activities such as the ecological enhancement of Humboldtgraben and constructing a dividing object for water supply. Monitoring strategies, tailored to specific geographical areas, aim to assess changes in habitat quality and the effectiveness of conservation measures. Stakeholder engagement with nature conservation authorities, water management bodies, and local landowners ensures collaborative decision-making, while the initiative's significance is highlighted by its inclusion in the pearl mussel conservation program. The project spans two phases, with renaturation of Humboldtgraben scheduled for spring 2024, emphasizing sustainability and the enduring commitment required for ongoing care and monitoring to ensure the long-term success of ecological improvements and biodiversity enhancement in the region.

A. Goal, Objective, and Scope

1. Overarching Goal and Objective(s)

The core objective of our project is rooted in the principles of ecological restoration, with a profound commitment to fostering connectivity among diverse habitats. By doing so, we aim to enrich the region's biodiversity and reestablish a harmonious ecological balance. A pivotal focus lies in elevating water retention capabilities and implementing measures to facilitate rewetting, thereby reinstating the wetlands to their natural state.

This multifaceted approach not only enhances the year-round water flow but also serves as a catalyst for improving the living conditions crucial for the freshwater pearl mussel, thriving in both the lower Erlenbächlein and the Höllbach.

Our initiative takes a tailored approach to augmenting the habitat for the pearl mussel within the border stream. We specifically address the provisioning of a suitable food supply in the segment of the stream where the species breeds. To secure an adequate water supply in the side channel, a strategically designed dividing structure will be constructed on the creek, serving as a concentrated nursery area for juvenile pearl mussels.

Furthermore, in one of the tributaries of the Lužní brook (border stream), we plan to construct channels aimed at bolstering the food supply for pearl mussels. These channels are intricately designed to transport essential plant debris, including roots, stems, and leaves, into the water, playing a pivotal role in facilitating the transportation of vital food items to specific areas.

The overarching goal is to significantly enhance the structural integrity of the watercourse, thereby amplifying the ecological functionality and biodiversity of the Humboldtgraben. Concurrently, we strive to create optimal conditions for the continued well-being of the freshwater pearl mussel. Embracing the natural dynamics of water, our measures are poised to contribute to the improvement of ecological conditions and water retention capacity, aligning with the standards outlined in the EU Water Framework Directive.

Pilo Flat bog at the "upper course" of the Erlenbächlein (Author: Jörg Hacker)

2. Geographical Area

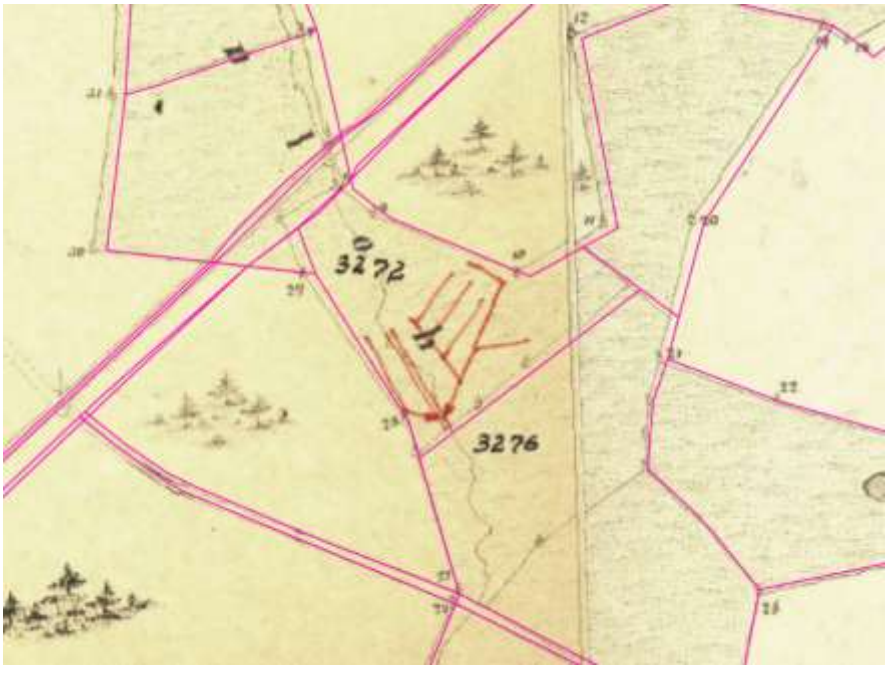
Erlenbächlein Area, Rehauer Forest in the Fichtelgebirge Mountains and Smrčiny Mountains. The measure is located in the catchment area of the Lužní Brook, which forms the state border between the Czech Republic and Bavaria, and Erlenbächlein, which drains into the Höllbach (Pekelský potok), which is also a border stream. The entirety of the catchment area is evenly divided between Bavaria and the Czech Republic. This locale represents a typical Green Belt area, once situated beyond the Iron Curtain.

3. Ecosystem Identification

The Erlenbächlein area in the Rehauer Forest embodies a unique mosaic of diverse biotopes, encompassing flat moors, spring moors, meadows, and sedge or rush-rich wet meadows. Nevertheless, these pristine biotopes face fragmentation due to drained, degraded, and afforested areas, significantly compromising the ecological integrity and connectivity of the region. Our project is committed to restoring this fragmented landscape into a connected and resilient ecosystem through targeted actions.

The Smrčiny Mountains hold their main value in the preservation of watercourses and their catchment areas. A concentration of biodiversity, particularly notable for hosting rare species such as the freshwater pearl mussel *Margaritifera margaritifera*, the brook lamprey *Lampetra planeri*, the bullhead *Cottus gobio*, and the common minnow *Phoxinus phoxinus*, defines the area. Various measures are underway to restore and preserve the natural form of the catchment. The catchment areas of Lužní potok and Bystřina are pivotal sites for the pearl mussel action plan, involving the release and nurturing of juveniles into adulthood.

Efforts are being made to restore natural channels of small tributaries and vernal pools, although these initiatives are still in progress. Given the extensive size of the entire area, continued restoration of small tributaries and the maintenance of facilities are imperative to provide a conducive environment for the juvenile stages of pearl mussels.



Drainage plan in historical map, Erlenbächlein area (Author: Bayerische Vermessungsverwaltung)

4. Biodiversity Enhancement

The freshwater pearl mussel is a quintessential umbrella species. The conservation of pearl mussels can contribute to the preservation of habitats for various other, lesser-studied organisms. Due to the high ecological requirements of the pearl mussel, environments suitable for their habitation also cater to the needs of other, less demanding species.

In locations where pearl mussels breed, an environment conducive to the well-being of species such as the brook lamprey, the bullhead, and the common minnow is created.

Afforested peatland sites, Erlenbächlein area (Author: Jörg Hacker)

Ponds in the peat body, Erlenbächlein area (Author: Jörg Hacker)

Humboldtgraben, Erlenbächlein area (Author: Jörg Hacker)

B. Background and Justification

1. Necessity Overview

The lack of restoration efforts for the dividing facility poses a potential threat to the continuous supply of sufficient water to the juvenile pearl mussel nursery. This not only endangers the juvenile stages of the pearl mussels but also jeopardizes the entire multi-year rearing cycle.

The restoration of the small tributaries is a crucial element within the comprehensive large-scale management plan for the border river basin.

The Humboldtgraben, a tributary of the southern Regnitz, is an artificial and straightened watercourse over extensive stretches. This straightening has constrained the natural dynamics of the water, leading to adverse effects on water quality and biodiversity. Nevertheless, the somewhat warmer water compared to the Regnitz provides favourable breeding conditions for young freshwater pearl mussels. Therefore, a complete reversal of the historical ditch was not considered for nature conservation reasons.

2. Site Selection Criteria

The care of pearl mussels and other organisms in the Lužní Brook basin has been carried out over a long period of time and in cooperation with many entities on both sides of the Czech-Bavarian border. This is a unique area where one of the most endangered ecosystems in Central Europe - an oligotrophic small or middle stream basin - has been preserved as a result of the Iron Curtain.

Continued care of this area and the implementation of new measures in the area is therefore directly offered. The benefits of any positive changes are felt on both sides of the state border.

C. Approach and Activities

1. Restoration Approaches

The proposed methods have been substantiated through practical application, establishing their functionality and effectiveness as measures to enhance the ecosystem condition of oligotrophic catchments. These approaches are designed to rectify the damage inflicted by past inappropriate interventions and reinstate the natural regime.

Drawing from the successful implementation of the Pearl Mussel Action Plan, a long-standing conservation program in the Czech Republic, these measures reflect a proven track record in species conservation initiatives.

2. Techniques and Methods

- Creation of Corridors and Transition Zones: establishing ecological corridors and transition zones between different habitat types to facilitate the movement of flora and fauna and enhance ecological connectivity.
- Dismantling of Drainages: existing drainage systems that have contributed to the desiccation of wetlands will be dismantled to restore the natural water balance of the biotopes.
- Removal of Non-Native Afforestations: non-native afforestations will be eliminated to restore the original open landscapes and promote the growth of natural vegetation.
- Rewetting: intensified rewetting, particularly in degraded moor and wet meadow areas, aims to regenerate the typical flora and fauna of these habitats. The restoration of small streams is a method employed in the overall restoration of aquatic ecosystems, including entire watersheds. Much of this work will be carried out manually to prevent damage to the aquatic environment.
- Ecological Enhancement Project for Humboldtgraben: Dredge the Humboldtgraben along a length of approximately 178 meters, creating bulges and filling the base with various types of gravel. Establish 15 gravel bays with diversion structures made of gravel, stones, rootstocks, and trunks to facilitate mussel breeding. Implement a one-sided natural meandering approach to preserve the adjacent property. Maintain the

Humboldtgraben regularly over a length of about 350 meters to ensure the vegetation remains intact as a food source for the mussels residing in the gravel bays.

- Construction of Dividing Object for Water Supply: the dividing object, essential for supplying water to the rearing channel (the environment for young pearl mussels), will be constructed using traditional oak wood material and methods. This meticulous approach is necessary to ensure minimal impact on the aquatic environment during the construction process.

3. Ecological Assessments

The restoration plan draws upon lessons learned from past experiences involving comparable measures within the region. Specifically, it is rooted in a peer-reviewed action plan focused on pearl mussels. This plan is an integral component of both the endorsed management strategy for the protected area and the European Special Area of Conservation (SAC). Notably, this undertaking represents a consensus-driven initiative, with unanimous agreement among stakeholders regarding its appropriateness.

4. Ecological Connectivity

The proposed measures aim to enhance the connectivity of the stream environment, safeguarding not only the habitat of the pearl mussel but also that of numerous other species thriving in oligotrophic stream environments.

Implementation of measures in smaller tributaries serves to amplify the connectivity of the entire watercourse. This exemplifies a classic instance of ecological connectivity.

D. Indicators and Monitoring

1. Indicators Overview

Fichtelgebirge Mountains: Preparation involves capturing the initial state of selected sites through initial observations and photo documentation. The observation protocols include developing simple templates with categories such as date, location, weather, observed animal and plant species, and the condition of water, with regular observations scheduled on a monthly basis. Photo documentation entails taking standardized photos from predetermined perspectives and distances, marking fixed points for recurring photos to enable consistent comparisons. The indicator assessment focuses on observing changes in habitat quality, connectivity between habitats, and water retention. Data analysis and reporting involve collecting and analyzing data from protocols and photos, summarizing results in a report, and visualizing changes through comparative photos. The adjustment and improvement phase includes informing and involving stakeholders and using insights gained to adjust measures.

Humboldtgraben: Preparation involves capturing the initial state of selected sites through initial observations and photo documentation to establish baseline states. The observation protocols are structured by developing simple templates encompassing

categories such as date, location, weather, observed animal and plant species, water condition, and indications of erosion or flooding. Regular observations are scheduled, typically on a monthly basis. Photo documentation involves taking standardized photos from predetermined perspectives and distances to facilitate comparisons over time, with fixed points marked for recurring photos to ensure consistency. Indicator assessment focuses on observing changes in habitat quality, including vegetation and soil conditions, as well as monitoring water retention, wetlands, water levels, and signs of erosion or flooding. Data analysis and reporting encompass collecting and analyzing data from protocols and photos to identify trends and changes, followed by summarizing results in a report and visualizing changes through comparative photos. Adjustment and improvement involve stakeholder involvement through informing and engaging stakeholders, and utilizing feedback loops to adapt measures based on insights gained during the process.

Smrčiny Mountains: In the Smrčiny Mountains, the monitoring scheme is tailored to the length of streams with improved function related to the target species, such as the rearing of Pearl mussel and the collection of detritus. The measurement unit is in meters, with the baseline data starting at 0 meters of streams with improved function. Monitoring occurs once after the completion of the activity, utilizing expert assessments of the streams' status and measurements using aerial photos or measuring tape. The data analysis and reporting consist of a simple report from the monitoring, including an assessment of the effectiveness of conservation measures implemented in the region.

2. Responsibility Assignment

Monitoring will be conducted by BUND Department Green Belt & BUND Kreisgruppe Hof, and Ametyst, in collaboration with the main stakeholder, the Nature Conservation Agency of the Czech Republic (AOPK ČR).

3. Utilization for Decision-making

The relevant stakeholder bears responsibility for the affected area and will incorporate the obtained outcomes into future planning.

E. Community Engagement and Stakeholders

1. Stakeholder Identification

The nature conservation authorities, water management authorities, non-governmental organizations (NGOs), and respective landowners are actively engaged in collaborative efforts. Given the anticipation of significant and enduring usage restrictions, initiatives are underway to acquire land from private landowners. The goal is to ensure that all central areas are either owned by the Nature Conservation Agency of the Czech Republic (AOPK ČR) or the public sector, thereby guaranteeing their permanent protection.

The entirety of the area falls under the management of the Nature Conservation Agency of the Czech Republic, serving as the primary stakeholder. Another crucial stakeholder is the state enterprise Lesy ČR (State Forest Department).

At the local level, the Aš Municipal Authority plays a vital role as an important entity. Additionally, the Local Fishermen's Association serves as a valuable local partner in these conservation efforts.

2. Involvement and Consultation

The entire set of proposed measures has emerged from discussions with the Nature Conservation Agency. It not only fulfils their requirements but also aligns seamlessly with the essential needs of nature conservation.

3. Community-based Approaches

The implementation of the dividing object will be undertaken by a local company in collaboration with The Local Fishermen's Association.

F. Budget and Resources

1. Budget Estimation

The Bund Naturschutz utilizes its own essential funds and seeks additional financial support through the Landscape Maintenance and Nature Park Directive (LNPR). This funding is crucial for the acquisition of areas and the implementation of related measures. In instances involving publicly-owned properties, such as those administered by Baysf or Hof District, the Bund Naturschutz will utilize its own funds as needed for the execution of measures. Furthermore, the implementation of these measures is undertaken in collaboration with the water management authorities, who contribute their funds to the initiative. The execution and financing of these measures are overseen by the RECO project.

2. Equipment and Tools

Equipment and tools needed for the implementation of the pilot action include: wood, saw, nails, pick, shovel, rubber boots.

G. Timeline

1. Action Timeline

Gradual procurement and concurrent implementation of measures will be executed in close collaboration with public sector stakeholders throughout the entire ReCo project duration. Renaturation of the Humboldtgraben as part of watercourse maintenance will be carried out in spring 2024.

2. Phase Timeframes

The action is structured into two phases: a preparatory phase (first half of 2024) and an implementation phase (second half of 2024).

H.Risk Assessment and Mitigation

1. Risk Identification

The primary objective of this initiative is the ecological restoration and establishment of interconnectivity among various habitats to enhance biodiversity and reinstate ecological equilibrium. A specific emphasis is placed on enhancing water retention and rewetting processes to revive the natural conditions of the wetlands. Despite the substantial societal benefits in terms of improved ecosystem services, certain usage restrictions are imposed on select properties. Consequently, interventions within the central area are confined to publicly-owned properties or lands acquired by the BN, ensuring their enduring protection. While a considerable portion of the areas is already under public ownership, there remains a potential risk associated with private landowners who may not consent to the proposed measures or the sale of their properties. Consequently, a significant aspect of the project involves acquiring land on a smaller scale and negotiating compromises with local stakeholders to facilitate successful implementation.

2. Mitigation Strategies

One potential challenge is the selection of the supplier; however, this risk is mitigated by having a pre-arranged supplier, minimizing potential disruptions. Furthermore, proactive discussions on proposed measures occur in advance, involving key stakeholders and local authorities. This contributes to a collaborative and informed decision-making process. Given the extreme sensitivity of freshwater pearl mussel habitats, the implementation is directly overseen by water management authorities with decades of experience in ecological enhancement of waters.

I. Partnerships and Collaborations

1. Collaborating Entities

Nature Conservation Agency of the Czech Republic, Lesy ČR – State Forest Department, Local Fishermen's Association.

2. Capacity Building

The measures are repeatable; therefore, it is advisable to incorporate them for future implementations.

3. Educational and Outreach Activities

The Ametyst NGO intends to arrange excursions for students in the area. These excursions aim to introduce students to the importance of preserving the local environment and educate them about the measures taken to promote biodiversity. Ametyst has previously conducted similar excursions for students and school pupils in the past.

J. External Approvals

1. Compliance Assurance

All restoration activities adhere to environmental regulations. These measures are grounded in the principles of the pearl mussel conservation program and align with the approved management plan for the protected area.

2. Permits and Approvals

Implementation of the measures requires only the approval of the Nature Conservation Agency, with which the project has been coordinated since its inception.

K. Reporting

1. Data Collection Process

A conclusive report detailing the installation of the dividing object will be submitted. A comprehensive report on the restoration of the small streams in the Lužní Brook catchment will be prepared. Both documents will be furnished to the project partners and the Nature Conservation Agency.

2. Progress Reporting

The ReCo project and relevant stakeholders will be informed through the final reports, the Ametyst website and social media.

L. Durability

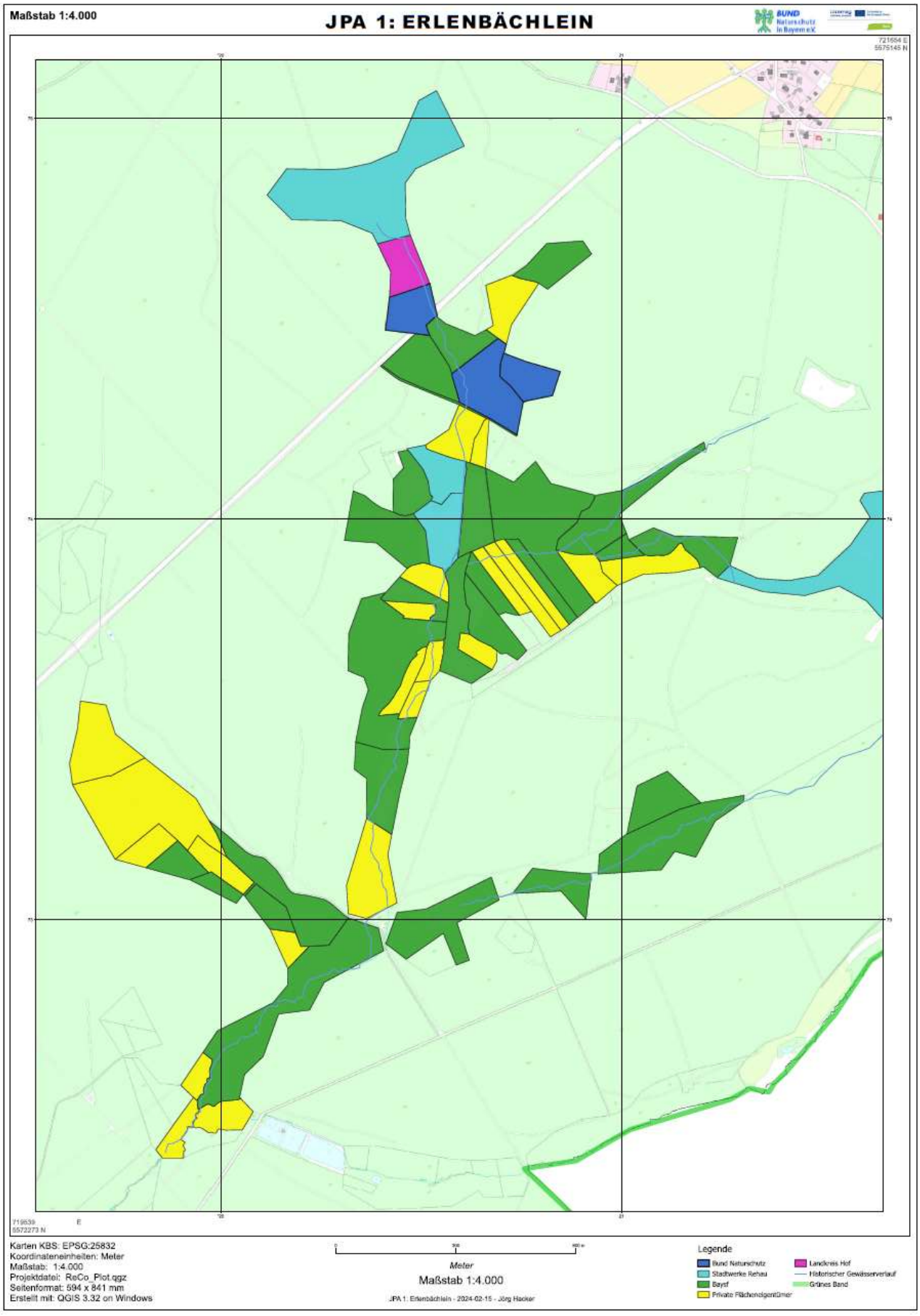
1. Sustainability Consideration

In addition to realizing immediate ecological improvements, the project aims to facilitate sustainable landscape development in the long term. The overarching goal is to establish a resilient and interconnected ecosystem that can be emulated by other regions. It is crucial to acknowledge that the efficacy of both measures is time-limited. Continuous care is imperative for the area, involving the ongoing monitoring and restoration of previously implemented interventions. The estimated duration of effectiveness for both measures, without additional intervention, is approximately 15 to 20 years.

Beyond the immediate enhancements, the project seeks to advance the sustainable development of the water landscape. By creating an ecologically functional and resilient ecosystem, the project sets a precedent for similar renaturation measures in the region.

2. Area Management

The area is integral to the pearl mussel conservation programme, where dedicated efforts have been consistently implemented for an extended period. It is highly probable that these conservation endeavours will persist in the future. This region holds significance as one of the priority areas for nature conservation in the Czech Republic.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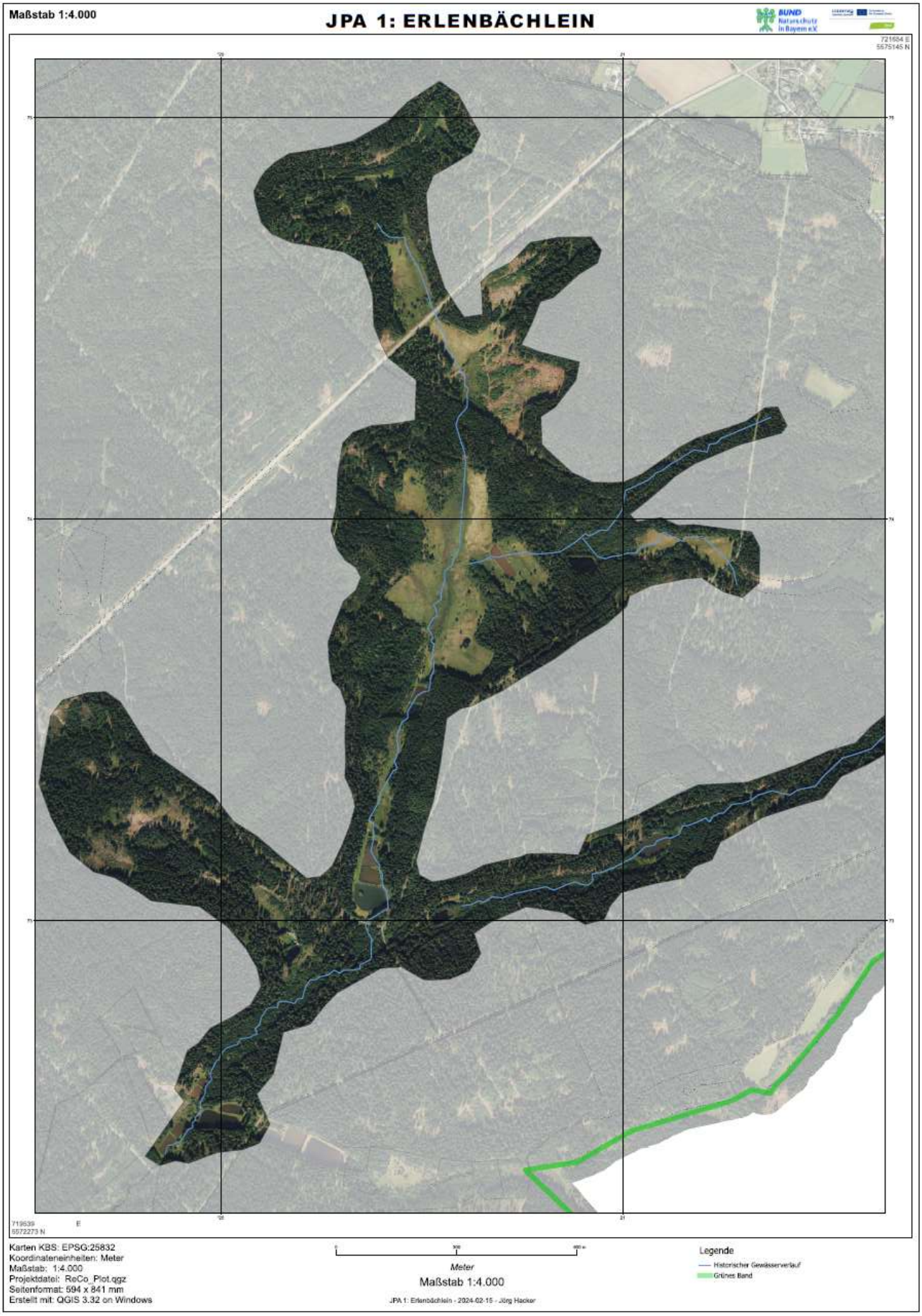
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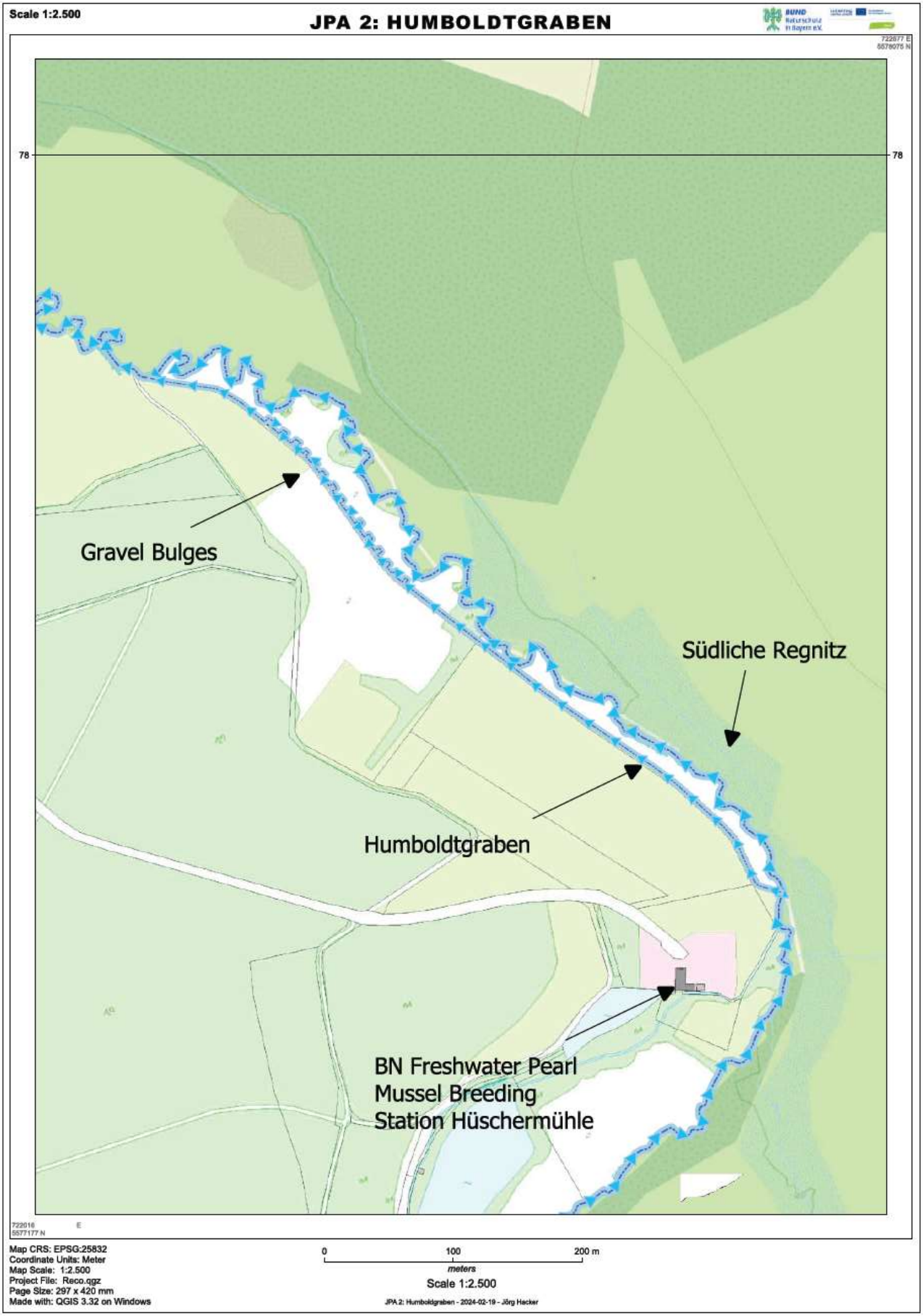
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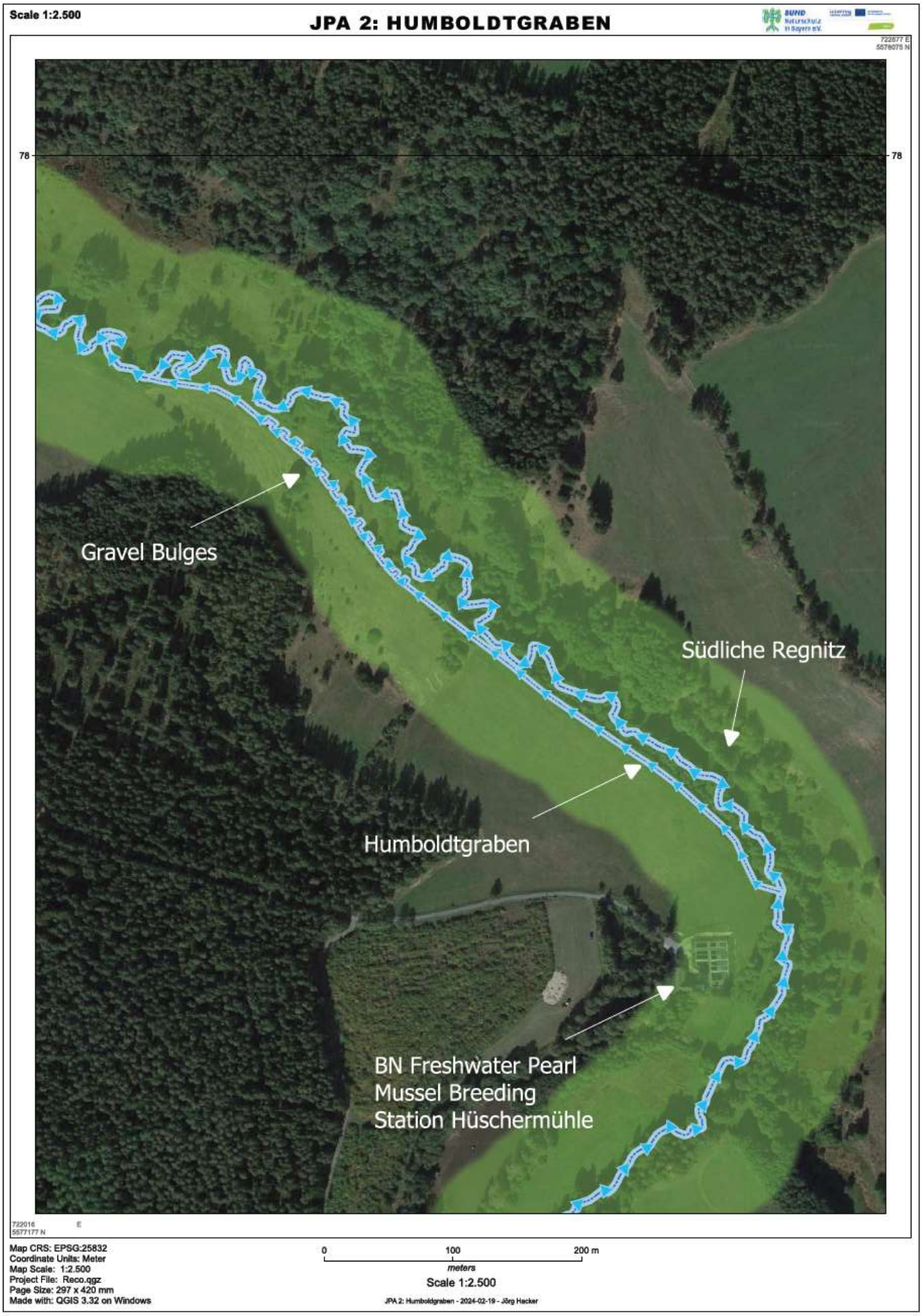
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PILOT REGION 2: GORENJSKA REGION (SLOVENIA)

Joint Pilot Action: Reviving Alpine Meadowland in Karavanke (Gorenjska region) - Sustaining Vibrant Blooms and safeguarding Endengered Species

BSC Kranj

The Joint Pilot Action in Gorenjska, Slovenia, focuses on revitalizing Alpine meadowlands in the Karavanke Mountains, with a primary goal of implementing, monitoring, and evaluating adapted agricultural management's effects on biodiversity. Emphasizing the mountain daffodil as a flagship species, the project aims to integrate seed collection, test field establishment, and awareness campaigns for landowners, residents, and visitors. The target area encompasses the Western Karavanke Mountains, with meadows in Jesenice hosting the protected daffodil. The project emphasizes ecological assessments, biodiversity enhancement through adapted agricultural practices, and digital communication initiatives. Recognizing challenges like overgrowth and changing agricultural trends, the initiative identifies the need for proper management to ensure daffodil preservation. Indicators for monitoring include landowner participation, cultivated areas, and communication actions. Stakeholders, including municipalities, nature conservation experts, tourist boards, and landowners, collaboratively engage in activities, aiming for sustainable impact, awareness, and conservation beyond the project's timeline. The pilot's success hinges on adaptive agricultural measures, seed projects, digital communication, and community involvement in fostering biodiversity in the Karavanke region.

A. Goal, Objective, and Scope

1. Overarching Goal and Objective(s)

The primary goal of the Joint Pilot Action is to implement, monitor, and evaluate the effects of adapted agricultural management on mountain meadows in the Karavanke Mountains, with the objective of revitalizing and conserving their biodiversity over the long term. Within this scope, the pilot action will particularly focus on the mountain daffodil *Narcissus poeticus* ssp. *radiiflorus*. An additional aim is to introduce seed collection for this protected species and establish test sites to monitor the success of the seed collection process. Prioritizing awareness, the project seeks to inform landowners, residents of the Karavanke Mountains, and visitors about the significance of natural values and biodiversity conservation. Over the long term, the project aspires to contribute to the establishment and enhanced management of smaller nature-protected areas. Furthermore, the

project endeavours to integrate and coordinate the efforts of sectoral expert services and local authorities for a unified approach to the management of high mountain meadows in the targeted area.

2. Geographical Area

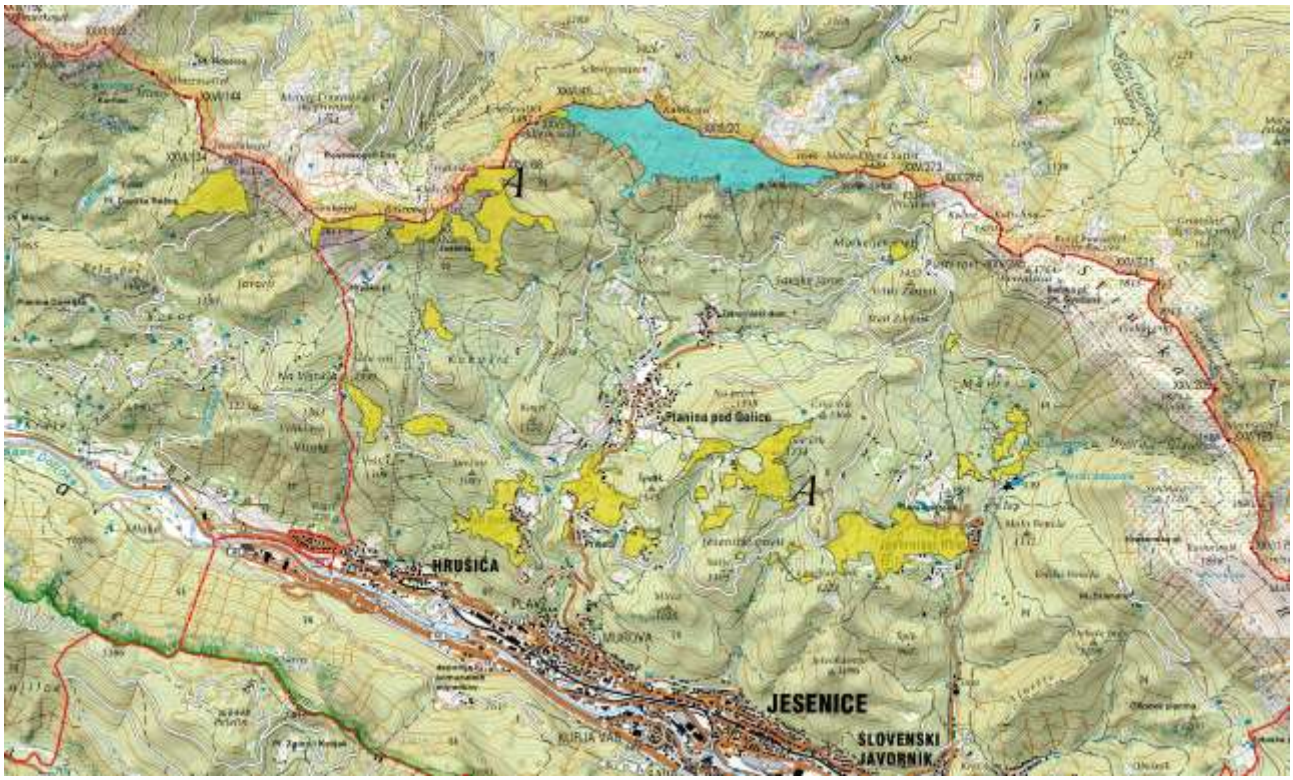
The target geographical area of the Joint Pilot Action is situated in the Western Karavanke Mountains, specifically encompassing the Karavanke region within the municipal boundaries of Jesenice. In Jesenice, the mountain daffodil is found in the Karavanke segment of the municipality, initially appearing in the lower part of the Karavanke foothills at an altitude of approximately 700 m.a.s.l. The daffodil habitats include meadows and pastures in the broader vicinity of Plavški Rovt, Planina pod Golico, Prihodi, and Javorniški Rovt. They also extend to overgrown hay meadows above Hrušica, reaching up to the summit ridges of the Karavanke Mountains, notably on Golica (1,835 m.a.s.l.). In the eastern part, the daffodil's distribution is confined to the Javorniški Rovt area, encompassing Jezerec and Mavra. In the western part, its range extends into the municipality of Kranjska Gora, covering the areas of Raven and Dovška Rožca.

Alpine meadow with blooming daffodils (Author: Klemen Klinar)

3. Ecosystem Identification

The Regulation on Protected Wild Plant Species stipulates that all wild species of daffodils are considered protected plants, making it illegal to knowingly destroy, including tearing, cutting, felling, removing from the wild, damaging, or collecting plants of this species (Regulation on Protected Wild Plant Species, 2004). In Slovenia, the mountain daffodil has held protected status since 1922. Daffodils are listed in the Red List of the Regulation on the Classification of Endangered Species of Flora and Fauna, categorized as

O1 (a subcategory under O, including species protected by the Ordinance on the Protection of Rare or Endangered Species of Flora and Fauna, no longer endangered, but with a potential risk of re-endangerment). The O status permits the harvesting of above-ground parts of a plant from the wild, excluding seeds and fruits, for personal use (Regulation on the Red Listing of Threatened Species of Flora and Fauna, 2002). The allowed quantity for personal use in one day is limited to a bouquet, equivalent to what a person can hold between the thumb and forefinger (Regulation on Protected Species of Wild Flora and Fauna, 2004). Daffodil sites are designated of national and local importance under the Regulations on the Designation and Protection of Natural Values. These sites are also integrated into the ecologically significant Natura 2000 network (Regulation on the Designation and Protection of Natural Values, 2004).



Map depicting areas with protected natural values related to daffodil stands in the Western Karavanke region: Blue indicates sites of national importance, while yellow designates sites of local significance (Author: ARSO, 2024)

4. Biodiversity Enhancement

The implementation of adapted agricultural management measures, such as deferred mowing, exclusion of spring grazing, and the use of exclusively organic fertilizers, coupled with the maintenance of the forest edge, will ensure that areas under contractual obligation by farmers adhere to conditions favoring the growth of the mountain daffodil. Simultaneously, these measures will positively impact the overall biodiversity of the mountain meadows. In addition, the Joint Pilot Actions will encompass further initiatives aimed at the conservation and enhancement of biodiversity within the pilot area. Activities will include the collection of daffodil seeds and the establishment of test fields to

investigate the success of artificial sowing for meadow restoration after construction or earthworks. Furthermore, the creation of digital communication content and the organization of communication and awareness-raising events will contribute to a deeper understanding of the significance of biodiversity, thereby supporting its conservation and enhancement.

B. Background and Justification

1. Necessity Overview

The municipality of Jesenice, nestled in the Karavanke region, is home to expansive and widely recognized daffodil habitats, notably on the slopes of the Golica Mountains and the meticulously cultivated meadows encircling the villages of Plavški Rovt, Planina pod Golico, Prihodi, and Javorniški Rovt. Local narratives from older generations vividly describe the Golica Mountains' slopes adorned in white with daffodil flowers, making it the largest and most frequented daffodil site in Slovenia. Despite the recognition of daffodil habitats in other regions of the country, Golica and its surrounding villages remain unparalleled in both size and popularity among tourists.

In nurturing these natural environments for daffodils, proper agricultural management of the meadows is indispensable. However, the evolving landscape in these hill regions, adapting to modern agricultural trends and techniques, exerts pressures on daffodil sites. Challenges include:

- overgrowth of farmland,
- shift in agricultural use towards extensive farming, negatively impacting daffodil growth (such as the abandonment of mowing meadows solely for grazing),
- transition to intensive farming with adverse effects (including early spring grazing, premature mowing, ensiling, and baling instead of traditional drying on the ground).

An example of overgrown meadow with low level of biodiversity and a visible decline in daffodils (Author: Klemen Klinar)

The abundance of daffodil flowers within a specific area is predominantly influenced by cultivation practices and ecological conditions, particularly soil type and moisture, light availability, and the organic content of the soil. Among these factors, cultivation methods are deemed the most influential, emphasizing the pivotal role of proper management for achieving widespread daffodil representation. In instances of inadequate management, neglect, or intensified land use, only specific sections of the area—typically deeper soils with moderate fertilization – can sustain thriving daffodil populations. In areas prone to overgrowth, daffodils may endure for several years or even a decade, persisting individually on the periphery of more densely vegetated woodlands. The longevity and scattered presence of daffodils in such overgrown areas highlight their resilience even in less favourable conditions.

Sharp edge between the daffodil fields and intensively cultivated meadow with premature spring grazing (Author: Klemen Klinar)

Relying on daffodil abundance counts and their correlations with climatic data, it becomes evident that the annual daffodil abundance is significantly impacted by weather conditions. Considering the escalating impact of climate change, marked by extreme weather events, it is anticipated that daffodil stands will experience further consequences. In particular, droughts during the dry season are anticipated to emerge as particularly unfavorable situations, posing challenges to the thriving of daffodil populations.

2. Site Selection Criteria

The Joint Pilot Action covers the area of daffodil stands in the municipality of Jesenice. The area is bounded to the north by the state border, to the west by the municipal border, to the south by a 700 m contour line, and to the east by the Javornik stream to its source and the Medje dol stream to the state border.

Within the defined area, areas eligible for inclusion in the programme are those which represent a spatially contiguous area where the mountain daffodil occurs at least at a frequency such that the plant is represented individually over the whole area at a

density of 1 specimen per m^2 or in clumps. Within the cultivation units, ineligible areas larger than 10 m^2 (e.g. trees, rocks, buildings) shall be excluded.

Beneficiaries eligible for Joint Pilot Action activities are natural persons who are owners or, in the case of multiple owners, co-owners of the land. In addition, selected sites must meet the following conditions:

- each spatially contiguous cultivation unit of at least 300 m^2,
- the minimum total area of all cultivation units per owner is 1,000 m^2,
- in the case of co-ownership, the beneficiary signs a declaration that the other co-owners of the land have no objection to his/her inclusion in the scheme.

An area with an extraordinary density of daffodils in the western part of Golica mountain (Author: Klemen Klinar)

C. Approach and Activities

1. Restoration Approaches

Since 2017, the Daffodil Preservation Program ("Ohranimo narcise") has been in operation in the municipality of Jesenice, focusing on conserving daffodil habitats in the Karavanke Mountains. The program primarily collaborates with landowners who adjust their activities in the area to meet the specific needs of daffodils. The Municipality of Jesenice, the Development Agency of Upper Gorenjska, and the Institute of the Republic of Slovenia for Nature Conservation actively participate in this initiative. In response to the program's recent stagnation, the Joint Pilot Action will implement additional measures to expand the number of participating landowners and enlarge the areas covered by the program. During the planning phase, a survey was conducted among landowners in daffodil sites to understand their needs and preferences. Based on their feedback, the decision

was made to enhance the program by including more landowners, incorporating additional arable land, launching a seed collection project, implementing innovative digital communication, and conducting an awareness-raising campaign.

2. Techniques and Methods

To achieve the objectives, the Joint Pilot Action will implement the following activities:

1. Monitor the implementation of the adapted agricultural management program in the areas already covered by land monitoring.
2. Conduct monitoring of daffodil stands, observing daffodil numbers at 10 permanent sample sites on different types of stands.
3. Enhance the promotion of the program among landowners, involve at least two new landowners, and acquire additional areas in the program of at least 2 hectares, including any increase by already-involved landowners.
4. Initiate a daffodil seed project, comprising:
   a. Establishing an accepted written agreement with at least 5 owners for collecting daffodil seeds on their land.
   b. Developing professional guidelines for seed collection.
   c. Conducting the first seed collection in June 2024.
   d. Establishing at least two test fields to verify the success of future daffodil sowings.
   e. Securing a written agreement with ZRSVN OE Kranj for the trial's implementation for the next five years, extending until at least 2029.
5. Prepare and implement modern digital communication content for presenting biodiversity in the mountain meadows of the Karavanke Mountains, targeting visitors, especially during the non-flowering season, in collaboration with the local Tourist Information Center (TIC). Ensure meaningful integration of the content into the tourist offerings and communication channels of tourism providers and promoters.
6. Procure appropriate digital equipment for presenting the developed digital content.
7. Organize three communication and awareness-raising events on the importance of biodiversity in mountain meadows:
   a. Conduct a workshop for owners involved in the Preserving Daffodils program, featuring a demonstration of mowing with a remote-controlled mower and a lecture on the richness of biodiversity in the Karavanke mountain meadows.
   b. Host an event for visitors during the daffodil flowering season.
   c. Present the results of the VR content design to local stakeholders, owners, the local population, and other interested members of the public.
8. Pilot the implementation of mowing steep meadows by at least 3 owners involved in the program.

3. Ecological Assessments

To oversee daffodil habitats in the Western Karavanke region, management plans were formulated in 2008 under the auspices of the Institute of the Republic of Slovenia for Nature Conservation for nine designated areas (Golica 1, Golica 2, Javorniški Rovt - Pristava, Farm Menten, Markljev rovt - Kočna, Martinčev rovt, Plavški Rovt, Prihodi - Parkelj, and Rogarjev rovt). During the preparation of the Special Protection Area (SPA), the overarching guidelines from the management plans were incorporated and endorsed for the execution of various measures, including directives related to mowing, grazing, and fertilization.

An example of the mosaic landscape of intermingled meadows and forests on the southern slopes of Španov vrh. All the meadows in the picture represent daffodil stand (Author: Surveying and Mapping Authority of the Republic of Slovenia)

4. Ecological Connectivity

The Joint Pilot Action area comprises a mosaic of diverse ecosystems, including forests, cultivated grasslands, and mountain pastures. Conservation efforts primarily target the steeper, extensively cultivated meadows, often encircled by forests. Preserving these meadows is vital for safeguarding the specific flora and fauna intricately connected to the mosaic structure of the habitats in the area. This interconnection creates unique environments and essential connections crucial for the area's flora and fauna, such as meadows serving as grazing areas for game, the distinctive species structure of grassland-forest edges featuring light-loving fruiting tree species, and extensive hay meadows providing a habitat for grassland butterflies. Establishing an ecologically coherent

landscape with diverse grassland and woodland habitats, showcasing rich biodiversity, will enhance the region's resilience to potential climate change pressures.

D. Indicators and Monitoring

2. Indicators Overview

Indicator I focuses on the number of landowners involved in the restoration of alpine meadows. The indicator is defined as the count of landowners/farmers participating in the Preserving Daffodils program, who, already meeting program conditions, sign agreements for additional treatment/cleaning of meadows under the ReCo project, thereby supporting flower biodiversity in Alpine meadows. The unit of measurement is the number of contracts/agreements with farmers. The baseline data is set at 36 for the year 2024, with a target of at least 2 additional involved landowners for the year 2025. Monitoring will occur by ensuring the involvement of additional farmers during the pilot action implementation, and contracts for the Preserving Daffodils program for 2025 will be signed accordingly. The data collection method involves BSC Kranj-PP10 and external experts drafting agreements with defined measures/activities for landowners based on certain agreed conditions. These agreements will be revised and signed by landowners, committing to carry out the agreed-upon measures or activities. The collected data will be reported as the number of contracts signed in autumn by landowners, reflecting their genuine interest in adapting grassland maintenance to encourage a greater diversity of grassland flowers.

Indicator II, focusing on the cultivated area included in the program, defines that 40.52 hectares will be cultivated based on contracts signed by landowners/farmers, adhering to program guidelines. Additionally, the pilot action encourages farmers to extend their efforts by cleaning and cultivating an additional 2 hectares of meadows. The unit of measurement is hectares of the cultivated area, with a baseline of 40.52 hectares cultivated within the Daffodils Programme and an additional 2 hectares provided through the agreement of the ReCo pilot action. Monitoring of the cultivated area, involving landowners, takes place annually, typically in late June or July. The data collection method entails a field review with landowners, assessing the size of the mowed area, proper mowing timing, and processing methods. A comprehensive report, including improvement suggestions and incentives for future activities, is prepared in October 2024. The collected data will be analyzed and reported alongside the signing of new contracts for 2025 in autumn, specifying the areas to be covered, and anticipates an increase in the cultivated area to 42.5 hectares based on the promotion of the ReCo pilot action program.

In the context of Biodiversity Empowerment Actions (indicator III), the indicator aims to heighten awareness regarding the significance of biodiversity conservation in Alpine meadows through a set of three communication initiatives. These initiatives encompass a workshop designed for stakeholders, an event catering to the general public and residents, and a virtual reality (VR)-based information point tailored for visitors. The

measurement unit for this indicator is the number of communication actions, with a baseline of 0 in 2023 and an anticipated growth to 3 in 2024. Monitoring is scheduled at the conclusion of the pilot action implementation period (PR 4) and after one year of VR utilization. The data collection method involves organizing workshops and events, analyzing participant feedback, and providing the VR application based on video recordings and interviews conducted in June. Qualitative data, gathered through interviews or surveys with local stakeholders, including farmers, conservationists, and community members, will be analyzed and reported. Additionally, proposals for future communication activities, aimed at enhancing awareness of the importance of natural values and biodiversity conservation, will be developed.

3. Responsibility Assignment

BSC Kranj, in collaboration with external experts, will be tasked with the implementation and communication with stakeholders, including municipalities, the Institute of the Republic of Slovenia for Nature Conservation, and the Tourist Information Office, among others. Additionally, they will engage with beneficiaries such as residents and visitors. Their responsibilities encompass data analysis, the preparation of a concise report detailing the implementation process, results, on-field observations, and recommendations for future actions in the area. This information is essential for gaining insights into the social aspects of conservation efforts and assessing the level of acceptance for the implemented measures.

4. Utilization for Decision-making

In the long term, we will continue to collaborate on the topic with relevant stakeholders. We plan to compare current data with baseline information to assess changes over time, identifying both positive and negative trends to evaluate whether conservation goals are being met. The ultimate objective is to expand the pilot action to other areas in the region and demonstrate to decision-makers the necessity of managing smaller nature-protected areas. Additionally, we aim to emphasize the importance of integrating the efforts of various sectoral professional services and local authorities in achieving comprehensive and effective nature conservation.

E. Community Engagement and Stakeholders

1. Stakeholder Identification

The following stakeholders will be engaged in the implementation of the Joint Pilot Action: Municipality of Jesenice, Jesenice Tourist Information Centre, Institute of the Republic of Slovenia for Nature Conservation, Regional Unit Kranj (ZRSVN, OE Kranj), Development Agency of the Upper Gorenjska Region, Golica Tourist Board, landowners, local residents, visitors and tourists.

2. Involvement and Consultation

The municipality of Jesenice will be integrated into the Joint Pilot Action as a local community already fostering the preservation of daffodil plantations and shaping the overall identity of the community around the daffodil as a key local symbol. It is anticipated that the municipality will continue funding initiatives to incentivize landowners to cultivate their land following the Joint Pilot Action implementation. The Jesenice Tourist Information Centre will actively contribute to the development and execution of modern digital communication content, integrating it into the tourist offerings, and organizing a communication and awareness-raising event for visitors. The Institute of the Republic of Slovenia for Nature Conservation, Regional Unit Kranj, serving as the expert institution responsible for nature conservation, will actively participate in all Joint Pilot Action activities as an expert advisor, guideline preparer, and administrator of the test fields for seed sowing post- Joint Pilot Action implementation.

Monitoring the presence of daffodils and orchids on alpine meadows in Karavanke, implemented by The Institute of the Republic of Slovenia Nature Conservation, Regional Unit Kranj and The Development Agency of Upper Gorenjska (Author: Klemen Klinar)

The Development Agency of Upper Gorenjska will participate in the Joint Pilot Action as an organization that has already executed the "Preserving Daffodils" project since 2016, building upon it through upgrades and new activities within the Joint Pilot Action of the ReCo project. The Golica Tourist Board will serve as a stakeholder in the development of digital communication content, integrating it into the tourism offerings, and contributing to the implementation of communication and awareness-raising events for both the local population and visitors. Key contributors to the project will be the landowners, with 36 currently involved and at least 2 more planned. They will play a crucial role in ensuring the proper management of daffodil stands and will actively participate in a communication

and awareness-raising event. Additionally, they will partake in a practical demonstration of mowing using a remote-controlled mower, with a pilot mowing session involving three landowners. This initiative aims to enhance their awareness and knowledge regarding effective daffodil management practices.

3. Community-based Approaches

At the community level, the initiative will primarily engage with landowners, with 36 already under contractual commitment for daffodil conservation. Efforts will be made to identify individuals, potentially younger and more educated, among them who can serve as advocates for biodiversity conservation within their village communities. These advocates will play a pivotal role in recruiting new landowners to participate in the conservation program. Regarding education, active collaboration is planned with local tourist organizations, specifically TIC Jesenice and TD Golica, as well as the development agency, for communication and awareness-raising events. This collaboration aims to actively involve the local population and visitors by incorporating themes related to biodiversity awareness into the events organized by these entities.

F. Budget and Resources

1. Budget Estimation

Activity	Duration	Estimated cost
0. Preparation of the SPA	January - February 2024	EUR 5.000,00
1. Monitoring the implementation of the Adapted Farming Programme	June - September 2024	EUR 3.000,00
2. Monitoring daffodil stands	May - July 2024	EUR 2.000,00
3. Increased promotion of the programme among landowners and additional involvement of new landowners and acquisition of additional areas in the programme	March - November 2024	EUR 2.000,00
4. Launching a project to propagate/preserve daffodils by seed	March - September 2024	EUR 7.000,00
5. Developing and delivering modern digital communication content	May - February 2025	EUR 24.000,00
6. Purchase of appropriate digital equipment for the presentation of the developed digital content (e.g. computers, VR glasses, etc.)	September - February 2025	EUR 5.000,00
7. communication and intelligence events	May - February 2025	EUR 8.000,00
8. Piloting the mowing of steep meadows	June - September 2024	EUR 8.000,00
TOTAL	January 2024 - February 2025	EUR 64.000,00

2. Equipment and Tools

No equipment and tools are required for meadow maintenance activities, as the landowners will personally undertake the agricultural cultivation work. The tillage operations are categorized into three potential combinations of mowing and harvesting for the meadows:

- hand mowing - hand harvesting: involves mowing exclusively with a hand scythe and manual harvesting where no motorized means are used to remove forage from the surface; tractor removal of forage from the edge of the surface is acceptable,
- machine mowing - manual harvesting: encompasses any mowing with power-driven equipment, such as a power mower, self-propelled mower, or tractor mower, followed by manual harvesting,
- machine mowing - machine harvesting: includes the use of power-driven equipment for both mowing and the collection/removal of forage from the surface by motorized means, like a tractor with a sa-trailer. However, baling of raw forage in mechanical harvesting is not allowed; removal of semi-dry forage for drying in a shed or on a drying device is acceptable.

To pilot and demonstrate remote-controlled mower activities and mowing by at least three landowners, an external contractor will be hired. This activity is part of the SPA due to the current trend of abandoning steep meadows, and modern remote-controlled mowers are expected to help maintain these areas with less physical effort. Additionally, to create modern communication digital content for educational and awareness-raising purposes, and to continue these efforts post-project, computer equipment (e.g., laptops, VR glasses, etc.) will be acquired to facilitate content presentations at a centralized location in the Jesenice municipality area.

G. Timeline

1. Action Timeline

Activity	Duration	A key milestone
1. Monitoring the implementation of the Adapted Farming Programme	June-September 2024	monitoring of all areas involved
2. Monitoring daffodil stands	May-July 2024	monitoring of vegetation at 10 sample sites
3. Increased promotion of the programme among landowners and additional involvement of new landowners and acquisition of additional areas in the programme	March - November 2024	indicators achieved: • at least 2 new owners in the programme, • 2 ha of new land in the programme
4. Launching a project to propagate/preserve daffodils by seed		
a) Written agreements with owners, obtaining MNVP consent for collecting seeds of protected species	March-May 2024	at least 5 written agreements with the owners (for seed collection, sowing and test plots), approval of the MNVP
b) expert guidance	March-May 2024	a document with instructions for collecting, preparing and sowing seeds and a monitoring methodology completed
c) collecting daffodil seeds	May-July 2024	at least 0,5 l of seeds harvested

d) establishment of test fields, determination of germination, monitoring of germination in test fields	July-September 2024	at least 2 test fields established and handed over to the RRSVN for monitoring at least until 2029
5. Developing and delivering modern digital communication content	May 2024-February 2025	digital communication content completed
6. Purchase of appropriate digital equipment for the presentation of the digital content developed	September 2024-February 2025	a digital content presentation point is set up
7. communication and intelligence events		
e) workshop for owners	May-August 2024	1 event held (at least 10 owners present)
f) event for visitors	May-June 2024	1 event held (at least 30 visitors)
g) Presentation of results after designing VR content for local stakeholders.	January-February 2025	1 event held (minimum 20 participants)
8. Piloting the mowing of steep meadows	June-September 2024	Mowing of meadows by at least 3 owners

2. Phase Timeframes

The timeframe has no phases but is divided into 8 main activities.

H.Risk Assessment and Mitigation

1. Risk Identification

The risk is associated with the creation of contemporary digital communication content, requiring careful preparation in a suitable format to engage visitors while maintaining accessibility for a broad audience. Considering that the rest of the Joint Pilot Action aligns with and enhances an existing program, the likelihood of other risks is minimal. During the Joint Pilot Action preparation phase, the activities were, to some extent, already coordinated with other stakeholders, such as landowners, ZRSVN, and OE Kranj.

2. Mitigation Strategies

A content production company, leveraging its extensive experience and proficiency in foreseeing and evaluating the significance of content, will actively participate in conceiving and developing modern communication digital content. Throughout the creation and implementation phases, collaborative efforts will be forged with the Jesenice Tourist Information Centre and the Golica Tourist Board. This collaborative approach ensures the alignment of content production with their specific requirements and capabilities, including considerations of available space, time constraints, and staffing resources. By tailoring the content to meet the unique needs of these entities, this partnership aims to deliver impactful and tailored digital communication materials.

I. Partnerships and Collaborations

1. Collaborating Entities

The Municipality of Jesenice plans the participation of a representative from the Department of Agriculture, a representative from the Jesenice Tourist Information Centre, a representative from the ZRSVN OE Kranj, a representative from the Development Agency of Upper Gorenjska, a representative from the Golica Tourist Association, and a representative from the landowners who will actively engage in the activities.

2. Capacity Building

Educational and awareness-raising activities are outlined within the Joint Pilot Action. These activities, with a particular emphasis on the workshop tailored for landowners, are pivotal in enhancing the capacity of the local population to appreciate biodiversity as a significant asset and value. The acquired knowledge will empower landowners to serve as advocates for the protection of protected species and natural values. A comparable capacity-building impact is envisaged through the education of local youth, facilitated by the co-creative digital content to be developed as part of the Joint Pilot Action. This approach aims to foster a broader understanding of environmental conservation, ensuring a sustainable and informed commitment to safeguarding biodiversity among both landowners and the younger generation in the community.

3. Educational and Outreach Activities

Three educational and awareness-raising events are scheduled as part of the initiative:

1. A workshop targeting landowners in daffodil habitats, featuring a demonstration of mowing with a remote-controlled mower and a lecture emphasizing the significance of biodiversity in the mountain meadows below Golico. This session will also spotlight the most endangered and protected species in the region.
2. A visitor event designed for the general public, with a specific focus on biodiversity in mountain meadows within the Western Karavanke Mountains. This event is planned to take place in the field, providing a hands-on experience.
3. The presentation of the outcomes from the Virtual Reality (VR) content creation to local stakeholders, including the launch and showcase of the VR content dedicated to daffodils and the broader biodiversity of the Western Karavanke region.

J. External Approvals

1. Compliance Assurance

The proposed activities will be collaboratively designed in partnership with ZRSVN, OE Kranj, serving as an active stakeholder in the implementation of the SPA. Any actions

involving privately owned land, such as the collection of daffodil seeds, will strictly adhere to the requirement of obtaining written consent from the landowners.

2. Permits and Approvals

Given that the mountain daffodil is a protected wild plant species, the activity of seed collection will be contingent upon receiving approval from the Ministry of Natural Resources and Spatial Planning of the Republic of Slovenia.

K. Reporting

1. Data Collection Process

The project partner, BSC Kranj d.o.o., will collaborate with the field partner or external contractor to ensure the ongoing monitoring of the performance of Joint Pilot Action activities. For each activity, the following evidence will be systematically provided:

Activity	Evidence to be provided
1. Monitoring the implementation of the Adapted Farming Programme	field inspection records
2. Monitoring daffodil stands	10 points of site monitoring records
3. Increased promotion of the programme among landowners and additional involvement of new landowners and acquisition of additional areas in the programme	table of owners and areas covered by the programme by contract
4. Launching a project to propagate/preserve daffodils by seed	• Written agreements with owners • Consent of the MNVP • Expert guidance • Photos of seed collection • Declaration of custody of the test fields by ZRSVN
5. Developing and delivering modern digital communication content	• Content presentation document
6. Purchase of appropriate digital equipment for the presentation of the digital content developed	• Photos of installed equipment • Photos from the launch event
7. communication and intelligence events	• Attendance sheets from events • Photos from events
8. Piloting a remote-controlled mower for mowing steep meadows	• Written consent from at least 3 owners to carry out the mowing • Photos of the mowing operation

2. Progress Reporting

Project Partner BSC Kranj, in collaboration with the field partner/external contractor, will maintain regular communication with project stakeholders, ensuring they are kept informed about project progress through scheduled meetings. BSC Kranj will provide updates in online pilot action group meetings and during partnership meetings held every six months. To disseminate information to the general public and visitors, communication will be conducted through various channels, including social networks managed by TIC Jesenice, Development Agency of Zgornje Gorenjska, Tourist Board Golica, and BSC Kranj. Additional dissemination avenues include the e-news of BSC Kranj, local media such as Jesenice news, and at least one regional media outlet, such as the Gorenjski glas

newspaper. This comprehensive communication strategy aims to ensure transparency and broad awareness of project activities among both stakeholders and the wider community.

L. Durability

1. Sustainability Consideration

The sustainability of Joint Pilot Action results will be guaranteed through several measures:

- The program is designed to persist beyond the Joint Pilot Action, extending to new landowners and newly acquired land during the project, ensuring continuity at least until 2029. This will be achieved by engaging landowners and overseeing the appropriate agricultural cultivation of the involved land. The ongoing management of the project will be entrusted to the Development Agency of Upper Gorenjska, with financial support from the Municipality of Jesenice.
- The pilot project focusing on daffodil propagation through seed collection, initiated with the assistance of the ReCo Joint Pilot Action project, is set to operate until 2029. The ZRSVN, OE Kranj, will oversee the management of the test fields.
- Beyond the Joint Pilot Action, the modern communication content and the necessary computer equipment utilized for demonstration or interpretation will be repurposed for ongoing educational and awareness-raising initiatives. The provision of both content and equipment will be the responsibility of TIC Jesenice.
- The promotion of awareness among landowners through the demonstration and pilot mowing of meadows using remote-controlled mowers will have a lasting impact on understanding the significance of biodiversity and their role in mitigating climate change. It will also foster a sense of pride and awareness, encouraging landowners to continue properly managing flowering meadows in the Karavanke mountains.

2. Area Management

The current stewardship of mountain meadows in the Karavanke Mountains within the municipality of Jesenice reflects a growing commitment to preserving this natural treasure, with a particular focus on the mountain daffodil as a flagship species. In the medium term, the ReCo project's pilot activities, will benefit from institutional management and funding. Looking ahead, it would be prudent to consider the integration of the program into an established nature protection area or reserve for long-term sustainability. An ideal prospect involves extending the coverage of nearby or interconnected protected areas and safeguarding the Western Karavanke region within existing frameworks such as the Karavanke UNESCO Global Geopark, thus enhancing its value as a significant option for conservation and cultural heritage preservation.

PILOT REGION 4: ŠKOCJANSKIZATOK NATURE RESERVE (SLOVENIA)

Joint Pilot Action: Protecting Ecological Values and Importance of the Mediterranean Brackish Wetland for Biodiversity and Nature Protection

DOPPS - BirdLife Slovenia

The Joint Pilot Action in Škocjanski zatok Nature Reserve aims to address climate change challenges affecting wetland ecosystems, particularly coastal wetlands. Located in southwest Slovenia, this 122.7-hectare reserve includes a brackish lagoon and freshwater marsh critical for biodiversity. The initiative, managed by DOPPS-BirdLife Slovenia under the ownership of the Republic of Slovenia, focuses on mitigating climate change impacts on Natura 2000 habitats and bird species in the reserve. Key accomplishments include the establishment of a freshwater marsh and habitat restoration efforts, resulting in the addition of 17 breeding bird species since 2007. The pilot action seeks to create new mudflats, enhancing nesting sites for Natura 2000 species. Predicted sea-level rise and climate change threaten coastal wetlands globally, emphasizing the urgency of conservation efforts. The approach involves habitat mapping, bird monitoring, and the creation of two new mudflats using specialized equipment. Risks such as pollution and water quality concerns are addressed through collaboration with stakeholders and effective protocols. Community engagement, educational outreach, and partnerships with local entities, including the Municipality of Koper and the Port of Koper, are integral to project success. The initiative aligns with the Škocjanski zatok Nature Reserve's 10-year management plan, ensuring long-term sustainability. Regular reporting and workshops ensure transparent communication with stakeholders, supporting adaptive management decisions. With a planned timeline from March 2022 to June 2025, this pilot action represents a comprehensive and sustainable approach to climate resilience in Škocjanski zatok Nature Reserve.

A. Goal, Objective, and Scope

1. Overarching Goal and Objective(s)

The primary objective of the Joint Pilot Action in the Škocjanski zatok Nature Reserve is to effectively tackle the challenges arising from climate change, specifically in wetland ecosystems, with a targeted emphasis on coastal wetlands. The initiative aims to devise and implement measures that mitigate the adverse effects of climate change on the safeguarded Natura 2000 habitats and bird species inhabiting the brackish lagoon of the Škocjanski zatok Nature Reserve.

2. Geographical Area

The Škocjanski zatok Nature Reserve (45°32'29" N, 13°44'35" E) stands as the largest brackish wetland in southwest Slovenia, encompassing 122.7 hectares and comprised of two primary sections: a brackish lagoon and freshwater marsh. Located near the town of Koper, it falls within the Koper Littoral region and, from a maritime standpoint, is integral to the Koper Bay and the broader Gulf of Trieste. The propinquity to the sea, combined with a Mediterranean climate and Sub-Mediterranean vegetation, cultivates a diverse array of plant and animal species. Serving as a nesting, wintering, and migration site of European significance, the reserve boasts a remarkable biodiversity. The region experiences a substantial number of sunlit days, reaching up to 2,350 hours annually, with temperatures fluctuating between 0°C and 20°C. The precipitation pattern follows a Sub-Mediterranean regime, characterized by elevated precipitation in spring and autumn and diminished levels in winter and summer. Designated as a nature reserve in 1998 and acknowledged as an ecologically vital area in 2004, Škocjanski zatok attained inclusion in the European Natura 2000 network (SI 5000008) in the same year.

Škocjanski zatok Nature Reserve and its location in Slovenia (Author: DOPPS)

3. Ecosystem Identification

The Škocjanski zatok Nature Reserve stands as a distinctive ecosystem in Slovenia, distinguished by its proximity to the sea, Mediterranean climate, sub-Mediterranean vegetation, and anthropogenic origin. Boasting a diverse array of habitats, including

freshwater wetlands, ponds, reedbeds, shallows, salt marshes, mudflats, islets, and deep-water areas, this reserve serves as a haven for a rich variety of fauna and flora, some of which are rare and endangered. Notably, 41% of all Slovenian amphibian species, 41% of reptile species, over 66% of bird species observed in Slovenia, and 36% of Slovenia's mammals find refuge in this area.

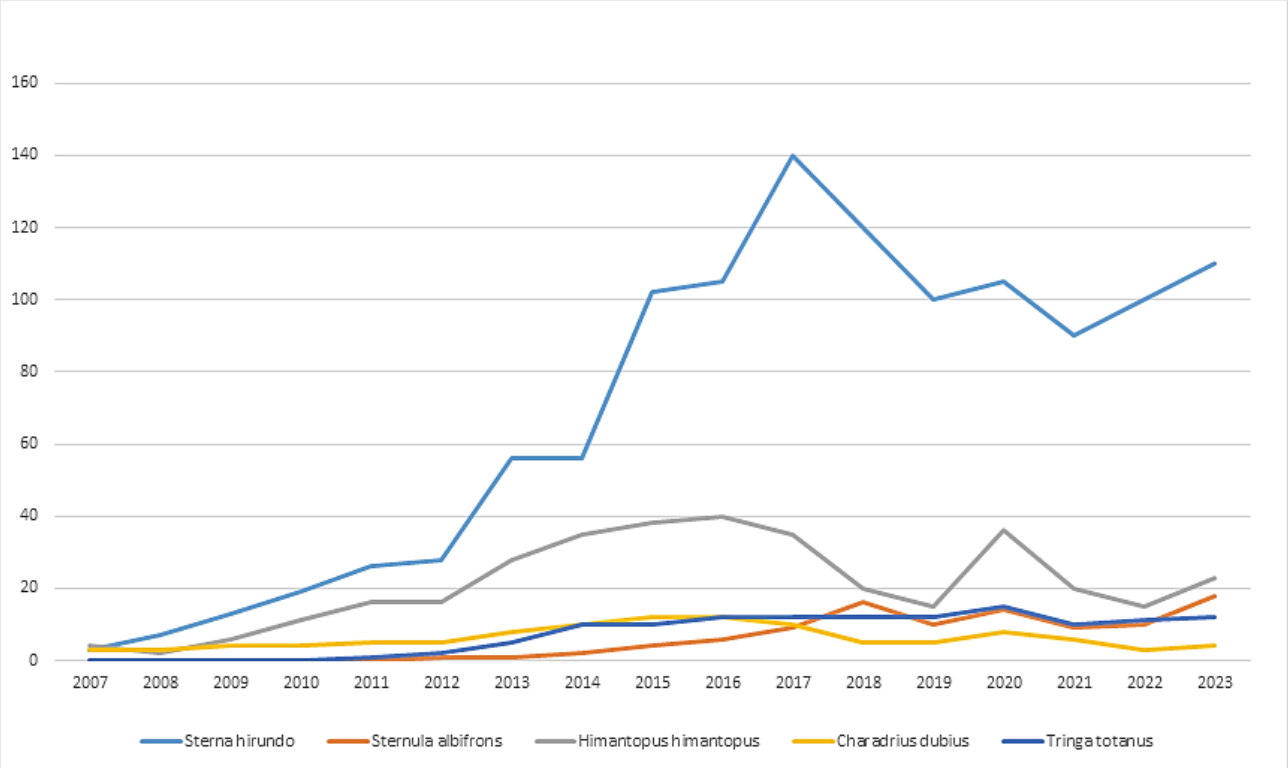
A noteworthy accomplishment in meeting conservation objectives is the establishment of a freshwater marsh, coupled with extensive efforts to restore and regenerate the habitat in the brackish lagoon, conducted between 2006 and 2007. This success exemplifies best practices in natural habitat creation, marked by collaboration between botanical, ecological, and hydrological experts alongside technical specialists. The restoration and creation of various habitats, rare and endangered at both Slovenian and European levels, have fostered conditions conducive to the proliferation of bird species, especially those of national and international importance. The introduction of mudflats and marginal habitats in the brackish water lagoon has provided new nesting sites for significant Natura 2000 species, including the *Sterna hirundo* (common tern), *Sternula albifrons* (little tern), *Himantopus himantopus* (black-winged stilt), *Tringa totanus* (common redshank), and *Charadrius alexandrinus* (kentish plover).

The Škocjanski zatok Nature Reserve has witnessed the addition of 17 new breeding bird species since 2007, including the *Charadrius dubius* (little ringed plover), *Sterna hirundo* (common tern), and *Himantopus himantopus* (black-winged stilt) since 2007, *Spatula querquedula* (garganey) and *Cygnus olor* (mute swan) since 2008, *Tringa totanus* (common redshank) since 2011, *Sternula albifrons* (little tern) since 2012, *Larus michahellis* (yellow-legged gull) since 2013, *Podiceps cristatus* (great crested grebe), *Aythya ferina* (common pochard), and *Ardea purpurea* (purple heron) since 2017, *Anser anser* (greylag goose) since 2018, *Recurvirostra avosetta* (avocet), *Columba palumbus* (woodpigeon), *Oriolus oriolus* (oriole), and *Hirundo rustica* (barn swallow) since 2019. Its ecological significance is underscored by the identification, observation, and recording of more than 1,600 different plant and animal species in the protected area by 2023.

4. Biodiversity Enhancement

Through restoration endeavors, novel expanses conducive to the growth of target Natura 2000 habitats in the brackish lagoon of Škocjanski Zatok will be established, encompassing mudflats and sandflats emergent at low tide (N2000 code 1140), *Salicornia* sp. and other annual plants colonizing mud and sand (N2000 code 1310, featuring key halophyte species such as glasswort *Salicornia europea* and sea blite *Suaeda maritima*), Mediterranean salt meadows *Juncetalia maritime* (N2000 code 1410), and Mediterranean and thermo-Atlantic halophilus scrub *Sarcocornetea fruticosi* (N2000 code 1420, with principal perennial halophyte species including shrubby samphire *Arthrocnemum fruticosum*, sea lavender *Limonium angustifolium*, and sea purslane *Halimione portulacoides*). This initiative is anticipated to augment the nesting success of Natura 2000 birds, namely the Kentish plover *Charadrius alexandrinus*, Little tern *Sternula albifrons*, and Common tern *Sterna hirundo*, with a notable surge in breeding numbers expected: 5 to 10 pairs of Kentish plover, 10-20 pairs of Little tern, and up to 150 pairs of Common tern. Moreover, these

restoration activities will ameliorate water circulation within the lagoon, mitigating the isolation of peripheral habitats. This holistic approach aims to alleviate the risk of lagoon eutrophication over time, fostering enhanced ecological conditions for nesting birds and the flourishing of halophytes across the entire lagoon area.



The number of breeding pairs of Natura 2000 birds in the lagoon from 2007 to 2023 (Author: DOPPS)

B. Background and Justification

1. Necessity Overview

Coastal wetlands, including the Škocjanski zatok Nature Reserve, represent ecosystems subject to bi-directional flooding occurring twice daily in most regions. A crucial physiological aspect of these ecosystems lies in their periodic and predictable flooding, significantly shaping successional development, species composition, stability, and productivity. Recognized for years, coastal wetlands' importance for diverse flora and fauna stems from the intricate interplay between marine and terrestrial habitats. Dominated by halophytes, these areas serve as vital feeding, resting, and nesting sites for numerous bird species.

Research indicates that climate change-induced sea-level rise will profoundly impact coastal wetlands, with projections suggesting a faster increase in the 21st century. This phenomenon poses a substantial threat globally, particularly in low-lying sedimentary coastal regions where more frequent flooding or vertical habitat retreat is anticipated. The Mediterranean and Baltic Sea regions, in particular, may witness the complete

disappearance of coastal wetlands by 2080 due to relative sea-level rise. This poses a formidable challenge for developing cost-effective biodiversity conservation plans, considering the considerable expense involved in restoring or reconstructing lost habitats.

Over the past 30 years, data from the tidal station in Koper, adjusted for sedimentation and surface subsidence trends, indicate an annual sea-level rise of 0.28 cm. Projections foresee a rise in the Gulf of Trieste by 5 cm by 2020, 11 cm by 2040, 16 cm by 2060, 22 cm by 2080, and 28 cm by 2100 compared to the latest average sea level data from 2011.

Conclusively, climate change emerges as the paramount threat to habitats and bird species in the brackish section of the Škocjanski zatok. Without intervention, the Natura 2000 habitats in the brackish lagoon are expected to diminish, adversely affecting dependent fauna. Consequently, the brackish lagoon may transform into a more marine environment, with observable changes in shorebird species composition and abundance serving as reliable indicators of the severity of the present situation.

2. Site Selection Criteria

The selection of the Škocjanski zatok Nature Reserve as the area for implementing the Joint Pilot Action was guided by several key factors, with the most significant being:

- The proven success of past restoration efforts, particularly the LIFE-Nature project (LIFE00NAT/SLO/7226), which stands as a well-implemented model of best practices. This project not only showcases past achievements but also illuminates the potential for further sustainable development within the area.
- The area's pivotal role in transitioning from a degraded environment to a habitat supporting numerous endangered plant and animal species. The diverse range of habitats resulting from previous restoration activities plays a crucial role in biodiversity conservation in the region.
- A management approach centred on preserving ecosystem diversity, thereby fostering biodiversity.
- The provision of numerous ecosystem services, critically important for the local environment, thereby contributing to the sustainable development of the region.
- Being a notable exemplar of sustainable development in the city of Koper and its environs, the area serves as a green space countering urban impacts, enhancing the quality of life for residents, and contributing to the spatial improvement of the city of Koper.

C. Approach and Activities

1. Restoration Approaches

The strategy for addressing the impacts of climate change on protected habitats and species within the brackish lagoon of the Škocjanski zatok Nature Reserve entails the establishment of two additional smaller islets/mudflats, covering a combined area of 420

m^2. The creation of these new mudflats necessitates the incorporation of various forms positioned at different micro-heights to promote the spontaneous development of targeted habitats, taking into account the natural succession process. For optimal effectiveness, these newly established areas should be situated in the central part of the lagoon, in close proximity to existing nesting islets and positioned away from the lagoon's edge to prevent access by terrestrial predators.

2. Techniques and Methods

The implementation of the Joint Pilot Action will necessitate the following procedure:

- Acquisition of material for constructing mudflats involves deepening interconnected secondary channels within the brackish lagoon.
- Creation of two new smaller mudflats (covering an area of 420 m^2) requires 710 m^3 of lagoon sediment.
- Excavation of lagoon sediment will be executed using a floating excavator equipped with a grabber and a high-pressure pump for sediment transportation from the lagoon's bottom. An additional floating excavator with a long arm will assist in holding the sediment transport pipe in the designated location for new mudflat creation.
- The output material composition must consist of 80% sediment and 20% water. This ensures low water content, preventing surface erosion and providing denser, more suitable material for forming new muddy areas.
- Dredging lagoon sediment from secondary channels enhances water circulation, reducing the isolation of peripheral habitats. This contributes over time to mitigating the risk of lagoon eutrophication and improving ecological conditions for flora and fauna across the entire lagoon area.
- It's crucial to consider the breeding season in Škocjanski zatok Nature Reserve, as works must not be carried out between April 15 and August 15.

3. Ecological Assessments

The Joint Pilot Action for the Škocjanski zatok area is grounded in two key documents:

1. Ivajnšič, D., Kaligarič, M. 2014. How to Preserve Coastal Wetlands, Threatened by Climate Change-Driven Rises in Sea Level. Environmental Management: 1–14. This document provides predictions for the Škocjanski zatok Nature Reserve, forecasting a potential drastic reduction in perennial halophytes by the middle of the 21st century due to climate change. The study proposes various adaptation and mitigation countermeasures to safeguard the targeted habitat types and the ecosystem services they offer.
2. As part of the ECOSMART project (Interreg Italia-Slovenija), an Adaptation Plan for the Škocjanski zatok Natura 2000 area was developed in 2021. This plan outlines the challenges faced by the area and proposes effective solutions.

4. Ecological Connectivity

Through the implementation of the Joint Pilot Action, we aim to enhance the conditions in the reserve's brackish lagoon, benefiting numerous plant and animal species, with a particular focus on migratory birds. The brackish lagoon serves as a vital stopover on their migration route and a breeding area. Anticipated outcomes include an increase in the number of breeding pairs of migratory birds, emphasizing the crucial role of mudflats as nesting areas. Biodiversity conservation in the brackish lagoon is paramount for maintaining ecosystem stability within the protected area and its immediate and broader surroundings.

The sentinel data gathered within the ReCo project will play a significant role in the management of Škocjanski zatok, particularly for scientific research, environmental monitoring, assessing the impacts of climate change, and monitoring bird populations.

D. Indicators and Monitoring

1. Indicators Overview

1. Indicator 1: Presence (coverage area) of Natura 2000 habitat types:

- Mudflats and sandflats not covered by sea water at low tide - code 1140,
- Salicornia and other annual plants colonizing mud and sand – code 1310,
- Mediterranean salt meadows (*Juncetalia maritimi*) - code 1410,
- Mediterranean and thermo-Atlantic halophilus scrub (*Sarcocornetea fruticosi*) – code 1420.

The presence of habitat types will be identified through mapping using the PHYSIS typology, aligned with the Palearctic classification of habitat types commonly used in Europe. The mapping will employ fieldwork based on digital orthophoto images (DOF, scale 1:2500), integrating drone technology and multi-spectral scanning for a comprehensive assessment. The resulting digital model will aid in evaluating environmental pressures and planning measures for Natura 2000 habitat conservation.

2. Indicator 2: Monitoring of nesting birds with a focus on Natura 2000 birds:

- Kentish plover *Charadrius alexandrines*,
- Little tern *Sternula albifrons*,
- Common tern *Sterna hirundo*.

The monitoring of nesting birds follows a mapping count methodology, involving thorough examinations and counts of nesting pairs and nests on newly created mudflats. Additionally, bird ringing of little tern and common tern will be conducted using a dual-ring system for identification in the field.

These comprehensive monitoring and assessment strategies aim to contribute valuable data for the successful implementation of the Joint Pilot Action in the Škocjanski zatok Nature Reserve.

Common tern *Sterna hirundo* (Author: Domen Stanič)

Kentish plover *Charadrius alexandrinus* (Author: Domen Stanič)

2. Responsibility Assignment

The tasks related to the two indicators will necessitate the involvement of appropriately skilled professionals or external contractors, specifically requiring botanists for habitat mapping, geographers for GIS data processing, and ornithologists for bird monitoring.

To keep stakeholders abreast of the ongoing activities and outcomes, we will employ diverse communication channels. The results will be disseminated through both the official website and various social media platforms, ensuring convenient online access to documents, presentations, and supplementary materials. Additionally, we plan to conduct workshops designed to directly showcase the results to key stakeholders, providing them with an opportunity to pose questions and seek clarifications. Emphasis will be placed on using clear and easily comprehensible language to enhance information accessibility for different target groups. This multifaceted communication approach aims to foster transparency and engagement throughout the project.

3. Utilization for Decision-making

- Assessment of the Effectiveness of Conservation Measures: the data will be analyzed in the context of implemented conservation measures, facilitating a comparison of conditions before and after the measures' implementation. This comparative analysis will enable an assessment of whether changes in habitats align with the desired conservation goals.
- Adoption of Adaptive Management Decisions: the analyses will yield insights into habitat dynamics over time, fostering a better understanding of evolving environmental conditions and their impacts on ecosystems. In response to this information, adaptive management strategies will be formulated to address new conditions, with a specific focus on adapting to the challenges posed by climate change.
- Benefits for Planning Future Measures: the gathered information will serve as a foundational resource for planning upcoming conservation measures, strategically directing efforts towards the most effective approaches for biodiversity conservation. Fieldwork results will contribute to identifying potential deficiencies or the necessity for additional measures. Adopting this management approach ensures that the collected data not only facilitates the monitoring of the current environmental state but also serves as a groundwork for implementing further conservation and sustainable management measures in the area.

E. Community Engagement and Stakeholders

1. Stakeholder Identification

Principal stakeholders include the Municipality of Koper, Port of Koper d.d, University of Primorska – Faculty of Tourism, Tourism Cooperative “Treasures of Istria”, Primary

School of Ankaran, tourists, birdwatchers, non-governmental organizations (NGOs), and the general public.

2. Involvement and Consultation

Stakeholder engagement will be facilitated through a series of workshops designed to foster active participation and open communication. The workshops are structured as follows: the initial workshop will serve as an introduction, featuring a presentation on both the Joint Pilot Action and the broader ReCo project. Building on this foundation, the second workshop aims to provide more comprehensive insights into the Joint Pilot Action's progress. Finally, the third workshop will showcase the initial outcomes of the implemented Joint Pilot Action and include a presentation on the implications of climate change for our environment, coupled with actionable steps individuals can take. Throughout these sessions, a participatory approach will be maintained, allowing participants to express their opinions and offer suggestions regarding the Joint Pilot Action. This open dialogue will encourage stakeholders to actively contribute to the ongoing discussions, ensuring that their perspectives shape the collaborative efforts effectively.

3. Community-based Approaches

The engagement of stakeholders in the restoration process plays a pivotal role in ensuring the successful execution of activities. Their valuable insights and expertise enhance the implementation, fostering a more thorough and effective restoration. Early involvement of stakeholders not only leads to improved solutions but also mitigates potential conflicts in later stages. Collaboration with stakeholders facilitates a deeper understanding of the community's needs and expectations. Emphasizing the significance of Joint Pilot Action for the local community is crucial, underscoring how it contributes to the community's well-being. Achieving this necessitates a concerted effort to raise awareness, a goal that can be effectively realized through diverse digital platforms. This multi-faceted approach ensures that the benefits and positive impacts of the Joint Pilot Action are communicated comprehensively to the local community, fostering support and participation.

F. Budget and Resources

1. Budget Estimation

- Cost for creating two new mudflats in the brackish lagoon – 16,856.74 EUR,
- Cost for equipment (boat for habitat mapping and monitoring of birds) – 8,000.00 EUR,
- Cost for monitoring/ habitat mapping and bird monitoring – fieldwork and multi-spectral and photogrammetric surface scanning (external expert) – 15,000.00 EUR,
- Coordination and administration – 2 persons,
- Technical staff – 2 persons.

2. Equipment and Tools

To effectively execute the Joint Pilot Action in Škocjanski zatok, the involvement of a capable external organization equipped with specialized machinery is imperative. This includes a floating excavator with a grabber and a high-pressure pump, essential for the extraction and transportation of sediment from the lagoon's bottom. Equally vital is the engagement of qualified personnel proficient in water management. The success evaluation of the implemented Joint Pilot Action mandates the expertise of skilled professionals such as botanists for habitat mapping, geographers for GIS data processing, and ornithologists for bird monitoring. Furthermore, field operations in the brackish lagoon area necessitate a low-draft boat with an electric motor, facilitating access to the newly formed mudflats situated in the central segment of the lagoon. This holistic approach ensures the comprehensive and proficient execution of the Joint Pilot Action, aligning with the conservation goals of Škocjanski zatok Nature Reserve.

G. Timeline

1. Action Timeline

March 2022 – June 2025.

2. Phase Timeframes

1. Creation of two new mudflats in the brackish lagoon:
   - starting date – mid March 2023.
2. Habitat mapping – field work:
   - from April to October 2024 (2x),
   - from April to October 2025 (2x).
3. Habitat mapping – multi-spectral and photogrammetric surface scanning:
   - from April to October 2024 (1x),
   - from April to October 2025 (1x)
4. Bird monitoring and ringing:
   - from May to June 2024 (2x),
   - from May to June 2025 (2x).

H. Risk Assessment and Mitigation

1. Risk Identification

Potential risks and challenges in the Škocjanski zatok Nature Reserve encompass:

1. Pollution from diverse sources: pollution risks arise from multiple sources, including activities within the Port of Koper, inadequate communal infrastructure in the reserve's

hinterland, improper waste management, ongoing construction sites in proximity, and the presence of transport infrastructure near the reserve. These factors collectively pose threats to the ecological integrity of the reserve.

2. Water quantity and quality concerns: the volume and quality of water entering the reserve represent critical challenges. Issues stem from the Rižana and Badaševica rivers, as well as the influx from the sea through the sea channel. Monitoring and managing the water dynamics are essential to address potential fluctuations that could impact the delicate balance of the reserve's ecosystem.

Mitigating these identified risks demands a comprehensive strategy that involves collaboration among stakeholders, effective waste management practices, and continuous monitoring of water sources. By addressing these challenges, the Škocjanski zatok Nature Reserve can sustain its unique ecosystem and fulfil its conservation objectives.

2. Mitigation Strategy

Planned strategy:

1. In addressing pollution from various sources, active collaboration is established with key stakeholders, the Municipality of Koper and the Port of Koper. A comprehensive protocol has been implemented with the Port of Koper, delineating a structured response in the event of pollution incidents to minimize potential damage. Ongoing discussions with the Municipality of Koper are currently underway to further strengthen these initiatives.
2. Concerning the quantity and quality of water from the rivers Rižana and Badaševica, as well as the sea channel, a well-defined protocol is in place with the responsible organization, which also serves as our Accredited Sampling Point (ASP), the Slovenian Water Agency. The level of collaboration with the agency is excellent, ensuring effective measures and coordination in monitoring and maintaining the desired standards for water quantity and quality.

I. Partnerships and Collaborations

1. Collaborating Entities

Restoration activities and the subsequent monitoring of the Joint Pilot Action in Škocjanski zatok will be carried out through collaborative efforts with key stakeholders, including the Municipality of Koper and the Port of Koper. This initiative benefits from an already effective partnership with the responsible Slovenian ministries: the Ministry of Natural Resources and Spatial Planning, and the Ministry of the Environment, Climate, and Energy. In the realm of educational activities, a strategic partnership has been forged with the Faculty of Mathematics, Natural Sciences, and Information Technologies at the University of Primorska. This collaboration enhances the multidimensional approach of the project, bringing together governmental bodies, educational institutions, and local

authorities to ensure the success of the restoration and monitoring endeavors in Škocjanski zatok.

2. Capacity Building

If there is a desire to organize capacity-building programs for local communities, personnel, or specific stakeholders, such considerations will be prioritized. It is crucial to empower individuals or communities, enabling them to acquire extensive new knowledge and share their experiences. This approach is fundamental to fostering improved and more efficient functioning for all parties involved.

3. Educational and Outreach Activities

Details regarding the implementation, motivations, and outcomes of the Joint Pilot Action in Škocjanski zatok will be seamlessly incorporated into guided tours tailored for visitors eager to explore the reserve. Elevating public awareness, particularly among school groups, stands as a pivotal objective in reserve management. Information about the Joint Pilot Action's progress and significance will be seamlessly woven into the educational program of the Škocjanski zatok Nature Reserve. It's noteworthy that the reserve draws over 20,000 visitors annually, with approximately 7,000 actively engaging in guided tours.

Regular updates on Joint Pilot Action achievements will be actively showcased on the DOPPS website and various social media platforms. Moreover, the findings will be featured in the widely distributed publication, Svet ptic, circulated throughout Slovenia. In addition to these channels, efforts will be made to disseminate Joint Pilot Action results through local newspapers and potentially on radio and television platforms, ensuring widespread visibility and understanding of the conservation initiatives taking place in Škocjanski zatok.

J. External Approvals

1. Compliance Assurance

Given that the Joint Pilot Action is being implemented in a protected area, encompassing a nature reserve, Natura 2000 zone, and ecologically significant region, it is imperative that all restoration activities strictly adhere to environmental regulations.

2. Permits and Approvals

Prior to commencing the Joint Pilot Action in the Škocjanski zatok area, it is imperative to compile all necessary technical and legal documentation. This includes obtaining nature conservation consent, a requisite authorization for activities conducted in an area bestowed with a special status under nature conservation regulations. Given that the Republic of Slovenia owns the Škocjanski zatok Nature Reserve, it is crucial to align all permits and documentation with the pertinent ministry responsible for the nature reserve. This ensures compliance with regulatory standards and facilitates a seamless approval

process for the implementation of the Joint Pilot Action, underscoring the commitment to meticulous planning and adherence to conservation protocols.

K. Reporting

1. Data Collection Process

Data tracking for the Joint Pilot Action will involve two primary methods: habitat mapping and bird monitoring. Habitat mapping will encompass the vectorization of mapped polygons, converting them into shape format through GIS software. This process ensures a detailed representation of habitat types, allowing for comprehensive analysis and evaluation. On the other hand, bird monitoring data will be captured, stored, and processed using the Wildlife Recorder program. This dedicated software facilitates effective management of bird-related information, enabling detailed insights into nesting patterns, population dynamics, and overall avian activities within the monitored area. The combined use of GIS technology and specialized recording programs ensures a robust and integrated approach to data collection, enhancing the precision and reliability of the Joint Pilot Action progress assessment.

2. Progress Reporting

The execution of the Joint Pilot Action and its subsequent monitoring will be systematically communicated to the ReCo project team. Regular updates will be disseminated during monthly Joint Facilitation meetings, discussions within the WP2 working group, partner meetings/excursions, or whenever the lead partner expresses interest. Stakeholders will be kept informed through a structured approach, involving three planned workshops. The initial workshop will serve as an introduction to both the Joint Pilot Action and the overarching ReCo project. The second workshop will delve into more intricate details regarding the Joint Pilot Action's progress. Finally, the third workshop will showcase the tangible outcomes and results achieved during the early stages of the Joint Pilot Action. This strategic communication plan ensures that relevant parties are consistently apprised of the developments, fostering transparency and engagement throughout the implementation and monitoring phases of the Joint Pilot Action.

L. Durability

1. Sustainability Consideration

The restoration activities of the Joint Pilot Action will be integrated into the 10-year management plan of the Škocjanski zatok Nature Reserve covering the period from 2025 to 2034. These activities will be seamlessly integrated with other management tasks, collectively supporting the long-term sustainability of this ecological area. This strategic alignment ensures that the Joint Pilot Action's restoration efforts are not isolated but

synergistically woven into the broader framework of ongoing and future conservation initiatives. By embedding Joint Pilot Action actions within the comprehensive management plan, the Nature Reserve aims to optimize the impact of restoration endeavours, fostering a holistic and sustained approach towards the preservation and enhancement of the Škocjanski zatok ecosystem.

2. Area Management

The owner of the Škocjanski zatok Nature Reserve is the Republic of Slovenia, and the manager is DOPPS-BirdLife Slovenia, as stipulated by Decision on the Selection of the Concessionaire No. 636-06/99-4 for Škocjanski zatok and Concession Agreements No. 252100-50-85/00 signed between the Government of the RS and DOPPS, along with Annexes No. 1 and 2 to this Agreement. The Republic of Slovenia has extended DOPPS's management of Škocjanski zatok until the conclusion of 2029. The comprehensive execution of the Joint Pilot Action within the brackish lagoon takes place in an area owned by the Republic of Slovenia, with DOPPS authorized for its management. In the aftermath of the project's completion, the ownership of the two newly established mudflats will be retained by the Republic of Slovenia, while the management responsibilities will persist under the purview of DOPPS-BirdLife.

Brackish lagoon of the Škocjanski zatok Nature Reserve with mudflats (Author: Stanislav Valand)

PILOT REGION 5: **EUROPEAN BISON – IŃSKO LAKELAND** (POLAND)

Joint Pilot Action: **Enhancing Migration Routes for European Bison Conservation in NW Poland**

Green Federation "GAIA"

The Joint Pilot Action in Northwest Poland, led by the Green Federation "GAIA," focuses on enhancing migration routes for the European Bison *Bos bonasus* population, contributing to their sustainable conservation. The project spans the Ińsko Lakeland and an extended pilot region, covering a total area of 40,200 km². With a goal to augment both the size and range of the Bison population, the initiative strives to facilitate migration routes, minimize human-wildlife conflicts, and promote coexistence. Noteworthy biodiversity enhancement strategies include careful breeding programs, habitat management, and initiatives for natural herd diversification. The comprehensive approach incorporates advanced technology, such as GPS collars, to monitor Bison movements and behaviors. The project emphasizes community engagement through stakeholder workshops, community-based approaches, and various outreach activities. A budget of 69,000 EUR supports the initiative, including resources for coordination, technical staff, and necessary equipment. Monitoring indicators involve 20 Bison equipped with GPS collars over 18 months, contributing to valuable insights. Risk mitigation strategies, compliance with nature protection laws, and collaboration with diverse entities ensure a sound and sustainable approach. The project's durability is affirmed through GPS collar maintenance and the continuation of activities post-project, securing the long-term viability of the Bison population in the region.

A. Goal, Objective, and Scope

1. Overarching Goal and Objective(s)

The goal of this Joint Pilot Action is to increase both the size and range of the European bison *Bos bonasus* population that has been reintroduced in Northwest Poland. To achieve this overarching goal, two key objectives have been identified. Firstly, efforts will be directed towards enhancing migration routes for European bison herds, ensuring a conducive environment for their movement. Secondly, there is a focus on minimizing conflicts between humans and European bison, promoting coexistence and harmonious interactions in the region. Through these concerted efforts, the aim is to foster a sustainable and thriving European bison population in Northwest Poland.

2. Geographical Area

The Ińsko Lakeland, encompassing the core area, spans a total of 880 km² in North-western Poland, while the extended Pilot Region extends over an area of 40,200 km². The region is characterized by its primary land use in agriculture and forestry, boasting a rich system of watercourses, water bodies, and wetlands. With a developing road and railway network, the area is relatively sparsely urbanized, emphasizing a focus on wildlife and nature-oriented tourism. Notable protected areas within the Ińsko Lakeland include the Ińsko Landscape Park, designated as Natura 2000 site with the code PLB320008 Ińsko Refugium, and PLH320067 Ińsko Lakeland.

3. Ecosystem Identification

The European bison, the heaviest wild land animal in Europe, faced extinction in the wild at the beginning of the 20th century, but its population has been successfully rebuilt from just 7 individuals. The worldwide population now exceeds 10,000 individuals, surpassing the minimum safe population size. In Poland, there are approximately 2,223 individuals, with 350 bisons distributed among 11 herds in the region, including 77 residing in Ińsko Lakeland.

Typical landscape of the Ińsko Lakeland (Author: Aneta Kozłowska)

4. Biodiversity Enhancement

The European bison conservation efforts in Northwest Poland have been marked by a focus on multiple key strategies. Initiatives include promoting population growth through careful breeding programs and habitat management, with a specific emphasis on initiating natural herd diversification. Ensuring free gene flow between herds has been prioritized to maintain high genetic diversity, contributing to the species' greater resistance to

environmental variability. Simultaneously, there has been a concerted effort to increase social acceptance of conservation measures, fostering a positive attitude towards the restitution of the European bison in the region. This comprehensive approach is complemented by effective anti-poaching measures, aiming at the reduction of illegal activities that pose a threat to the bison population. Together, these conservation endeavors underscore the commitment to preserving the European bison and its ecosystem in Northwest Poland.

B. Background and Justification

1. Necessity Overview

In contemporary conservation efforts, addressing migration barriers is imperative to counteract the isolation of individual herds. The consequential limited gene flow contributes to low genetic diversity, fostering inbreeding and subsequently increasing vulnerability to diseases and environmental changes.

Another critical concern revolves around the risk of low social acceptance due to numerous large herds causing damage to crops. This aspect not only threatens the harmonious coexistence of wildlife and agriculture but also poses challenges to garnering support for conservation initiatives.

West Pomeranian European bisons (Author: West Pomeranian Nature Society)

Furthermore, the persistent threat of poaching is hindering population growth, despite the birth of approximately 40 calves per year. Alarmingly, the population has

experienced a stagnation over the past two years, with 24 individuals illegally killed in 2021 alone. This highlights the urgent need for collaborative efforts in implementing effective strategies to mitigate poaching and ensure the sustained growth of the population.

In conclusion, the Joint Pilot Action is essential to address migration barriers, mitigate human-wildlife conflicts, and combat illegal activities such as poaching. By adopting a collective approach, we can work towards ensuring the long-term viability of these endangered populations and safeguarding biodiversity.

2. Site Selection Criteria

The focus of our efforts lies in supporting of the reintroduction program established by the West Pomeranian Nature Society, ReCo project's Associated Partner, since 2005. This comprehensive initiative encompasses various strategies, including captive breeding, reintroduction, translocations, interventions, winter feeding, and veterinary services. Through these concerted actions, we aim to not only increase the overall bison population but also facilitate the natural diversification of herds. We are pleased to report a steady rise in the number of bison, and our ongoing endeavours have successfully initiated the natural diversification process within the herds.

Captive breeding centre of the West Pomeranian Nature Society in Jabłonowo (Author: West Pomeranian Nature Society)

Notably, the Ińsko Lakeland has been selected as the newly established site of a herd of reintroduced European bisons under the West Pomeranian Nature Society

reintroduction initiative. This chosen location serves as the thriving habitat where the reintroduced bison population is now flourishing as part of our broader conservation efforts. This holistic approach underscores our commitment to the preservation and thriving of the bison population in the region.

C. Approach and Activities

1. Restoration Approaches

Restoration Approaches include the enhancement of the management of European bison herds reintroduced in NW Poland. This involves identifying migration barriers and formulating recommendations for transport infrastructure investments. Additionally, efforts are directed towards optimizing the population's spatial structure by maintaining low densities (<3 individuals/1,000 ha) through the increase in the number of herds. The implementation of constant population monitoring is crucial, ensuring a swift response to potential human-bison conflicts.

2. Techniques and Methods

Outlined below are the planned techniques and methods:

1. GPS-Collar Deployment: equipping an additional 20 animals with state-of-the-art GPS collars enhances monitoring and analysis of their movements and behaviours, providing valuable data for conservation efforts.
2. Migration Barriers Identification: a comprehensive assessment identifies and understands migration barriers that may impede the natural movement of wildlife. This entails studying geographical features, human-made structures, and other factors contributing to obstacles in the animals' migratory routes.
3. Poaching Identification and Tracking: implementing advanced tracking technologies actively identifies and monitors instances of poaching. The integration of real-time tracking systems allows for prompt responses to potential threats, contributing to the protection of endangered species and the preservation of biodiversity.
4. Formulation of Recommendations for Transport Infrastructure Investments: as part of the pilot investment, a thorough analysis of the existing transport infrastructure in the region is conducted. Based on the findings, detailed recommendations for strategic investments in transportation networks are formulated, aiming to balance human development needs with wildlife conservation and promote sustainable coexistence.

This comprehensive approach involves not only the deployment of technology for data collection but also addresses broader issues such as migration barriers and poaching, contributing to a more holistic and effective conservation strategy.

A GPS-collared female bison with a calf (Author: West Pomeranian Nature Society)

3. Ecological Assessments

The Ecological Assessments draw upon the extensive and ongoing restitution activities led by the West Pomerania Nature Society (Associated Partner). This approach ensures a comprehensive assessment rooted in the society's commitment to long-term ecological restoration.

Complementary to this effort are reintroduction activities funded through various European Union initiatives, such as the LIFE program, initiated in 2005. This collaborative synergy with other EU-funded projects underscores our dedication to ecological restoration and biodiversity enhancement, contributing significantly to the overall health of the ecosystems involved.

Incorporating advanced technology, the assessments feature GPS monitoring to gain a nuanced understanding of wildlife dynamics. Notably, 80 individuals are equipped with GPS collars, enabling precise and real-time tracking. This sophisticated monitoring system enhances our capacity to collect accurate data on the movements and behaviors of the monitored species, providing valuable insights for conservation and management strategies.

4. Ecological Connectivity

Ecological connectivity in the European bison reintroduction efforts in Northwest Poland involves identifying and addressing migration barriers to ensure the successful restoration of this iconic species. Key steps in this context include:

1. Identification of migration barriers: conduct a thorough assessment of the existing landscape to pinpoint obstacles that hinder the natural movement of European bison within the designated area in Northwest Poland. This may include man-made structures, roads, or other impediments.
2. Best practices in transportation: implementing transportation solutions that minimize disturbance to the bison population and their habitats. This involves adopting practices that ensure safe passage for the bison while considering the ecological impact of any infrastructure development, as well as the creation or modification of wildlife crossings, underpasses, or bridges to facilitate the movement of the European bison and other wildlife.
3. Restoration of migration corridors: focus on rehabilitating and restoring natural migration corridors that were historically used by herbivores in the region. This may include habitat restoration, rewilding initiatives, and landscape management practices to encourage the free movement of the bison population.
4. Promotion of gene flow: ensure the genetic health of the European bison population by facilitating natural gene flow. Creating interconnected habitats allows for the exchange of genetic material between different subpopulations, promoting overall genetic diversity and resilience.
5. Enhancement of genetic diversity: implement measures to actively support the growth of genetic diversity within the European bison population. This may involve targeted breeding programs, genetic monitoring, and conservation efforts to safeguard the long-term viability of the reintroduced population.

By following these steps, the European Bison reintroduction program in Northwest Poland aims to establish a thriving and genetically diverse population while fostering ecological connectivity and sustainable coexistence with the surrounding landscape.

D. Indicators and Monitoring

1. Indicators Overview

The featured indicator in this study pertains to the monitoring of 20 individual animals, each equipped with GPS collars (indicator 1), over a period of 18 months (indicator 2). The measurement unit for this analysis is at the individual level, and the baseline data indicates a starting point of 0 for both the number of animals equipped and the monitoring time. The frequency of monitoring is conducted on a weekly basis, utilizing GPS transmitters as the primary data collection method. The gathered telemetry data is further enriched by combining it with maps, specifically utilizing sentinel data, within a temporal

framework. This comprehensive approach to data analysis and reporting provides a nuanced understanding of the animals' movements and behaviors over time, offering valuable insights into their ecology and contributing to broader research and conservation efforts.

3. Responsibility Assignment

The responsible parties for the Joint Pilot Action monitoring are the Green Federation "GAIA" and the West Pomeranian Nature Society.

3. Utilization for Decision-making

The information will be utilized for decision-making, specifically in the formulation of recommendations for investments and interventions in transport infrastructure.

E. Community Engagement and Stakeholders

1. Stakeholder Identification

In the process of stakeholder identification, a diverse range of entities has been recognized as integral participants of the Jouint Pilot Action, including local communities, the State Forests organization, the Land Forces Training Centre in Drawsko, the Municipality of Jabłonowo, the Regional Directorate for Environmental Protection in Szczecin, University of Szczecin, farmers, and tour operators.

2. Involvement and Consultation

A national stakeholder workshop in Poland, along with two local stakeholder workshops, will be organized to actively promote awareness and engagement regarding the migration patterns of the European Bison. These workshops serve as crucial platforms for fostering discussions, sharing information, and garnering support for the conservation efforts focused on the migration behaviours of this iconic species. Furthermore, these events also provide a forum to disseminate valuable insights and updates on the monitoring initiatives aimed at understanding and safeguarding the migration routes and behaviours of the European Bison. The collective efforts of national and local stakeholders in these workshops contribute significantly to the broader objectives of conservation and sustainable management of the European Bison population in Poland.

3. Community-based Approaches

Community-based approaches are integral to the development of the Joint Pilot Action, ensuring active involvement of stakeholders. This inclusive process prioritizes incorporating their perspectives, addressing concerns, and incorporating suggestions into the decision-making process. To enhance awareness, community events, art installations, and social media platforms will be leveraged to underscore the significance of preserving migration routes for European Bison. These initiatives aim to highlight the vital role played by local communities in this conservation endeavour. Additionally, proactive mechanisms will be employed to address human-wildlife conflicts, minimizing negative interactions between bison and local communities. Through these comprehensive strategies, the

conservation efforts not only prioritize the European Bison's migration routes but also emphasize the collaborative and community-centric nature of the initiatives for sustained success.

F. Budget and Resources

1. Budget Estimation

The 69,000 EUR budget will support the Joint Pilot Action in Poland.

2. Equipment and Tools

Resources for the project include coordination and administration with two personnel, a technical staff comprising four individuals, one veterinarian, and essential equipment such as 20 GPS collars, an off-road car, animal immobilization tools, as well as IT hardware and software for receiving and analysing GPS data.

G. Timeline

1. Action Timeline

From month 14 to 36.

2. Phase Timeframes

PHASE	COLLARING	GPS MONITORING	DATA ANALYSIS	REPORTING, CONCLUSIONS AND RECOMMENDATIONS
TIMEFRAME (project lifetime month)	14	14-30	19-33	34-36

H. Risk Assessment and Mitigation

1. Risk Identification

Potential risks and challenges include GPS collar failures, the death of collared animals, issues with GPS data transmission, and the management of a large and complex volume of GPS data.

2. Mitigation strategy

Mitigation strategies for identified risks and challenges are as follows:

1. Collars will be under warranty, ensuring repair and battery replacement for a minimum of 18 months by the responsible manufacturer.

2. In case of an animal's death, the collar will be retrieved and placed on another animal within the same herd by West Pomeranian Nature Society.
3. Data transmission will be secured through an agreement with the GPS operator, ensuring sufficient capacity.
4. To manage excessive data, analysis will incorporate longer time intervals for GPS reports.

I. Partnerships and Collaborations

1. Collaborating Entities

Joint Pilot Action implemented in collaboration of the Green Federation "GAIA", the West Pomeranian Nature Society (Associated Partner), Regional Directorate for Environmental Protection in Szczecin (Associated Partner), University of Szczecin (Associated Partner), Polish Society for Conservation Genetics LUTREOLA, State Forests, Municipality of Jabłonowo.

2. Capacity Building

Capacity building initiatives include one national stakeholder workshop in Poland, two local stakeholder workshops focusing on European Bison migration and monitoring, a peer-review visit to the Polish pilot region involving project partners, associated partners, and external stakeholders, a project advisory board meeting in Szczecin, and a transnational inter-generation workshop for both young and experienced nature protectionists in the Polish pilot region.

3. Educational and Outreach Activities

Educational and outreach activities encompass the production of a project outputs report in Polish, along with the development of promotional and informational materials available on the project's website, ensuring comprehensive dissemination in the local language.

J. External Approvals

1. Compliance Assurance

The activities conducted within the framework of the Joint Pilot Action align with the provisions of Polish nature protection law and adhere to relevant EU guidelines. Furthermore, these initiatives adhere to established best practices validated by other entities involved in comparable projects, ensuring a sound and compliant approach.

2. Permits and Approvals

Activity carried out based on the permission of the Regional Directorate for Environmental Protection in Szczecin and the Minister of the Environment (obtained).

K. Reporting

1. Data Collection Process

Reporting data will be collected, analysed and stored by the Green Federation “GAIA”, with the support of the West Pomeranian Nature Society and the University of Szczecin.

2. Progress Reporting

Monitoring results will be disseminated through two workshops, articles in local and internet media, on the Green Federation "GAIA" website, and in the form of peer-reviewed manuscripts, ensuring comprehensive reporting and accessibility to stakeholders.

L. Durability

1. Sustainability Consideration

The GPS collars will undergo maintenance, including possible repairs and battery replacement, for a minimum of 18 months. Data collection via GPS will span the same period, and post-project, joint efforts between PP5 and WPNS will ensure the continuation of activities, aligning with the project's sustainability requirements for a duration of 5 years.

2. Area Management

After the completion of the project and after the expiry of its durability period, the activities undertaken under the Joint Pilot Action will be continued by West Pomeranian Nature Society.

PILOT REGION 6: EUROPEAN WILD CAT - THAYATAL NATIONAL PARK & NATIONAL PARK PODYJÍ (AUSTRIA & CZECH REPUBLIC)

Joint Pilot Action: Enhancing Biodiversity and Connectivity: Joint Pilot Action for European Wildcat Conservation in Thayatal-Podyjí National Parks

Thayatal National Park & National Park Podyjí

The Joint Pilot Action in Thayatal and Podyjí National Parks will include several activities. On the Czech side, it will establish three ponds and a wetland, enhancing biodiversity and connectivity in a historically wet meadow near Znojmo, Czechia. Focused on supporting the European wildcat, a biodiversity indicator, the initiative on the Austrian side involves releasing two wildcats, managing meadows, removing invasive species, planting trees, and restoring a wetland. Thayatal, a biodiversity hotspot bordering Lower Austria and the Czech Republic, plays a crucial role in maintaining species connectivity. Monitoring involves GPS data, planting records, and surveys for amphibians, orthopterans, and odonata. The timeline spans March 2024 to February 2026, addressing risks like habitat isolation and climate change. Stakeholders include park administrations, nature conservation departments, local communities, and the scientific community. Community engagement ensures public awareness, coordination with stakeholders, and municipality presentations. The budget, resources, and equipment details provide transparency. The plan emphasizes sustainability with long-term area management practices. Collected data will aid decision-making, adaptive management, and understanding landscape connectivity for biodiversity conservation in both national parks.

A. Goal, Objective, and Scope

1. Overarching Goal and Objective(s)

The Joint Pilot Action on the Czech side aims to establish a system comprising three small ponds and an adjacent wetland, creating a rare and endangered habitat. This initiative is designed to enhance biodiversity and improve connectivity with other isolated water bodies in the generally dry and heavily cultivated surrounding landscape.

The Joint Pilot Action site is situated in Czechia, 7 km southwest of the Znojmo district town, at the southwestern edge of the Hercynian Massif, adjacent to the

Pannonian region. The specific location is in a shallow valley near a small intermittent stream. Historically, the area was a regularly mowed wet meadow, but after abandonment, it became overgrown with reed, other tall herbs, and bushes.

The primary focus of the joint pilot activities is to boost the interconnectivity of crucial habitats and acquire knowledge on supporting the population of the flagship species European wildcat *Felis silvestris*. This collaborative effort seeks to create a thriving ecosystem that not only enhances biodiversity but also contributes to the conservation of the European wildcat.

2. Geographical Area

The Thayatal National Park, situated at the border of northern Lower Austria and the Czech Republic, along with its neighboring Podyjí National Park, represents some of the most biodiverse areas within Central Europe's protected regions. This steep valley, adorned with natural forests, owes its remarkable biodiversity to a combination of diverse geology, river morphology, and its location at the intersection of two climate zones. Amidst the fragmented landscapes of Waldviertel, Weinviertel, and South Moravia, this relatively small expanse of 7,660 hectares (Thayatal NP 1,360 hectares, Podyjí NP 6,300 hectares) holds significant value for wildlife in Central Europe.

Despite its size, the area serves as a crucial stepping stone for migrating wildlife, including the European Wildcat, Lynx, Wolf, and other species requiring interconnected movement corridors for migration and dispersion. Podyjí National Park, part of the Inter-National Park along with Austria's Thayatal National Park, is one of the Czech Republic's four national parks. It safeguards near-natural forests along the deep Dyje River valley, with a biome considered unique in Central Europe. Encompassing elevations from 534 to 214 meters, the park features diverse habitats, including forest, grassland, arable land, shrubland, rocky areas, and inland wetlands. The Dyje River, flowing for 40 kilometers through the park, carves a deeply forested valley within the Českomoravská vrchovina uplands, reaching a depth of 220 meters. The park's land use is dedicated to nature conservation, research, forestry, and agriculture, offering park trails leading to historic sites such as Nový Hrádek castle ruins, Hardegg Castle, and Vranov nad Dyjí Chateau.

3. Ecosystem Identification

The European wildcat, once extinct in Austria, experienced a remarkable rediscovery in Thayatal National Park in 2007, subsequently becoming a flagship species for the park. Its presence serves as an indicator of a healthy ecosystem with functional trophic levels. The sensitivity of *Felis silvestris* to disturbance further highlights its role in signifying undisturbed ecosystems.

Characterized by its high mobility, the European wildcat occupies territories ranging from 500 to 1,000 hectares. Landscape connectivity is pivotal in habitat selection and sustaining the species. While Thayatal National Park is primarily covered by undissected forests, the common landscape area encompassing Lower Austria's Eastern Quarter, Waldviertel, Weinviertel, and the counties of South Bohemia, Vysocina, and South Moravia faces increasing fragmentation due to construction, roads, and intensive use. This

fragmentation disrupts wildlife migration corridors, isolating crucial protected areas and near-natural landscapes like those in the Waldviertel, South Bohemia, Thayatal, and Podyjí National Parks.

The resulting lack of exchange of animals and plants poses a threat to biodiversity, impacting not only the European wildcat but also other mobile, specialized, and rare species. These ecological stressors highlight the importance of addressing landscape connectivity to ensure the conservation of nature, particularly for species like the European wildcat.

4. Biodiversity Enhancement

Promoting connectivity through the restoration of habitats in the vicinity of national parks is essential. Connected landscapes play a pivotal role in preserving biodiversity and maintaining healthy populations. In the pilot region, Thayatal National Park stands as a biodiversity hotspot along the Ecological Green Belt. However, the restoration and connection of habitat patches in the surrounding area are crucial for sensitive and highly specialized species, enabling them to locate stable habitats and migration routes.

Addressing these challenges and safeguarding one of Austria's biodiversity hotspots, while preparing the pilot region for future resilience, are primary goals for nature conservation in the area. The emphasis on restoring habitats and enhancing connectivity underscores the commitment to sustaining diverse ecosystems and ensuring the long-term viability of the region's unique and specialized species.

B. Background and Justification

1. Necessity Overview

The protected areas and valuable landscapes in this region are becoming increasingly isolated. Landscape fragmentation hinders wildlife migration between natural habitats, and long-term security for these habitats can only be achieved through habitat networks like the Ecological Green Belt. Habitat networks, aligned with the EU strategy for Green Infrastructure, offer additional opportunities to enhance landscape permeability for wildlife, including foraging and the exchange of genetic material. They also provide leisure spaces for people, improve water management, air quality, and offer various ecosystem services.

These features need to be proactively promoted in the pilot region to prevent further landscape dissection. In addition to addressing landscape connectivity, the Thayatal National Park pilot region is confronted with the ongoing challenge of a rapidly changing climate, marked by more extreme weather events and prolonged dry periods. Without proactive interventions, landscape elements and habitats face increasing pressure from these issues.

Effective landscape management and connectivity can positively contribute to stabilizing habitats, supporting species, and establishing resilient migration routes. This, in

turn, helps secure robust pools of biodiversity in the face of evolving environmental challenges.

2. Site Selection Criteria

Site selection criteria are based on thorough preliminary studies, including remote landscape analysis, to identify areas with potential connectivity issues. Scientific evaluation of potential restoration measures has been conducted in advance to inform decision-making. The focus is on small permanent or periodic ponds, along with adjacent salt-marshes and wetlands, which constitute endangered and highly localized habitats at the edge of the Hercynian Massif.

These habitats play a crucial role in supporting a diverse array of wildlife, including amphibians, water insects, and birds, as well as hosting highly specialized and endangered species. Unfortunately, habitat degradation resulting from factors like melioration or the abandonment of traditional agriculture has led to a rapid decline in these vital habitats. Additionally, the small area and scattered distribution of these habitats have disrupted the metapopulation structure of the involved species. Addressing these challenges through targeted restoration measures is essential to ensure the conservation of these endangered and area-limited ecosystems.

C. Approach and Activities

1. Restoration Approaches

Two European wildcats, equipped with telemetric transmitters, will be released to provide GPS data indicating their locations and migration routes. The project involves the management of degraded dry meadows, removal of invasive species, and the restoration of a degraded wetland. Planting trees and hedges will enhance landscape interconnectivity. Heavy machinery will be employed to excavate soil, allowing natural precipitation and underground water to fill newly formed terrain depressions. Anticipated natural fluctuations in water surface levels, aligned with the adjacent periodic water stream, will support habitat restoration.

The artificial creation and restoration of periodic ponds and wetlands, a well-studied approach, aim to enhance local biodiversity and habitat connectivity. The Joint Pilot Action respects the natural history of the site, acknowledging past managed wetlands. The initiative will significantly improve habitat quality and connectivity along the Daníž stream, serving as a vital refuge and stepping stone for numerous species. Moreover, it will enhance connectivity with similar habitats in the surrounding landscape, contributing to a more integrated and resilient ecosystem.

2. Techniques and Methods

To enhance landscape connectivity, strategic tree and hedge planting is underway in key areas. In the restoration of a degraded wetland, the process involves the removal of trees followed by mowing of the area. Similarly, for the restoration of degraded dry

meadows, trees and bushes are cleared, and the areas are subsequently mowed, with the removed plant material extracted from the site.

In the release of wildcats, specialized collars are employed for telemetric recording of migration routes and habitat usage. The collected data undergoes thorough evaluation and analysis utilizing specialized programs to gain insights into the behaviour and movements of the released wildcats.

3. Ecological Assessments

Prior to implementing restoration measures, comprehensive studies were conducted. A feasibility study on the release of feral cats was undertaken, assessing the practicality and viability of such an endeavour. Additionally, in-depth studies on landscape connectivity were conducted, focusing on the interconnection of habitats within the project area. Further studies delved into landscape elements such as dry meadows and degraded wetlands, recognizing their role as crucial stepping stones for biodiversity in the region. These detailed studies serve as the foundation for informed decision-making and successful execution of the restoration measures.

4. Ecological Connectivity

Sentinel data has been instrumental in identifying critical landscape structures susceptible to connectivity-related interventions in the analysis of habitat use and migration routes of introduced wildcat individuals. Sentinel data will continue to play a crucial role, providing valuable insights and information for effective monitoring and management.

D. Indicators and Monitoring

2. Indicators Overview

Over the past years, Thayatal and Podyjí National Parks have periodically documented evidence of European Wildcat occurrence in the area, reinforcing the significance of this species as an indicator for expansive woodlands and interconnected landscapes. The origin of the detected individuals remains unknown, and the potential impact of stock support measures on enhancing the local population is yet to be determined. In an effort to comprehend migration patterns and support the European Wildcat population, two individuals will be released with telemetric transmitters. The data evaluation will provide insights into the feasibility of stock support, migration routes, and areas for enhancement. Thayatal National Park aims to improve landscape connectivity in the pilot area by planting trees, hedges, and managing degraded dry meadows. Connected landscapes are vital for species like the European Wildcat, as migration is integral to their biological life cycle. The restoration also includes the revitalization of a small wetland and ponds, addressing landscape degradation through habitat improvement in the pilot region.

The indicators selected for monitoring the Joint Pilot Action include:

1. Wildcat Release: the indicator involves the release of two European Wildcats, equipped with telemetric transmitters providing GPS data on their place of stay and

migration routes. The measurement unit is digital GPS data, collected frequently up to twice a day over one year. Baseline data is derived from 15 years of research on *Felis silvestris*, including wildlife-cam recordings and genetic analysis of cat hair, which will be referenced to the newly gained data. The data is collected through telemetric transmitters, and experts will analyse it, focusing on migration routes and the cats' places of stay.

2. Habitat Improvement – Trees and Hedges Planting: this indicator entails the planting of trees and hedges, measured in individual plants. Baseline data is drawn from previous research on theoretical migration routes of *Felis silvestris* and the connectivity of landscapes. Potential areas for restoration measures, identified based on this data, will be documented over a year of planting. Each planting action will be documented, and experts will analyse the data, referencing it to existing information. The analysis will particularly focus on the migration patterns of *Felis silvestris* and the overall interconnectivity of landscapes.
3. Management of Degraded Dry Meadows, Removal of Invasive Species: this indicator involves the management of degraded dry meadows and the removal of invasive species, measured in hectares (ha). Baseline data is informed by research on theoretical migration routes of *Felis silvestris* and the connectivity of surrounding landscapes. Over a two-year period, each management deployment will be documented, and experts will analyse the data, providing a detailed report on the success of the management. These dry meadows, identified as crucial for biodiversity, will be actively managed to enhance their ecological value.
4. Restoration of Small Wetland: the indicator focuses on the restoration of a small wetland, measured in hectares (ha). Baseline data is obtained from research on the degradation of wetlands due to agricultural usage in the pilot region in previous projects. The existing data will guide the identification of a suitable degraded wetland for restoration measures. In 2024, the restoration management will be applied, documented, and analyzed by experts. Biotope mapping methods will provide insights into the succession of the wetland, and the experts will generate a report documenting the success of the restoration measures.
5. Amphibia: amphibians, vital components of small shallow pond ecosystems, are all included in the national Red List in the Czech Republic, with approximately half of them at elevated risk levels. Monitoring will involve a minimum of three visits per year, during the breeding period, clutches period, and the presence of tadpoles and larval stages. These surveys, conducted for 30 minutes each, will comprehensively cover the area. Acoustic and visual identification and counting of calling males, adults, egg clutches, and larvae will be performed. The baseline survey in 2024 will precede pond creation, with evaluation of the actions planned for 2025. Collected data will facilitate comparisons of species count, specimen abundance, and changes in endangered species.

6. Orthoptera: orthopterans, prominent inhabitants of European grasslands, include numerous species bound to wetlands and salt marshes, with many being rare and endangered in the Czech Republic. Monitoring will occur three times a year, capturing the entire spectrum of potentially occurring species. The 15-minute transect walk during surveys will cover all available habitats, with 500 sweeps of vegetation using a net. This approach, along with counting stridulating males, will allow for assessing changes in species count and specimen abundance before and after pilot action. The detailed knowledge of orthopteran habitat requirements will aid in evaluating changes at the microhabitat scale.
7. Odonata: insects dominant in various water bodies, especially small shallow ponds, are sensitive indicators of water quality and regime. Sampling will take place three times a year to encompass the potential spectrum of species. The baseline survey in 2024 will precede pond creation, with evaluation of actions in 2025. Only adult specimens will be assessed during a 30-minute transect walk through all available habitats. Individuals detected up to 2m from the transect line will be counted, with a sweeping net used for more challenging determinations. Collected data will allow for comparisons of species count, specimen abundance, and evaluations of changes in endangered species, contributing to the understanding of the impact of pilot actions.

4. Responsibility Assignment

The release of two European Wildcats will be meticulously orchestrated by an expert, who will navigate the legal intricacies surrounding this action. Scheduled for early summer or fall 2024, contingent on the cats' age, initial preparations will commence in late 2023. Collaborative efforts with international experts, some affiliated with the ReCo project, are underway. Thayatal National Park will ensure close coordination with initiatives like the "Austrian Platform Wildcat", and outcomes will be disseminated to the public, researchers, and experts in late 2024. Thayatal National Park's active involvement in expert initiatives will leverage events to showcase data and analyses.

Planting actions, aligned with regional stakeholders and municipalities, will be communicated extensively to the public and political representatives. Thayatal National Park, collaborating closely with regional area management experts, initiated meetings in summer 2023. Management activities will kick off in early 2024, extending until the end of 2025. The responsible experts will furnish data, conduct analyses, and formulate recommendations for future management, engaging municipalities and the Nature Conservation Department of Lower Austria in the communication process.

For wetland management, experts will implement measures based on prior studies and recommendations. They will furnish a comprehensive account of methods, evaluate the management process, and offer suggestions for future practices. Initial discussions in 2023 aimed to pinpoint a suitable wetland, with 2024 earmarked for its definition and management. The collaboration with experts and engagement with local stakeholders and political representatives will remain central to this process.

4. Utilization for Decision-making

The collected data will play a pivotal role in comprehending the migration routes of the European Wildcat in the area and pinpointing gaps in existing corridors. Additionally, this data will furnish crucial insights into the likelihood of successfully supporting the local, unstable population of this species. With this information, adaptive management decisions regarding habitat improvement and stock support can be made. The collected data will form the foundational information for in-depth analyses of migration routes and the interconnectivity of landscapes.

Moreover, the data will serve as a baseline for the management of dry grasslands in the pilot regions in the future. It will provide essential insights into the effectiveness of restoration measures for degraded small wetlands. The subsequent application of biotope mapping methods will document the success of these applied measures, offering a baseline for adaptive management decisions concerning similar wetlands in the pilot area.

E. Community Engagement and Stakeholders

1. Stakeholder Identification

The primary stakeholders in the region include the administrations of Thayatal National Park and Podyjí National Park, the Department of Nature Conservation of Lower Austria, legal representatives of the surrounding communities, the engaged public and residents of the communities, the scientific community involved in research within the area, NGOs dedicated to landscape preservation, as well as entities contributing to tourism development in the pilot area. This diverse group of stakeholders reflects the multifaceted interests and responsibilities associated with the conservation and sustainable management of the region.

2. Involvement and Consultation

Local stakeholders play a vital role in the implementation of restoration measures. The release of European Wildcat individuals is closely coordinated with the local hunting community, and efforts are made to keep the interested public well-informed about the actions undertaken. The planting of hedges and trees, along with the restoration of dry meadows and a degraded wetland, involves coordination with local communities and regional entities. External experts are enlisted to execute these measures, maintaining regular communication with local administrative authorities and NGOs.

3. Community-based Approaches

The project's intentions will be presented to the local community of municipality Hnanice before restoration commences. This proactive step ensures that local citizens and stakeholders are informed about the planned wetland construction in the vicinity of their village and land.

F. Budget and Resources

1. Budget Estimation

The estimated budget for National Park Podyjí is approximately 40,000 EUR, with 80% of the costs covered by ERDF. The primary work will be carried out by an external contractor, utilizing an excavator as the main tool. Surveillance during the work, as well as subsequent monitoring and management, will be overseen by 2-3 National Park Podyjí employees.

For Thayatal National Park, the breakdown of costs is as follows:

- External study on stock support of European Wildcat: 20,000 EUR,
- Wildcat monitoring costs: 15,000 EUR,
- Material costs for Wildcat monitoring: 1,500 EUR,
- Costs for planting trees/hedges and restoring wetland: 20,000 EUR,
- Costs for restoration of dry meadows: 60,000 EUR.

2. Equipment and Tools

Wooden lures, wildlife cameras (including batteries), valerian tincture, trees, hedges, single-axle tractor with a cutter bar, brush cutter, loppers, trailer, tarpaulins, rakes, and petrol or batteries for the equipment.

G. Timeline

1. Action Timeline

March 2024 – February 2026.

2. Phase Timeframes

The restoration activities within our project span several key timelines. The restoration of dry meadows is set to commence in February 2025, with the process expected to conclude by August 2025. Wildcat stock support initiates in March 2024 and concludes in August 2025, while concurrent wildcat monitoring begins in March 2023 and extends until February 2026. The wetland restoration phase is scheduled to begin in June 2024 and reach completion by September 2024. These distinct timelines are strategically aligned to ensure effective implementation, allowing for comprehensive pre-JPA monitoring in spring and summer 2024, while the creation of ponds is planned for the autumn and early winter of 2024, minimizing disturbance to the site's animal inhabitants outside the vegetation season. Subsequent monitoring and assessment of our Joint Pilot Action will be conducted during the spring and summer of 2025 to evaluate its overall impact.

The first phase will be pre-JPA monitoring in spring and summer 2024. The pond's creation will occur during autumn and at the beginning of winter 2024. This date outside the vegetation season is crucial to minimize disturbance to animals inhabiting the site.

Monitoring and assessing the effects of our JPA will take place during the spring and summer of 2025.

H.Risk Assessment and Mitigation

1. Risk Identification

The Thayatal National Park, though legally preserved for the long term, faces threats from intensified land use driven by an increasing demand for developed land, roads, and intensive agriculture. This elevated human activity negatively impacts the rich biodiversity and various ecosystem services of the landscape in the Thayatal National Park pilot region and its surroundings. Despite legal protections, the landscape is vulnerable to isolation, fragmentation, and the deterioration of wildlife migration due to expanding development. Long-term security for wildlife habitats depends on habitat networks like the European Green Belt, aligning with the EU strategy for Green Infrastructure. Proactive promotion of these networks can enhance landscape permeability, benefiting both wildlife and human activities.

The pilot region also contends with the challenges of a rapidly changing climate, marked by extreme weather events and prolonged dry periods. Without proactive measures, landscape elements and habitats are at risk. Landscape management and connectivity initiatives play a vital role in stabilizing habitats, species, and migration routes to ensure resilient biodiversity.

On a more specific level, legal and regulatory conditions for releasing and monitoring European Wildcats must be secure, along with ensuring the availability of individuals when needed. The primary risk identified is the potential contamination of the local stream with petroleum substances or alterations in its water regime. Contractors are obligated to prevent and address any leaks, using only equipment certified for aquatic environments during fieldwork. This comprehensive approach addresses risks at various levels, promoting sustainable landscape management and biodiversity conservation in the Thayatal National Park pilot region.

2. Mitigation Strategies

The implementation of restoration measures is entrusted to external professionals, who undergo a thorough risk assessment before commencing the work. These experts are obligated to fulfil a reporting obligation, ensuring transparency and accountability throughout the restoration process. This proactive approach helps identify and address potential risks, contributing to the successful and responsible execution of the restoration initiatives in the Thayatal National Park pilot region.

I. Partnerships and Collaborations

1. Collaborating Entities

The collaborating agencies involved in the restoration and conservation efforts include the administration of Podyjí National Park, the department of nature conservation of Lower Austria, legal representatives of the surrounding communities, the interested public and inhabitants of the communities, the scientific community conducting research in the area, as well as NGOs dedicated to landscape preservation and tourism in the pilot area. This collaborative effort brings together diverse stakeholders with a shared commitment to the protection and sustainable management of the natural environment in the region.

2. Capacity Building

The comprehensive plan for establishing a wetland in the designated location underwent consultation with water and wetland ecosystem experts from the South Moravian Museum in Znojmo. Collaboration extends to the founder of our organization and project partner, the Ministry of the Environment. Additionally, ongoing communication ensures that the mayor of the impacted municipality, where the wetland is planned, remains informed. A collective meeting involving stakeholders from the surrounding land and local citizens is also on the agenda, emphasizing transparency and community involvement in the project.

3. Educational and Outreach Activities

Regarding the findings from the study on the European wildcat and its habitat usage, the outcomes will be integrated into educational materials designed for students and visitors of Thayatal National Park. This initiative aims to enhance public awareness and understanding of the wildlife and ecosystems within the park, fostering an informed and conservation-oriented community.

J. External Approvals

1. Compliance Assurance

All restoration activities are meticulously planned to adhere to stringent environmental regulations. The external experts involved in the restoration process are obligated to strictly follow all rules and regulations governing the implementation of these measures. This commitment ensures that the restoration efforts align with environmental standards, fostering responsible and sustainable practices throughout the project.

2. Permits and Approvals

The administration of Thayatal National Park, as the designated authority for nature protection, holds the responsibility and authority to make decisions regarding

research and the implementation of restoration measures within its jurisdiction. However, for the release of European Wildcats, a mandatory permit from the regional district administrative authority is required. It's important to note that all essential construction permits regarding planned ponds are currently valid, ensuring that the construction activities are appropriately sanctioned in accordance with the laws of the Czech Republic. This adherence to legal requirements underscores the commitment to conducting activities within the framework of established regulations.

K. Reporting

1. Data Collection Process

Data reporting will be systematically gathered through progress reports and final reports submitted by external experts overseeing the execution of the restoration measures. A meticulous documentation process will be maintained, involving regular photography of the site throughout the entire restoration process. The effectiveness of the Joint Pilot Activities will be assessed through a comprehensive monitoring scheme. An annotated inventory of species identified on the restored site, with particular focus on endangered or highly specialized species, will be compiled and presented. This rigorous documentation and evaluation process ensures transparency and provides valuable insights into the outcomes and ecological impact of the undertaken restoration initiatives.

2. Progress Reporting

National parks actively communicates the progress and outcomes of the joint pilot action through various channels, including social media platforms and direct communication by the responsible staff. This proactive approach ensures that the community and the public at large stay informed about the ongoing initiatives, fostering transparency and engagement. Regular updates on the restoration measures, wildlife monitoring, and other relevant developments will be disseminated to provide a comprehensive understanding of the positive impact and contributions to biodiversity in the pilot region.

L. Durability

1. Sustainability Consideration

The sustainability of the pilot actions is effectively ensured by the long-term perspective of the planted trees and hedges. The restoration measures on degraded wetlands and dry meadows are carried out by a regional expert responsible for the preservation and protection of the region. This strategic involvement ensures a sustainable approach, aligning with the expert's commitment to the long-term health and resilience of the ecosystem. By entrusting the restoration to a local authority dedicated to conservation, the project

promotes enduring benefits for the environment, supporting the overall sustainability of the initiative.

2. Area Management

The plan is to replicate and maintain the successful restoration measures in future projects of Thayatal National Park. National Park Podyjí has incorporated the maintenance and monitoring of the restored pond system into its long-term plans, ensuring continuity beyond the current project. Comprehensive management practices, including regular mowing, grazing, and occasional deepening of ponds, will be implemented to prevent advanced succession and maintain the persistence of the habitat. The newly constructed pools will be added to the list of permanently monitored wetland areas in Podyjí National Park, continuing a monitoring tradition that spans over 15 years. This commitment reflects the dedication to the sustained health and vitality of the restored ecosystems.

SUMMARY: INNOVATIVE APPROACHES TO ECOLOGICAL RESTORATION – DIVERSE STRATEGIES ACROSS EUROPEAN GREEN BELT IN THE RECO PROJECT

The Joint Pilot Actions within the ReCo project showcase innovative strategies employed across diverse European landscapes. In Pilot Region 1, spanning Fichtelgebirge and Smrčiny Mountains, the restoration efforts focus on enhancing biodiversity and ecological equilibrium, with a specific emphasis on the freshwater pearl mussel habitat. Through activities like ecological corridor creation and the removal of non-native afforestations, the project aims to bolster the health of the Regnitz/Rokytnice River catchment area.

Moving to Gorenjska, Slovenia, the chapter delves into the revitalization of Alpine meadowlands in the Karavanke Mountains. Central to this initiative is the implementation, monitoring, and evaluation of adapted agricultural management practices, specifically considering their impact on biodiversity. The mountain daffodil serves as a flagship species, and the project integrates seed collection, test different site management, and extensive awareness campaigns for various stakeholders.

The third section highlights the Joint Pilot Action in Škocjanski zatok Nature Reserve, addressing the challenges posed by climate change to coastal wetland ecosystems. Managed by DOPPS-BirdLife Slovenia, the project focuses on mitigating climate change impacts on Natura 2000 habitats and bird species. Noteworthy achievements include habitat mapping, bird monitoring, and the creation of new mudflats, contributing to the overall resilience of the 122.7-hectare reserve.

Northwest Poland takes center stage in the following section, led by the Green Federation "GAIA." Here, the focus is on enhancing migration routes for the European Bison population in the Ińsko Lakeland. Through careful breeding programs, habitat management, and community engagement, the project strives to contribute to the sustainable conservation of the Bison population.

In Thayatal and Podyjí National Parks in Austria and Czechia, the establishment of three ponds and a wetland takes centre stage. Targeting biodiversity and connectivity, the pilot action specifically supports the European wildcat, a crucial biodiversity indicator. The restoration efforts involve releasing wildcats, managing meadows, removing invasive species, and engaging in community outreach for long-term sustainability.

Collectively, these Joint Pilot Actions epitomize the ReCo project's commitment to multifaceted and sustainable ecological restoration, emphasizing the significance of local adaptation, collaborative partnerships, and community involvement in fostering biodiversity across European landscapes.

The ReCo project's (www.interreg-central.eu/projects/reco) consortium consist of:

- Bavarian Branch of Friends of the Earth Germany (Lead Partner, Germany),
- Hof county branch of Friends of the Earth Germany (Germany),
- DOPPS – BirdLife Slovenia (Slovenia),
- Ametyst, NGO (Czech Republic),
- Federacja Zielonych "GAJA", NGO (Poland),
- Municipality of Staranzano (Italy),
- Thayatal National Park (Austria),
- University of Vienna (Austria),
- Silva Tarouca Research Institute for Landscape and Horticulture (Czech Republic),
- BSC – Business support organisation ltd., Kranj (Slovenia),
- Podyji National Park Administration (Czech Republic),
- Ministry of the Environment of the Czech Republic (Czech Republic).