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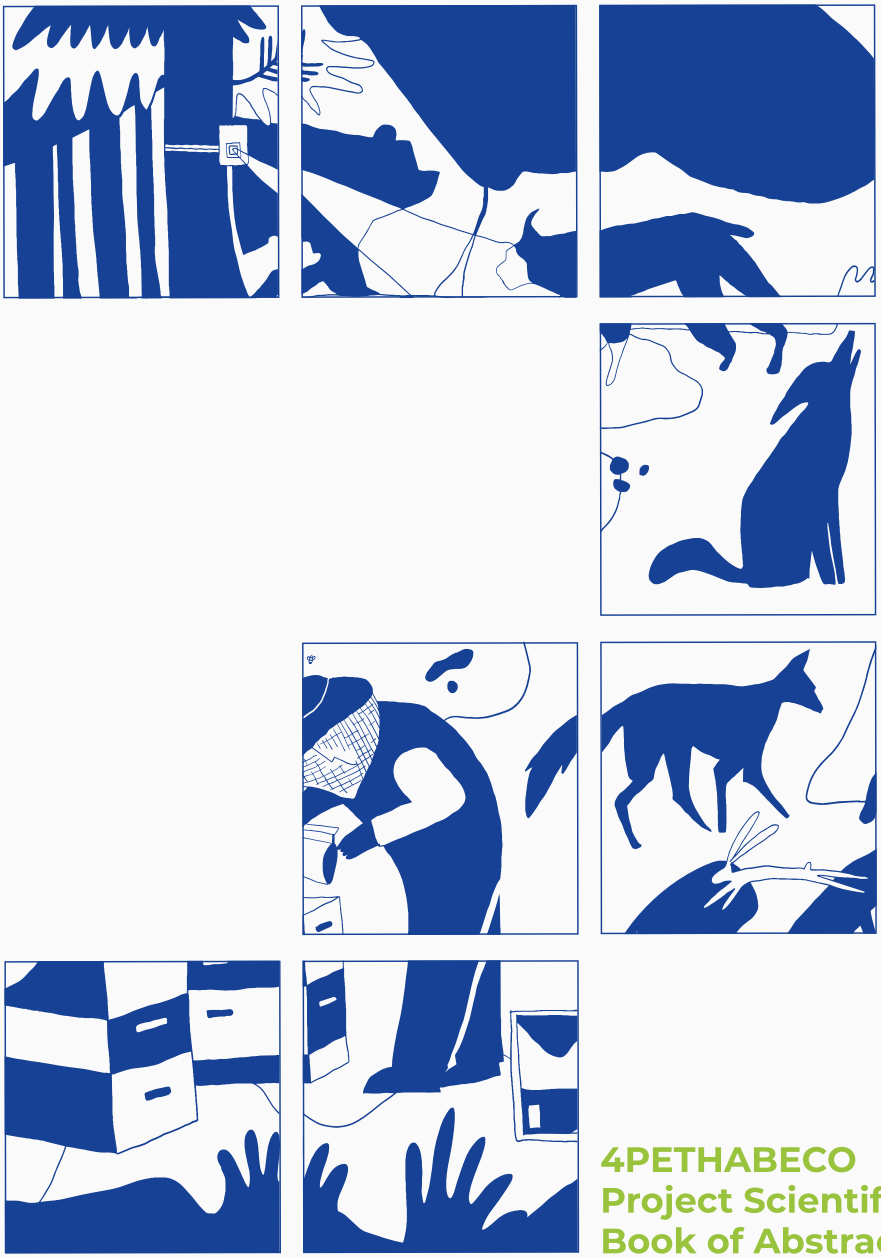
4PETHABECO

International Large Carnivores Habitat Management Conference



4PETHABECO Project Scientific Conference Book of Abstracts

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IPA ADRION

4PETHABECO

International Large Carnivores Habitat Management Conference

4PETHABECO Project Scientific Conference Book of Abstracts

Tirana, Albania
25-26 February, 2026

PPNEA
PROTECTION AND PRESERVATION OF NATURAL ENVIRONMENT IN ALBANIA
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Koper 2026

International Large Carnivores Habitat Management Conference
4PETHABECO Project Scientific Conference Book of Abstracts

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Project partners:

4pethabeco.interreg-ipa-adrion.eu/

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WELCOME ADDRESS

PRESENTATION OF 4PETHABECO PROJECT

Stefano Filacorda
University of Udine - 4PETHABECO lead partner

It is a privilege to welcome you to this conference dedicated to one of the most dynamic and complex conservation challenges in contemporary Europe: fostering coexistence between people and large carnivores. Across the continent, species such as bears, wolves, and lynx have been gradually reclaiming parts of their historical range, reflecting decades of coordinated conservation policy, scientific progress, and public engagement. Their return, while an ecological achievement, has also highlighted the intricate realities of living with wildlife in landscapes shaped by centuries of human activity.

As these species expand into regions with diverse ecological conditions, land-use demands, and cultural traditions, the need for informed, collaborative approaches becomes ever more pressing. Coexistence cannot rely solely on ecological knowledge—it requires a nuanced understanding of social attitudes, governance structures, economic considerations, and the lived experiences of rural communities. This conference provides a much-needed platform to bring these elements together.

The 4PETHABECO project, implemented under the Interreg IPA ADRION programme , aims to strengthen cooperation among participating countries to address the socio-environmental challenges of the EUSAIR flagship PET HAB ECO (Protection and Enhancement of Natural Terrestrial Habitats and Ecosystems). This flagship is a key component of Pillar 3 “Environmental Quality” of the EU Strategy for the Adriatic and Ionian Region. The project covers a vast area of immense biological value, spanning the Alps, the Dinaric-Balkan range, and the Pindus mountains. It involves a partnership of 10 partners from Italy, Slovenia, Croatia, Montenegro, Serbia, Albania, Greece, and North Macedonia. Its primary goal is to improve ecological connectivity and identify innovative forms of coexistence between humans and large carnivores (LC) to support their long-term conservation. The project’s operational strategy is structured into three main

Work Packages. WP1 focuses on the reinforcement of cooperation in LC monitoring through common digital tools and platforms. Key actions in this phase include testing and demonstrating new monitoring techniques—such as passive acoustic monitoring and real-time camera traps—and organizing professional training for participants from IPA countries on LC data analysis and reporting. Furthermore, a digital stakeholder platform will be developed to foster data transparency and citizen science. In WP2, the project addresses social conflicts and human impacts by improving participatory processes for innovative management. The objective is the joint creation of an integrated AIR Strategy and Action Plan that considers environmental, social, cultural, and economic aspects to foster coexistence. This is supported by establishing focus groups of experts and stakeholders to co-create management solutions tailored to local needs. Finally, WP3 targets the improvement of eco-corridors and green infrastructure networks to reduce habitat fragmentation. This involves a technical analysis to create connectivity and suitability maps that identify main corridors and fragmentation barriers, such as highways. Innovation is driven by the establishment of a "Living Labs" network in participating countries, which co-designs solutions at the community level. Additionally, the project implements demonstrative pilot actions to reduce impacts on domestic animals through the use of tools like guardian dogs and GPS collars with proximity sensors. As part of Activity 2.1 of the 4PETHABECO project, the international conference "Large Carnivore Habitat Management" will be held on February 25–26, 2026, followed by a technical field visit to protected areas on February 27–28. The event serves as a platform to discuss the cultural, social, and environmental pillars of innovative large carnivore (LC) habitat management. In line with the objectives of the EUSAIR macro-regional strategy, the conference aims to: 1) Foster Dialogue: Share information and discuss various management models to improve coexistence between humans and large carnivores in the Adriatic-Ionian Region (AIR) 2) Integrate Perspectives: Address increasing social conflicts and anthropogenic impacts on LC habitats by incorporating ethical, cultural, and social considerations into conservation strategies 3)Promote Collaboration: Involve all project partners as lecturers to engage a wide range of stakeholders and raise public awareness 4) Support the Strategy: Utilize the discussions and outcomes of the conference to inform the development of the Joint Strategy and Action Plan for the region.

I invite you to use this gathering to exchange insights, question assumptions, and build partnerships that extend beyond this event. Together, we can contribute to a future in which the conservation of large carnivores strengthens—not strains—the social, cultural, and ecological fabric of the regions we call home.

PRESENTATION OF THE INTERNATIONAL LARGE CARNIVORES HABITAT MANAGEMENT CONFERENCE

Aleksandër Trajçe
Conference Organizer PPNEA

The *International Large Carnivores Habitat Management Conference*, held from 25–26 February 2026 in Tirana, Albania, brought together researchers, practitioners, policy-makers, and civil-society actors working on one of Europe's most pressing conservation challenges: ensuring the long-term survival of large carnivores and their coexistence with humans in increasingly human-dominated landscapes.

Bears, wolves, and lynx are ecologically valuable species whose presence reflects the integrity, connectivity, and resilience of ecosystems. At the same time, their wide-ranging behaviour, predatory nature, and impacts to human activities place them at the centre of complex social, economic, and political debates. Across Europe, their recovery in some areas contrasts sharply with decline or stagnation in others, highlighting the need for context-specific, evidence-based, and socially informed management approaches.

The conference was designed as a platform for dialogue across disciplines and regions, recognising that effective large carnivore habitat management cannot rely on ecological knowledge alone. Instead, it requires the integration of spatial planning, connectivity science, governance frameworks, cultural perspectives, and participatory approaches that meaningfully engage local communities and stakeholders. The programme reflects this ambition by combining ecological research, applied case studies, methodological advances, and social-science perspectives on coexistence.

The contributions selected for the conference span a broad geographic scope, and while they focused primarily in the Adriatic-Ionian region and the Balkans, they brought perspectives from

the Alps, the Carpathians, and the Caucasus, while also addressing transboundary and macro-regional governance frameworks. Several presentations focused on habitat suitability and connectivity modelling, using advanced spatial data, telemetry, and innovative analytical tools to identify core habitats, corridors, and bottlenecks essential for gene flow and population viability. These contributions highlight both methodological progress and the practical implications of embedding connectivity into spatial planning and infrastructure development.

Equally prominent were applied and operational perspectives. Case studies from protected areas, connectivity conservation areas, and national contexts illustrate how scientific knowledge can be translated into concrete management actions, from restoring habitats and mitigating infrastructure impacts to establishing intervention teams and piloting corridor-based conservation measures. Together, these contributions demonstrated pathways for moving from analysis to implementation, a recurring challenge in large carnivore conservation.

A distinctive feature of the conference was its strong emphasis on the human dimension and coexistence topics. Several presentations and workshops examined coexistence through participatory, transdisciplinary, and culturally informed lenses. They explore how narratives, values, moral frameworks, and historical experience shape human–carnivore relations, and how neglecting these dimensions can unintentionally generate or exacerbate conflict. Approaches such as living labs, stakeholder engagement methodologies, and education-focused tourism initiatives are presented as tools for co-creating solutions that are socially acceptable, locally grounded, and more likely to endure.

Hosting the conference in Albania carried particular significance. The country lies as an important crossroad of key transboundary landscapes and ecological corridors in the Adriatic-Ionian region, particularly in the Dinaric-Pindos range - one of the core areas for European large carnivores, while also facing serious challenges related to habitat fragmentation, threatened populations, issues with law enforcement and limited capacities within responsible institutions for large carnivores. By convening the conference in Tirana, the organisers sought to strengthen regional exchange, highlight underrepresented contexts, and support the integration of national and

transnational perspectives on conservation, management and co-existence. By bringing together diverse experiences, methods, and viewpoints, the conference aimed to contribute to a more coherent, inclusive, and effective strategies for large carnivore habitat management across Europe and beyond.

THE EUSAIR STRATEGY: STRENGTHENING ENVIRONMENTAL QUALITY THROUGH FLAGSHIP INITIATIVES

Darja Dobrila
Public Agency for Promotion of Entrepreneurship and Developing Projects of Municipality of Izola - Slovenia

This presentation will show the strategic framework and flagship initiatives under Pillar 3 – Environmental Quality of the EU Strategy for the Adriatic–Ionian Region (EUSAIR). The purpose is to analyse how coordinated regional mechanisms can improve environmental protection, biodiversity conservation, and sustainable coastal–marine management. The research question addresses: How do transnational contingency planning, habitat protection, and marine species monitoring contribute to strengthened environmental resilience?

The presentation will also include synthesizing objectives, planned outputs, and cross-pillar linkages across flagship projects, including ASOSCoP (oil spill contingency planning), PET HAB ECO (terrestrial habitat protection), 3MPS (marine protected species management), and ICZM&MSP (integrated governance of coastal and maritime zones).

Findings indicate that the region's environmental challenges—marine pollution risks, habitat fragmentation, biodiversity decline, and increasing anthropogenic pressures—are addressed through harmonised planning frameworks, cross-border cooperation platforms, and science-based monitoring systems. Key anticipated impacts include enhanced ecological connectivity, reduced pollution risks, improved preparedness for marine incidents, strengthened conservation of large carnivores and marine species, and adoption of regional management measures. Furthermore, the integration of ICZM and MSP is shown to be critical for resolving spatial conflicts, guiding sustainable economic use of coastal resources, and aligning national strategies with transboundary environmental objectives.

Overall, the study highlights the relevance of coordinated macro-regional governance in achieving long-term environmental sustainability. By establishing unified methodologies, reinforcing institutional capacities, and promoting cooperative action, the EUSAIR Pillar 3 initiatives contribute significantly to safeguarding natural assets and supporting resilient, sustainable development in the Adriatic–Ionian Region.

CONFERENCE COMMITTEES

PROGRAMME COMMITTEE

Melitjan Nezaj (PPNEA, Albania)

Aleksander Trajce (PPNEA, Albania)

Klaudja Koci (PPNEA, Albania)

Stefano Filacorda (University of Udine, Italy)

Virginia Barca (University of Udine, Italy)

Liliana Vižintin (Science and Research Centre Koper, Slovenia)

ORGANISATIONAL BOARD

Melitjan Nezaj (PPNEA)

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Sara Skrapalliu (PPNEA)

Bledi Hoxha (PPNEA)

Stefano Filacorda (University of Udine, Italy)

Virginia Barca (University of Udine, Italy)

CONFERENCE PROGRAM

INTERNATIONAL LARGE CARNIVORES HABITAT MANAGEMENT CONFERENCE

February 25–26, 2026
Hilton Garden Inn Tirana, Albania

TIRANA, ALBANIA, FEBRUARY 25, 2026

14:00–14:30

Registration

14:30–14:45

Welcome and Introduction

Stefano Filacorda *(University of Udine): The EUSAIR Strategy: Strengthening Environmental Quality through Flagship Initiatives*

Aleksandër Trajçe *(PPNEA, Albania)*

Darja Dobrila *(Public Agency for Promotion of Entrepreneurship and Developing Projects, Municipality of Izola, Slovenia)*

15:15 - 17:45

SESSION 1: LARGE CARNIVORES DISTRIBUTION AND ECOLOGICAL REQUIREMENTS

Moderator: ***Klaudja Koci*** *(PPNEA)*

A Regional Habitat Suitability Assessment for Large Carnivores Across the Alpine-Dinaric-Pindos Region

Presenter & Affiliation: ***Gjorge Ivanov***
(Oikon Ltd. – Croatia)

From Research to Protection – Conservation of the Balkan Lynx

Presenter & Affiliation: ***Bledi Hoxha***
(PPNEA – Albania)

Structured Mapping for Long-term, Large-scale Mammal Monitoring and Conservation

Presenter & Affiliation: ***Bernarda Bele***
(Science and Research Centre Koper – Slovenia)

Are Jackals and Wolves Increasingly Sharing Habitats in Bosnia and Herzegovina?

Presenter & Affiliation: **Dragana Šnjegota**
(University of Banja Luka – Bosnia and Herzegovina)

Behavioral Ecology and Habitat Requirements of Brown Bear Females with Cubs

Presenter & Affiliation: ***Slaven Reljić***
(Oikon Ltd. – Croatia)

Assessing Brown Bear Distribution in the Racha Corridor: Implications for Connectivity Conservation in the Caucasus

Presenter & Affiliation: **Tamar Uguzashvili**
(SABUKO – Georgia)

Bears Across Borders: Connecting Wildlife and Humans Across Distant Mountain Ranges and Political Boundaries

Presenter & Affiliation: ***Charilaos Pylidis***
(Greece/UK)

Jackal Movement and Habitat Use in a Mosaic Landscape

Presenter & Affiliation: ***Duško Ćirović***
(University of Belgrade – Serbia)

Questions & Discussion

Coffee/Tea Break

18:00 – 19:15

SESSION 2: MANAGEMENT OF PREY AND HABITAT TO IMPROVE SUITABILITY AND CONNECTIVITY

Moderator: ***Aleksander Trajce*** *(PPNEA)*

Role of Wildfires and Grazing in Habitat Suitability

Presenter & Affiliation: ***Stefano Filacorda***
(University of Udine – Italy)

Maintaining Ecological Connectivity for Large Carnivores in the Carpathians: From Science to Implementation

Presenter & Affiliation: ***Cristian-Remus Papp***
(WWF & Babeș-Bolyai University – Romania)

Operationalizing Large Carnivore Habitat Management: Intervention Teams and Connectivity-Based Approaches in Kosovo

Presenter & Affiliation: ***Krenare Salihu***
(ECOPANA – Kosovo)

Questions & Discussion

Dinner

TIRANA, ALBANIA, FEBRUARY 26, 2026

09:15 – 10:45

SESSION 1: NEW APPROACHES AND TECHNIQUES TO IMPROVE CONNECTIVITY AND VALIDATE MANAGEMENT

Moderator: ***Melitjan Nezaj*** *(PPNEA)*

From Sites to Systems: Applying IUCN Tools to Conserve Connectivity in Large Carnivore Landscapes

Presenter & Affiliation: **Oliver Avramoski**
(IUCN ECARO)

PONT Connect - PONT Connectivity Conservation Strategy

Presenter & Affiliation: ***Mirjam de Koning***
(Prespa Ohrid Nature Trust)

Towards an Increasingly Connected World: New Methodological Approaches for Environmental Connectivity and Implications for Landscape Planning

Presenter & Affiliation: **Lorenzo Bernicchi**
(University of Udine – Italy)

Ecological Connectivity in Protected Areas – Activities and Results from Forest Connect Project

Presenter & Affiliation: ***Marija Iković***
(CZIP – Montenegro)

Large Carnivores (Bear, Wolf, Lynx) in Albania Are Facing a Difficult Survival: Challenges and Needs

Presenter & Affiliation: ***Ferdinand Bego***
(University of Tirana – Albania)

Developing a Pilot Governance Model for Connectivity Conservation Areas (CCA) in Albania: The Case of Munella Nature Park

Presenter & Affiliation: ***Klaudja Koçi*** *(PPNEA – Albania) &*
Eldisa Zhebo *(ICLA – Albania)*

Questions & Discussion

Coffee/Tea Break

11:00–13:00

SESSION 2: CULTURAL, SOCIOLOGICAL AND ANTHROPOLOGICAL ASPECTS

Moderator: ***Bledi Hoxha*** *(PPNEA)*

Human–Wildlife Coexistence in the European Context

Presenter & Affiliation: ***John D. C. Linnell***
(NINA - Norway)

Too Much Care: Large Carnivores, Coexistence and the Production of Conflict

Presenter & Affiliation: ***Aleksandër Trajçe***
(PPNEA – Albania)

Transdisciplinary and Participatory Approaches Promoted by Project 4PETHABECO

Presenter & Affiliation: ***Bernarda Bele***
(ZRS Koper – Slovenia)

Invisible Barriers to Connectivity: Anthropogenic Resistance and Functional Connectivity in Large Carnivore Conservation

Presenter & Affiliation: ***Virginia Barca***
(University of Udine – Italy)

Sharing Space with Bears: The Critical Role of Electric Fences

Presenter & Affiliation: ***Nevena Petković***
(CZIP – Montenegro)

Human–Wildlife Conflicts in Serbia: Bear Damage to Beehives, Livestock and Orchards

Presenter & Affiliation: ***Stefan Prekajski***
(BPSSS – Serbia)

Living Labs Approaches Promoted by Project 4PETHABECO for Co-creating Tailored Solutions Addressing Coexistence Challenges

Presenter & Affiliation: ***Liliana Vižintin***
(Science and research Centre Koper – Slovenia)

Education and Tourism: Large Carnivore Center DINA Pivka

Presenter & Affiliation: ***Helena Mandelj Šneberger***
(Zavod za turizem Pivka – Slovenia)

Questions & Discussion

Lunch

15:00–16:30

PARALLEL WORKSHOPS

Workshop 1: Cultural Dimensions of Habitat Suitability and Connectivity for Large Carnivores in the Adriatic-Ionian Region

Workshop moderator: ***Liliana Vižintin***
(Science and research Centre Koper, Slovenia)

Workshop 2: Environmental Variables for Habitat Suitability and Connectivity with a Practical VIF Analysis in Google Earth Engine

Workshop moderator: ***Bruno Ćaleta***
(Oikon – Croatia)

Workshop 3: The Role of Protected Areas for the Future of Large Carnivores

Workshop moderator: ***Cristina Comuzzo***
(Julian Prealps Natural Park – Italy)

16:30–17:15

PLENARY PRESENTATION OF THE GROUP'S WORK AND CLOSING REMARKS

ABSTRACTS

SHORT ORAL PRESENTATIONS

A REGIONAL HABITAT SUITABILITY ASSESSMENT FOR LARGE CARNIVORES ACROSS THE ALPINE-DINARIC-PINDOS REGION

Presenter & Affiliation: *Gjorge Ivanov*
Oikon Ltd., Institute of Applied Ecology - Croatia

Authors: *Gjorge Ivanov[1], Bruno Ćaleta[1], Slaven Reljić[1], Goran Gužvica[1], Tea Teskera[1], Dora Čuljak[1], Dime Melovski[2], Aleksandar Pavlov[2], Andrej Gonev[2], Aleksandar Stojanov[2], Vasko Avukatov[2], Aleksandra Penezic[3], Duško Ćirović[3], Neda Bogdanović[3], Zoe Skalkos[4], Lampros Krampokoukis[4], Alexandros Karamanlidis[4], Lorenzo Bernicchi[5], Lorenzo Frangini[5], Andrea Madinelli[5], Virginia Barca[5], Sara Vezzaro[5], Marcello Franchini[5], Antonella Stravisi[5], Stefano Filacorda[5], Josip Kusak[6], Đuro Huber[6], Lidija Šver[7], Ratko Popović[7], Slavko Struna[8], Nikica Radić[8], Dragana Šnjegota[9], Haris Hadžihajdarević[10], Kata Dejanović[10], Mirko Šarac[11], Dražen Kotrošan[11], Josipa Šimić[12], Fatos Lajci[13], Adelina Kastrati[13], Aleksander Trajce[14], Bledi Hoxha[14], Melitjan Nezaj[14], Emlijano Qorraj[14], Ilir Shyti[14], Nevena Petković[15], Marija Iković[15], Igor Stojović[15], Aleksandar Perović[16]*

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[10]*Nature & Humans, Bihać, Bosnia and Herzegovina*

[11]*Ornithological Society Naše Ptice, Sarajevo, Bosnia and Herzegovina*

[12]*Association for Environmental Protection and Sustainable Development*

Naša baština, Tomislavgrad, Bosnia and Herzegovina
[13]*Environmentally Responsible Action, Kosovo*
[14]*Protection and Preservation of Natural Environment in Albania, Albania*
[15]*Center for Protection and Research of Birds of Montenegro, Montenegro*
[16]*Environmental Protection Agency of Montenegro, Montenegro*

Presentation Type: Short Oral Presentation

Corresponding author: Gjorge Ivanov,
email: _

Keywords: Habitat suitability modeling, Large carnivores, Telemetry and C1/C2 occurrence data

Abstract: Large carnivore conservation requires harmonized, transboundary habitat assessments based on robust spatial data. We developed a multi-species habitat suitability modeling framework covering Southeast and Central Europe, including Greece, Albania, North Macedonia, Kosovo, Serbia, Montenegro, Bosnia and Herzegovina, Croatia, Slovenia, and Northern Italy (Alpine NUTS-2 regions). Occurrence data were compiled from many organisations from the above-mentioned countries and standardized into two datasets: systematic and opportunistic C1/C2 records and telemetry data for brown bear (Ursus arctos), grey wolf (Canis lupus), and Eurasian lynx (Lynx lynx, including L. l. balcanicus).

More than 20,000 C1/C2 records were harmonized into a unified spatial database. Telemetry data (>700,000 locations) were spatio-temporally thinned to reduce autocorrelation, resulting in ~160,000 independent points. To address temporal mismatches between species presence and environmental data inherent in static modeling, we implemented a spatiotemporal feature extraction workflow for different topographic, land-cover, climatic and anthropogenic factors. With that, environmental data were dynamically matched to the year of species observation.

Species-specific and combined habitat suitability models were fitted using Maxent and achieved high predictive performance (Boyce Index: 0.95–0.99; AUC: 0.89–0.95). The combined model demonstrated excellent validation (Boyce Index = 0.989), identifying the Alps, Dinarides, and Pindos mountain ranges as key regional strongholds.

Moving beyond static suitability, we assessed functional connectivity using Omniscape (Omnidirectional Circuitscape). Habitat suitability was transformed into resistance via a negative exponential function to simulate landscape conductance. The resulting current flow maps highlight critical ”pinch points”; and transboundary corridors essential for maintaining gene flow. These results provide a robust, dynamic foundation for habitat conservation during spatial planning and green infrastructure development across the Adriatic-Ionian region.

FROM RESEARCH TO PROTECTION – CONSERVATION OF THE BALKAN LYNX

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Presentation Type: *Short Oral Presentation*

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Keywords: *Research, Balkan lynx, density, home range, conservation*

Abstract: Research of large carnivores is essential for guiding conservation and management, particularly for small, isolated, or genetically vulnerable populations. The Balkan lynx (*Lynx lynx balcanicus*), the most endangered subspecies of the Eurasian lynx lives in the southwestern Balkans with fewer than 50 mature individuals. Our studies show robust data of the Balkan lynx's spatial ecology, foraging patterns, and population dynamics, and how important this data is for transboundary conservation initiatives.

Based on camera trap surveys conducted between 01.05.2020 and 30.04.2025 in North Macedonia, Albania and Kosovo a total of 43 independent adult and subadult individuals were identified. The majority of identified individuals came from North Macedonia (37), followed by Albania (5) and Kosovo (1).

Additionally, we analysed camera trap data from the systematic sessions in Mavrovo National Park in North Macedonia with Spatial Capture–Recapture (SCR) models, to estimate population density trends. Multisession analyses revealed a decline from 2.3 ± 0.7 lynx per 100 km^2 of suitable habitat in 2013 to 1.2 ± 0.4 in 2023.

GPS/GSM telemetry data revealed male home ranges of 373-400 km^2 and female ranges of 108-119 km^2, consistent with other European populations of the Eurasian lynx. Analysis of 153 prey remains documented five different species: roe deer (*Capreolus capreolus*), chamois (*Rupicapra rupicapra*), brown hare (*Lepus europaeus*), red fox (*Vulpes vulpes*) and marten (*Martes foina/martes*).

The data directly contributed to international conservation actions, including the decision of the Balkan lynx's IUCN Red List status "Critically Endangered", CMS listing in Appendix I, and the development of the CMS Regional Conservation Strategy for the Balkan lynx. By linking ecological knowledge with policy frameworks, it is possible to create evidence-based strategies to safeguard endangered species like the Balkan lynx.

STRUCTURED MAPPING FOR LONG-TERM, LARGE-SCALE MAMMAL MONITORING AND CONSERVATION

Presenter & Affiliation: *Bernarda Bele*
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Presentation type: Short Oral Presentation

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Keywords: mammal monitoring and conservation, distribution maps

Abstract: Distributional ranges are fundamental attributes of species, shaped by ecological requirements and constrained by phylogenetic history. Initially of interest primarily to basic research, species ranges have attracted increasing attention in some of the most prominent areas of contemporary science, including conservation management and the spill over of zoonotic diseases. Species respond to unprecedented environmental change by modifying their ranges at varying rates. Because such changes are of broad public interest, there is a persistent demand for their systematic monitoring. Distribution maps are therefore publicly available for all European mammals. However, because conceptual approaches and mapping accuracy vary widely among sources, a more structured and standardised framework is desirable. Here we report on the current pan-European mammal mapping effort conducted within the EMMA2 project, which is now in its final phase. Its main outcome will be a published Atlas, expected in May of this year. The Atlas will

document post-1999 occurrences of all 247 free-living mammal species in Europe, mapped using a 50 × 50 km grid based on the Military Grid Reference System (MGRS). The Atlas published in 1999 serves as a baseline for assessing distributional changes over the past two decades. Science and research centre Koper has been involved in the EMMA2 project since its launch in 2016, through representation in the Steering Group, coordination at the national level for Slovenia, co-editorship of the Atlas, and authorship or co-authorship of species accounts for several mammal taxa.

ARE JACKALS AND WOLVES INCREASINGLY SHARING HABITATS IN BOSNIA AND HERZEGOVINA?

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Presentation Type: Short Oral Presentation

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Keywords: Bosnia and Herzegovina, wolves, jackals, GIS, habitat

Abstract: The ranges of wolves (*Canis lupus*) and jackals (*Canis aureus*) are rapidly expanding across Europe, increasingly overlapping due to habitat changes, climate shifts, and adaptation to human-modified landscapes, raising important ecological questions, particularly regarding their future coexistence. In Bosnia and Herzegovina, jackals have primarily occupied the northern lowlands along the Sava River, while wolves have traditionally inhabited mountainous regions. However, recent observations indicate that jackals are increasingly occurring at higher altitudes, bringing them closer to the wolf habitats. To investigate the current distribution patterns and range overlap of both species in Bosnia and Herzegovina, we applied the Analytical Hierarchy Process (AHP) within a Geographic Information System (GIS) framework. This approach enables hierarchical weighting of key environmental and anthropogenic criteria and has been successfully applied in comparable ecological studies. The primary factors included in the AHP model, such as land cover, altitude, temperature, rainfall, and proximity to roads and river

networks, were selected based on well-documented habitat suitability drivers. Prioritization and weighting of these factors were completed by two complementary data sources: local data (field observations, camera trapping, hunting statistics, expert knowledge, and communication with forest rangers) and previously published studies on wolf and jackal distributions in Bosnia and Herzegovina. These data were used to construct pairwise comparison matrices and generate species-specific suitability maps. Our results confirm the predominant lowland distribution of jackals, with a notable expansion into higher elevations, while wolves remain largely concentrated in mountainous areas. Importantly, the resulting overlap maps reveal zones of potential contact between the two species, indicating an increasing likelihood of ecological interactions that may shape future community dynamics and management strategies.

BEHAVIORAL ECOLOGY AND HABITAT REQUIREMENTS OF BROWN BEAR FEMALES WITH CUBS

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Presentation Type: Short Oral Presentation

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Keywords: Habitat conservation, Denning areas, Environmental Impact Assessment (EIA)

Abstract: Constructing new infrastructure in a natural environment requires a pre-construction Environmental Impact Assessment which is expected to determine the minimum safe construction exclusion zone. From literature and personal research experience, we know that bears tend to choose remote areas for denning which are usually difficult to access and/or at higher altitudes. In such areas, especially on mountain ridges, there could be good wind-power potential and in Croatia, the construction of wind farms in these areas

has been rising in recent years. It is of utmost importance to preserve the denning areas.

We wanted to answer the question of how far from the den a female bear with cubs of the year (COYs) moves in each of the consecutive months following their emergence. Assumption: in the first month(s) after the emergence the COYs are small and the distance from the den and monthly range covered will be lesser, increasing as the COYs grow.

We collected telemetry data of 15 brown bear females with COYs tracked in Croatia and Serbia from 2010 to 2024. We measured and compared their monthly ranges (MCP 100%) and longest distances from the den to the edge of the range. Emergence from the den occurred from the very end of March to the end of April, hence, movements and MCP areas in the first three months of the year were zero or close to zero.

In April, the average of the longest distances from the den in Croatia and Serbia were 1,22 and 1,83 km, while the average MCPs were 0,69 and 1,44 km^2, respectively. The values in the following months were: in May 4,01 and 4,04 km, and 4,85 and 9,14 km^2. In June 4,70 and 8,40 km, and 12,14 and 33,38 km^2. In July 5,03 and 9,46 km and 14,03 and 44,10 km^2. In August 4,98 and 9,13 km and 17,26 and 56,45 km^2. In September 19,82 and 9,34 km and 249,94 and 84,61 km^2. In October 21,67 and 25,63 km and 116,48 and 549,85 km^2. In November 8,45 and 22,48 km and 21,20 and 117,05 km^2. In December 4,46 and 6,76 km and 13,55 and 44,53 km^2. The largest distances and ranges were in the hyperphagia period from September to November. Preliminary, more feeding sites and provided anthropogenic food and higher bear densities in Croatia could explain smaller distances and monthly ranges compared to Serbia.

ASSESSING BROWN BEAR DISTRIBUTION IN THE RACHA CORRIDOR: IMPLICATIONS FOR CONNECTIVITY CONSERVATION IN THE CAUCASUS

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Presentation Type: Short Oral Presentation

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Keywords: brown bear, occupancy modelling, Caucasus, habitat connectivity

Abstract: Understanding large carnivore distribution in the Caucasus is essential for conservation planning, yet systematic survey data remain scarce. We conducted camera trap surveys in the Racha region of western Georgia (April-August 2025) to assess brown bear (*Ursus arctos*) occupancy and habitat relationships in a landscape bridging two protected areas. Using occupancy models accounting for imperfect detection, we deployed 16 camera stations across a 20,418-ha study area characterized by mixed forests, subalpine meadows, and human-modified landscapes at elevations of 1,280-2,179 m.

Brown bears were detected at 9 of 15 stations, with an estimated occupancy of 0.95 (±0.26 SE), substantially higher than the naive occupancy of 0.60. The detection probability was low (0.07 ± 0.03 SE per weekly occasion), indicating a widespread distribution but cryptic behavior. Model selection revealed that human disturbance (distance to roads and settlements) was the strongest predictor of bear

occupancy, though model uncertainty was moderate. Fine-scale forest cover (250m radius) showed weak positive associations with occupancy, suggesting local habitat quality influences site use.

The results demonstrate that the Racha corridor supports a widespread brown bear population despite human presence, indicating potential for human-wildlife coexistence in the region. Our findings provide baseline data for evidence-based conservation planning and highlight the value of occupancy modeling in understanding the distribution of large carnivores where detection is challenging. These results underscore the ecological significance of maintaining habitat connectivity between protected areas in the Caucasus.

BEARS ACROSS BORDERS: CONNECTING WILDLIFE AND HUMANS ACROSS DISTANT MOUNTAIN RANGES AND POLITICAL BOUNDARIES

Presenter & Affiliation: *Charilaos Pylidis*
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Presentation Type: Short Oral Presentation (Online)

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Keywords: bear, connectivity, Balkans

Abstract: In the era of Horizon, Biodiversa, and LIFE+, is there still space for small independent initiatives? We firmly believe there is. Small-scale, independent projects, when paired with focused efforts and thorough data analysis, can provide valuable insights for the monitoring and conservation of large carnivores. Our initiative, BEARS ACROSS BORDERS is one such example. Led by NGOs, supported by wildlife charities, and synergising with academic institutions and government organisations across the Balkans and the UK it has been running since 2017. Our initial focus was the estimation of the size of the Eastern Balkan bear population using non-invasive genetics, with the intention to shift from arbitrary study areas contrived by administrative and national borders to ecologically meaningful populations. Since then, we have been actively investigating the functional connectivity of the expanding the Eastern Balkan and Dinaric-Pindos metapopulations. Our initial analyses of bear subpopulations from four distant mountain ranges, revealed the existence of widespread genetic structure but also the functional connectivity of the two main Balkan clusters. We observed a primary east-west

genetic subdivision -a trend seen in many taxa-and a secondary north-south cline. A particularly encouraging result was the ongoing functional connectivity of populations across distant mountain ranges which was supported by analyses of different types. The confirmation of the functional connectivity of the Eastern Balkan and Dinaric-Pindos populations, is positive news for bears and their habitat and highlights the need for identifying and conserving habitat corridors. As our initiative continues to grow and we are broadening our scope and partnerships while engaging with local communities and authorities, international collaboration remains at its heart. This initiative exemplifies how shifting the focus from a limited study areas to a broader ecologically significant region, can make even with modest sampling, meaningful contributions in understanding large carnivore population dynamics on the Balkan Peninsula.

JACKAL MOVEMENT AND HABITAT USE IN A MOSAIC LANDSCAPE

Presenter & Affiliation: *Duško Ćirović*
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Presentation Type: Short Oral Presentation

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Keywords: Golden jackal, movement, GPS telemetry

Abstract: As part of the Interreg project 4PETHABECO we caught, collared and tracked a male yearling golden jackal in eastern Serbia over 51 days, obtaining 1171 GPS fixes (94.1% success rate) at 1 h intervals. Using net squared displacement, we identified three longer excursions (1–7 days) and three shorter excursions (1–3 hours). The jackal's home range and core region were concentrated around a small village, with excursions extending to nearby villages along the Zlotska Reka stream and briefly into forested mountains. Total areas used at 50%, 95%, and 99% utilization distributions (UD) by methods were: Kernel 0.89, 15.9, and 36.9 km^2; dynamic Brownian bridge movement models 0.22, 12.6, and 36.3 km^2; and minimum convex polygon 8.3, 70.4, and 72.4 km^2. Excluding excursions, home ranges (95% UD) and core regions (50% UD) were 2.23 and 0.03 km^2 (MCP), 3.23 and 0.3 km^2 (Kernel), and 2.3 and 0.1 km^2 (dBBMM), respectively.

Habitat use differed between resident and excursion states. Resident fixes were mainly in agricultural fields with natural vegetation (n = 617), complex cultivation (n = 189), and non-irrigated arable land (n = 22), while excursions included more diverse land cover, including

forests. Step lengths averaged 262 m overall, with excursions showing longer movements (mean 571 m) than while resident (175 m). Step length varied by time of day, peaking at night (422.9 m), lower at dusk (291 m) and dawn (237.4 m), and lowest during the day (55.8 m). Kruskal–Wallis and pairwise Wilcoxon tests confirmed significant differences by all periods of daytime ($p < 0.001$), except between night and dusk. Hourly analysis showed nocturnal and early-morning peaks in movement, particularly during excursions, contrasting with lower, more consistent resident movements. Shortest steps (means ~ 30 m) occured between 9:00 h and 15:00 h. Longest step was measured at 4.2 km.

ROLE OF WILDFIRES AND GRAZING IN HABITAT SUITABILITY

Presenter & Affiliation: *Stefano Filacorda*
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Authors: *Stefano Filacorda[1], Virginia Barca[1], Lorenzo Bernicchi[1], Lorenzo Frangini[1], Gabriele Antonini[1], Giulia Amato[1], Sara Vezzaro[1], Andrea Madinelli[1]*

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Presentation Type: Short Oral Presentation

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Keywords: wildfires, large carnivores, pasture

Abstract: Among the most striking ecological processes currently affecting Central and Southern Europe are the increase in wildfires and the decline of grazing lands—trends driven by land-use changes and climate change. These two processes significantly influence habitat suitability, subsequently altering resident wildlife communities. In the countries participating in the 4Pethabeco project (Italy, Croatia, Slovenia, Montenegro, North Macedonia, Albania, and Serbia), wildfires in 2025 affected over 280,000 hectares. This figure represents a 50% increase over the historical average, with peaks of 150% in Albania, 300% in Serbia, and 75% in Montenegro. On average, 50% of these fires occur in forested areas. Conversely, while overall forest cover across these countries has increased by 1–6% over the last 20 years, this expansion is often concentrated in transition zones—areas that face the highest fire risk. Wildfires influence the presence of wildlife and large carnivores, particularly in the short term, by: a) Reducing refugia: Loss of forest cover and transition habitats. B) Decreasing prey availability. The reduction of grazing (2-20% decline in pastures

over the last 20 years in different countries), which is associated with specific declining wildlife communities, also paradoxically affects the presence of carnivores. This occurs indirectly by: a) Reducing wild prey populations b) Increasing the vulnerability of livestock activities, leading to heightened conflict and a decrease in social acceptance of carnivores. Maintaining grazing lands is essential for reducing the risk of specific types of wildfires and preventing land fragmentation. The frequency, extent, and intensity of fires, combined with the loss of grazing areas, must be factored into territorial planning. These factors must be actively addressed through specific natural resource management strategies and integrated into predictive models for occupancy and connectivity within project areas. Ultimately, the effects of fire and grazing must be studied across various time scales to better interpret their complex relationships with wildlife.

MAINTAINING ECOLOGICAL CONNECTIVITY FOR LARGE CARNIVORES IN THE CARPATHIANS: FROM SCIENCE TO IMPLEMENTATION

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Presentation Type: Short Oral Presentation

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Keywords: large carnivores, ecological connectivity, Carpathian Mountains.

Abstract: Ecological connectivity is essential for the long-term conservation of large carnivores in the Carpathian Mountains, one of Europe's most biodiverse and least fragmented regions, supporting substantial populations of brown bear (*Ursus arctos*), grey wolf (*Canis lupus*), and Eurasian lynx (*Lynx lynx*). Large carnivores require extensive, connected habitats to fulfill biological needs such as dispersal, gene flow, and resource acquisition; however, fragmentation severely limits these processes, increasing isolation and vulnerability

of populations. Human pressures, particularly the rapid expansion of linear transport infrastructure (roads, motorways, railways), have accelerated habitat fragmentation across the Carpathians, compromising in some areas landscape permeability and impeding wildlife movement. National legislations and institutional frameworks currently lack consistent recognition and harmonization of ecological networks, hindering transboundary conservation efforts and effective planning of ecological corridors.

Recent research has advanced methodologies for delineating coherent ecological networks tailored to large carnivores by integrating habitat suitability modelling with connectivity analyses using approaches such as least-cost paths and random walk models. These models identified core habitats and ecological corridors (field validated) across heterogeneous landscapes, serving as key tools for landscape planning that can be integrated into regional spatial planning processes.

Complementing scientific advances, the International Action Plan on Conservation of Large Carnivores and Ensuring Ecological Connectivity in the Carpathians, adopted under the Carpathian Convention, provides a transboundary framework for conservation and coordinated management (3). It emphasizes harmonised national implementation, alignment with EU and international biodiversity commitments, and collaborative mechanisms to maintain and restore ecological linkages across borders.

However, conserving ecological connectivity in the Carpathians needs a coherent blend of science, policy, and planning: robust connectivity modelling, harmonised legal frameworks, multi-stakeholder cooperation, and targeted mitigation of infrastructure impacts. Such integrated efforts are critical for sustaining large carnivore populations, promoting genetic exchange, reducing human-wildlife conflict, and preserving the broader ecological integrity of this key European ecoregion.

OPERATIONALIZING LARGE CARNIVORE HABITAT MANAGEMENT: INTERVENTION TEAMS AND CONNECTIVITY-BASED APPROACHES IN KOSOVO

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Keywords: Habitat connectivity, Intervention teams, large carnivores

Abstract: Effective management of large carnivore habitats requires approaches that combine immediate conflict response with long-term planning for habitat suitability and ecological connectivity. In Kosovo, increasing habitat fragmentation, expanding infrastructure, and frequent human–wildlife interactions highlighted the need for practical, operational solutions that move beyond traditional conservation measures.

This presentation presents a case study from Kosovo focused on two complementary habitat management tools: the establishment of the country's first Large Carnivores Intervention Team and the identification of priority ecological corridors to enhance landscape connectivity. The Intervention Team was developed through a multi-institutional process and trained to provide rapid, coordinated responses to incidents involving wolves, bears, and lynx. Clear operational protocols and inter-agency cooperation improved emergency handling while reducing risks to people, wildlife, and property.

In parallel, habitat connectivity was addressed through spatial analysis (GIS), field assessments, and stakeholder consultations, leading to the identification of six pilot ecological corridors. These corridors target critical movement routes affected by infrastructure barriers and conflict hotspots, providing concrete entry points for integrating large carnivore connectivity into spatial planning and habitat management frameworks.

Initial results indicate improved institutional readiness, better communication with local communities, and increased recognition of connectivity as a core component of large carnivore habitat management. By linking emergency intervention capacity with connectivity-driven planning, this approach addresses both short-term management needs and long-term habitat functionality.

The Kosovo experience demonstrates a transferable model for the Adriatic-Ionian region, showing how operational response mechanisms and habitat connectivity planning can jointly support sustainable coexistence and effective large carnivore habitat management.

FROM SITES TO SYSTEMS: APPLYING IUCN TOOLS TO CONSERVE CONNECTIVITY IN LARGE CARNIVORE LANDSCAPES

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Presentation Type: Short Oral Presentation

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Keywords: Conservation connectivity", IUCN RHINO", IUCN NbS Standard

Abstract: Large carnivores require extensive, connected landscapes to survive and thrive, yet conservation efforts continue to focus predominantly on protected areas, despite the fact that most movement, dispersal and conflict occur beyond their boundaries. As landscapes become increasingly fragmented by agriculture, infrastructure and climate change, maintaining ecological connectivity across multi-use landscapes has become a central challenge for large carnivore conservation.

This presentation synthesises recent IUCN guidance, standards and tools that together provide a coherent framework for designing, governing and validating connectivity outcomes at landscape scale. Building on the IUCN Guidelines for Conserving Connectivity through Ecological Networks and Corridors, the presentation frames connectivity as a planned and measurable conservation outcome, embedded within ecological networks comprising protected areas, other effective area-based conservation measures, ecological corridors and a permeable matrix.

The Global Standard for Nature-based Solutions is presented as a key design instrument for interventions in productive landscapes, including agriculture and climate adaptation contexts, where “soft connectivity” can significantly reduce landscape resistance when properly implemented. To move from intention to demonstrable outcomes, the RHINO methodology and the STAR metric are highlighted as tools to prioritise threats, assess biodiversity risk, and validate whether connectivity interventions are effectively reducing pressures on wide-ranging species. Sector-specific guidance on roads, railways and canals illustrates how infrastructure planning represents a critical stress test for connectivity at landscape scale.

Together, these tools demonstrate that the challenge facing large carnivore conservation is no longer a lack of knowledge, but the integration and application of existing guidance across sectors and scales. The presentation concludes with practical implications for planners, conservation managers and policy-makers seeking to move from isolated sites toward functional, resilient ecological networks.

PONT CONNECT - PONT CONNECTIVITY CONSERVATION STRATEGY

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Presentation Type: Short Oral Presentation

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Keywords: Connectivity Conservation Areas, PONT, ecological corridors

Abstract: Protected areas are the fundamental building blocks of national conservation strategies in the south-western Balkans and are central to PONT's approach. To be effective, though, protected areas need to be of sufficient size and ecologically connected to one another and the larger landscape. The areas providing ways to identify, maintain, enhance, and restore ecological connectivity are called Connectivity Conservation Areas (CCAs).

The south-western Balkans is one of Europe's most biologically diverse regions. Energy infrastructures such as dam construction and mining are among the most frequent threats to protected areas and have a high impact compared with other threats. In the period 2022-2024 with the help of local experts, seven CCAs were identified in the PONT Focus Area which covers up to 2 million hectares connecting the cross border Prespa-Ohrid watersheds with the transboundary protected area clusters of Jablanica-Shebenik, Korab-Shara, Albanian Alps, and Pindos-Aoos-Vjosa. Based on the recommendations outlined in the CCA expert studies, and in consultation with the relevant national environmental authorities, PONT designed and launched a call for proposals for NGOs to pilot interventions in priority ecological

corridors within the CCAs. The first pilot grants started early 2023 and the first results were collected and analysed to establish and consolidate the “PONT Connectivity Conservation Strategy”.

The objective of “PONT Connect” is to develop and pilot strategies for biodiversity conservation and sustainable management of key ecological corridors in priority Connectivity Conservation Areas (CCAs) following a participatory approach. This will lead to long-term conservation actions (such as applied research, surveys, monitoring, active habitat management and habitat restoration) benefiting both people and nature in selected ecological corridors with strengthened management of biodiversity. Connectivity conservation will contribute to the sustainable management of protected areas. Overall, this will improve the understanding of the participating countries of the biodiversity importance and socio-economic potential of connectivity conservation as a contribution to the global 30x30 targets and the European Green Deal.

TOWARDS AN INCREASINGLY CONNECTED WORLD: NEW METHODOLOGICAL APPROACHES FOR ENVIRONMENTAL CONNECTIVITY AND IMPLICATIONS FOR LANDSCAPE PLANNING

Presenter & Affiliation: *Lorenzo Bernicchi*
University of Udine - Italy

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Presentation Type: Short Oral Presentation

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Keywords: landscape connectivity, large carnivores, multi-species connectivity, scenario analysis

Abstract: Habitat connectivity is a cornerstone of conservation strategies for wide-ranging species, particularly large carnivores, whose long-term persistence depends on the ability to move across heterogeneous landscapes. This is especially true in regions like the Alps and the Balkans, core areas for the 4PETHABECO project, where natural habitats are increasingly fragmented by infrastructure and land-use changes. Maintaining or restoring functional linkages is essential to ensure demographic exchange, gene flow, and long-term access to suitable environments.

Earlier connectivity studies relied on static maps or expert-based corridors, offering initial guidance but often oversimplifying the complexity and dynamism of real-world landscapes and animal movements. Today, advances in spatial ecology and statistical modelling enable

more accurate assessment of functional connectivity by accounting for scale-dependent processes and behavioral flexibility, and by integrating species-specific habitat preferences, demographic data, and landscape dynamics. They also support scenario analysis to evaluate how connectivity may shift in response to urban development, land-use changes, or climate impact, and help identify critical dispersal areas under different future conditions. Multi-species models further enhance this perspective by identifying shared corridors, informing broader, transboundary strategies that maximize conservation benefits for multiple species.

Integrating these advanced connectivity methods into conservation planning allows for the identification of priority areas where targeted actions, such as habitat protection, ecological restoration, or barrier mitigation, can most effectively enhance landscape permeability. Within 4PETHABECO, these methods are applied to detect transboundary dispersal corridors and bottlenecks that are critical to the connectivity of species such as wolves, brown bears, and Eurasian lynx. These carnivores rely on large, connected habitats to maintain viable populations across administrative borders. By embedding these models into spatial planning, the project contributes to the development of coherent ecological networks that support biodiversity, reduce fragmentation, and promote sustainable landscape management across the Alpine and Dinaric-Balkan regions.

ECOLOGICAL CONNECTIVITY IN PROTECTED AREAS – ACTIVITIES AND RESULTS FROM FOREST CONNECT PROJECT

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Presentation type: Short Oral Presentation

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Keywords: Connectivity, telemetry, forests

Abstract: The Forest Connect project – "Towards Climate-Resilient Forest Habitat Corridors for Large Carnivores in the Balkan–Carpathian–Dinaric Region" is an international initiative aimed at conserving biodiversity and enhancing ecological connectivity of forest ecosystems across the Balkan, Carpathian and Dinaric regions. These areas play a crucial role in the movement and long-term survival of large carnivores such as the brown bear, wolf and lynx. The project is implemented within the Interreg VI-B Danube Region Programme, has a duration of 30 months, and brings together 15 partner organisations and 8 associated partners from seven countries, with co-financing from the European Union.

The main objective of Forest Connect is to ensure climate-resilient and functional connectivity of forest corridors that enable cross-border movement of large carnivores, while addressing pressures from unsustainable forest management, habitat fragmentation, infrastructure development and climate change. This objective is pursued through the development of advanced tools for transnational

forest monitoring and management, enhancement of forest habitat heterogeneity, connectivity and resilience, and strengthening cooperation among institutions, experts and local communities.

Project activities include mapping and analysis of ecological corridors, development of GIS databases and digital models, implementation of pilot measures to increase habitat resilience, and engagement of local communities in actions aimed at reducing human–large carnivore conflicts. In protected areas such as Durmitor, Biogradska Gora and Prokletije National Parks, concrete field activities are being carried out to restore habitats, increase the availability of natural food resources, and reduce the risks of habitat degradation and wildfires.

Forest Connect contributes to the development of strategic recommendations for climate-resilient corridor management, strengthening ecosystem resilience, biodiversity conservation and the coexistence of humans and wildlife.

LARGE CARNIVORES (BEAR, WOLF, LYNX) IN ALBANIA ARE FACING A DIFFICULT SURVIVAL: CHALLENGES AND NEEDS

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Presentation Type: Short Oral Presentation

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Keywords: Bear, Wolf, Balkan Lynx, population decline, challenges for recovery

Abstract: While populations of large carnivores have recovered across much of Europe in recent decades, their status in Albania has deteriorated significantly. The brown bear (Ursus arctos) is recently assessed as Vulnerable (VU), the wolf (Canis lupus) as near threatened (NT), whereas the Balkan lynx (Lynx lynx balcanicus) is listed as Critically Endangered (CR). Population estimates indicate a sharp decline over the past decades: brown bears have decreased from approximately 400–450 individuals in the 1960s to 180–220 in recent years, wolves from 800–850 to 200–240 individuals, and the Balkan lynx from 60–64 individuals to only 8–10 individuals. The decline has been most pronounced in the Balkan lynx, whose population has decreased nearly sixfold, reflecting its high ecological specialization.

The primary drivers of these declines include ongoing habitat loss, fragmentation and degradation, coupled with reductions in prey availability. Additional threats include illegal killing, capture for economic gain, poisoning related to unresolved human–large carnivore

conflicts, and the isolation of Balkan lynx metapopulations, which limits the species' recovery potential. Conservation measures implemented to date, including national action plans for the bear and lynx (2027) and a nationwide hunting ban enforced between 2014 and 2025, have not significantly contributed on LCs population recovery.

This presentation examines the current status of large carnivore populations in Albania, identifies the key drivers and conservation challenges affecting their survival, and proposes targeted measures to improve their long-term conservation and recovery.

DEVELOPING A PILOT GOVERNANCE MODEL FOR CONNECTIVITY CONSERVATION AREAS (CCA) IN ALBANIA: THE CASE OF MUNELLA NATURE PARK

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Presentation Type: Short Oral Presentation

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Keywords: connectivity conservation, protected area governance, Balkan lynx

Abstract: The connectivity conservation concept represents a very innovative field of work for Albania and the Western Balkans. PPNEA has well recognised the need for bio corridor management for mammals such as the Balkan lynx and the Brown bear populations. Nevertheless, PAs in Albania, local authorities, local CSOs, and the communities with a stake in decision-making for enhancing bio corridor connectivity lacked the awareness, knowledge, and capacities to consider working for these innovative management practices. The seeds of this project came from the research and consultations during the preparation of the feasibility study on enhancing connectivity in Albania and North Macedonia, in the PONT Focus Region. Through a pilot project, the aim was to create the conditions for implementing Connectivity Conservation Areas (CCAs) in the ecological corridor Cukal– Munella–Balgjaj–Martanesh, by focusing on building

institutional capacity, developing governance models, strengthening community engagement, and advancing research, monitoring, and habitat restoration.

In Albania, where ecological value is embedded within cultural landscapes, we have learned that technical solutions alone are not enough. The Transect Walk has emerged as a transformative method in our pilot efforts as a platform for shared exploration and meaning-making. Between 2023 and 2025, the application of the Transect Walk methodology across ten sites produced rich, grounded insights into how ecological systems are shaped and perceived by communities. These observations emerged not just from structured inquiry, but from walking, listening, and reflecting directly with the people who live within these landscapes.

The team has been working to develop a pilot governance plan for the Munella biocorridor, Balkan lynx home in Albania. The work uses exploratory interviews with national and local institutions and other stakeholders, combined with validation workshops. The Munella region is the most important bio-corridor that connects the Albanian Alps National Park with Korab-Koritnik Nature Park, through the Skavica gorge.

TOO MUCH CARE: LARGE CARNIVORES, COEXISTENCE AND THE PRODUCTION OF CONFLICT

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Presentation Type: Short Oral Presentation

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Keywords: large carnivores, coexistence, conservation and management

Abstract: Research advances on human–large carnivore relations has increasingly shifted from a central focus on conflict towards concepts of coexistence, while also recognising that what are labelled as 'human–wildlife conflicts' often involve underlying human–human conflicts alongside material impacts from wildlife. Building on this work, this material examines human–large carnivore interactions through an ethnographic study of three large carnivore species in the highlands of Albania, a landscape characterised by long-standing coexistence between people and predators.

The findings show that impacts from large carnivores generate diverse, spatially differentiated, and morally mediated responses within local communities. These responses vary according to where impacts occur and how they are interpreted through locally embedded social and moral frameworks that primarily regulate relations among humans, rather than prescribe attitudes towards wildlife. In this context, material impacts do not necessarily translate into conflict, nor do they automatically undermine tolerance towards large

carnivores. Instead, coexistence is sustained through socially negotiated understandings of acceptable loss, responsibility, and moral conduct.

I argue that conservation and management approaches that fail to recognise this local diversity, informal historical experience of coexistence, and existing levels of tolerance risk mischaracterising impacts as conflict. Such misreadings can inadvertently generate or escalate human–human conflicts, even in contexts where these are initially absent. In areas where coexistence with large carnivores is already well established and tolerance remains high, management interventions should therefore not be assumed to be inherently necessary, but require careful, context-specific assessment to avoid disrupting the social and moral order that sustain coexistence.

TRANSDISCIPLINARY AND PARTICIPATORY APPROACHES PROMOTED BY PROJECT 4PETHABECO

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Authors: *Liliana Vižintin[1], Bernarda Bele[1], Boris Kryštufek[1,2]*

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Presentation Type: Short Oral Presentation

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Keywords: coexistence, transdisciplinary, stakeholder-engagement methodology

Abstract: Achieving coexistence between humans and large carnivores in human-modified landscapes remains a major conservation challenge. Although many projects include local communities, recent studies indicate that transdisciplinary approaches are still not systematically fostered within large-carnivore conservation efforts. This reveals an important gap and highlights the need for more explicit integration of transdisciplinary and multi-stakeholder engagement in conservation funding schemes, as these approaches can, in some contexts, improve the likelihood of successful conflict resolution. Social conflicts involving large carnivores are often characterized by a lack of trust between stakeholders and authorities, as well as insufficient and non-transparent communication among stakeholder groups. Addressing such conflicts therefore requires a deeper understanding of their social, economic, cultural, and interpersonal dimensions. This can be achieved through participatory processes

that actively involve all relevant stakeholders and are tailored to the specific local context.

The stakeholder-engagement methodology developed within the 4PETHABECO project is based on four guiding principles: inclusivity (engaging a broad and representative set of stakeholders), flexibility (allowing partners to select context-appropriate engagement methods), transparency (ensuring open communication and clear documentation), and consistency (using shared tools and formats to support comparability and synthesis of results). In this contribution, we present the participatory approaches adopted by 4PETHABECO—including focus groups, surveys, and optional supplementary methods—and report preliminary results of multi-stakeholder involvement. In particular, we highlight initial findings regarding stakeholder perceptions, priorities, and recommendations for large-carnivore habitat management.

INVISIBLE BARRIERS TO CONNECTIVITY: ANTHROPOGENIC RESISTANCE AND FUNCTIONAL CONNECTIVITY IN LARGE CARNIVORE CONSERVATION

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University of Udine - Italy

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Presentation Type: Short Oral Presentation

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Keywords: Anthropogenic resistance, Functional connectivity, Large carnivores

Abstract: Current connectivity planning for large carnivores (LC) predominantly assesses *landscape resistance* based on landscape's biophysical components such as land cover and infrastructure. Although recent approaches have broadened this framework by incorporating ecological processes beyond purely physical features, including intra- and interspecific interactions, the role of human dimension remains largely overlooked as a key determinant of functional connectivity.

Attempts to incorporate human influence into connectivity analyses typically rely on indirect spatial proxies of anthropogenic pressure, including human population density or proximity to roads and settlements. However, these proxies fail to capture the direct effects of human behaviours on wildlife movement and survival.

Building on the concept of *anthropogenic resistance*, defined as the influence of human behaviours on species' movement, survival, and movement-related costs, this contribution highlights how practices such as persecution, hunting, tolerance or supplementary feeding, land-use and livestock management can act as invisible barriers to functional connectivity, regardless human presence itself. Neglecting these dimensions may result in over- or underestimation of connectivity, potentially leading to socially unsustainable corridors or ecological traps.

Human behaviours are influenced by interacting factors operating at individual, community, and institutional levels, in turn rooted in socio-cultural contexts and historical experience shaping values and core beliefs. These include perceptions and attitudes, social identity and local traditions, legal and policy frameworks (e.g. protection regimes and hunting regulations), habitat and species management, and coexistence strategies (e.g. economic incentives and compensations).

The occurrence and intensity of human actions therefore vary spatially in response to psychological, socio-economic, cultural, and institutional drivers, often at fine spatial scales. However, LC populations naturally extend beyond administrative boundaries, requiring conservation objectives and planning approaches operating at broader spatial scales.

Within the transboundary framework of the 4PETHABECO project, integrating anthropogenic resistance into habitat and connectivity planning is particularly relevant. The region encompasses diverse socio-cultural backgrounds, land-use practices, management traditions, and coexistence histories, which interact with physical barriers to influence connectivity among shared wildlife populations across national borders. This contribution advocates for a multi-scalar social–ecological approach integrating landscape and anthropogenic resistance to support more effective, socially acceptable, and coordinated transnational strategies for long-term coexistence and conservation.

SHARING SPACE WITH BEARS: THE CRITICAL ROLE OF THE ELECTRIC FENCES

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Presentation type: Short Oral Presentation

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Keywords: brown bear, electric fences, beekeepers

Abstract: The Center for the Protection and Research of Birds (CZIP) has been donating electric fences since 2021. Through this process, we have had the opportunity to observe how this protection method influences the coexistence between humans and bears. Today, as climate change becomes increasingly evident and the scarcity of natural food presents a growing challenge, damage to beehives is becoming more frequent. Yet, only a small number of beekeepers take measures to protect their hives. What are the reasons? The main obstacles include the high cost of electric fences, lack of technical knowledge, fear of additional responsibilities, limited awareness or understanding of the law and unclear or complicated procedures for obtaining subsidies. Our presentation explores these challenges in Montenegro and shares potential solutions and experiences.

HUMAN–WILDLIFE CONFLICTS IN SERBIA: BEAR DAMAGE TO BEEHIVES, LIVESTOCK AND ORCHARDS

Presenter & Affiliation: *Stefan Prekajski*
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Presentation Type: Short Oral Presentation

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Keywords: Human–bear conflict, spatial patterns, conflict mitigation

Abstract: Brown bears (Ursus arctos) play a key role in ecosystem functioning, but their interactions with human activities can lead to conflicts. In Serbia, these conflicts manifest primarily as damage to beehives, orchards, and livestock, with additional observations of bear presence reported by local communities. Understanding the patterns and drivers of such interactions is essential for effective management and coexistence.

This study compiles and analyzes data collected between 2006 and 2025 from field surveys, official reports, and citizen observations. The dataset includes records of damage incidents and bear sightings, allowing assessment of spatial trends and identification of areas with higher conflict potential. Particular attention was given to habitat characteristics influencing bear activity near human settlements and agricultural areas.

Results indicate that most damage occurs in beekeeping areas, with livestock incidents also significant in certain regions. The findings highlight the importance of targeted mitigation strategies, such as preventive measures, habitat management, and community

engagement, to reduce conflicts while supporting large carnivore conservation.

This study contributes to the ongoing efforts in the Adriatic-Ionian Region to strengthen cooperation in large carnivore habitat management. By integrating ecological data with socio-economic considerations, it provides practical guidance for policymakers, conservation practitioners, and local communities aiming to balance biodiversity protection with sustainable human livelihoods.

LIVING LABS APPROACHES PROMOTED BY PROJECT 4PETHABECO FOR CO-CREATING TAILORED SOLUTIONS ADDRESSING COEXISTENCE CHALLENGES

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Presentation Type: Short Oral Presentation

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Keywords: Living Labs, coexistence challenges, large carnivores

Abstract: Social conflicts surrounding large carnivores are increasing across Europe, largely due to the expansion of these species into human-modified and agricultural landscapes. Such conflicts arise because large carnivores may be perceived as valuable by some stakeholders but as a source of risk or hardship by others, depending on differing values, attitudes, livelihoods, and everyday practices. Effective involvement of diverse interest groups is therefore crucial to identify and co-design tailored solutions that are both feasible and acceptable. These bottom-up processes can complement top-down approaches, which alone often struggle to achieve implementation or community buy-in.

Living labs (LLs) have gained recognition as a research methodology for addressing complex sustainability challenges and for structuring collaborative innovation processes involving users, communities, businesses, and public and civil-society actors. They are increasingly

regarded as tools for enhancing citizen participation and fostering social cohesion. LLs offer a unique context for studying social innovation, as they assign an active role to citizens as users, co-creators, and co-producers of knowledge. They have been applied in various fields, including climate-change mitigation and adaptation and resilience within agri-food systems. However, their evaluation remains inconsistent, largely due to methodological heterogeneity and diverse project designs.

This contribution discusses the application of living-lab methodologies for co-creating tailored solutions addressing coexistence challenges and social conflicts associated with the expansion of large carnivores into human-modified landscapes. Drawing on the context of the 4PETHABECO project, we consider two LL types—Nature-based Living Labs and Agroecosystem Living Labs—as case studies with potential transferability across regions and sectors relevant to large-carnivore management.

EDUCATION AND TOURISM: LARGE CARNIVORE CENTER DINA PIVKA

Presenter & Affiliation: *Helena Mandelj Šneberger*
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Presentation Type: Short Oral Presentation (Online)

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Key words: education-focused tourism, edutainment approaches

Abstract: Large Carnivore Center DINA Pivka is an education-based visitor exhibition that connects nature conservation with tourism through contemporary, experience-led interpretation. The centre was developed within the Interreg (SI-HR) project Carnivora Dinarica and opened to the public in 2021, presenting large carnivores and human–wildlife coexistence.

The DINA Centre addresses both organised educational groups and individual visitors, combining structured learning with experience-based, engaging interpretation. Educational content is delivered through interactive exhibition elements, edutainment approaches and tailored programmes that translate expert knowledge on large carnivore ecology, biology and coexistence into clear, accurate and accessible content.

The presentation explores how education-focused tourism can strengthen understanding, support coexistence and create long-term value for visitors and local communities. It highlights interpretation quality and well-prepared educational staff as key factors in turning a project-based exhibition into a lasting educational practice.

PARALLEL WORKSHOPS

CULTURAL DIMENSIONS OF HABITAT SUITABILITY AND CONNECTIVITY FOR LARGE CARNIVORES IN THE ADRIATIC-IONIAN REGION

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Presentation Type: Workshop

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Keywords: cultural narratives, habitat suitability and connectivity

Abstract: Cultural narratives (stories, myths, literature, and collective memory) strongly influence how societies perceive their relationship with nature and respond to environmental challenges. Studies across the humanities and environmental sciences show that such narratives transmit ecological knowledge, shape environmental values, and motivate collective action. Integrating culture as a dimension of habitat suitability is increasingly recognized as essential for realistic ecological-corridor planning and effective coexistence strategies.

Large carnivores are especially vulnerable to human pressures, and shifts in their ranges can disrupt ecosystem functioning and intensify conflict. This workshop examines cultural and natural-heritage narratives linked to large-carnivore habitat suitability and connectivity in the Adriatic–Ionian Region. Participants will engage with creative and participatory methods using a prototype facilitation-resources

toolkit developed within the 4PETHABECO project, and will provide feedback on its usability and potential for broader application.

The workshop and toolkit draw on established approaches for promoting dialogue, stakeholder engagement, and transitions from conflict to coexistence. Expected outcomes include identifying key narrative typologies related to large carnivores (such as heritage species, perceived threats, or symbols of wilderness), clarifying cultural-ecosystem-service and governance narratives that influence connectivity and coexistence, and outlining guiding principles for effective expert-to-public communication.

ENVIRONMENTAL VARIABLES FOR HABITAT SUITABILITY AND CONNECTIVITY WITH A PRACTICAL VIF ANALYSIS IN GOOGLE EARTH ENGINE

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Presentation Type: Workshop

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Keywords: habitat suitability models, habitat connectivity models, variable multicollinearity

Abstract: Effective habitat suitability and connectivity modeling for large carnivores depend heavily on the selection and quality of environmental predictors. However, the inclusion of multi-source spatial data, ranging from topography to climate and anthropogenic factors, often introduces significant multicollinearity. If left unaddressed, these redundancies can destabilize model coefficients and lead to misleading ecological conclusions during the interpretation of habitat quality and corridors.

This hands-on workshop is designed to guide participants through a practical workflow for preparing and validating environmental covariates. Moving beyond theoretical definitions, we will demonstrate the process of accessing and integrating diverse datasets (e.g., MODIS thermal data, Copernicus CORINE Land Cover, TerraClimate, VIIRS night lights, and SRTM-derived topographic indices).

Using a cloud-computing approach for real-time spatial analysis, participants will perform diagnostic tests for multicollinearity using a

robust implementation of the Variance Inflation Factor (VIF). The session will focus on identifying redundant variables interpreting statistical warnings and making informed decisions on variable selection to ensure robust models.

Participants are encouraged to bring laptops to engage in a practical exercise focused on the Dinaric-Balkan-Pindos region. By the end of the workshop, attendees will have a clear understanding of the transition from raw data ingestion to a validated predictor stack ready for habitat suitability modeling and connectivity analysis. While experience in Google Earth Engine is an asset, it is by no means a prerequisite. The workshop is structured to be fully accessible to researchers of all technical backgrounds.

THE ROLE OF THE PROTECTED AREAS FOR THE FUTURE OF LARGE CARNIVORES

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Julian Prealps Natural Park - Italy

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Presentation Type: Workshop

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Keywords: Protected Areas, transboundary cooperation, conflict management

Abstract: The return of Large Carnivores (Wolf, Brown bear, Lynx) in Europe represents one of the successful stories of conservation but at the same time presents complex management challenges in landscapes strongly modified by humans. The coexistence between human activities and LC thus becomes a real significant challenge.

In this context protected areas could play a fundamental role in the long-term preservation of these species, providing suitable habitats and food resources and reducing direct mortality potentially caused by humans.

But that's not all: they also play an important role in education, training, and communication and represent real pilot areas where different ways and strategies for coexistence. However, designated protected areas alone are not enough: the elusive nature and extensive spatial requirements of carnivores necessitate a strategy that transcends administrative boundaries.

This workshop aims to explore the strategic role of protected areas as central nodes in a wider ecological network. The topics to be explored include: the importance of promoting structural and functional connectivity between parks, Natura 2000 areas and Emerald network to facilitate dispersal and genetic exchange, which are important for preserving populations; the challenges associated with managing human-carnivore interactions with the aim of finding strategies for an active involvement of stakeholders to mitigate conflicts and promote coexistence; cross-border management in the conservation of LC.

Through the presentation of case studies from EU and non-EU participating countries, there will be the opportunity to share existing best practices in LC management at different levels. The final goal is to identify some shared guidelines for cross-border and network management, in which protected areas play a role in promoting concrete conservation policies in order to ensure sustainable coexistence between human communities and large carnivores in the future European landscape.

CONFERENCE CONCLUSIONS

International Large Carnivores Habitat Management Conference

Tirana, Albania, 25–26 February 2026

4PETHABECO Project

The International Large Carnivores Habitat Management Conference brought together researchers, practitioners, public authorities, and civil-society actors to confront the complex ecological and social challenges associated with conserving wide-ranging carnivores across the Adriatic-Ionian Region. Over two days, contributions demonstrated that the future of brown bears, wolves, lynx, and other species depends on the integration of ecology, governance, culture, and community-based knowledge within a transnational and collaborative framework.

Advancing Ecological Knowledge and Connectivity Planning

A central outcome of the conference was the reaffirmation that maintaining ecological connectivity is a prerequisite for the long-term viability of large carnivore populations. Presentations highlighted significant methodological advances in habitat-suitability modelling, telemetry, occupancy analyses, and multi-species connectivity mapping across the Alpine, Dinaric-Balkan, Pindos, and Caucasus regions. These studies provided a robust evidentiary basis for delineating core habitats, ecological corridors, dispersal bottlenecks, and regions vulnerable to fragmentation. Their application in spatial planning – particularly in the context of expanding transport infrastructure – was emphasized as essential for preserving functional movement networks at the landscape scale.

Strengthening Institutions and Governance Frameworks

Conference discussions underscored a growing consensus that effective large-carnivore management requires governance systems capable of coordinating action across jurisdictions and institutional mandates. Case studies from Kosovo, Albania, and the Carpathians illustrated how intervention teams, cross-sector partnerships, harmonized monitoring protocols, and adaptive management models can improve institutional responsiveness and policy coherence. Participants stressed that ecological data must be embedded within national and regional planning procedures, environmental-impact assessments, and connectivity-focused regulations to ensure that conservation considerations are systematically implemented

Integrating Social, Cultural, and Anthropological Perspectives

A significant contribution of the conference was the explicit recognition that coexistence is shaped not only by the ecological behaviour of carnivores, but by human values, moral frameworks, narratives, and lived experiences. Presentations showed that perceived "conflicts" often stem from governance gaps, social tensions, or mismatches between local expectations and institutional responses. By examining cultural narratives, traditional ecological knowledge, and community-level moral reasoning, contributors demonstrated how tolerance, acceptance, and perceptions of legitimacy vary across landscapes. Understanding these dynamics is critical for designing socially acceptable, context-specific conservation measures.

Embedding Transdisciplinary and Participatory Methods

Many contributors called for mainstreaming participatory and co-creative approaches in large-carnivore management. Examples included stakeholder-engagement frameworks, living labs, focus groups, transect walks, and collaborative governance models. These approaches support trust building, foster transparent communication, and empower local actors to co-design solutions that reflect

local priorities, knowledge systems, and socioeconomic realities. Within the 4PETHABECO project, the development of a flexible but standardized engagement methodology was highlighted as an important step toward achieving comparable and integrative participatory processes across the region.

Responding to Emerging Environmental and Socio-Ecological Pressures

The conference also addressed a series of accelerating pressures – including increased wildfire frequency, the decline of traditional grazing systems, climate-driven habitat changes, and infrastructure expansion – that influence both carnivore ecology and human–wildlife interactions. Presenters emphasized that these pressures can amplify vulnerability, reduce prey availability, reshape movement patterns, and heighten the risk of socio-economic conflict. Anticipating and mitigating these impacts will require forward-looking planning, climate-resilient landscape management, and coordinated responses across sectors and borders.

Education, Communication, and Cross-Border Knowledge Exchange

Educational initiatives and public-facing institutions, such as the DINA Pivka Centre, were recognized as powerful platforms for fostering public understanding of carnivore ecology and coexistence. At the same time, best-practice examples from protected areas, connectivity projects, and cross-regional collaborations highlighted the benefits of reciprocal learning between EU and non-EU partner states, and between scientific research and traditional knowledge. Participants emphasized that such reciprocal knowledge exchange prevents duplication of effort, strengthens institutional capacity, and accelerates policy innovation.

Final Statement

The discussions and findings presented during the conference affirm that large-carnivore conservation – and the coexistence it requires – cannot be achieved through ecological science alone. Instead, it demands a coordinated, adaptive, and transdisciplinary approach that unites ecological expertise, social insight, participatory engagement, and effective governance across administrative and cultural boundaries.

The insights shared in Tirana will directly support the development of the joint Adriatic–Ionian Strategy and Action Plan under the 4PETHABECO project. They provide a strong foundation for shaping future policies and collaborative initiatives aimed at ensuring that humans and large carnivores can share landscapes in ways that are ecologically sustainable, socially equitable, and resilient to future change.

PHOTOGALLERY

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Capture the gaze,
preserve the freedom.
One purchase,
A thousand acres of freedom

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