Interreg CE HUMANITA

TRANSNATIONAL POLICY RECOMMENDATIONS FOR BIODIVERSITY PROTECTION AND VISITORS MANAGEMENT: THE HUMANITA PROJECT APPROACH

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HUMANITA

HUMANITA Project

The project “HUMANITA – Human-Nature Interactions and Impacts of Tourist Activities on Protected Areas” brought together 10 partners from Austria, Croatia, Hungary, Italy and Slovakia, and 12 associated partners. HUMANITA addressed the growing demand for outdoor activities and the challenges it creates for protected areas in Central Europe. Its main goal was to support protected area managers in balancing visitor expectations with the protection of natural values. Through evidence-based and participatory approaches, the project helped managers make better decisions, prevent negative impacts and reduce human–nature conflicts. HUMANITA focuses on the joint development of tools and methods for assessing the environmental impacts of tourism in protected areas. Through transnational cooperation and pilot actions, partners tested innovative approaches to monitoring environmental conditions and improving management responses. The project also involved tourists and local communities in activities such as participatory monitoring, helping to raise their awareness, build trust and encourage more responsible behaviour towards nature.

Project duration: April 1, 2023 – March 31, 2026
Total budget: €2,396,346.70

Project partners:
University of Žilina, Slovakia (Lead partner)
Eurac research, Italy
University of Parma, Italy
Notitia Ltd, Croatia
Carinthia University of Applied Sciences, Austria
CEEweb for Biodiversity, Hungary
EGTC Geopark Karawanken/Karavanke, Austria/Slovenia
Public Institution Kamenjak, Croatia
Tuscan-Emilian Apennine National Park, Italy
Bükk National Park Directorate, Hungary

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HUMANITA Project

Human-nature interactions: understanding and managing tourism impacts in protected areas

The document presents a series of policy recommendations addressed to park managers and policy makers providing a final summary of the topics addressed by the Interreg CE HUMANITA project regarding the monitoring and mitigation of human-nature impacts and conflicts in protected areas. The recommendations are grounded in a set of multilevel actions implemented throughout the project, including: the measurement and evaluation of tourism impacts; the development of citizen science initiatives and participatory activities involving stakeholders; and the promotion of knowledge exchange and cooperation among parks and protected areas, with a view to updating visitor management methods and models and fostering approaches that support active and informed environmental protection. In this context, the policy recommendations presented in this document are structured into three main sections, reflecting the thematic areas addressed by the project activities. Each section opens with a concise overview of the key insights gained and the most relevant results achieved. These findings provide the basis for transferring key lessons learned into decision-making processes, both at the technical-operational level, targeting parks and protected areas, and at the political-institutional level, involving public land management bodies and competent authorities.

The first section outlines the creation of a transnational framework for biodiversity monitoring, developed starting from the analysis and collection of best practices.

The second section focuses on monitoring activities carried out in the pilot areas including the field-implementation use of innovative technologies such as UAVs, LiDAR, and GNSS, the initiatives of public engagement launched by the project partners, the creation of a multi-level database for the common understanding and exchange of impacts measurements.

The third section provides an overview of experiences and results of visitor engagement activities, and the development of new common strategies of heritage narratives, aimed at fostering visitors' emotional engagement and shared responsibility.

Each chapter comprises of an activity carried out within the project to illustrate the beneficial application of the principles set out in the recommendations. Images and charts accompany the text to help readers navigate the sections. At the end of each chapter, links are provided to the official project documentation, where readers can find the scientific sources of the recommendations presented here.

MONITORING OF TOURISM ENVIRONMENTAL IMPACTS: METHODS, DATASETS AND CITIZEN ENGAGEMENT

TAKE HOME MESSAGE

HUMANITA has created a transnational shared framework for monitoring biodiversity in its five pilot areas, with the aim of gathering, harmonizing, and consolidating knowledge on existing monitoring methods and developing innovative solutions.

Collaboration played a key aspect role: experts, citizen scientists, and local communities contributed together to data collection and interpretation, showing how monitoring can be a shared responsibility.

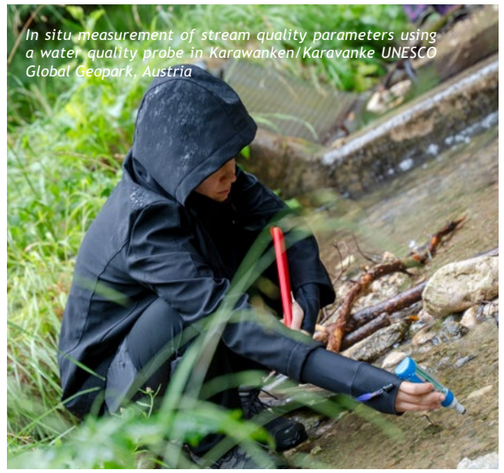
These experiences translate into concrete actions to institutionalize monitoring, ensure long-term support, strengthen stakeholder engagement, and guide planning, regulation, and cross-border cooperation through the data collected.

The project started building the scientific and methodological foundation by establishing a shared evidence base on tourism pressures, environmental impacts, and monitoring practices across all pilot sites (Lower Kamenjak, Bükk NP, Karawanken-Karavanke Geopark, Malá Fatra NP, and Tuscan-Emilian Apennine NP). The overarching objective was to collect, harmonise, and build a knowledge base on existing monitoring methods to measure tourism pressures on the environment, identify critical hotspots within pilot sites, and prepare the ground for developing, testing and implementing innovative monitoring solutions. To achieve this, HUMANITA combined desk research, workshops and interviews and field-based assessments. The collected information was translated into a transnational monitoring strategy to monitor tourist impact on the environment. The first core activity was the compilation of a comprehensive list of monitoring methods for visitor impacts in protected areas. Partners screened international good-practices and synthesized them, setting a common understanding of available tools and their applicability. A Good Practice Workshop was organized gathering eight experts to present the state-of-the-art approaches in GNSS-based visitor tracking, remote sensing of vegetation impacts, erosion monitoring with UAV photogrammetry, as well as wildlife acoustics and camera-based monitoring. The event strengthened knowledge exchange and helped partners define relevant technological options for their own contexts.

Building on this shared knowledge base the **Good Practice Report** consolidated the most promising methods for visitors, wildlife, vegetation, erosion, and pollution monitoring. These outputs formed the conceptual backbone for field investigations at the project pilot sites.

The Report on environmental impacts of tourism on each pilot site detailed analyses of specific aspects of local ecosystems outlining data on detected impacts, protected species, tourist flows, hotspots, and existing monitoring obligations. Partners identified key pressures such as trampling, trail erosion, disturbance of wildlife, invasive species spread, pollution, and unregulated visitor behaviour. These reports created a harmonized knowledge baseline and revealed knowledge gaps and priority monitoring needs.

Amphibian swab sampling for eDNA analysis to assess the potential presence of the chytrid fungus performed during the HUMANITA Summer School



In situ measurement of stream quality parameters using a water quality probe in Karawanken/Karavanke UNESCO Global Geopark, Austria

All findings converged into the **Transnational Monitoring Strategy** which provides a unified conceptual framework for visitor, vegetation, erosion, wildlife, and pollution monitoring. It outlines indicators, methods, spatial focus areas, responsibilities, resources, and timelines, ensuring comparability across parks while allowing local adaptation. The strategy operationalizes the achieved outputs into a structured monitoring program to be implemented, tested and transferred.

The methodological, conceptual, and empirical basis thus established, built capacity among partners, and defined coherent monitoring directions, ensuring common knowledge to develop, test, and apply innovative solutions grounded in robust evidence.

Data acquisition for erosion monitoring using 360° spherical camera in Tuscan-Emilian Apennine National Park, Italy

Grounded Recommendations for Park Managers

1. Adopt a Unified Biodiversity Monitoring Framework

Adopt a unified biodiversity monitoring programme to ensure clarity on why, what, where, when, who, and required resources for each activity; select indicators and methods that directly address those pressures; and ensure comparability across regions.

2. Engage Citizen Scientists and Local Stakeholders in Monitoring

Mobilize citizen science and local stakeholders to strengthen data collection, awareness, and programme legitimacy (e.g., for invasive species and litter monitoring), coupled with appropriate training and support measures.

3. Ensure Long-Term Monitoring Through Structured Timing

Plan monitoring timing as a long-term commitment; establish baselines during the project; define intervals sufficient to detect change beyond natural fluctuations, and specify thresholds that trigger management responses for adaptive visitor management.

4. Use Monitoring Evidence to Guide Zoning and Access Management

Use monitoring evidence to support management decisions and, where warranted, adjust zoning, trail designations, or access to protect sensitive habitats and species under high tourism pressure.

Policy Recommendations for Public Authorities

1. Secure Long-Term Funding for Continuous Monitoring

Ensure stable, multi-year financing for continuous monitoring beyond project cycles, addressing the common weakness of ad hoc, underfunded efforts and enabling time series sufficient to detect trends and guide action.

2. Promote Standards for Continuous Monitoring for Comparability across Sites

Endorse and mainstream a common biodiversity monitoring programme as a planning standard for conservation areas, enabling comparable, valid data while allowing local adaptation to site conditions and monitoring obligations.

3. Institutionalize Stakeholder & Citizen-Science Programmes

Support structured stakeholder engagement and citizen science programmes to bridge traditional knowledge, science, and policy; include measures to enhance programme visibility and educational outcomes.

4. Embed Monitoring Evidence in Regulation and Plans

Integrate monitoring outputs into regulatory instruments and management plans, enabling timely adjustments to conservation status, zoning, access regimes, and infrastructure based on defined thresholds of change.

5. Build Cross-Border Collaboration and Knowledge Networks

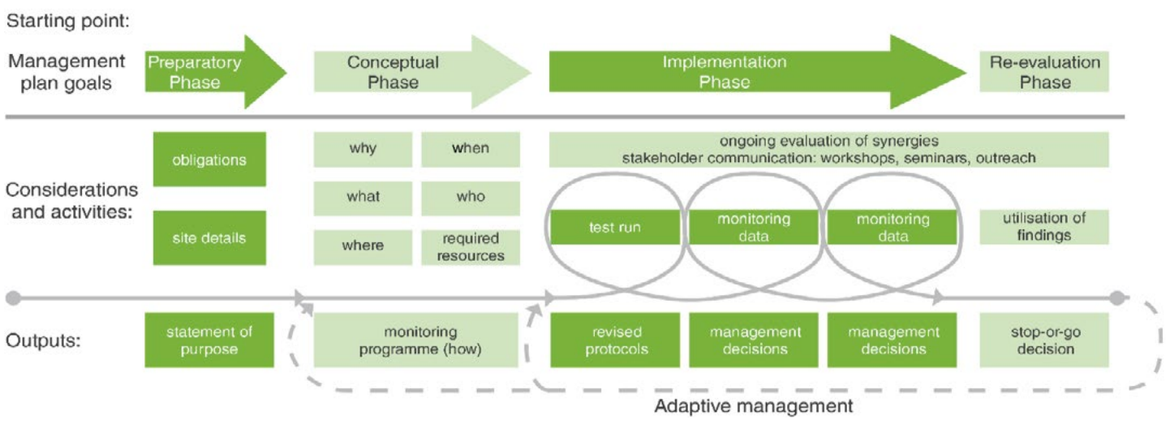
Promote cross-border collaboration and associate partner networks to share know-how, coordinate transboundary pressures, and scale innovative methods and training.

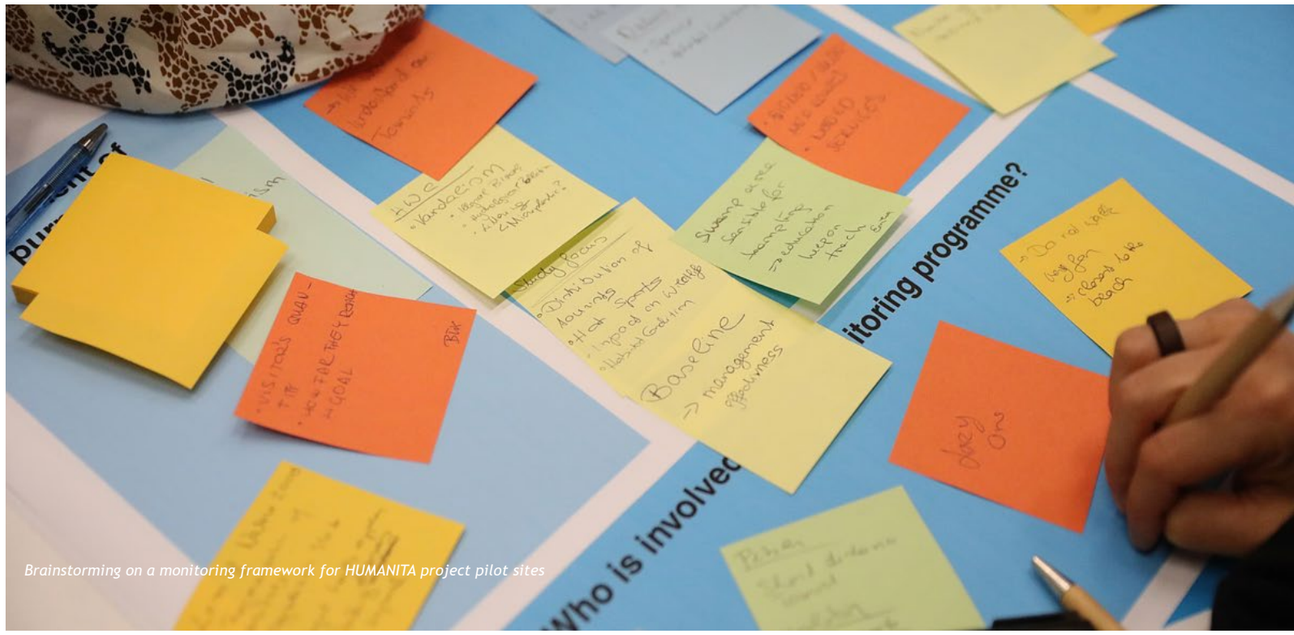
Good Practice Example: Implementing a Unified Biodiversity Monitoring Framework

Our project applied the IUCN framework for monitoring biodiversity in protected areas as a structured, unified approach. Following the IUCN working concept, the process starts from clearly defined management objectives and systematically clarifies why a specific monitoring activity was carried out, what indicator is used, where and when the activity should be carried out, who would be responsible, and what are required resources for carrying out the monitoring programme. To define the scope of the monitoring programme, each pilot site created a report on environmental impacts of tourism at pilot sites, identifying conflicts with conservation management objectives.

Within the transnational monitoring strategy apart from the statement of purpose for each pilot site, the question of responsibilities, selection of methods and indicators as well as the required resources were detailed to allow monitoring activities to directly address identified pressures and conservation targets. The implementation phase combined the development of standardized protocols, test runs, continuous data collection, internal and external evaluation of activities in the form of online workshops and discussion rounds as well as stakeholder engagement. By applying this stepwise and adaptive approach, the monitoring programme ensured comparability across sites while allowing site-specific adaptation to local ecological conditions and legal obligations. This example demonstrates how adopting a unified biodiversity monitoring framework, in line with IUCN standards, can support policymakers and park managers in establishing consistent, transparent, and decision-oriented monitoring systems across regions.

Workflow of the biodiversity monitoring framework employed to correspond with site management goals of HUMANITA pilot sites (Source: Dalton et al., in press)





Brainstorming on a monitoring framework for HUMANITA project pilot sites

List of Deliverables and Output as reference material:

Scan the QR codes and consult the documentation below by visiting the 'Output' sections on the project's official website.

Report on best practice and gaps to monitor environmental impacts of tourism inside Protected Areas (PAs)

Transnational monitoring strategy

Report on data collection and analyes

INTEGRATED METHODOLOGICAL FRAMEWORK AND MULTISOURCE DATASETS FOR ASSESSING TOURISM IMPACTS

TAKE HOME MESSAGE

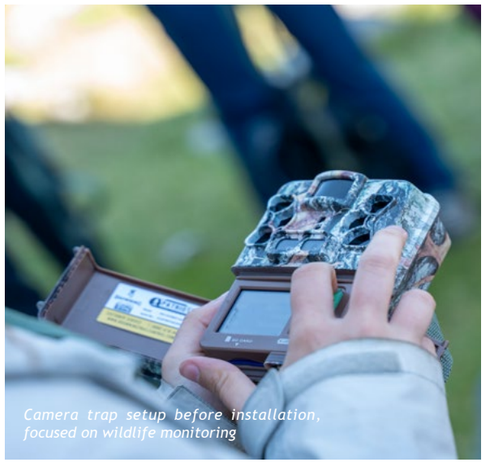
Based on the transnational monitoring strategy, HUMANITA carried out monitoring activities in the pilot areas on visitors, vegetation and wildlife, erosion, and pollution, using advanced technologies, digital tools, and citizen science initiatives.

These activities generated a multi-level database, improving understanding of the impact of tourism and providing a solid technical basis for action plans and policy recommendations.

The experience of the pilot sites highlighted a key aspect: technological innovation is only effective if accompanied by appropriate methodological choices, operational planning, periodic reviews, and stable support structures.

Static GNSS measurements for base station corrections in the Karawanken/Karavanke UNESCO Global Geopark, Austria

In the framework of the determined transnational monitoring strategy, pilot sites focused on testing and evaluating it as an integrated monitoring system to understand and manage tourism impacts on protected areas. Applying multi-parameter approaches and comparable methods across diverse protected areas, park authorities produced harmonized outputs that support evidence-based visitor and nature management. Partners focused on five main monitoring pillars: visitor monitoring, vegetation monitoring, wildlife observation, erosion monitoring, and pollution assessment. Approaches included classical field surveys, advanced digital tools (UAV photogrammetry, LiDAR, TLS, GNSS-based apps), citizen-science methods, and automated sensing devices such as infrared counters, camera traps and acoustic sensors. A centralized relational database and a web-viewer and app were developed to manage, visualize and compare data, thanks to the implementation of dedicated tools specifically developed according to each different monitoring activity. Visitor monitoring combined automatic counters, digital trail data (Strava Metro, Outdooractive, Komoot), and camera traps equipped with AI-powered algorithms to identify spatial-temporal visitor patterns, unofficial trail use, peak-pressure zones, and behavior affecting sensitive habitats. These activities generated robust datasets that highlight seasonality, differences between hikers and bikers, weekday/weekend variations, and correlations with erosion or wildlife disturbance.



Camera trap setup before installation, focused on wildlife monitoring

Vegetation monitoring documented trampling effects, habitat changes, and the presence of rare or invasive species through expert surveys and data collection with citizen science approaches. Thousands of observations were collected, enriching biodiversity baselines and confirming sensitive areas requiring management measures. Wildlife monitoring employed photo traps and acoustic sensors to observe species presence, behavior, and visitor–wildlife interactions. Findings revealed nocturnal activity patterns, disturbance events, and the value of combined human–wildlife datasets for conservation decisions. Erosion monitoring used UAV-based and ground-based approaches, utilizing LiDAR, TLS, and photogrammetry to quantify soil loss, trail degradation, and emergence of wild paths. Repeated surveys enabled comparison of seasonal changes and evaluation of mitigation actions (e.g., wool-net stabilization or managed trail reconstruction). Pollution monitoring assessed microplastic and macroplastic presence (notably at Kamenjak), revealing hotspots linked to visitor intensity and environmental transport mechanisms; citizen-science tools complemented expert sampling. Study visits, internships, and a Summer School were also delivered, strengthening capacity building, method transfer, and cross-site learning, with particular focus on on-site activities. Finally, the internal and external evaluation report confirmed that the proposed approach and related methods are effective, while emphasizing challenges connected to data complexity, device maintenance, and sustaining participatory approaches. A comprehensive, multi-scale evidence base was achieved that significantly advances understanding of tourism impacts and provides the technical foundation for the action plans and policy recommendations.

Wildlife monitoring in Malá Fatra National Park, Slovakia

eDNA analysis to assess the potential presence of the chytrid fungus in the lake water performed during the HUMANITA Summer School

Grounded Recommendations for Park Managers

1. Select monitoring technologies according to practical needs of scale, resolution and feasibility

Choose monitoring tools based on the size and accessibility of the area, the expected rate of environmental change, and the level of detail required. Broad or remote areas may benefit from aerial surveys, while localized issues often require high-precision terrestrial methods; likewise, wildlife and vegetation monitoring should rely on sensor networks or targeted field surveys depending on habitat sensitivity and operational constraints.

2. Assess operational constraints of manual versus automated data-collection methods

Compare feasibility, reliability and resource implications before selecting monitoring protocols. Manual surveys provide contextual accuracy but require trained personnel and offer limited temporal frequency; automated systems allow continuous monitoring but depend on stable power supply, connectivity and regular maintenance.

3. Centralize monitoring data to improve integration, interpretation and long-term usability

Adopt shared data-management workflows that bring together visitor, vegetation, erosion, wildlife and pollution datasets. Centralization facilitates correlation analyses, improves data quality assurance, reduces fragmentation, and supports advanced visualisation tools, strengthening evidence-based decision-making.

4. Implement periodic reviews to update monitoring techniques based on performance

Schedule regular internal and external evaluations to assess the effectiveness, accuracy and cost-efficiency of selected methods. Adjust protocols and technologies based on emerging evidence, ecological conditions and evolving management priorities.

5. Plan monitoring logistics to ensure continuity and minimize data gaps

Organize fieldwork schedules, staff allocation, device maintenance and seasonal access planning to guarantee consistent data acquisition. Clear operational planning reduces missing observations, ensures comparability over time and strengthens the reliability of long-term monitoring programmes.

Policy Recommendations for Public Authorities

1. Strengthen regional capacity-building through funded technical training programmes

Support continuous professional development through regional training courses, field-based workshops, summer schools and cross-park exchanges.

2. Establish minimum monitoring standards and harmonized protocols across regions

Define reference indicators, reporting templates and methodological baselines that allow protected areas to collect comparable, interoperable datasets.

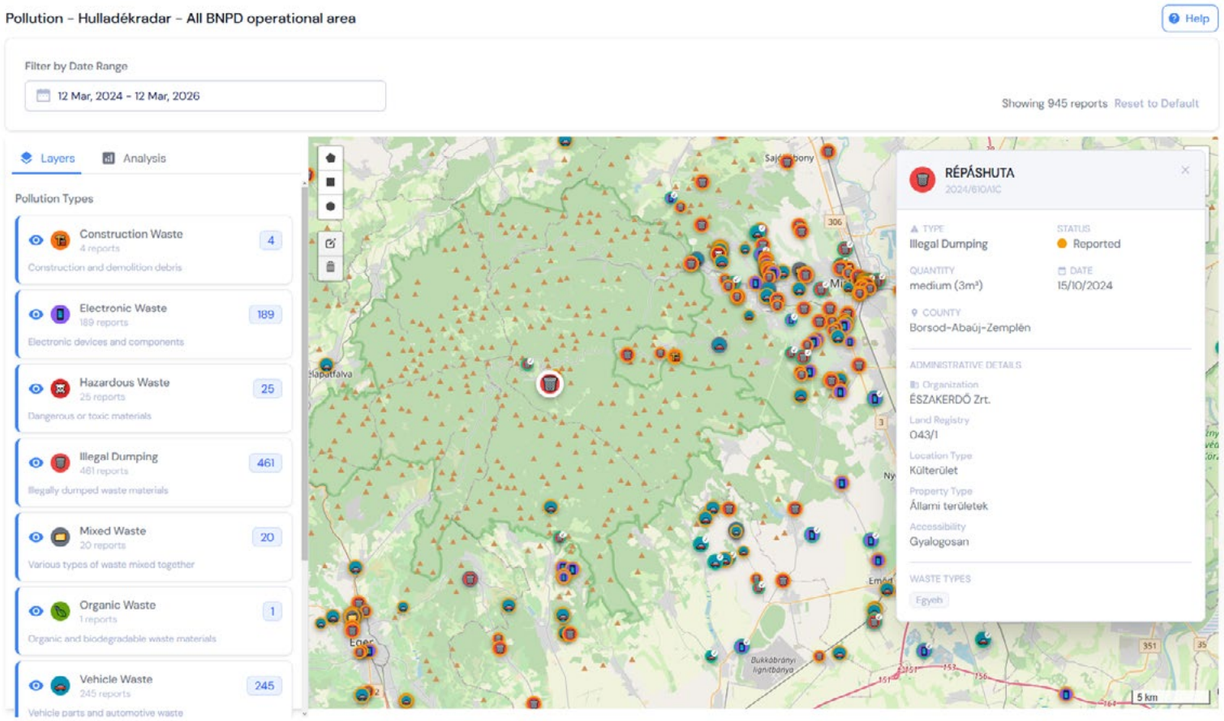
3. Secure long-term financial mechanisms for monitoring infrastructure and data governance

Create multi-year funding instruments, maintenance contracts and co-financing schemes that ensure stable operation of sensors, remote systems, data-storage infrastructures, and training programmes.

A Structured Example of Integrated Monitoring Governance: The HUMANITA Relational Database and Web-Based Platform

Within the HUMANITA project, partners developed a shared relational database and a dedicated web-based platform to centralize, standardize, and harmonize the diverse monitoring data collected across pilot sites. Designed to address the variability in instruments, formats, sampling frequencies, and methodological approaches adopted by different Partners, the database provides a structured and interoperable framework for storing, processing, and analysing environmental and visitor-related data. The HUMANITA relational database and platform centralize and harmonize heterogeneous monitoring data through shared categories, structured metadata, and interoperable formats. Furthermore, it integrates manual and automated workflows within a secure and scalable infrastructure that strengthens logistical continuity, enables adaptive methodological review, supports comparable evidence across protected areas, and highlights the importance of long-term financial mechanisms and capacity-building for effective monitoring governance. The database architecture organizes information into clearly defined sections, enabling the integration of heterogeneous datasets including erosion, pollution, visitors, vegetation, wildlife, and other monitoring results. Through PostgreSQL and PostGIS integration, the system supports both numerical and spatial data management, allowing advanced cross-dimensional and geo-referenced analysis.

This structure directly responds to the need for centralized monitoring data workflows, facilitating correlation analyses between human pressures and environmental conditions, and strengthening evidence-based decision-making processes. Authorized users upload monitoring datasets through the platform interface, selecting pilot site, activity, and date parameters. Once uploaded, files are processed through predefined elaboration jobs, and the resulting standardized outputs are automatically stored in dedicated thematic tables. The dashboard then enables visualization of results in graphical or GIS-based formats, with access regulated by role-based permissions and partner association. The HUMANITA relational database and platform system illustrates how structured digital governance of monitoring data can translate strategic recommendations into operational practice. By moving from fragmented data collection toward an integrated, secure, and interoperable system, this approach demonstrates how protected areas can strengthen analytical capacity, improve transparency, and support adaptive management policies grounded in reliable and comparable evidence.



Waste dumping locations recorded with the Hulladékradar app, visualized on the HUMANITA dashboard, Bükk National Park, Hungary

List of Deliverables and Outputs as reference material:

Scan the QR code and consult the documentation below by visiting the 'Output' sections on the project's official website.

Report on testing and data collection in PAs:

- Pilot action testing new innovative monitoring methods and approaches Public Institution Kamenjak
- Pilot action testing new innovative monitoring methods and approaches – Tuscan-Emilian Apennine National Park
- Pilot action testing new innovative monitoring methods and approaches –Bükk national Park
- Pilot action testing new innovative monitoring methods and approaches – Mala Fatra National Park
- Pilot action testing new innovative monitoring methods and approaches Karawanken-Karavanke UNESCO Global Geopark

Jointly developed solutions assessing the impact value of different types of tourist activities on nature

COMMUNITY ENGAGEMENT AND NARRATIVE-BASED STRATEGIES FOR BEHAVIOURAL CHANGE IN SUSTAINABLE TOURISM MANAGEMENT

TAKE HOME MESSAGE

The HUMANITA project involved tourists and stakeholders in various stages, first through surveys and questionnaires aimed at understanding visitors' actual perceptions of the impact of tourism activities in protected areas, and then through practical demonstrations and collective monitoring, with the aim of raising awareness and promoting active participation in conservation practices.

In parallel, the development of new common heritage narrative strategies introduced innovative approaches that go beyond information sharing towards emotional engagement and shared responsibility.

The following recommendations are based on these foundations: translating evidence, participation, and new narratives into structured guidelines for park managers and public authorities to integrate conservation-oriented tourism into long- term policies and practices.

Testing a citizen science project for collecting data on invasive plants during the HUMANITA Summer School

Tourists' surveys, stakeholder interviews, and workshops were carried out in all five pilot sites. These provided a robust empirical basis describing tourism pressures, key conflicts, visitor perceptions, awareness gaps, and the challenges faced by protected-area managers. Findings highlighted widespread issues such as erosion, habitat degradation, illegal trail use, disturbance to wildlife, pollution, and insufficient visitor knowledge. Building on this evidence, introductory workshops were organised across all pilot areas, engaging students, residents, tourism operators, guides, and local authorities. These events combined awareness-raising with hands-on demonstrations, such as erosion assessment, UAV- and LiDAR-based monitoring, invasive-species identification, waste-mapping tools, and discussions on sustainable visitor behaviour. The workshops strengthened cooperation between park administrations and stakeholders, improved understanding of ecological vulnerabilities, and stimulated active participation in conservation practices. The Online Green Academy has been established as a digital repository offering training materials on citizen-science tools (e.g., iNaturalist, HulladékRadar, drone- based monitoring, springs mapping), pilot-site-specific guidance, and thematic resources on environmental impacts and sustainable tourism. This platform ensures long-term capacity-building for visitors, schools, protected-area staff, and wider communities. The participatory monitoring programme tested and validated diverse methodologies, including eDNA sampling, invasive-species mapping, UAV/LiDAR surveys of erosion, and citizen-driven data collection. These activities demonstrated the feasibility of integrating community-sourced information into systematic environmental monitoring and reinforced local ownership of conservation processes. Tourists' surveys, stakeholder interviews, and workshops were carried out in all five pilot sites. These provided a robust empirical basis describing tourism pressures, key conflicts, visitor perceptions, awareness gaps, and the challenges faced by protect-

Environmental education activities at Malá Fatra National Park, Slovakia

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Grounded Recommendations for Park Managers

1. Institutionalize Integrated, Multi-Source Monitoring Frameworks for Visitor Pressure and Ecological Response

Establishing park-wide monitoring systems that combine different tools and methods of tourism impacts assessment, supported by data standardization, long-term budgets, and data-sharing obligations enable adaptive, evidence-based, long-term management capacity.

2. Establish Visitor Orientation & Environmental Interpretation Protocols at Access Nodes

Standardizing orientation installations at all main access points including dynamic signage on prohibitions, sensitive habitats, species, and seasonal rules, QR-based micro-learning modules, app-linked interpretive content. Parks, mountain huts, guides, tourism operators follow certified communication protocols to align messages, reduce misinformation and improve compliance.

3. Institutionalize Participatory Monitoring as a Complement to Professional Monitoring

Integrate citizen science into official monitoring frameworks through standardized training modules, data-validation workflows, co-managed community programmes with schools, guides, NGOs, and visitor centres, incentives for long-term engagement.

Policy Recommendations for Public Authorities

1. Enforce Spatial Regulation through Zoning, Seasonal Restrictions, and Alternative Trail Networks

Impose strict seasonal closures in high-sensitivity zones, legally desinated quiet zones for wildlife, implement alternative trail networks to redistribute flows, formalize cycling and mountain-biking zoning with mandatory routing on authorized tracks, enforce fines for off-trail access, illegal bivouacs, motorized access, illegal climbing routes and lighting fires.

2. Implement Mobility Management Measures Targeting Peak-Pressure Periods

Adopt integrated mobility management policies including seasonal road closures and mandatory shuttle systems, dynamic parking regulation, bans on motorized access to sensitive zones, with enforcement via fencing and camera systems, soft-mobility incentives (hiking, biking, integrated public transport networks).

3. Require Tourism Operators to Align Business Models with Conservation Outcomes

Incentivize tourism operators to adopt low-impact operational standards, including waste reduction, energy efficiency, water management, silent operations, and no artificial lighting in sensitive zones. Ensure mandatory environmental training for guides, accommodation managers, and activity providers. Encourage participation in data collection activities, such as visitor counts, feedback gathering, and incident reporting. Promote the integration of nature-friendly narratives and responsible behaviour messages into marketing strategies. Require compliance with certified sustainable tourism schemes, such as ECST or equivalent. Regional authorities should link incentives (e.g., grants, concessions, tax benefits) to demonstrated compliance with conservation-supporting practices.

A Compelling Example of Innovative Communication Narratives: The HUMANITA Creative Videos and the Open-Air Exhibition “Wild planet, beautiful planet, my planet…”

Within the HUMANITA project, partners developed an innovative mechanism to shape a shared “common heritage” narrative, resulting in the Guidelines for New Communication Narratives in Visitor Management. Grounded in heritage interpretation, the Manual supports professionals in parks and protected areas in designing engaging and educational communication strategies. Two concrete applications of these new communication narratives were the production of creative pilot-site videos and the realization of an interactive open-air exhibition. Across pilot sites partners produced short creative videos aimed at reimagining the human–nature relationship. These videos move beyond traditional informative formats and instead adopt emotionally resonant storytelling approaches. By conveying the idea that species barriers are permeable and that meaningful relationships and forms of communication can exist across species lines, the videos position humans not as external observers of nature, but as embedded participants within shared ecosystems. Through innovative visual language and narrative techniques, the creative videos promote empathy, curiosity, and a renewed sense of belonging to local natural heritage. A complementary best-practice example of applied narrative innovation is the open- air exhibition “Wild planet, beautiful planet, my planet…”, developed within the Karawanken-Karavanke UNESCO Global Geopark. Conceived as a sustainable outdoor exhibition space, the initiative presented over 120 rare, vulnerable, and exceptional plant and animal species through large-format photographs displayed in public urban settings. Each panel combined imagery with short, accessible texts in Slovenian, German, and English. QR codes integrated into the panels enabled visitors to listen to the sounds of featured species, from large mammals to birds and insects, transforming the exhibition into an immersive, multisensory experience. This interactive dimension strengthened visitor involvement and encouraged deeper reflection on biodiversity conservation. By situating biodiversity narratives in everyday public spaces and combining artistic expression, scientific knowledge, and participatory tools, the exhibition demonstrated how communication can transcend information delivery and become an experiential pathway toward conservation awareness. Together, the creative videos and the open-air exhibition exemplify how new communication narratives can translate policy objectives into emotionally compelling, locally grounded actions. They show that when communication is designed as shared storytelling, rather than one-way dissemination, it can mobilise communities, strengthen collective identity around common heritage, and inspire long-term stewardship of natural ecosystems.

Open street exhibition in Mezica, Slovenia, highlighting biodiversity and fragile elements of the Karavanke UNESCO Global Geopark for students, locals, and visitors

List of Deliverables and Outputs as reference material:

Scan the QR codes and consult the documentation below by visiting the ‘Output’ and ‘Media’ sections on the project’s official website.

Local Action Plans

- Local Action Plan – Bükk National Park Directorate
- Local Action Plan – Karawanken-Karavanke UNESCO Global Geopark
- Local Action Plan – Mala Fatra National Park
- Local Action Plan – Public Institution Kamenjak
- Local Action Plan – Tuscan-Emilian Apennine National Park

Creative videos:

- Tuscan-Emilian Apennine National Park: Pietra di Bismantova
- Tuscan-Emilian Apennine National Park: Gessi Triassici
- National Park Malá Fatra
- Public institution Kamenjak: Lower Kamenjak and Medulin Archipelago
- Bükk National Park

Exhibition in Karavanke-Karawanken UNESCO Global Geopark:

- “Wild planet, beautiful planet, my planet…”

CONCLUSIONS

The policy recommendations developed within the HUMANITA project represent the consolidation of three years of applied research, transnational cooperation, multi- source monitoring, and participatory engagement across five Central European protected areas. A key insight emerging from HUMANITA is the necessity of **systematic, harmonized, and interoperable monitoring frameworks**. Across all pilot sites, fragmentation of methods and uneven temporal coverage hindered the capacity to detect trends and link visitor flows to ecological responses. The project demonstrated that unified monitoring protocols, supported by structured timing, common indicators, and centralized data governance, enhance comparability, allow the identification of spatial hotspots, and strengthen the evidential basis for zoning, trail management, and conservation actions. The recommendations emphasize the institutionalisation of integrated monitoring systems that combine automated sensors, remote-sensing technologies, classical field surveys, and citizen-science inputs within a coordinated and long-term strategy. Equally significant is the recognition that **monitoring alone cannot achieve ecological resilience** unless coupled with adaptive management measures and strong regulatory support. HUMANITA underscores the need for explicit thresholds of change, enforcement mechanisms, and spatial planning tools, such as seasonal closures, visitor redistribution measures, and mobility management policies that proactively mitigate impacts where sensitive habitats, rare species, or erosion-prone environments are at risk. These measures require not only managerial authority but also enabling regional and national policy frameworks capable of sustaining long-term investment in monitoring infrastructure, training, data stewardship, and staff capacity. Another critical contribution of the project is the demonstration that **community engagement and participatory monitoring are indispensable complements to technical data collection.** Citizen involvement increased spatial coverage, reduced monitoring costs, and fostered stewardship among residents, guides, schools, and visitors. The recommendations therefore call for the institutionalisation of participatory schemes, supported by training modules, validation protocols, and inclusive governance structures that can be recognized and funded as integral components of conservation management rather than isolated outreach activities. Moreover, HUMANITA highlights the transformative potential of **narrative-based communication frameworks** in influencing visitor behaviour, enhancing compliance, and fostering emotional engagement with conservation objectives. Creative videos, interpretive installations, and digital learning platforms demonstrated that communication grounded in common-heritage narratives can shift perceptions, bridge scientific and local knowledge, and support responsible recreational practices. Accordingly, the policy recommendations call for the systematic integration of interpretation protocols at key access points, harmonised messaging across tourism operators, and the use of immersive storytelling approaches to complement regulation and monitoring. Finally, the recommendations emphasize that sustainable tourism management is inherently **multi-level and transboundary.** Cross-border ecosystems, shared visitor markets, and common threats require coordinated standards, interoperable data systems, and long-term cooperation networks. HUMANITA's transnational monitoring strategy and shared relational database exemplify how joint frameworks can produce robust, scalable, and policy-relevant evidence. As such, the overall most relevant lessons learnt from the project, summarized in the recommendations, call upon regional and European institutions to provide stable funding instruments, promote harmonised monitoring standards, and embed evidence-based governance principles into Natura 2000, biodiversity strategies, climate resilience policies, and regional development programmes. Overall, the HUMANITA policy recommendations form a comprehensive, operational, and forward-looking toolbox. They translate scientific evidence, community insights, and technological innovation into actionable guidance, offering protected areas a coherent path toward managing tourism pressures while safeguarding ecological integrity and strengthening the human–nature relationship for the long term.

Field excursion of the HUMANITA team in Malá Fatra National Park, Slovakia

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