

NEWS LETTER

Topics

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Wildlife monitoring...

Human – nature conflict management

Green Academy

Become a **Citizen Scientist**

Scientific achievements

Dear stakeholders,

we welcome you to our third newsletter! We are eager to share with you all the news about our progress in the **HUMANITA project** so far. We have been very active and have made important progress in all areas, from monitoring of environmental impacts of tourists inside protected areas (PAs), current methods, and best practices, to developing innovative monitoring methods and data sets to detect environmental impacts of tourists, and human–nature conflict management. We hope you will enjoy this issue of the newsletter, and we invite you to contact us for all and any questions you may have.



Photo: Lara Piko

Photos: Balázs Megyeri, Urosh Grabner



PARTNER MEETING

4th International HUMANITA Project meeting in Karawanken-Karavanke UNESCO Global Geopark

Danijela Modrej, EGTC Geopark Karawanken/Karavanke

From September 10th to September 12th 2024, the **4th project meeting** was proudly hosted by the Karawanken-Karavanke **UNESCO** Global Geopark (Austria/Slovenia).

The partner meeting took place at the visitor centre **Geo.Dom** in Austria, located at the pilot site on **Petzen/Peca Mountain**.

During the meeting, the **HUMANITA project** partners discussed and resolved various topics related to human versus nature conflicts, including **the impact of tourism on protected areas**. The discussions also focused on activities of Work Packages 2 and 3, especially the development of relational database and data collection, innovative methods for upcoming activities in the frame of **Green Academy** and development of 'common heritage' narratives, introductory workshop at PA's, progress made so far, and concrete plans and activities for the future to **promote visitor-friendly approaches and nature conservation**. Each partner also presented the activities carried out so far in the pilot areas.

On the **first day** partners also went on a short hike to show the **monitoring activities** in the pilot area of Petzen/Peca Mountain and held an **introductory workshop** to engage the public and stakeholders in observing invasive alien species in the Geopark through citizen science.

On the final day, the 12th of September, partners embarked on an excursion – a guided tour of **Podzemlje Pece** (Peca Underground), including a bicycle trip through the tourist mine.

Read more about the HUMANITA project:
www.interreg-central.eu/projects/humanita/



Illustration: Ellena Plettenbacher

Monitoring of environmental impacts of tourists inside PAs, current methods, and best practice

Lilia Schmalzl, Carinthia University of Applied Sciences in Austria

In the frame of the **INTERREG Central Europe project HUMANITA**, partners are exploring how visitors of protected areas plan, navigate and track their outdoor activities. During the summer of 2023, **790 visitors were surveyed from five protected areas in Central Europe**.

Our findings revealed that approximately **42%** of the visitors use apps or digital devices for orientation and/or tracking. More men (45.6%) than women (38.5%) reported using these applications.

Age also plays a role in the use of digital tools: nearly **50%** of young visitors aged **18 to 29 use apps** or digital devices, while usage drops to around **31%** for those aged 60 or older.

We also observed a notable difference between cyclists and hikers. Among the surveyed **cyclists, 56%** use apps or digital devices, compared to **45%** of **hikers**.

Outdoor and fitness apps can influence the spatial behavior of visitors. Information about routes is not necessarily published by a public authority, such as the tourist organisation or the Conservation Area management. Any user can publish their favorite hiking, cycling, or other outdoor activity. This poses a threat to park management if activities are promoted in sensitive natural areas, like core zones of National Parks. Monitoring information on these platforms can be beneficial for sustainable visitor management.

Based on the results of our questionnaire, we are exploring how data from various platforms could be used for better understanding of the spatial-temporal movement of visitors.

Developing innovative monitoring methods and data sets to detect environmental impacts of tourists

Alessandro Valletta, University of Parma

Advancing progress across all pilot sites

Based on the results achieved in the last year, we have intensified activities at all pilot sites. Among other things, we focused on processes related to soil erosion on tourist trails. We tested various advanced technologies that will help us understand this phenomenon. These efforts aimed to deepen our understanding of soil erosion phenomena and their environmental impacts by employing a diverse array of advanced technologies.

University of Parma pilot sites saw the integration of technologies at multiple scales to investigate soil erosion dynamics. High-altitude photogrammetric surveys using unmanned aerial vehicles (UAVs) allowed for the mapping of extensive areas with precision, while close-range investigations provided detailed insights into smaller trail sections.

For these localized studies, optical and laser-based sensors were deployed, enabling high-resolution modelling of erosion patterns and processes. A dedicated activity was planned in the **Lama Lite Pass** pilot site, where a controlled testing of a 360° panoramic camera was conducted. This test aimed to evaluate the sensor's ability to reconstruct long trail sections in challenging environments. Using a total station, fixed targets along a 1.7 km stretch of trail were meticulously surveyed. Subsequently, the same path was re-surveyed using the spherical camera. The resulting models are now being compared to assess the reliability and accuracy of this novel approach for trail monitoring.

University of Parma has with joint efforts from **Public Institution Kamenjak, Carinthia University of Applied Sciences** in Austria, and **EGTC Geopark Karawanken/Karavanke**, performed various surveys in other pilot sites. In May 2024, the team returned to Lower Kamenjak to replicate the UAV-based photogrammetric surveys and ground-based spherical imaging conducted in September 2023. These activities focused on grassland mapping and the detailed monitoring of an educational trail.

EGTC Geopark Karawanken/Karavanke hosted two visits in May and September 2024, where separate trail sections were surveyed using both aerial and ground-based photogrammetric sensors, generating valuable comparative datasets.

Research on microplastic concentration in soil and monitoring of earthworm distribution

Barbara Floričič, Lidija Krajcar, Public Institution Kamenjak

Research in **Lower Kamenjak** focused on studying **earthworm biodiversity**, with an emphasis on the **endemic species Istrian earthworm** (*Octodrilus istrianus*), and assessing microplastic contamination in the soil. Soil and earthworm samples were collected from 50 locations to evaluate the threats to these organisms. The study identified five earthworm species, with a significant presence of **Kvarner earthworm** (*Octodrilus bretscheri/kvarnerus*) and **Istrian earthworm** (*Octodrilus istrianus*), the latter thriving in deeper soils, highlighting its sensitivity to environmental changes and human activities.

The main threats to earthworms include habitat loss, intensive agriculture, increased wild boar populations, and tourism, all of which disrupt their habitats and micro-ecosystems. **Microplastic contamination** was found to be more concentrated near popular trails, main roads, and tourist zones, while even isolated areas, not directly exposed to human activity, contained microplastics. This suggests that microplastics can be transported through wind, rain, or waterways. Despite variations in contamination levels, microplastics pose a potential threat, particularly in areas with high human activity.

The study recommends integrating earthworms into conservation policies due to their importance for soil health and ecosystem services. Strategies such as low-intensity grazing and managing wild boar populations are crucial for preserving earthworm habitats. Additionally, by raising awareness through educational programs and materials, visitors can be informed about the vital role of soil biodiversity and earthworms, fostering a stronger commitment to the conservation of this unique ecosystem.

Photo: Davorka Hackenberger Kutuzović



Endemic species
Istrian earthworm
(*Octodrilus istrianus*)



Photo: Public Institution Kamenjak

Innovative parking management system at Lower Kamenjak

Barbara Floričič, Public Institution Kamenjak

The **HUMANITA project** is focused on **managing visitor flow and reducing environmental impacts at Lower Kamenjak**. A new parking management system has been implemented, utilizing **solar-powered cameras** and **LED panels** to monitor vehicle entry and parking availability in real-time.

The system includes the installation of **13 new solar power plants at three locations**, along with upgrades to eight existing panels. Additionally, **10 high-tech cameras** equipped with **laser technology** have been placed to monitor vehicle entry and exit. To ensure a smooth flow of traffic, a large **LED panel** has been installed at the park entrance, with **10 smaller panels** positioned in front of each parking zone. These panels provide visitors with real-time information on parking availability, guiding them to less crowded areas and reducing congestion. The monitoring infrastructure has also been enhanced with the addition of three new pillars to support the cameras and solar panels.

To further optimize visitor management, data from Strava Metro is being integrated with other available datasets to assess movement patterns and enhance the management of tourist activity throughout the park.

With these technological upgrades, the system now allows visitors to quickly find available parking spaces. The use of solar energy makes the system environmentally friendly and efficient, reducing the park's carbon footprint while improving the overall visitor experience.



Photo: Balázs Megyeri

Wildlife monitoring in Bükk National Park: A multifaceted approach

Lilla Farkas-Kiraly, Bükk National Park

The **Bükk National Park Directorate (BNPD)** launched a crucial wildlife monitoring program in the spring of 2024, focusing on the health of **amphibians** and the impact of tourism on **bats**.

This initiative utilizes cutting-edge technology and targeted data collection to understand and mitigate the threats facing these vulnerable species.

Amphibian disease surveillance

Amphibians are facing a global decline, with diseases like ***Batrachochytrium dendrobatidis* (chytrid fungus)** and **Ranavirus** playing a significant role.

These pathogens can devastate entire populations, pushing some species towards **extinction**. BNPD is actively investigating the prevalence of these diseases within the park, specifically focusing on the **yellow-bellied toad** (*Bombina variegata*) and the **common frog** (*Rana temporaria*).

To understand the potential influence of human activity on disease transmission, the project is examining amphibian habitats in the **Mátra Mountains** with varying levels of tourist activity. By comparing infection rates in high and low traffic areas, researchers hope to determine if tourism contributes to the spread of these deadly pathogens. This information will be vital for developing strategies to protect amphibian populations.

Assessing Tourism Pressure on Bats

The impact of tourism extends beyond disease transmission. **Bükk National Park** is also investigating how human activity affects **bat populations** that utilize the **Büdös-Pest** and **Kecske-lyuk caves** in the **Forrás valley** for breeding. These popular tourist destinations are subject to various disturbances, including noise pollution, littering, and the creation of illegal firepits.

To quantify these impacts, the project employs acoustic sensors to monitor bat activity within the caves. These sensors provide valuable data on bat behaviour and how it might be altered by human presence. Additionally, camera traps are strategically placed to record tourist activity, allowing researchers to correlate specific human behaviours with changes in bat activity patterns.

Photo: Urosh Grabner



The Path Forward

This comprehensive monitoring program will provide critical insights into the **complex relationship between wildlife and tourism in protected areas**. By understanding the pressures facing **amphibians** and **bats**, Bükk National Park can develop effective management strategies to ensure their **long-term survival**. This knowledge will be invaluable not only for Bükk National Park but also for other protected areas grappling with similar challenges.

Photo: Urosh Grabner





Photo: Urosh Grabner

Human – nature conflict management

Developing common heritage narratives of protected areas – a challenge of storytelling and dialogue with tourists

Paola Menzardi, Eurac Research

The mid-term of the project period has just passed, and preparations are underway for the second and final set of key-activities challenging the protected areas based on the medium to long term objectives that the project aims to achieve. **Monitoring of the tourism impact factors** on pilot areas is now approaching the final months of project planning and collected data is gradually being fed into the collective database of pilot areas functional to subsequent observation of impact trends and the application of consistent mitigation measures. The planned activities will assess the results achieved in instruments, guidelines, and action plans, providing managers with the tools to govern protected areas by applying strategies that better address the actual need for impact mitigation, thereby complementing existing measures.

Furthermore, activities are expected to **directly engage visitors, tourists, and the public in protected areas** to adopt new and conscious approaches to contexts, within a framework for renewed understanding of the interactions and effects generated human

presence and ecosystems. The project aims to create new narratives around the common heritage of protected areas, which are repositories of both material and immaterial natural assets, to foster an updated and effective dialogue with tourists, residents, and all those who experience these places in various ways.

So, to narrate means to grow new prospects of use of protected areas, -more sensitive and caring for the vulnerable aspects and specificities that determine their exceptional nature and the reason why that must be preserved.

The pilot sites will be committed to this framework in the coming months, between spring and summer 2025 – to realize and shape, each with its own different languages and operating modes, the narratives of an educational, inspiring and creative character that speak to the public, and at the same time involve them in the assumption and construction of the messages they intend to transmit.

Workshops, events, performances, training and information initiatives are going to take place, and multimedia materials will be produced, in order to create shared moments of interaction with tourists and local communities. The activity of creating the narratives is coordinated by Eurac research and is being concretized in its first phase in the drafting of a manual of common guidelines to be shared and acquired by the pilot protected areas in the implementation of a coherent system of narrations– homogeneous in principles, purposes, operational structures, replicability and sustainability elements.

The coming months will be used to finalize this document and to start the design and organizational phases of the common heritage narratives, of which the first and concrete implementation is planned for the next summer season in the territories of pilot protected areas participating in the project.

Green Academy project is on air – How much do you know about citizen science?

Paola Menzardi, Eurac Research

The **Green Academy** is the initiative launched by the **HUMANITA project** that promotes open access digital materials for education and training on **citizen science** and the participatory activities developed by the project. The contents of the Green Academy are available in the "media" section of the official project website and grow as activities progress.

The first section is dedicated to specific material presenting the general aims of the project, introducing the following sections on citizen science tools applied in the pilot areas, and on-going citizen science initiatives currently running within the sites.

The main objective of the **Green Academy** is the wide dissemination of knowledge gained during the project regarding citizen science, tools, opportunities and ongoing practices as examples to be replicated in other similar contexts.

We invite all interested parties to disseminate the **Green Academy** activity by sharing the project site and useful information to access the section, encouraging greater sensitivity among visitors and tourists to consciously and actively commit themselves to the conservation of protected natural environments.

Image by Freepik



Image by pch.vector on Freepik

Human – nature conflict management

Become a Citizen Scientist

Text and photos: Urosh Grabner, EGTC Geopark Karawanken/Karavanke

As we confront global challenges, it's important to seek local solutions that can help **protect endangered species, manage invasive alien species, safeguard our water sources, and address many other issues.** Science benefits from diverse perspectives, it needs more eyes and ears than any scientist can provide.

In 2024, we initiated data collection on **invasive alien species (IAS)** as part of **the HUMANITA project** in our **Karawanken-Karavanke UNESCO Global Geopark**. With the help of **Citizen Science**, involving individuals with a direct approach to the local community, and individuals such as nature enthusiasts, photographers, and hikers.

With the help of the **Citizen Scientist Community**, we have collected **over 9.000 observations** and confirmed locations of **Invasive alien plant species** and counting in the Geopark, and so far, altogether **60 non-native plant species** in nature.

Our main goal is to gather information about **all non-native plant species** that have invaded the **habitats of native plants in our Geopark**.

With your assistance and the information you provided, we are on the path to success, **creating a map of locations that has never been done before**. The project will conclude in 2026, and we still have a long way to go, to fill the gaps and add new valuable observations from you.

Our approach is simple. We decided to go directly with the high goal of obtaining useful data. **Anyone can become a Citizen Scientist.** With basic training, better saying short friendly conversations between the coordinator of the project and you (no more than 5 minutes and all the answers are answered), we are providing simple instructions that ensure consistency and quality of observations and data collection.

Who can be a citizen scientist?

Citizen scientists are generally **non-professionals** who are **curious** or **concerned individuals**. They collaborate with professionals to advance scientific research on topics that matter to them.

How can I get involved?

It is simple, get in touch with us, and the dedicated project manager will then meet you and after a short introduction, you will become part of our Citizen Scientist team!

Don't worry, **it's not hard work**, and nobody will tell you when or where to go. You will receive clear instructions on how to collect data and what types of observations are useful for us. From that point on, you can decide how much time to dedicate to this task. Whether you collect observations during your walk with your dog or specifically go out for observation, it won't affect the data as long as you follow the simple guidelines we provide to ensure the usefulness and quality of your observations. **Remember, this is not a competition—every observation counts.** We don't expect you to gather hundreds, even one good observation can be quite enough and valuable.

Short introduction of the data collection of Invasive alien species

The project aims to enable anyone, anywhere to engage in meaningful scientific research. Information on other species not indigenous to our area is also desirable.

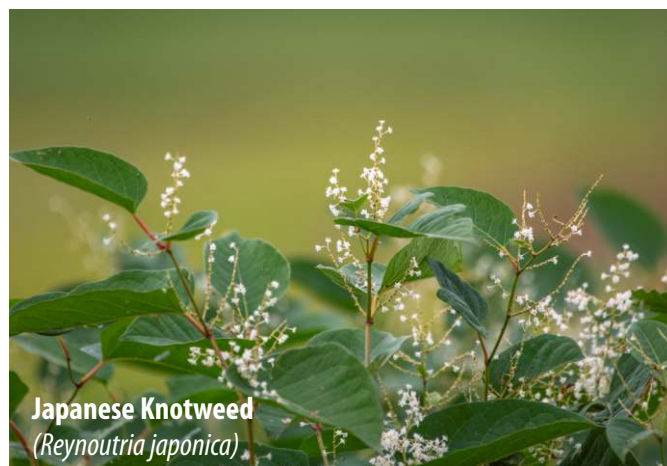
The main characteristics that are important in the set of observations: the **name of the species** (if you are not sure, take as many photos as you can of the species for a later proper ID with us), **GPX location** (you can help yourself with a GPS locator on your smartphone or mark it on the map), **number of plants** (1, more than 5, more than 25, more than 50, etc.), **photos** and **date of observation** (year, months or day), and if possible, predict the **size of the infected area** with a measurement of how many hectares or the length (non-obligatory).

Let's list just a few of the more noticeable and extremely invasive ones. You encounter many of them on your daily journey or you can find them somewhere near your place of residence and your activities in nature.

North American flower that has successfully migrated from gardens to our meadows and forests is the **Large-leaved Lupine** (*Lupinus polyphyllus*), found in both valleys and highlands, as it is very successfully adaptable to our conditions. The presence greatly affects the local flora and negatively affects the presence of many butterfly species (page 8).



Canada Goldenrod (*Solidago canadensis*)
and Giant Goldenrod (*Solidago gigantea*)



Japanese Knotweed
(*Reynoutria japonica*)



Himalayan Balsam
(*Impatiens glandulifera*)

North American **Canada Goldenrod** (*Solidago canadensis*) and **Giant Goldenrod** (*Solidago gigantea*), can be seen in larger groups on the fields, meadows, forest clearings and hillsides and stand out from afar with their high growth and distinctive yellow flowers in August.

Japanese Knotweed (*Reynoutria japonica*) and its relatives: **Giant Knotweed** (*Reynoutria sachalinensis*) and **Bohemian Knotweed** (*Reynoutria x bohemica*) which, with their rapid growth in the form of bushes, occupy the banks of rivers and streams, meadows and forest edges.

Himalayan Balsam (*Impatiens glandulifera*) which, with its tall growth, often keeps company with the previously mentioned species, dominates in rapid growth and spreads in a very original way, as the seeds explode when they mature and can fly tens of meters. It is found on forest edges, on wet surfaces and along the banks of rivers and streams.

See also the photo gallery with some other Invasive alien species found in our region...

We welcome you to join our **Citizen Scientist team** and appreciate every positive contribution you make.
Stay updated by following us on our social media channels.

INVASIVE ALIEN SPECIES

Karawanken—Karavanke UNESCO Global Geopark



Large-leaved Lupine (*Lupinus pollyphyllus*)




American Pokeweed
(*Phytolacca americana*)



Butterfly Bush
(*Buddleja davidii*)




Black locust
(*Robinia pseudoacacia*)



Yellow Oxeye
(*Telekia speciosa*)



Common Evening-Primrose
(*Oenothera biennis*)



Cutleaf coneflower
(*Rudbeckia laciniata*) – Goldquelle



Shaggy Soldier
(*Galinsoga quadriradiata*)



Annual Fleabane
(*Erigeron annuus*)



Common Ragweed
(*Ambrosia artemisiifolia*)

Scientific achievements

Alessandro Valletta, University of Parma

We are happy to announce the publication of the article **"Low-cost techniques for soil erosion monitoring on mountain trails"** as part of the **HUMANITA project**. This study, authored by the **University of Parma** research team, was presented at the 8th International ISPRS Workshop LowCost 3D – Sensors, Algorithms, Applications, held in Brescia (Italy) on 12–13 December 2024. It highlights innovative, cost-effective techniques for monitoring soil erosion in mountain environments – a critical issue for trail management in protected areas.

The article explores the challenges of monitoring soil erosion in mountain trails, such as limited accessibility, the need for portable instruments, achieving detailed data in rugged terrains, and ensuring the repeatability of surveys. Six pilot sites across Italy and Central Europe were used to test and evaluate these techniques under three distinct scenarios:

Scenario 1: Detailed analysis of small areas using Terrestrial Laser Scanning and close-range photogrammetry to detect micro-scale changes.

Scenario 2: Surveys of narrow forest trails using spherical photogrammetry and UAVs, providing high resolution and accuracy in vegetated environments.

Scenario 3: Broad-area monitoring with UAV photogrammetry to cover expansive, open landscapes.

The results offer valuable insights into the capabilities, limitations, and cost-effectiveness of these approaches, delivering practical guidelines for mitigating soil erosion and promoting sustainable trail management.

This publication underlines the HUMANITA project's commitment to advancing the understanding and management of environmental impacts caused by recreational activities in protected mountain areas. The findings contribute to the broader field of sustainable tourism by providing effective strategies for balancing visitors' presence with the preservation of fragile ecosystems.

The full article is available at the following link:
<https://doi.org/10.5194/isprs-archives-XLVIII-2-W8-2024-53-2024>

Reticula journal talks about us! Give it a read!

Paola Menzardi, Eurac Research

We are thrilled to announce also that the article **"Outdoor activities in Protected Areas: Fostering attitude and awareness for effective co-responsibility"** on ISPRA's technical-scientific journal Reticula is finally out! The article is authored by the team of Eurac Research and University of Parma, partners of the HUMANITA project.

The article explores how the growing interest in outdoor activities in protected areas is both a remarkable opportunity and a complex challenge. Through the analysis of the activities carried out by the HUMANITA project, the piece highlights the critical need to balance visitors' enjoyment with the protection of the natural ecosystems, promoting shared responsibility among tourists through education, dialogue, and awareness of the environmental impacts of human behaviour.

The article investigates the most interesting results of the questionnaires distributed to tourists during the summer season 2023, for a total of more than **790 surveys collected**, in the five pilot sites involved in the project, protected areas and national parks spread across Italy, Austria, Slovenia, Slovakia and Hungary. The reading of the data highlights the profile of tourists who visit these sensitive natural areas in terms of behaviours and attitudes, knowledge of the criticalities and problems to which the areas are subject, and awareness of human impact on ecosystems.

The data reveal significant insights on the incongruity found between tourists' perceptions of their role and interaction with natural environments and the real effects that tourism produces, highlighting the need to bridge these gaps through educational initiatives and the involvement of tourists in awareness raising activities.

Discover the full article here:
Reticula n. 37/2024 Monographic Number — English

https://www.isprambiente.gov.it/en/publications/technical-periodicals/reticula/reticula-n-37-2024-monographic-number?set_language=en



Experiential learning opportunities in humanita – HUMANITA internship

From September until the end of the year, our Hungarian partner **CEEweb for Biodiversity** was joined by an intern for the HUMANITA project. **Flora Rausch, a Master's student in Human Ecology**, gained excellent insight into our efforts to develop evidence-based and participatory management tools to decrease human-nature conflicts originating from tourism. She was included in writing reports, social media and advocacy work as well as the editing of videos.

In September, she was happy to meet everyone involved in the project during the 4th partner meeting at **Karawanken-Karavanke UNESCO Global Geopark**. She also joyfully took the opportunity to visit the Hungarian partner organisation **Bükk National Park Directorate** for a week. There, she could see some of HUMANITA's pilot sites and attend an outreach workshop on the project and citizen science tools applied to involve tourists in the National Park's conservation efforts.

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