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Case Study Report

Integrating cultural heritage and protected areas:

case study of Cultural Routes in the Abruzzo Region

Carmen ULISSE
Nasim SADRAEI TABATABAEI
Lorena FIORINI
Alessandro MARUCCI
University of L'Aquila, Italy

Abstract

This case study revolves around exploring the "Cammini degli Altipiani" project in the Abruzzo Region (Italy), affected by the 2009 earthquake. Encompassing the four Cultural Routes (CRs) across 42 municipalities, the CRs are located within Protected Areas (PAs), comprising two National Parks and one Regional Park. Aiming to increase the area's attractiveness and economic growth, these CRs promote historical, cultural, and natural heritage. The research adopts a GIS-based methodology to identify points of interest, focusing on historical, architectural, and natural sites within a 2 km buffer around the cultural routes. The CRs can be a bridge between cultural heritage and PAs, prioritizing the importance of preserving, understanding, and disseminating practices that support sustainable development and resilience while playing an important role in public awareness regarding biodiversity and habitat conservation.
We aim to show that CRs contribute to the preservation of Cultural Ecosystem Services (CES), raising local economic development and enhancing environmental education, ecotourism, and cultural heritage conservation within PAs.

Keywords

Cultural heritage, cultural routes, protected areas, conservation

1. Introduction

In recent years, with intensified global events such as the COVID-19 pandemic, tourism has been increasingly recognized as a potential tool for territorial development. Its positive effects can be harnessed through sustainable planning of strategies and concrete actions to prevent negative impacts on the environment and the quality of life in society (Weaver, 2007; Lu and Nepal, 2009). Despite the increasing spread and promotion of mass tourism today, there are still areas that enjoy a slower perception of the territory (Moira, Mylonopoulos and Kondoudaki, 2017). Over the past decade, there has been growing awareness around the topic of "slow mobility" as an opportunity to preserve the environmental value and attractiveness of regions, enabling more sustainable land enjoyment and tourism (Fullagar, Markwell and Wilson, 2012; Bergantino, Buongiorno and Intini, 2021).

Over time, Cultural Routes (CRs) have evolved and specialized beyond simple itineraries. Initially considered as infrastructure enabling sustainable movement, CRs have now become the content of the infrastructure itself, telling the story of the land and the communities they cross (Majdoub, 2010). In addition, through the exploration of territories by walking, they become examples of territorial planning aimed at safeguarding, enhancing, and promoting local resources (Fistola and La Rocca, 2018).Cultural and touristic valorization thus becomes a trigger for widespread development in inner areas if it generates local-level benefits by integrating with other resources, particularly economic ones, incentivized by various policy actions aimed at combating the abandonment and depopulation of the Central Apennine regions.

This work, therefore, focuses on the theme of CRs as an opportunity to promote slow mobility and sustainable tourism and it describes the case study of 42 municipalities in the Abruzzo Region involved in the "Cammini degli Altipiani" project implemented by the Special Office for the Reconstruction of the Crater Municipalities (USRC). In general, this office manages the reconstruction efforts in 56 municipalities within the Crater area (since 2012) and more than 100 municipalities outside the Crater area (since 2013), and it was established, following the earthquake that struck L'Aquila and surrounding areas in April 6, 2009, by Law No. 134/2012 which defined the end of the state of emergency (***Figure 1***).

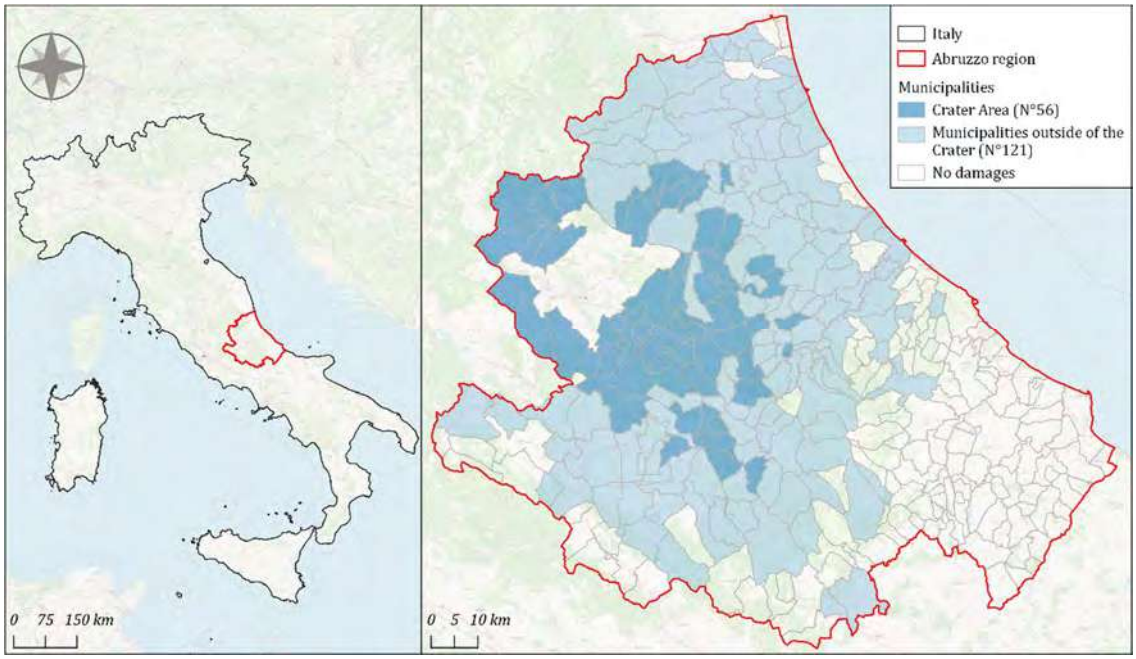

Figure 1. Location of the Abruzzo region and identification of the Crater area

1.1 "Cammini degli altipiani" project

The "Cammini degli Altipiani" project was initiated by the mayors of the municipalities involved and is being implemented by the USRC. This project does not want to replace the current tourist driver but wants to rediscover and highlight the historical, cultural, and natural part of the territory. The aim is to revitalize inner areas and local heritage using scientific approaches and innovative methods.

The project involves four CRs with a total length of 340 km (Cammino della Baronia, Cammino tra i Vestini, Cammino Grande di Celestino, and Cammino dei Francescani) within 42 municipalities, both inside and outside the Crater area. Figure 2 also illustrates that the CRs are included in a triangle of Protected Areas (PAs) (National Law No. 394/91), whose vertices are of the Gran Sasso and Monti della Laga National Park,

Sirente-Velino Regional Park, and Majella National Park. Figure 3 shows specific details for each CR (total length, number of stages, and the number of municipalities they cross).

Figure 2. Study area and localization of the CRs

Cultural Routes	Length (km)	N° of Stages	N° of Municipalities
Cammino della Baronia	77,79	11	9
Cammino dei Francescani	88,85	11	9
Cammino Grande di Celestino	93,17	4 + 2 alternative routes	19
Cammino tra i Vestini	82,41	8	11

Figure 3. Detailed information on the CRs included in the "Cammini degli altipiani" project

These CRs are set in areas of high natural value, recognized for national and international protection. They offer the opportunity to explore historic villages, archaeological sites, and local traditions. Unlike simple trails, what distinguishes these CRs is their rich cultural heritage, encompassing not only monumental and historical but also the ecological heritage of the protected areas, considered in terms of Ecosystem Services (ES) and inner area development.

1.2 Protected Areas and Cultural Ecosystem Services

The framework legislation for parks (National Law 394/1991) for the management and development of Italian parks and nature reserves (Di Pietro, 2019) was initiated in 1991 and provided the basis for preserving PAs. Later in 1997, Italy started to implement the Natura 2000 network established and managed by EU member states (Portaccio, Campagnaro and Sitzia, 2023) governed by two directives namely Habitat Directive (92/43/EEC), with Special Areas of Conservation (SACs) and Sites of Community Importance (SCIs) (Apostolopoulou and Pantis, 2009), and Birds Directive (79/409/EEC), classified into Special Protection Areas (SPAs) (Friedrichs , 2018). They cover 17% of the world's terrestrial regions and they are important in preserving biodiversity and natural habitats. Moreover, without these protected areas, the ecosystem could be at stake (Mwasaga, 2022). At both international and national levels, the interaction between protected areas and ecosystem services is well-documented in the literature (Chan, 2006; Costanza, 2007; Mace, Norris and Fitter, 2012). The establishment of PAs ensures the conservation and enhancement of natural heritage in terms of biodiversity and habitats, while also highlighting the crucial role of these areas in regulating, supporting, and provisioning Ecosystem Services (Xu, 2017).

However, in terms of overall territorial resilience, focusing solely on these categories of ecosystem services would be counterproductive, as it would overlook the intangible aspects of ecosystem services (Brand and Jax, 2007). Protected areas consist of different values namely: social, cultural, environmental, and scientific for both local and global communities (Sharmin, 2020). CRs allow the promotion of these values and the Cultural Ecosystem Services (CES), offering walkers the opportunity to connect with nature, environmental education (Fonseca, 2014), cultural heritage enhancement (Wang, Dane and Arentze, 2023), and ecotourism. In this way, the concept of a protected area expands beyond merely conserving biodiversity and becomes an incubator of “expert knowledge,” transformed into “common knowledge” through the experience of the CRs (Angelini and Santarelli, 2020).

2. Methodology

From its initial stages, the project is structured around a technical framework based on a GIS (Geographic Information Systems) approach. This study uses Volunteered Geographic Information (VGI) data, from OpenStreetMap (OSM) downloaded on February 14, 2024, due to its updated frequency and ease of integration with GIS software. The analysis area is identified based on the guidelines of the “Disciplinare attuativo del Registro regionale dei Cammini,” defined by Abruzzo Regional Law No. 10/2023 (Art. 20-21) and Regional Council Resolution No. 903/2023. This law introduces the Regional Register of Cultural Routes in Abruzzo, delineating the requirements for cultural paths and establishing a 2 km radius for essential services (such as accommodations and dining) around the CR. This same radius was used to get points of interest using OSM data.

In the methodology, historical, archaeological, and natural sites were included based on tourism information available on OSM (https://wiki.openstreetmap.org/wiki/Key:tourism). However, initial data was limited. To expand the dataset, the analysis was extended by including other OSM data layers to create

a wider range of cultural and natural points of interest across the region. ***Figure 4*** provides an overview of the categories and elements incorporated.

Points of interest	Description
Archeological sites	A place in which evidence of past activity is preserved
Castles and fortifications	Ancient structures and defensive buildings of historical significance
Churches, hermitages, and religious sites	Sacred buildings and places of worship
Civil architectures	Elements of architectural interest (buildings, palaces, squares, towers, and fountains). The type of access of the buildings (public/private) is not differentiated
Museums, monuments, and artistic sites	Elements of artistic interest (museums, memorial sites, monuments, theatres, artworks)
Naturalistic sites	Wide variety of physical geography, geological, and landcover features of natural interest (peaks, lakes, springs, caves, parks)
Viewpoints	A location with a good view of the surrounding countryside or notable buildings

Figure 4. Description of the Category of the Points of Interest

The resulting dataset is 760 elements across historical, architectural, religious, artistic, and natural sectors. Also, the dataset was reviewed to remove duplicates and unnecessary data to obtain an exhaustive database reflecting Cultural Ecosystem Services (CES). This objective approach provided a foundation for anthropologists engaged in researching and creating cultural content for the "Cammini degli Altipiani".

When it comes to expressing the educational values and aesthetic experiences provided by protected areas, it's challenging to identify specific locations (Plieninger *et al.*, 2013). Instead, we need to consider the whole protected area. For this reason, we intersected the CRs with the boundaries of PAs. These analyses considered the boundaries of Natura 2000 sites (https://www.mase.gov.it/pagina/liste-dei-sic) and Italy's protected area network (http://geoportale.regione.abruzzo.it/Cartanet). The results were expressed in terms of the percentage of CRs that fall within Protected Areas because there is an overlap between National and Regional Parks and their corresponding SCAs.

3. Results

The initial results focus on the cultural heritage identification in a 2 km buffer around the CRs. ***Figure 5*** shows the location of various points of interest, and the graph in ***Figure 6*** shows that this area is characterized by religious and architectural heritage.

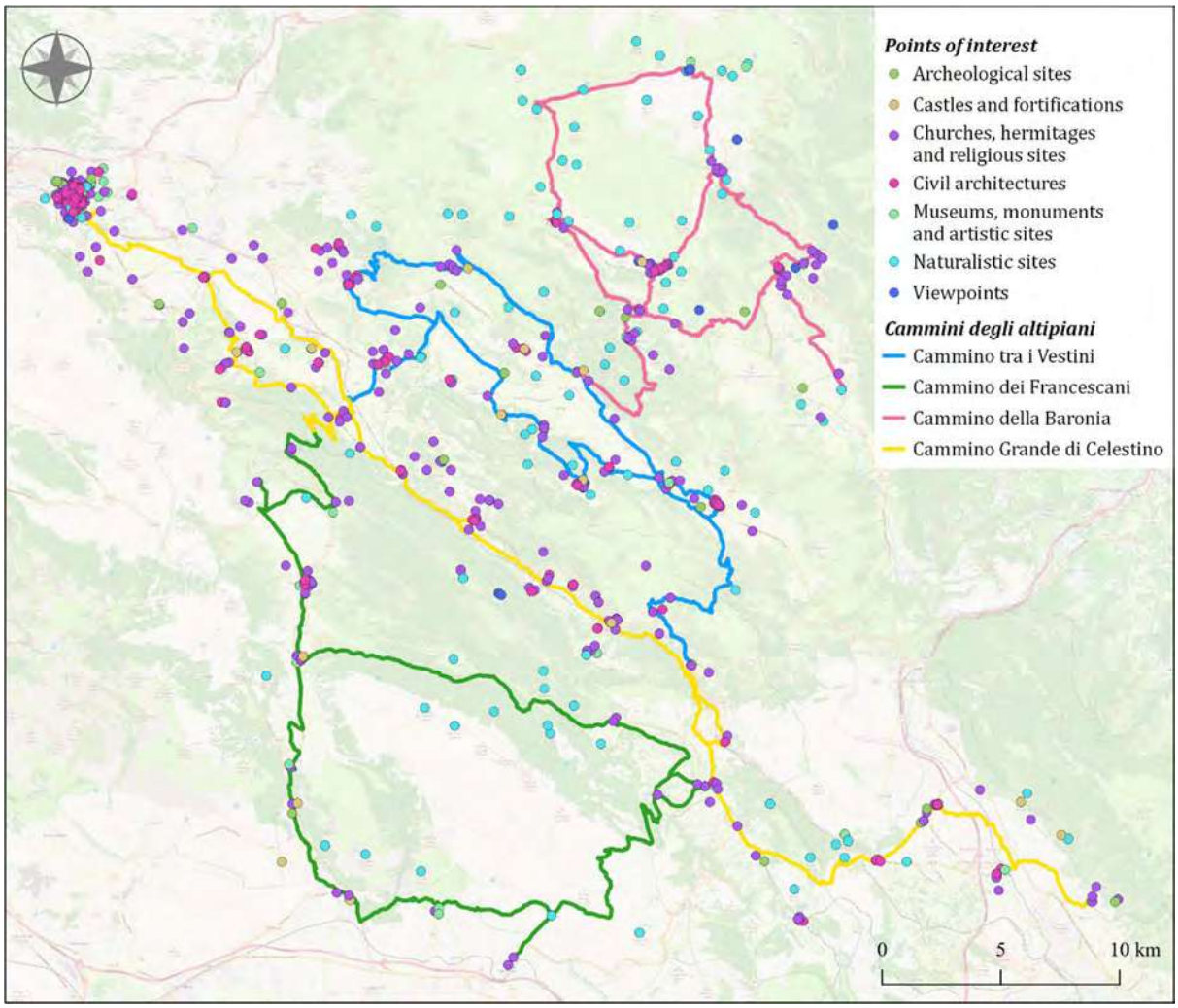

Figure 5. Qualitative characterization of the points of interest

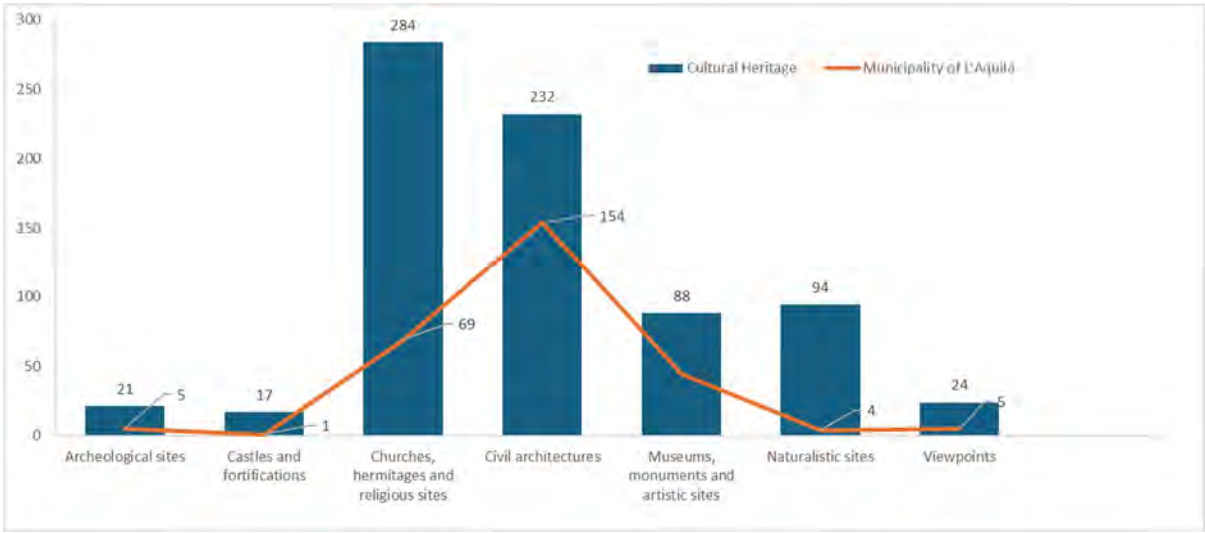

Figure 6. Quantitative characterization of the points of interest

These play an important role in the cultural identity and history of the area and the CRs. To better understand the results, according to the National Strategy for Inner Areas (Strategia Nazionale Aree Interne - SNAI), L'Aquila is a "hub" for essential services but also the city is distinguished by its cultural and historical richness (Di Stefano *et al.*, 2011). Indeed, around 66% of civil architectural heritage in the surrounding buffer zone is in L'Aquila but the accessibility of these structures remains crucial. Public buildings can support cultural tourism and local development, while those privately owned may limit such opportunities. Therefore, more analysis are needed to evaluate the public accessibility to these properties and whether they are architecturally significant.

A 2 km buffer was used to evaluate the points of interest along the CRs, but this analysis overlooks the areas' morphology. Although some locations appear close to CRs in aerial views, the actual walking distances might be longer due to highland topography and the real paths. This may impact the visitor experience, since reaching some locations could be more difficult than expected, suggesting a need for further evaluation of the points of interest and their accessibility (***Figure 7***).

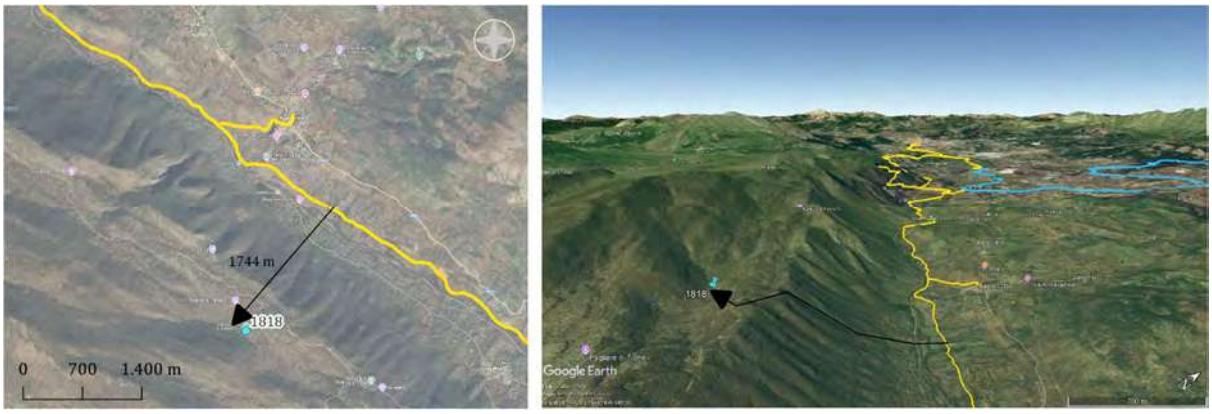

Figure 7. Example of the 2 km buffer limitation

According to the Ministry for the Environment and Energy Security (MASE), the Abruzzo region has the highest percentage of areas under ecological protection compared to the number of sites and the regional surface area. Based on the observations from our case study, 21% of Italy, 36% of the Abruzzo region, and 59% of the municipalities involved in the study fall within PAs similarly, 19% of Italy, 31% of the Abruzzo region, and 61% of the engaged municipalities are classified as Natura 2000 sites. ***Figure 8*** shows the complete and partial overlapping between them in the Abruzzo region.

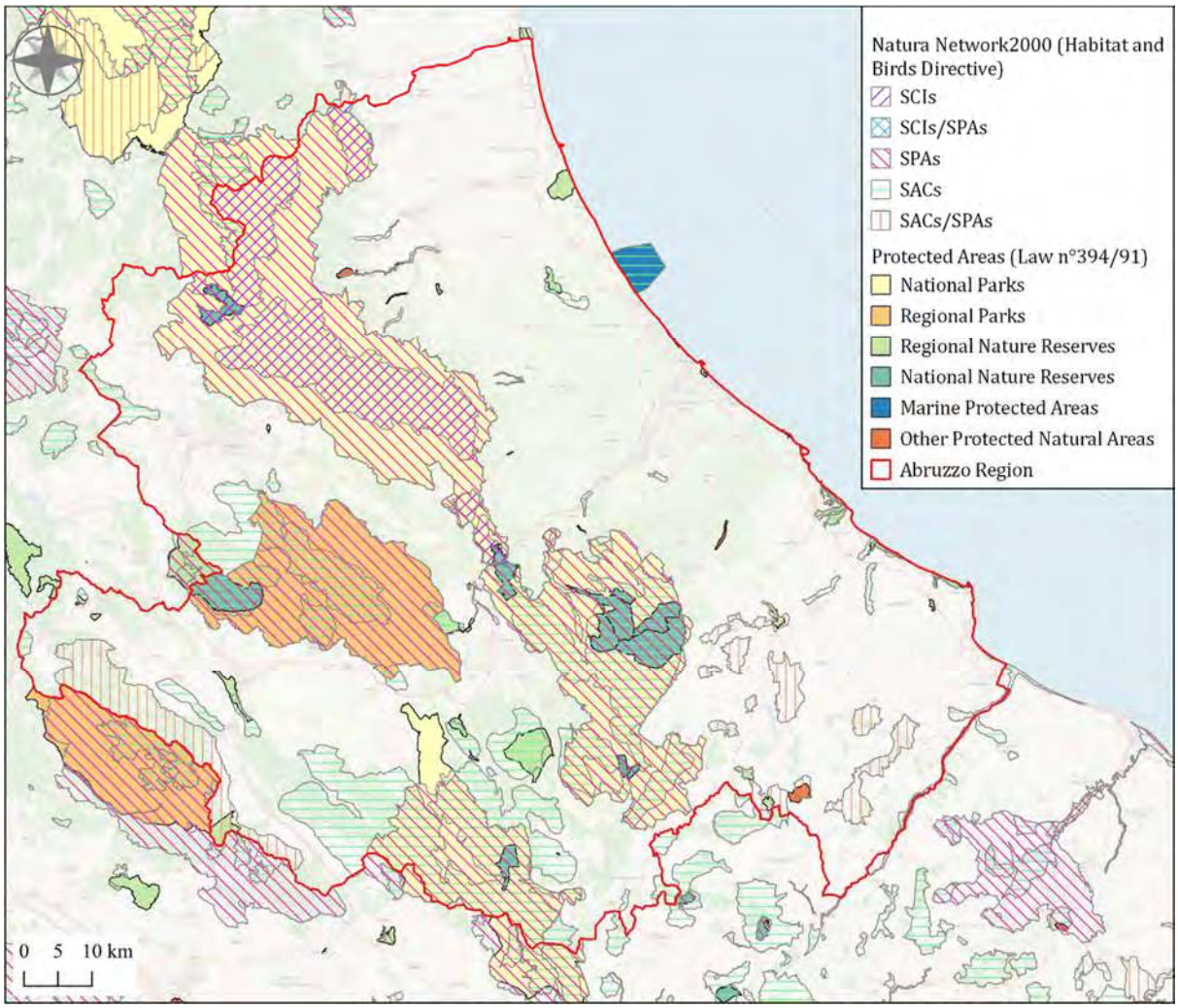

Figure 8. National and international level of protection in the Abruzzo Region

As for the PAs and the CRs, ***Figure 2*** and ***Figure 9*** show that not all the CRs pass through these zones.

Cultural Routes	Length (km)	Length in Natura 2000 (km)	Length in PAs (km)	Percentage of Cultural Routes in Protected Areas
Cammino tra i Vestini	82,41	7,79	7,79	9%
Cammino Grande di Celestino	93,17	38,44	36,17	41%
Cammino della Baronia	77,79	56,26	55,78	72%
Cammino dei Francescani	88,85	79,40	79,40	89%
Total	342,22	181,90	179,13	53%

Figure 9. Percentage of CRs in Protected Areas

As represented the situation is rather diverse. Less than 10 percent of Cammino tra i Vestini is embedded in PAs. However, more than half of the Cammino della Baronia lies within the Gran Sasso and Monti della Laga National Park. In addition, the Cammino dei Francescani is almost entirely located in the Sirente-Velino Regional Park. Lastly, The Cammino Grande di Celestino is the only one that passes through the regional park and intersects with one of the entrances to the Maiella National Park.

Beyond the specific details, it is important to evaluate the overall context of these CRs and PAs. The CRs are interconnected, and as a result, they also link the three PAs. In this way, sustainable mobility and use of the PAs can be achieved, while also connecting the intangible cultural heritage of these environmental attractions.

4. Conclusion

This case study explores how Cultural Routes (CRs) can serve as multidisciplinary laboratories for studying and promoting Cultural Ecosystem Services (CES). Using open data and tools like QGIS enhances spatial visualization and data management, allowing for an objective approach to study Cultural Ecosystem Services (CES) through the spatialization of hotspots and indicators—whether physical, biophysical, or biological, such as protected areas and habitats. However, while this spatial approach facilitates data retrieval, it may overlook CES's intangible qualities (Chan *et al.*, 2006). To address this, subjective methods like social media data (Martí, Serrano-Estrada and Nolasco-Cirugeda, 2019; Prete *et al.*, 2020) or interviews with local communities (Maraja, Barkmann and Tscharntke, 2016) can provide additional insights. This inclusive, bottom-up approach strengthens community engagement and fosters local stewardship (Ulisse, Fico and Marucci, 2024).

In contrast with typical trails, CRs enhance knowledge about cultural heritage and promote biodiversity conservation, especially within protected areas. Future work could include an isochrone analysis for proximity assessment of the points of interest, considering real travel times and terrain features (Khodnenko, Kudinov and Smirnov, 2018). Many CRs pass through protected areas, so it is crucial to balance tourism growth with conservation using sustainable management strategies (Stronza, Hunt and Fitzgerald, 2019; Maksanova *et al.*, 2023).

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