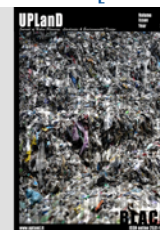


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THE ARCHAEOLOGICAL AND NATURAL PARK OF CUMA IN THE PHLEGRAEAN FIELDS: A PLANNING PROPOSAL

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HIGHLIGHTS

- Design strategies for the enhancement and redevelopment of archaeological and natural heritage.
- A project for the Archaeological and Natural Park of Cuma, in view of the importance of recovering the historical memory.
- Actions to improve accessibility of archaeological parks and to protect the remains.
- Strategies for the regeneration and redevelopment of high environmental fragility areas subject to significant anthropogenic pressure

ABSTRACT

The main theme of the research and planning is the Archaeological-Natural Park of Cuma-Licola, located between Pozzuoli and Bacoli. The park includes the archaeological site of Cuma, the first Greek colonial settlement in the West, and the forest of Licola, a natural reserve and Site of Community Importance. Alongside the dense fabric of archaeological evidence, the natural system plays a fundamental role, both for the transmission of the heritage of antiquity preserved there to future generations, and for the improvement of the environment quality. In this context, the Park system could curb the spread of unauthorized building, a phenomenon that is historically rooted in the study area, and it could represent an opportunity for the restoration of the abandoned areas. The lack of a unified and integrated planning for the archaeological sites in the area of Campi Flegrei has made these places, which are already subject by their nature to complex balances, very fragile. In this specific case, the inadequacy of timely interventions to secure the ancient structures has caused them further damage. Moreover, due to the inadequate system of connection with the nearest tourism clusters, the site is now isolated and difficult to reach. Through a rigorous methodology, the project aims at the restoration and enhancement of the Park, considering its historical, environmental and social relevance, its attractive potential and the significant economic impact that these actions could produce.

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1. INTRODUCTION

This contribution aims to expose the research and analysis criteria that led to the design proposal of the Cuma-Licola Archaeological and Natural Park, located between the municipalities of Bacoli and Pozzuoli, near the Mount of Cuma, within the largest territorial unit of the Phlegraean Fields (Campi Flegrei).

What defines the extraordinariness of the Phlegraean territory is the indissoluble interweaving that connects its geological nature, marked by volcanism and related bradisism, with human events. The destructive force of the volcanoes characterizing its orography, has made the territory so fertile that it is impossible to curb the upper hand of vegetation over anthropogenic works. The evidence of antiquity in this region can be read, as well as in the archaeological evidence everywhere scattered: in the original road axes, no longer distinguishable, but which still morphologically define the mobility system; in the typical plant species that cover the fertile craters and wetlands close to

the sea, already remembered by historical sources; in the intangible heritage, constituted by the myths and legends handed down to the present day, which have overtime fascinated literati and scholars.

The importance of the Cuma-Licola Archaeological-Natural Park lies in several factors: the site of Cuma welcomed the first Greek colonial settlement in the West, dating back to the second half of the 8th century b.C. and archaeological research aimed at rebuilding its events are essential to the analysis of the relations between Italic and Hellenic populations and for the reconstruction of subsequent process of Romanization, within ancient Campania. Secondly, the exceptional intensity of interconnection between the natural and archaeological system, which is a value to be preserved and defended from neighbouring urban activities, should be noted. Another peculiarity of the area is the specifically naturalistic one, since the Licola wood is a well-recognized reserve for its tree species and endangered birds. It should also be pointed out that, in view of the socio-cultural

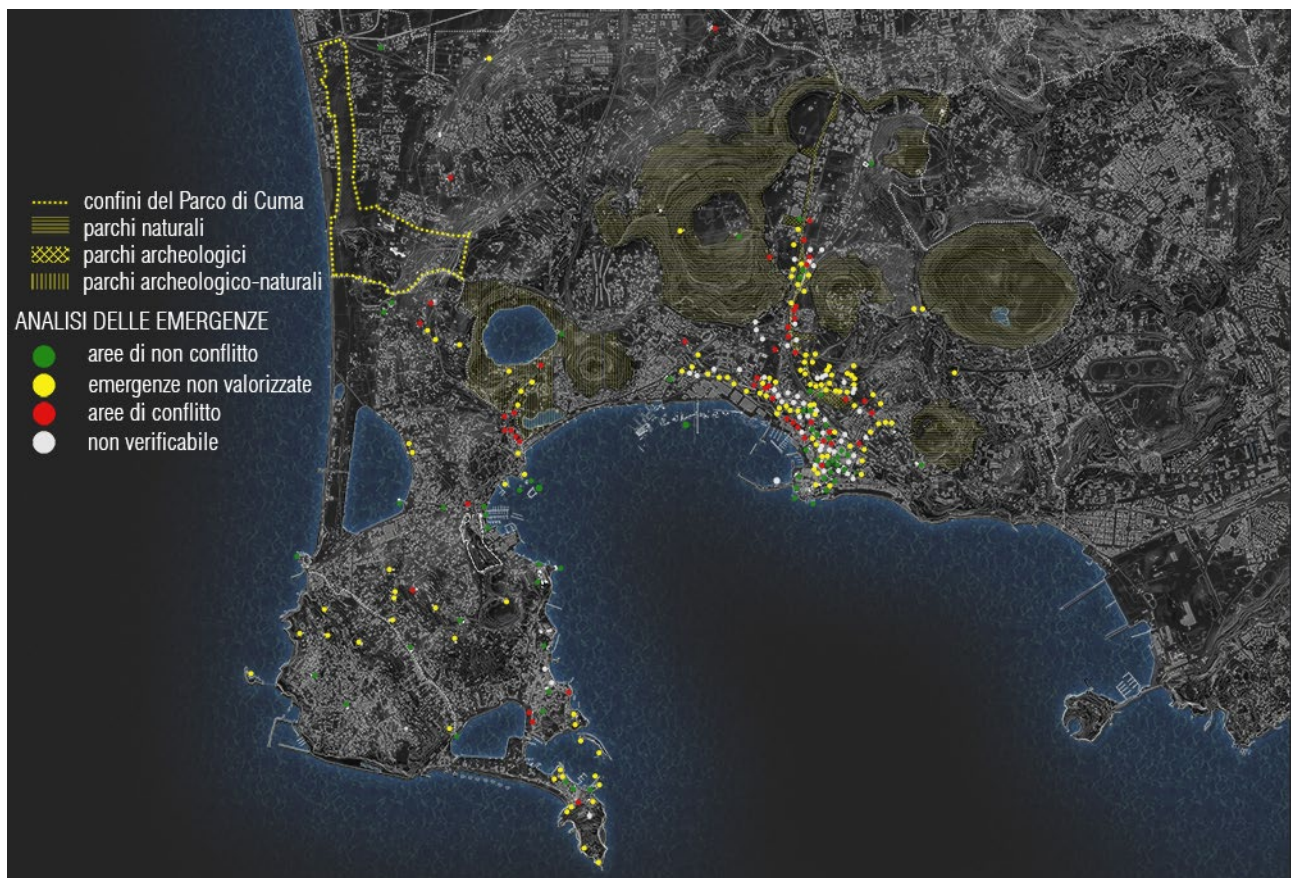


Figure 1: Campi Flegrei, analysis of the archaeological evidences. *Source: Author's elaboration.*

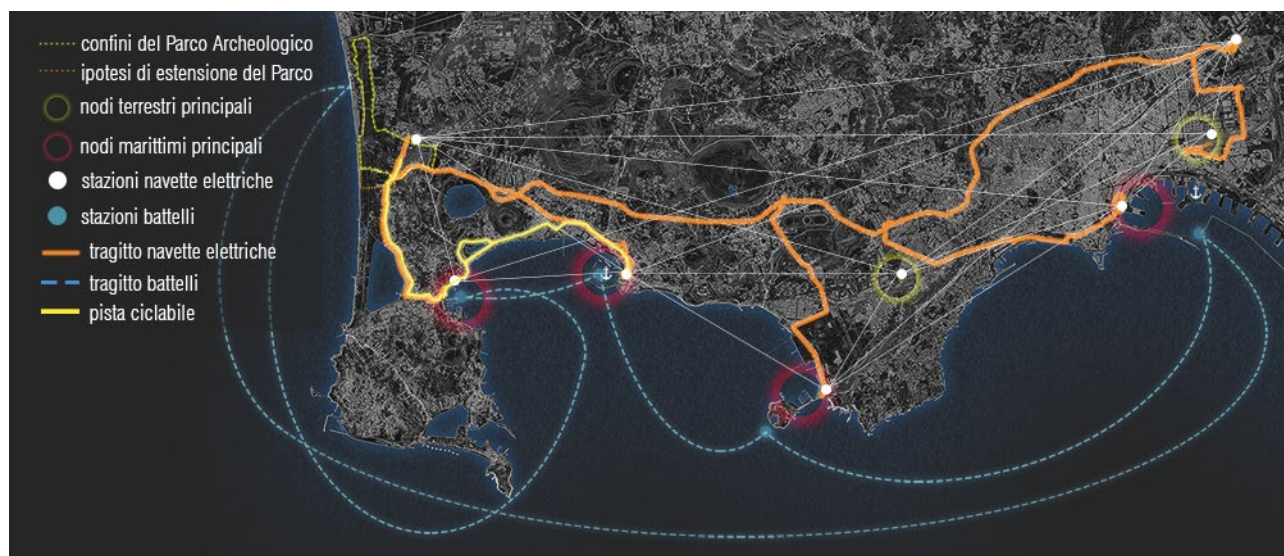


Figure 2: Archaeological Park of Cuma, the accessibility network. *Source: Author's elaboration.*

fabric in which the Archaeological Park is grafted, the planning moment may be an opportunity to involve inhabitants in the design choices, mainly in the determining the intrinsic/non-economic value of the area (Brown et al., 2018; Coscia et al., 2018; Kirkpatrick et al., 2018; O'Connor et al., 2019).

The inadequacy of timely action to secure archaeological evidence, poor maintenance and lack of unitary and integral planning for monumental sites, especially in recent years, have made the Park System vulnerable.

Now that the renunciation of traditional and identity values appeared to be causing enormous damages in the social structure, it seems necessary to recover the historical memory, the consciousness of our origins and roots, also through the implementation of development and recovery policies of archaeological areas (Cantone, 2005).

The method used for the proposal consists of four phases: the first moment is essentially analytical and, due to the high significance of the site being studied, it was necessary to collect and examine data of various kinds, to have a picture overall context. Later, the objectives and strategies to be adopted during the planning were identified and systematized analyzing both the issues related to the global context in which the park is inserted (the Metropolitan City of Naples) and the Campi Flegrei area, as well as those relating to near areas. The third phase is related to the design, which winds in two directions: firstly, it aims to solve the problems of mobility and connection with the center of the Metropolitan City of Naples and

those related to the road system and the parking areas outside the Park; furthermore, it implements strategies for redevelopment of inland routes and dining areas, with the introduction of new functions and the provision of restoration of archaeological emergencies.

At the end of the planning process, an economic-financial audit is then carried out, necessary to assess the sustainability of interventions.

2. BACKGROUND

The history of Cuma, as well as the Campi Flegrei, is closely linked to the natural phenomena typical of this territory. The volcanic activity has contributed to form exceptional deposits of construction materials, first of all the "pozzolana", the trachite and the yellow tuff, whose quarries still mark the landscape today. Certainly, even this wealth, combined with the extraordinary feracity of the soil and the strategic location, determined the historical fortune of this site.

Another particularly and relevant phenomenon is bradisism, whose manifestations cause, in alternating phases, the rise and lowering of the ground. In particular, the descending bradisismic phases and the rise of global sea level contributed over time to the creation of marshes in the areas leading to the beaches (Caputo et al., 2010; Amalfitano et al., 1990; Rescigno, 2012). It is clear that the site of Cuma, inhabited since the late Bronze Age by a



Figure 3: Archaeological Park of Cuma, archaeological roofs design. *Source: Author's elaboration.*

village of huts, probably of Opici, was reached by the first Greek settlers from Eubea, in the second half of the 8th century b.C. The Hellenic phase was followed by the Sanniti and Roman occupations, while the political and cultural role of Cuma and its area was always primary in ancient Campania (Caputo et al., 2010). During the late-ancient age

malaria, that accompanied the progressive growth of other marshes, caused its total abandonment; public buildings were the subject of spoliations in order to reuse the stone materials for the production of lime (Coraggio, 2014). However, the interest for this site, and for the whole Campi Flegrei area, was not over (Di Lello, 2005) as we can



Figure 4: Archaeological Park of Cuma, first area design. *Source: Author's elaboration.*

see in many works of art, whose first claims date back to the Renaissance (Giuliani, 2013). In addition to some random finds, it is certain that from the 1600s planned excavation activities were undertaken. More ambitious excavation works were promoted during the 1800s, with the goal, usual at the time, of finding sculptures and valuables. Following the First World War, the area was the subject of remediation by the National Combatant Opera, for the recovery of unhealthy areas to be granted to war veterans (Miano et al., 2017). Thanks to recent excavation campaigns, that began in the 1990s and are still ongoing, we were able to investigate a substantial part of the urban layout in the lower city.

3. TERRITORIAL ANALYSIS

Analysis of general mobility, specifically the roadway and railway networks, provides the necessary information to identify local accessibility issues. The study focuses on the transport systems that connect the ancient Neapolitan center with the archaeological site of Cuma and the links between this and the forest of Licola. Informations were also collected about the main coastal routes serving the Neapolitan marinas. Finally, the study of land and sea networks has identified the main nodes, i.e. the convergence poles of the most intense tourist flows.

The analytical phase shows the inadequacy of current mobility systems and, although one of the railway lines connecting the Campi Flegrei with the Metropolitan City of Naples crosses the park itself, the daily frequency is inadequate. Similar

problems afflict road public transport, which is lacking in both infrastructures and the expected number of daily trips.

The analysis of land use plans is necessary to identify urban areas that do not comply with provisions of the higher-level plans, especially the Landscape Territorial Plan of the Campi Flegrei. Although a considerable part of the territory is subject to Total Protection, due to the high concentration of archaeological finds and for the naturalistic value of coasts and green areas, there are many extemporaneous settlements scattered on the territory, some insisting directly on archaeological areas (a condition that is also repeated in the areas inside and overlooking the Cuma Archaeological Park).

The General Urban Development Plan (PRG) of Pozzuoli identifies the archaeological, natural and archaeological-natural parks falling into the municipal territory, including the Archaeological-Natural Park of Cuma-Licola. On the other hand, the Municipal Urban Plans of Bacoli and Monte di Procida are limited to identifying areas subject to archaeological constraint, including the Cuma area.

The Natura 2000 Network identifies numerous Sites of Community Interest (including the Archaeological-Natural Park of Cuma-Licola) and Special Protection Zones in the area, as a target of migratory wildlife categories.

Phlegrean area is marked by many and relevant archaeological evidence, spread both in the towns and in the near natural areas. The fragile balance of this territory is therefore attributable in part to the anthropogenic action, by definition degrading, partly to the natural action, which, as mentioned, is absolutely irreducible to the fertility of fields in areas subject to volcanism.

After collecting map data on archaeological her-



Figure 5: Archaeological Park of Cuma: Terme del Foro and a detail of the mosaic. *Source: photos by the author.*



Figure 6: Archaeological Park of Cuma: the lift. *Source: Author's elaboration.*

itage (D'Ambrosio et al., 1979; Zevi et al., 1993), it was therefore necessary to identify objective criteria useful to assess its state of degradation. The conditions of some archaeological emergencies are not verifiable to date, as they fall either within private property, or in places without access, usually in predominantly natural areas, often along the coasts (Fig.1). Data collected have made it possible to estimate that today about 90% of the unvalued archaeological evidence falls outside the perimeter of archaeological parks.

In an overall look at the context in which the plan is grafted, some data has been collected relating to the census sections near the park. There is a limited level of education, compared to that for the rest of phlegrean area, however low when compared with national data. Agricultural production is the backbone of local economy, mainly for the municipality of Bacoli and for the areas close to the archaeological site of Cuma.

Analysis of tourist flows was referred to the budget data published by MiBAC relating to the number of admissions to Italian archaeological parks. It seems that the site was not affected by the significant increase in tourist interest that has characterized the city of Naples, so much so that neither the Archaeological Park of the Campi Flegrei, nor the Archaeological Park of Cuma are included in the ranking of the most visited sites. The archaeological sites of Paestum and Herculaneum, similar in size and attractive potential, were considered as terms of comparison in the study of annual tourist attendance.

4. DESIGN GOALS AND STRATEGIES

The plan first addresses the problems of mobility, with the aim of facilitating the attainment of the site, and in general accessibility to the numerous phlegrean archaeological areas, from convergence poles of the Metropolitan City of Naples. It is therefore assumed that the links between the Neapolitan old town and the western suburb area have been strengthened. Furthermore, tour routes by sea are planned, for the benefit of a more varied and complete visit to the phlegrean archaeological finds, given the fact that many of them are near inaccessible coastal areas and sometimes even submerged.

About the archaeological evidences outside the parks identified by the Pozzuoli Plan, in view of their current state of degradation and sometimes abandonment, it is necessary to provide an adequate system of control and protection. It is therefore assumed that a networked archaeological park should be established, in which the ancient structures, not necessarily contiguous, are protected but also the subject of a unitary planning aimed at enhancement.

For settlements close to the Park, marked by a chaotic urban fabric and low-value buildings, it is essential to provide systematic redevelopment interventions aimed at improving the quality of existing buildings.

Some actions are also needed to strengthen routes inside the park, also in order to eliminate architectural barriers. For this purpose, we proposed

to create new routes and the installation of a lift near Monte di Cuma to facilitate the visit to the Acropolis, pursuing the criterion of the highest integration with the surrounding landscape and the slightest visual impact.

In order to solve the problems of degradation of archaeological artefacts that preserve decorative equipment and to protect them from the action of rain, we designed a set of restoration work and the installation of roofing systems responding to specific compatibility requirements with the fragility and value of the site.

The typical vegetation of the area is considered a decisive element in the value of Park System, both for its ability to evoke ancient myths, customs and habits, and for its natural and scientific value, given the fact that many local tree species are endangered. So we hypothesized a Botanical Garden for the preservation of native essences and an Urban/Social Vegetable Garden that welcomes expropriated agricultural producers, whose crops currently insist on archaeological areas.

From an operational point of view, the urban planning instrument suitable for achieving the objectives set was identified in the *Accordo di Programma* (literally Program Agreement). In fact, this tool allows the actions of the numerous actors and stakeholders involved to be concentrated in a single project, including, even, any change that may be necessary for current urban and regional planning instruments.

5. THE ACCESSIBILITY PLAN

Despite their extraordinary attractive potential, phlegraean archaeological sites are isolated from tourist centers. For this reason, in addition to the upgrade of existing transport systems, we designed an electric shuttle service, connecting the most important sites and harbours, and a transparent-bottomed boat service to visit the many and rich underwater archaeological evidence.

In order to define a system of pedestrian and cycling mobility, which is currently non-existent, we planned to add a cycle path near the main communication routes lacking of a sidewalk and to build an autonomous cycle path, which crosses the ports of Pozzuoli and Baia, and ends near the Cuma site, skirting or traversing the many scenic areas (Fig.2). In addition, two areas used for bike sharing were identified, one near the port of Pozzuoli, the other adjacent to the Cuma Archaeolog-

ical Park. Considering the extension of the track, some parking areas were also planned, usually nearby archaeological structures or particularly scenic point of view.

The area of the Cuma Archaeological and Natural Park has been divided into design units. The necessary splitting operation, in view of the extension of the site, does not affect the consideration of the Park as an indivisible unit, whose parts interact with each other and are mutually vital. Among the elements considered in the division, in addition to the homogeneous characteristics regarding functions and land uses, there are road and rail plots, which physically cross the territory. On the other hand, the access system is articulated according to the different vocations of each area, sometime provided for free entry in order to strengthen their role of service to local community.

Finally we designed some limited new building, nearby access gates, intended for various services to visitors and the planting of tree bands, as a visual barrier to divide archaeological and naturalistic areas from the surrounding inhabited cores. This is also in order to allow visitors a more intense visiting experience.

6. THE BIO-ARCHAEOLOGICAL PARK

The interventions design was divided into two phases: first, some homogeneous macroareas were defined, consistent both for land uses and for allowed types of intervention; secondly, specific actions have been identified.

The plan aimed at the reuse of all existing building units, currently abandoned within the park, to contain costs and to minimize new construction in areas with archaeological constraint. About the arrangement and development of plant types to be planted, some measures have been taken to prevent conflicts between natural elements and ancient structures. The criteria of reversibility and minimal environmental impact directed the choice of type and materials for routes inside the park, designed with wooden flooring easily repairable in case of damage and compatible with the presence of any archaeological remains not yet excavated.

Archaeological structures that still retain mosaic or painted decorations on walls or floors, require systems of protection from rain (Di Munzio, 2010; Laurenti, 2006; Osanna et al., 2018; Bread, 2017;

Ranellucci, 2009). Therefore we designed covers which, in addition to ensuring maximum reversibility, have few punctual supports on the ground, to limit interference with the ancient remains. In addition, to overcome condensation phenomena that could compromise the decorations and ensure adequate water disposing, grindshell structures made of solid wood and tempered glass have been provided, also for a better integration with surrounding landscape (Fig.3).

As anticipated, the Park site was divided into zones: the first consists of a small archaeological area and a larger naturalistic/agricultural area, where the Botanical Garden and the Urban/Social Vegetable Garden were located. Existing buildings are subject to renovation and functional adaptation, while the Terme Centrali complex, which is currently very degraded, is subject to conservation restoration. It is also planned to install a cover for particularly significant evidence such as the Tomba a Tholos, near the northern walls of Cuma, cur-

rently protected by temporary structures (Fig.4). The interventions related to the second design unit, mostly including the archaeological area, are aimed at safeguarding and protection of archaeological remains. Here the reuse of existing buildings has been preferred rather than construction of new buildings. In addition we hypothesized the philological reconstruction of a corner of the Hole with its porch, of which the original shape is known. Furthermore the installation of protective covers is essential for some evidence and for the already compromised mosaic (Fig. 5) in the Terme del Foro, currently exposed to rain.

We also suggested that some historic farms, including the so-called “del Gigante” and an abandoned building at the far north of the area, be converted into rest areas, while, for the farm so called “dei Francesi”, we planned renovation and using it as a guesthouse for students and scholars.

As already mentioned, it was important to build a lift near Monte di Cuma (Fig. 6), whose accom-



Figure 7: Archaeological Park of Cuma: second area design. *Source: Author's elaboration.*

modation was designed near the border between the Lower City and the fourth area, with the aim of facilitating the visit to the Acropolis. Finally we planned the relocation of crops incompatible with the protection of the archaeological areas on which they currently insist (Fig. 7).

For the third area, the Licola Forest, we designed only the renovation and functional adaptation of a building to be used as a rest area. This to minimize anthropic actions and to preserve the naturalistic and ecological character of the area.

The fourth area is characterized by a strong mix between natural system and the archaeological one. Here we designed the renovation and functional adaptation of two building units intended to host university activities, and the conservative restoration of some archaeological evidence, including the Tempio di Iside (Fig. 8).

The fifth area includes ruins of the Amphitheatre and the Villa Vergiliana: it is therefore a predominantly archaeological area. The only planned action is the restoration of the Amphitheatre, assuming its use for events in analogy with what already realized in other Roman similar structures.

6. CONCLUSIONS

Proposed plan for the Cuma Naturalistic Archaeological Park allows the strategies necessary to enhance and transmit to future generations of heritage, while effectively affecting the local economy. Design of access, developed basing on internationally recognized indicators for the assessment of the economic and financial sustainability of tourist initiatives, allow to affirm the convenience of intervention compared to hypotheses of a simple museumization. Through Multi Criteria Decision Aid techniques (Fabbri, 1998; Antunes et al., 2006; Langemeyer et al., 2018) we proved the intrinsic efficiency and the socio-economic-ecological sustainability of integration between archaeological site and nature park.

The liking test, conducted on significant samples of social groups of local population, using the CAT-WOE method (Rosenhead & Mingers, 2001; Sgobbo, 2017-2018), proved the effectiveness of the solution in relation to the ability to develop in citizens that sense of belonging and sharing indispensable to preserve intact a site of such a large size.



Figure 8: Archaeological Park of Cuma: forth area design. Source: Author's elaboration.

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